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The *CEPAL Review* was founded in 1976 and is published three times a year by the United Nations Economic Commission for Latin America and the Caribbean, which has its headquarters in Santiago, Chile. The *Review*, however, has full editorial independence and follows the usual academic procedures and criteria, including the review of articles by independent external referees. The *Review* is distributed to universities, research institutes and other international organizations, as well as to individual subscribers, and is also consulted extensively on the Internet.

The purpose of the *Review* is to contribute to the discussion of socio-economic development issues in the region by offering analytical and policy approaches and articles by economists and other social scientists working both within and outside the United Nations. Accordingly, the editorial board of the *Review* extends its readers an open invitation to submit for publication articles analysing various aspects of economic and social development in Latin America and the Caribbean.

The opinions expressed in the signed articles are those of the authors and do not necessarily reflect the views of the organization. The designations employed and the way in which data are presented do not imply the expression of any opinion whatsoever on the part of the secretariat concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

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The following symbols are used in tables in the *Review*:

- ... Three dots indicate that data are not available or are not separately reported.
- (–) A dash indicates that the amount is nil or negligible.
A blank space in a table means that the item in question is not applicable.
- (-) A minus sign indicates a deficit or decrease, unless otherwise specified.
- (.) A point is used to indicate decimals.
- (/) A slash indicates a crop year or fiscal year; e.g., 2004/2005.
- (-) Use of a hyphen between years (e.g., 2004-2005) indicates reference to the complete period considered, including the beginning and end years.

The word "tons" means metric tons and the word "dollars" means United States dollars, unless otherwise stated. References to annual rates of growth or variation signify compound annual rates. Individual figures and percentages in tables do not necessarily add up to the corresponding totals because of rounding.

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**ECONOMIC COMMISSION FOR
LATIN AMERICA AND THE CARIBBEAN**

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30 YEARS

CEPAL Review, first launched in 1976 under the leadership of Raúl Prebisch, has reached its thirtieth anniversary. Over the years, it has sought to serve as a channel for new ideas generated within ECLAC, for the work of researchers interested in analysing the realities of life in Latin America and the Caribbean, and for the discussion of approaches, strategies and policies for promoting equitable development in the region.

This has been achieved by adhering to academic criteria for the quality and relevance of contributions, based on a peer review system, and thanks to the enthusiastic and steadfast collaboration of our colleagues within ECLAC and elsewhere who share our goals of promoting knowledge and social progress in the region.

In order to serve as an effective channel for ideas, a publication must achieve a sufficiently wide circulation among its target readership. Since its inception, *CEPAL Review* has been sent to an extensive list of government bodies in the member countries and

an equally large number of universities and research institutes, as well as individual subscribers. Since 1999, the contents of the *Review* have also been available in full on the ECLAC website in .pdf format.

This online availability has considerably increased the circulation of the *Review*'s articles. In 2005 there were 371,134 downloads of material published between 2000 and 2005 in the Spanish-language version, *Revista de la CEPAL*. Downloads of material from the English-language *CEPAL Review* in the same period totalled 48,907. There have been nearly 5,000 downloads each month, or almost 60,000 per year, of material from each of the three issues published in 2005.

Given this wide dissemination and the broad support our editorial aims have received in intellectual circles in the region, we look forward to seeing *CEPAL Review* contribute still more to furthering the current debate on development opportunities in Latin America and the Caribbean.

Oscar Altimir
Director

Gaps in the welfare State and reforms to pension systems in Latin America

Andras Uthoff

Pension systems in Latin America are organized as tripartite contributory schemes paid into by employers, employees and the State. Their coverage has always been segmented and very low because a significant percentage of the labour market is composed of subsistence sectors with low productivity and unstable, uncertain access to commercial and financial networks (associated with a lack of employment protections, low income levels and a high incidence of poverty). As a result, contributory systems exclude a large proportion of workers and their families from protection against the risks of disability, old age and death, with large differences in coverage between the formal and informal sectors. The main challenge now is to incorporate solidarity financing into pension systems in an efficient way, so that contributory and non-contributory schemes can be combined in accordance with the logic of social security.

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I

Introduction

Pension systems have been designed with a view to smoothing fluctuations in consumption over the life cycle and ensuring decent incomes in situations of old age, disability and death. Their functions are social in nature, as they aim to remedy short-sighted decision-making about saving for old age and to use solidarity financing to provide the elderly poor with income. Nowadays, emphasis is also placed on their potential economic functions, such as contributing to the solvency of the public finances, providing financial savings for capital market development and making labour more competitive by reducing employment costs.

The development of these systems has been based on two assumptions: (i) workers are fully employed and in a position to save throughout their active life cycle, and (ii) families have one main provider whose insurance protects the other members. With these premises, systems combine contributory instruments (saving and insurance) to finance benefits in the event of unforeseen losses of income resulting from

disablement and premature death, and to ensure a decent old age (life expectancy). Contributions have traditionally been tripartite, being made by workers, employers and the State, and their purpose has been to protect the workers themselves, in their capacity as main earners, and their families. In some countries there are non-contributory pensions for poor older adults, and these are financed out of general taxation.

This article places the debate about pension system reforms in the context of the region's main characteristics, then goes on to examine the implications these characteristics have for the assumptions by which pension systems work. In the light of these considerations, it analyses the validity of the reform options chosen, highlights the main results observed in the region and formulates some conclusions about the importance of the role to be played in solving the pensions issue by the ECLAC proposal for the development of a social cohesion covenant to give the fiscal covenant a human face.

II

The main characteristics of the region

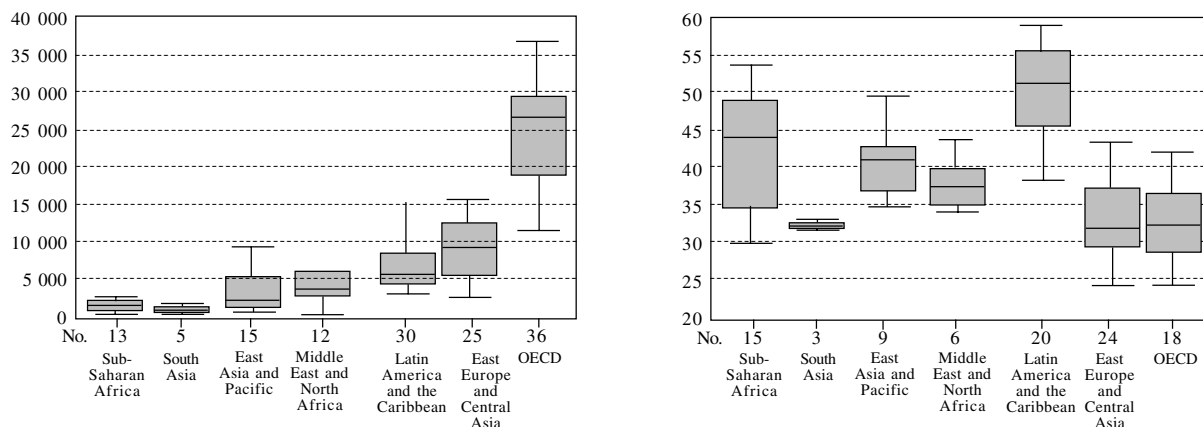
The extent to which the structural characteristics of the Latin American and Caribbean countries have been overlooked is striking, since knowledge of these has proved essential for evaluating pension system performance, almost irrespective of the type of reform carried out. Here I would like to highlight just five of these characteristics. First, the region's average development level: its per capita gross domestic product (GDP) averages a little over US\$ 5,000, which places it well above developing regions in Africa and Asia, but is only a fifth of the average for the group of developed countries in the Organisation for Economic Co-operation and Development (OECD) (figure 1). The main effect of this characteristic is that, in the new globalization paradigm, Latin America and the Caribbean have been treated as a middle-income region capable of attracting international capital to meet its development needs and of entering into free trade

agreements to sell its products on international markets. Actually, though, far from consolidating stable access to these markets, international capital flows have been elusive for some countries and volatile for others, and trade continues to be constrained by protectionism and unstable commodity prices. The fact is that the region's countries have seen their external vulnerability increase, have experienced severe trade and financing crises, and have had to weather major financial and balance-of-payments crises, with enormous social costs in the adjustment phases.

Second, the region has a history of inequality. Measured by the Gini coefficient, in fact, it is the world's most unequal. What this chiefly means is that, at current development levels, large sections of the population have been left in poverty and indigence and that, with inequality patterns like these, higher growth rates are required to defeat poverty (ECLAC,

FIGURE 1

Major regions: Gross domestic product per capita and Gini coefficients



Source: Prepared by the author from World Bank (2004) data.

2005a)—and these higher rates have not been forthcoming in the region in any stable fashion for decades.

Third, some indicators produced by ECLAC suggest that the region's economies have largely implemented the recommendations of international financial institutions concerning the introduction of structural reforms to liberalize the economy and give a larger role to the market and the private sector in the allocation of resources (figure 2). This has exposed major shortcomings in market regulation and oversight in the new industries that have grown up around public services and social policy management.

Fourth, it is important to note that while the proposed reforms to limit the role of the State to that of regulator, supervisor and distributor prevent it from managing enterprises,¹ they do not release it from its responsibility for designing and implementing mechanisms to protect the rights of the poorest, especially against health risks and employment and pension problems. In particular, it has to protect them against the structural risk represented by the mechanisms that transfer poverty across the generations, i.e., against exclusion from opportunities (in terms of nutrition, food, housing and decent work), which is largely a result of the poverty into which many of its citizens are born.

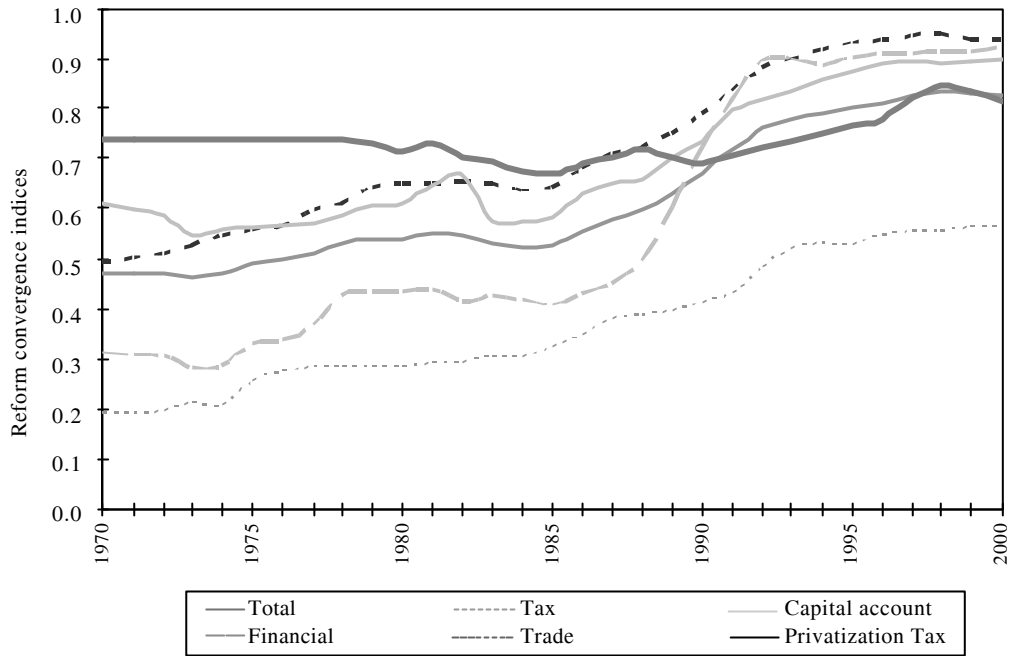
¹ Although many countries have kept the management of strategic enterprises in the public sector (for example, copper companies in Chile and oil companies in Mexico and the Bolivian Republic of Venezuela).

With the development issues that concern us, a paradox arises: the less developed a country is, the greater the needs are, but the lower the tax take from which governments can finance this goal. As figure 3 shows, public spending in Latin America as a percentage of GDP rose from 15% to 25% between the 1970s and 1980s, but then fell back to around 20%. This is less than half the equivalent figure in the countries of the European Union, where the welfare State is sizeable. Since the level of development in the European Union as expressed in per capita GDP is five times that of Latin America, it follows that public spending per person in the European Union is ten times Latin America's.

Lastly, we cannot ignore the risks entailed by globalization, which create a new dilemma for social protection systems. Because Latin America has come to be seen as a middle-income region, the countries have had to look to international markets for development financing sources and outlets for their export products. Thus, these economies have become more vulnerable to changes in international markets, and this, in the absence of an international financial architecture to coordinate macroeconomies and ensure stability, has made them far more sensitive to international crises. From the point of view of social protection, it is important to recognize that the regional economy has become more volatile and uncertain and that the adjustment measures applied to cope with financial crises entailing major social costs have been procyclical and placed extra pressure on the labour market, increasing problems of underemployment and

FIGURE 2

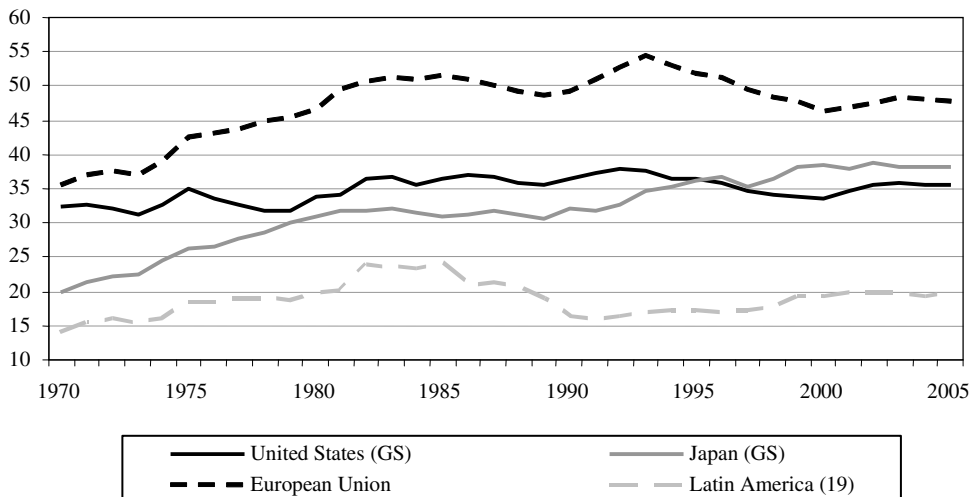
Latin America (17 countries): Convergence of reforms over time



Source: ECLAC, on the basis of the project “Growth, employment and equity: Latin America and the Caribbean in the 1990s” (HOL/97/6034), with data to 1995 from Morley, Machado and Pettinato (1999).

FIGURE 3

International comparisons: Public spending, 1970-2005^a



Source: For Latin America, ECLAC data based on official information; for European Union countries, Japan and the United States, data from the Organisation for Economic Co-operation and Development (OECD).

^a GS = government spending.

unemployment and forcing the State to cut spending just when the need for it is greatest.

In summary, social protection in Latin America needs to improve in the context of societies that, on the one hand, are considered “mature” and that, within the paradigm of globalization, are having to pursue their development in an ever more unstable world and

subject their economies to increasing liberalization, reducing the role of the State. Yet, on the other hand, these societies have a history of inequality between their citizens, and of low growth and investment crises as well, so that their governments lack the instruments needed to solve long-standing problems of inequality in the midst of growth and employment crises.

III

The consequences for social protection

The characteristics of the region have at least four implications for the development of new social protection systems. These are: (i) the gap that opens up in the welfare State when the dynamics of the population, the labour market and the public finances are combined; (ii) the new cultural phenomena deriving from the survival strategies that families have had to adopt to cope with this situation; (iii) the region’s growing divergence from the most developed countries in recent decades; and (iv) lastly, the belief that the fight against poverty is not succeeding as intended.

Although the region as a whole is in a phase of full demographic transition, the population dynamic varies between different groups of countries. Thus, a group consisting of Bolivia and Haiti is at an incipient stage, with fertility rates that are still high and a growing youth population as compared to that of working age. A second group, composed of El Salvador, Guatemala, Honduras, Nicaragua and Paraguay, is in a moderate phase of the demographic transition; there has been a sharp drop in fertility and the young population is starting to decline in relation to the working-age population, but the proportion of elderly people is still low. A third group of countries, consisting of Brazil, Ecuador, Colombia, Costa Rica, Mexico, Peru, the Bolivarian Republic of Venezuela and the Dominican Republic, is in full demographic transition; lower fertility was consolidated some years ago, and not only is the young population still decreasing in relation to the working-age population, but the elderly population is beginning to rise as well. Lastly, a fourth group of countries is at an advanced stage of the demographic transition, has consolidated the drop in fertility, continues to show substantial progress in reducing mortality and is seeing a significant increase in the proportion of elderly people in relation to those of working age.

Although this indicator is traditionally used to measure demographic dependency and anticipate possible shortfalls in the solvency of unfunded pension financing systems, it involves an assumption that the working-age population is able and willing to find productive, competitive and/or decent work. However, the data for Latin America reveal three facts which show that this is far from being the case. First, a large percentage of people of working age remain inactive, either because it is difficult to participate in the labour market while also looking after the home or because the market does not adequately price in their opportunity costs. Second, of those who are willing to work, the proportion failing to find jobs and remaining unemployed has risen from 7% to 10%, so that one in ten is now jobless. Lastly, estimates by the International Labour Organization (ILO) and ECLAC indicate that six to seven of every ten new jobs in recent years have been created in the informal sector, so that the proportion of working people employed in this segment of the labour market has increased (figures 4 and 5).

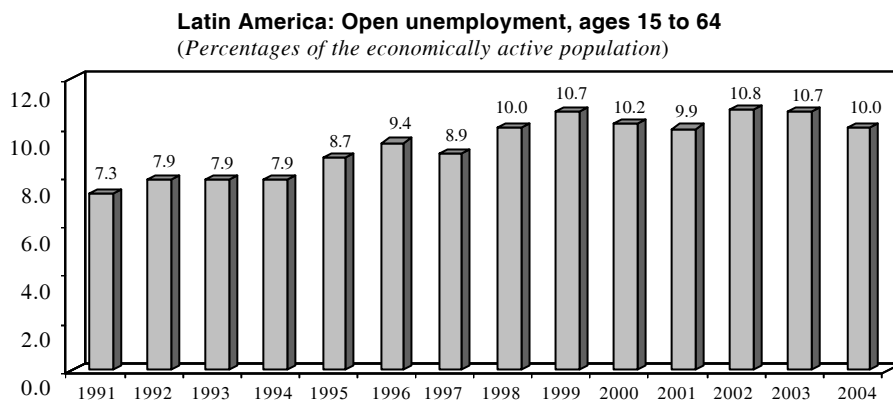
1. The gap in the welfare State

To characterize the gap in the welfare State, it is essential to have an understanding of changes in the demographic dynamic, the labour market and public finances.

In an earlier article (Uthoff, Vera and Ruedi, 2006), national panel data² for 1997 and 2002 were used to examine the behaviour of a dependency indicator defined as the ratio of minors, non-active adults, adults

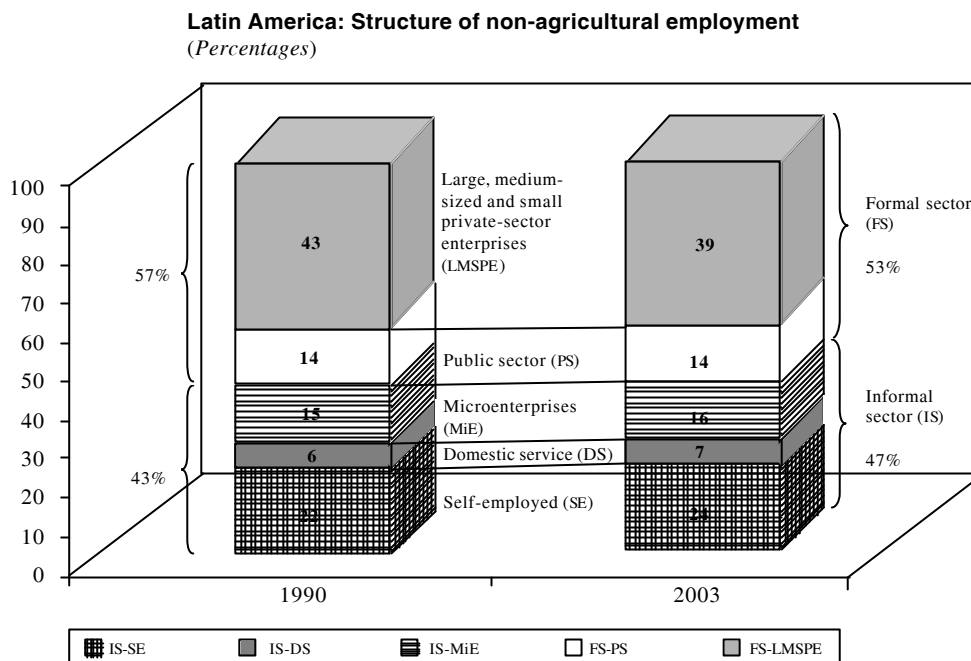
² Urban data were used for Argentina and Uruguay, as this was what was available, but the bulk of those countries’ population is urban in any case. Details of how the curve was derived can be found in Uthoff, Vera and Ruedi (2006).

FIGURE 4



Source: International Labour Organization (ECLAC, 2005b).

FIGURE 5



Source: International Labour Organization (ILO, 2005).

with informal jobs, unemployed people and older adults to formal workers. The regression yielded a negative coefficient of -2.65% for the ratio between the formal dependency indicator and per capita GDP.³ This ratio

systematically represents the demand for social protection.

Countries with high dependency indices and low per capita incomes have a high demand for social protection, which has to be met from public or private transfers. Lesser requirements are faced by richer countries.

A potential supply curve for State-provided social services can be derived by linking the countries' per capita GDP to the number of dependent people in relation to the number of people in formal work that could be "protected" by them. For this, we assume that

³ The estimation of the regression on the basis of panel data can be obtained on request from the authors cited, as can the Hausman test on the applicability of the random effects model. The same coefficient would be yielded by an estimation using pooled data. The 2002 per capita GDP data are taken from the World Bank's World Development Indicators and are expressed in 2000 prices.

the State is capable of providing each dependent with a given amount of benefits (the same for all categories of dependents) whose sum equals the total amount of resources spent on social services in Latin America.⁴

By including both curves in figure 3, it is possible to illustrate the gap in the welfare State and thereby create a typology of countries.⁵

While the existence of a welfare gap justifies system models that seek supplementary private financing, it does not remove the State's responsibility for protecting those who reach old age without having been able to finance their own pension benefits. The main weakness of the recent reforms has been their over-reliance on contributory systems, their high cost, and their effect in depriving the State of resources for alleviating old-age poverty.

2. Two new cultural phenomena

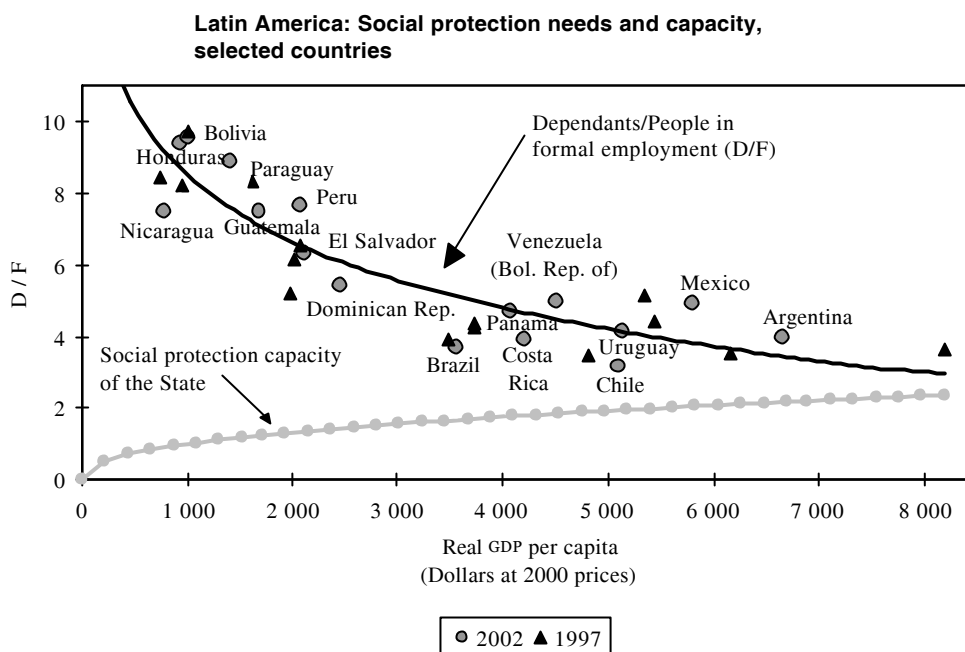
The higher the overall level of development as measured by per capita GDP (figure 6), the smaller the gap between the overall social protection needs of

dependents and the ability of the State to meet them. These social protection needs can be covered by the rest of the economy to a degree that depends on the income situation and people's capacity for out-of-pocket expenditure. In cases where public-sector social protection combined with private spending is inadequate, the resulting gap will be manifested in poor social indicators; by bringing about an unsatisfactory social situation, this shortfall has led to major changes in family structures (Arriagada, 2005) and in substantial remittance movements resulting from migration, which are estimated to have helped mitigate poverty in thousands of households in the region (figures 7 and 8).

3. Latin America is not converging

The third characteristic of the region is that the last decade has not been one of high, stable growth. On the contrary, as ECLAC reported to the International Conference on Financing for Development, opening the region up to international trade and financial markets increased its external vulnerability and resulted

FIGURE 6



Source: Prepared by the author.

⁴ Average social spending in Latin America was calculated from a sample of 16 countries.

⁵ The β used in this case is 0.35.

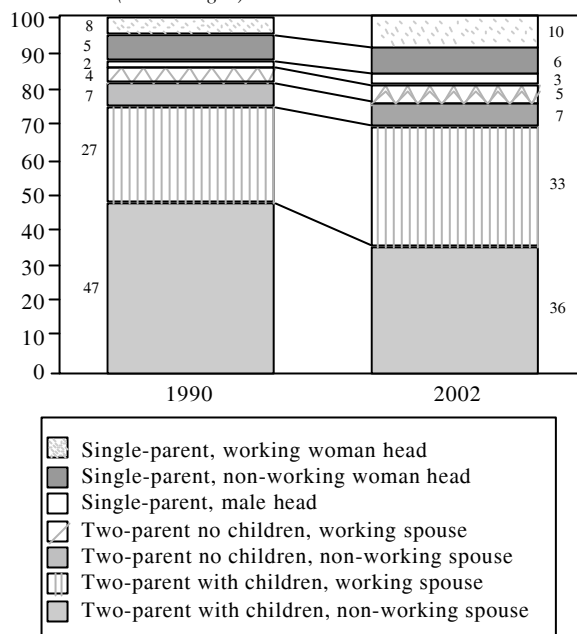
in unstable and, on average, low growth. In particular, access to international financial markets was segmented and highly volatile, export markets continued with protectionist practices, and growth ultimately proved sensitive to international financial crises. The international financial architecture, meanwhile, was unable to prevent contagion in the region.

The outcome is reflected in the trend of per capita GDP. With very few exceptions, per capita GDP in the region's countries was higher as a share of United States GDP in 1993 than in 2003, as the new millennium began. Going by this very preliminary indicator of development, the region did not converge towards United States levels of development (figure 9).

What makes the situation even worse is that, what with the high levels of inequality within Latin America, low growth, the effect of debt crises and the incidence of poverty (40% of the population), it can be concluded that the region's inhabitants are still living in much the same way as those of heavily indebted poor countries, such as Nicaragua. In short, the region has a high level of exclusion (figure 10).

FIGURE 7

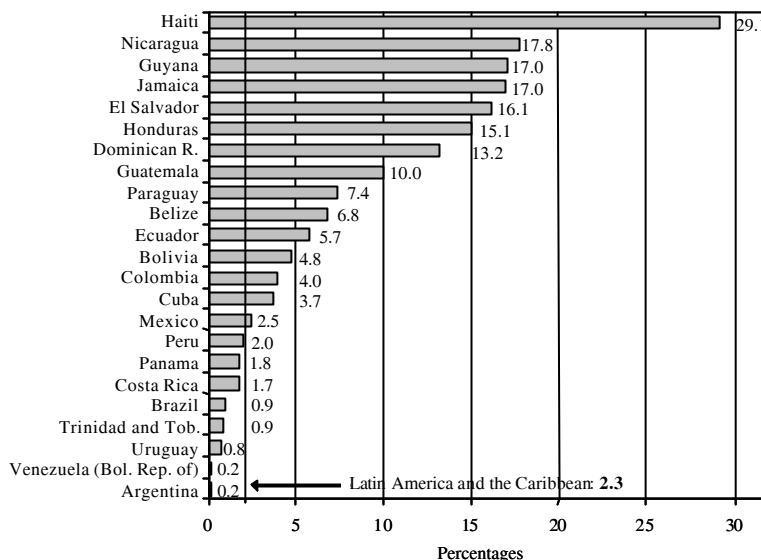
Latin America: Changes in family structure, 1990 and 2002
(Percentages)



Source: Arriagada, 2005.

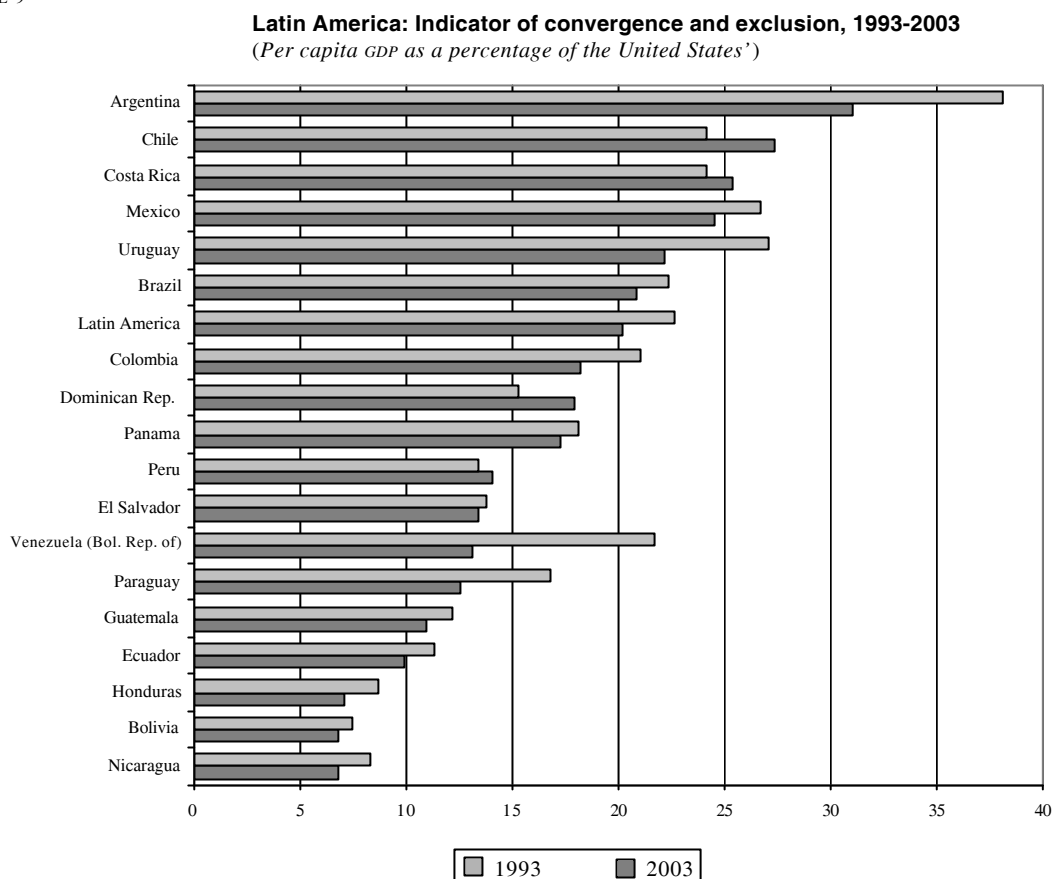
FIGURE 8

Latin America and the Caribbean: Remittances received, 2004
(Percentages of GDP)



Source: ECLAC (2005c).

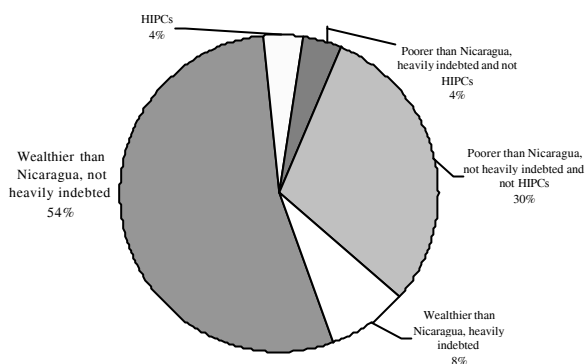
FIGURE 9



Source: ECLAC, on the basis of national accounts.

FIGURE 10

Latin America: Population that would qualify for assistance under different categories of the HIPC initiative^a
(Percentages of the population)



Source: ECLAC, on the basis of official information; Machinea and Uthoff (2005, p. 41).

^a HIPC initiative = Initiative to reduce the debt of heavily indebted poor countries.

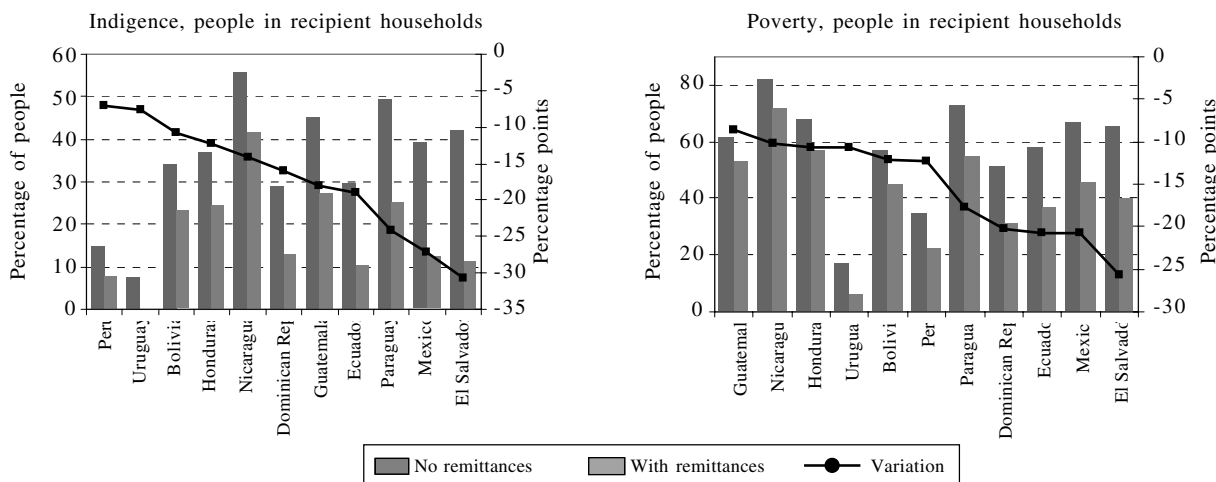
4. Anti-poverty efforts are not succeeding

A fourth characteristic of the region is that, with development occurring only slowly during the 1990s, the limitations of the welfare State and of the most vulnerable households' survival strategies have prevented anti-poverty efforts from having any significant success. Indeed, while it is estimated that remittances have helped to reduce the incidence of poverty in recipient households and that State transfers have also helped to alleviate it, the effect of these transfers on the incidence of poverty has ultimately been much smaller than that observed in developed countries, and poverty levels are still not back down to the levels seen in years prior to the debt crisis (figures 11 and 12).

For the region as a whole, in fact, the incidence of poverty displayed a ratchet effect at one stage, since poverty-output elasticity was much greater in the recessionary phase than in the subsequent GDP recovery

FIGURE 11

Latin America (11 countries): Impact of remittances on poverty and indigence rates in recipient households, around 2002^a

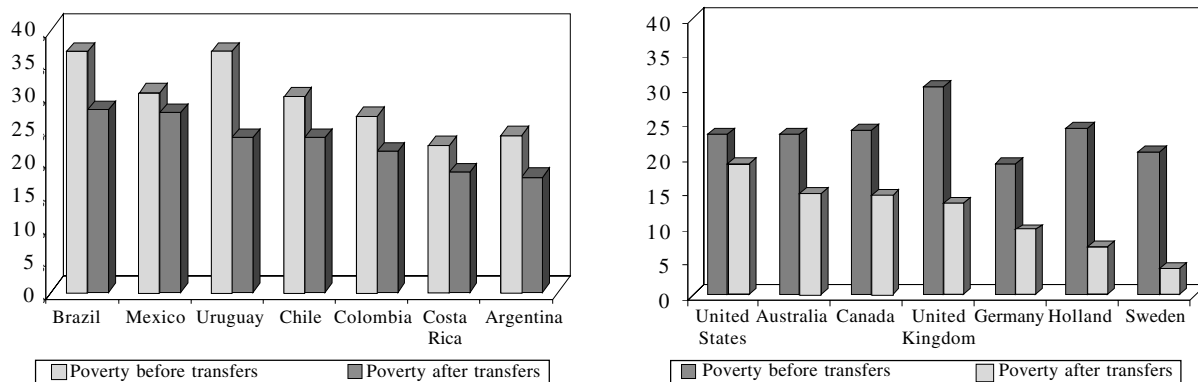


Source: ECLAC (2005c).

^a Urban areas only in Uruguay and Ecuador

FIGURE 12

Latin America and OECD: Effects of State transfers on relative poverty



Source: For Latin America, prepared by the author using data from the household surveys available (in Uthoff and Ruedi, 2005). For the OECD countries, Smeeding and Ross (2001).

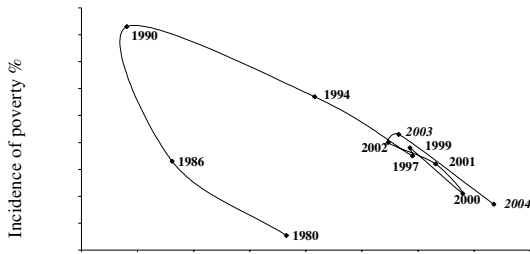
phase during the 1990s. Although this effect disappeared with the most recent crises, it left the incidence of poverty at a level much higher than that of 1980, even though the region's per capita GDP was almost 12% higher (figure 13).

What emerges from the above is that the life cycle theory on which pension systems are based needs to be questioned in the region, since this theory relies on the supposition that all workers ought to be saving during the active phase of their life cycle and then dissaving during the phase of retirement in old age (figure 14).

Doubt is cast over this supposition by at least three factors: (i) a high proportion of the population live in poverty with unstable, insecure jobs, many immediate needs and a high discount rate that limits their long-term saving capacity; (ii) a growing proportion of women are having to head single-parent households or supplement their husband's income in order to subsist, thus breaking with the formula whereby the man is the provider and the woman looks after the house, but without doing away with the duality of roles in this latter task, so that it is harder for women to hold down stable employment; and

FIGURE 13

Latin America: Incidence of poverty and gross domestic product per inhabitant



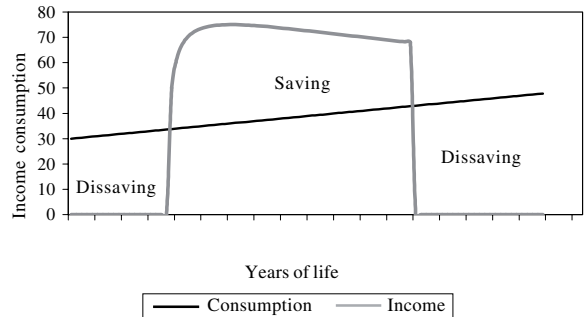
Source: ECLAC (2004a). The poverty figures for 2003 and 2004 are projections.

(iii) a growing proportion of workers are finding sporadic employment and do not have the income stability assumed by the life cycle theory.

In short, as figure 15 illustrates for the case of Chile, contributory models tend to display a low density of contributions, reflecting both the desire or need to remain inactive in order to take care of the home and the incidence of joblessness, uncertain employment and low

FIGURE 14

Income and consumption over the life cycle

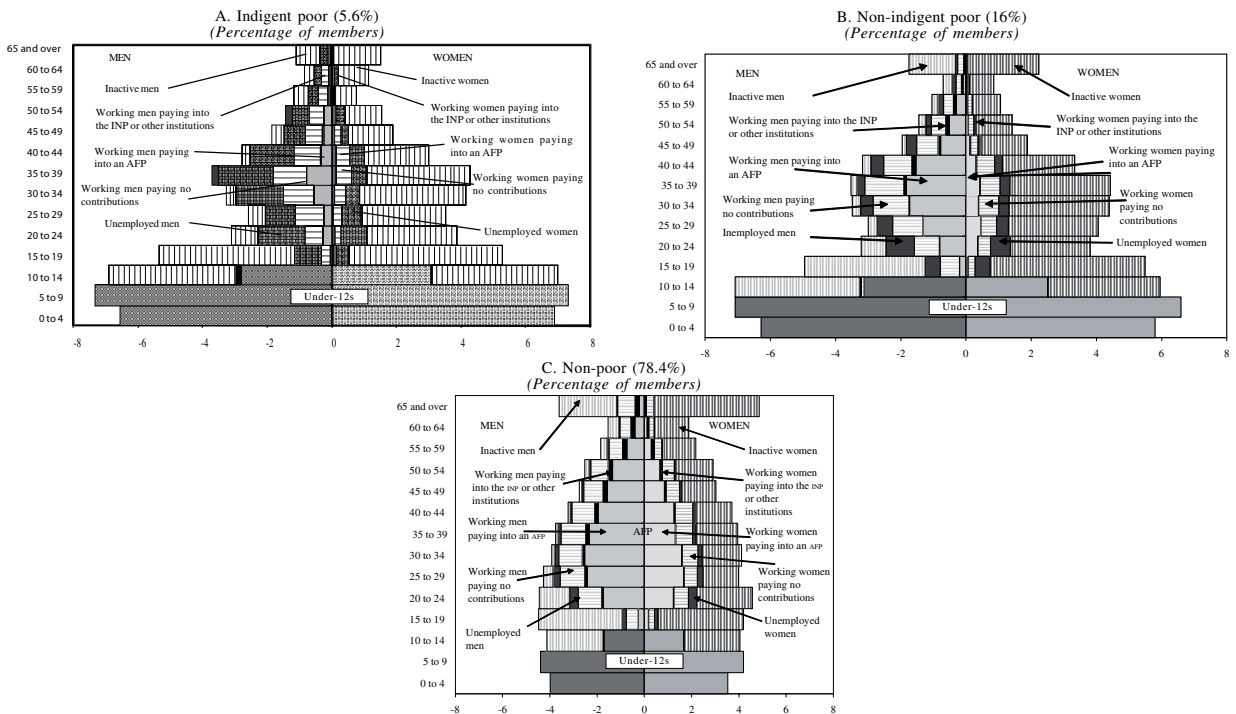


Source: Prepared by the author.

incomes; all this means that participation in contributory systems reproduces the inequities of the labour market and of society as a whole. As a result, only those who are able to find stable, well-paid employment will ultimately receive decent benefits. Since the great majority are not in that situation, these standard models will leave a large proportion of the population without decent pensions, especially women and those on low incomes.

FIGURE 15

Chile: Members paying into the pension system, by sex, age and poverty status^a



Source: Special tabulations based on the National Socio-economic Survey (CASEN, 1998).

^a INP = Instituto de Normalización Previsional (State social security agency); AFP = pension fund management company.

IV

Pension system reforms

The design of pension systems and the reforms made to them have tended to overlook the social and distributive component that is required if a financing system is to meet the needs of the elderly poor. Instead, the focus has been on the contributory component, which has also been required to perform economic functions such as buttressing the solvency of the public sector, generating financial saving and assisting the development of the capital market, while also reducing costs in order to make labour more competitive.

The financial mechanism traditionally used to manage contributions and turn them into benefits has been a pay-as-you-go system based on graded average premiums, including rules to establish an intergenerational saving contract and a fund to cover likely risks of disablement and death, plus reserves for anticipated demographic changes. Non-contributory pension systems, where they exist, are financed out of general taxation and transfers (Mesa Lago, 2004 and 2000).

Unfunded systems have been criticized for a number of reasons, among them: (i) the administration of saving funds for events that are certain, such as old age, differs significantly from that of insurance funds for likely events (sickness, disablement and premature death); (ii) financing by intergenerational distribution cannot cope with significant demographic changes like those accompanying the rapid ageing of the Latin American population;⁶ (iii) these funds are clearly vulnerable to “political use” of their resources, since there has always been the possibility that governments might borrow from them for laudable public policy financing purposes, but without always ensuring the risk-return balance required to protect the reserve funds established to cover long-term benefit payments; (iv) the nature of system contributions and their relationship to benefits create scope for large cross-subsidies that lack transparency, do not always serve

the interests of solidarity, and can affect the solvency of the system.

These four weaknesses of unfunded systems are at the heart of the arguments used by international financial institutions⁷ to urge the need for structural reforms, as opposed to traditional parametric reforms designed to introduce the actuarial adjustments that system solvency requires. Inspired by the neoliberal pension model developed under the military regime in Chile, these institutions promoted structural reforms whose aim was to establish a strict connection between individual effort and benefits by turning contributions into saving deposit instalments kept in individual retirement accounts under the control of pension fund management companies (AFPS) which manage investments in accordance with the rules laid down by a supervisory body. Unlike the intergenerational contract, whereby the contributions of current workers financed the benefits of current retirees, the neoliberal model introduces an individual contract in which the worker’s pension is financed out of the “pot” which he or she succeeds in building up, namely the sum of lifetime contributions, duly capitalized; in this case, it is the actual worker who bears the risks of demographic change, in the form of higher life expectancy at retirement, and the financial risks of capitalization over his or her lifetime.

Not all the countries have made reforms of this type, however. Three types of reform can currently be distinguished: (i) parametric reforms, with notional defined-contribution models to the fore; (ii) structural reforms; and (iii) reforms that supplement current systems with additional saving mechanisms.

By strengthening the link between a member’s contributions and benefits, even going so far in the extreme case as to employ a financing mechanism whereby these are managed in individual saving accounts, systems have experienced all the consequences warned of in the previous section: the pension fund markets that developed have proved hard to regulate, and the solutions adopted have tended to reproduce inequalities instead of counteracting them.

⁶ These are due to the rapid demographic transition which, since the mid-1960s, has translated into a large decline in fertility. Along with gradually rising life expectancy, the drop in fertility has led to significant changes in the age structure of the population that are affecting the ability of unfunded systems to maintain a proper financial balance between contributors and beneficiaries.

⁷ See World Bank (1994).

1. Structural reform options

The design of pension systems in Latin America was heavily influenced by the “social insurance” developed in former times by Chancellor Bismarck in Germany, which established protection for workers against the risks of old age, disablement and sickness.⁸ The most striking feature of such systems as applied in Latin America has always been their low coverage, chiefly owing to the informal nature of employment, now compounded by increasing job instability and insecurity because of the growing vulnerability of productive enterprises in the context of globalization (ECLAC, 2004b).

In its evaluation of the need for reforms in the early 1990s, and in view of rapid population ageing, ECLAC drew attention to the lack of progress in expanding coverage and warned of the pressure this would place on the fiscal accounts once the State took

responsibility for relieving poverty in old age (ECLAC, 1991).⁹ It also emphasized that countries replacing their financing mechanisms would have to cope with enormous fiscal transition costs.¹⁰

Despite these warnings, reform models focused on the contributory components, opting between alternatives within six broad areas: (i) the importance of member contributions as a source of financing; (ii) the link between benefits and individual effort; (iii) the mechanism for administering financing; (iv) State involvement in system management; (v) compulsion; and (vi) the role of the private sector. Table 1 summarizes the options available to reformers and the alternatives adopted in two extreme models: Chile’s, centred on the construction of a contributory individual capitalization pillar, and New Zealand’s, centred on the construction of a non-contributory pillar with universal citizen entitlements.

TABLE 1

Chile and New Zealand: Reform options and extreme alternatives

System design options available	Options adopted in the design of the Chilean model	Options adopted in the design of the New Zealand model
Contributory	Yes	No
Benefits	Defined contributions	Defined benefits
Financial administration	Individually funded	Unfunded
Management	Private	Public
Compulsion	Employees	Citizen right
Role of the State	Market regulation Market supervision Distribution	Promotion of voluntary private-sector saving

Source: Prepared by the author on the basis of St. John and Willmore (2001).

⁸ Originally, social insurance systems were based on compulsory contributions from employers and workers and a regulatory role for the State. Following the creation of the International Labour Organization in 1919, this type of insurance was established as a fundamental protection instrument for workers and their families, but was applied only to certain categories of workers. The concept was then extended in the United States (1935) and New Zealand (1938) to include elements of protection for the excluded and combat poverty, and the term “social security” began to be employed. This modernized concept was the one used by Beveridge between 1942 and 1946 as an instrument to combat poverty in Great Britain, so that contributory social insurance, social assistance for the poor and excluded and supplementary forms of voluntary insurance all came to form part of social security. These concepts and definitions have been enshrined in a variety of declarations on international social security law (Mesa-Lago, 2004).

⁹ Also highlighted at that time were institutional weaknesses affecting the implementation of saving systems, owing to the fragility of macroeconomic regimes and shortcomings in regulation, oversight and development both in the pension fund industry and in capital and insurance markets (Held, 1994; ECLAC, 1996, chapter 10). Early warning was given of the lack of organizational regulation and public policies to prevent the formation of financial conglomerates in the pension fund management market and to turn financial saving into real investment (Arrau, 1994 and 1996; Larraín, 1996).

¹⁰ See Holzmann (1997), ECLAC (1998) and Bravo and Uthoff (1999). Different interpretations and implications of these evaluations can be found in Uthoff (1995), ECLAC (2000, chapter 4), Jiménez and Cuadros (2003), Mesa-Lago (2004) and Titelman and Uthoff (2005).

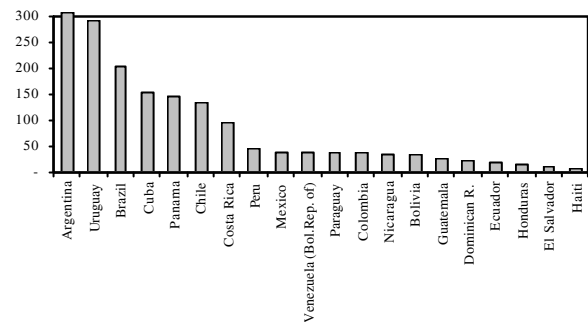
A number of elements should be taken into account before one or other of the extreme options is adopted. Two of them are crucial to the economics of the process. First, if an individual capitalization pillar prevails, the system will suffer from a lack of solidarity among members, since contributions are individually-owned saving instalments used exclusively to calculate the benefits of the member concerned. Second, when an unfunded financing mechanism is replaced by the new method of capitalization in individual accounts, the transition costs can be huge. The new system will have to pay for the benefits of retired members, the benefits accruing to current members because of rights acquired in the old system, and benefits explicitly guaranteed by the system, such as pensions for the armed forces, minimum pensions and welfare pensions. With the old system run on an unfunded, graded average premium basis, its reserve funds can be used to meet this expenditure if the social agreement under which the transition takes place so permits.

High transition costs and the loss of solidarity are consequences of the choices made with the Chilean model. An earlier study estimated the present value of the deficits the State would have to incur to cover these costs in a scenario where different countries opted for a Chilean-style reform (Bravo and Uthoff, 1999). For a number of countries this value was in excess of 200% of GDP, which was why they held back from a reform of this nature and opted for other models that will be

discussed further on. In the Chilean case, indeed, it is now universally recognized that the reform has cost the government more than 5.5% of GDP a year for a period of 25 years and that it will take several years yet to pay for all the transition costs, guarantees and accumulated deficits (figures 16 and 17).

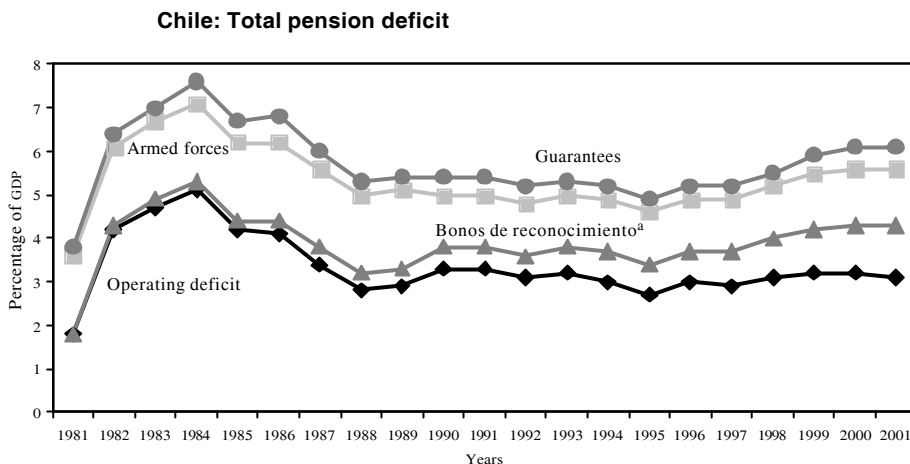
Nor is the option of establishing a universal citizen's pension beyond the financial requirements of the State. Following St. John and Willmore (2001), it is possible to distinguish two variables determining the amount of this type of pension as a percentage of GDP: the first is the number of beneficiaries as a percentage of the total population, and the second is the amount of the benefit as a percentage of the

FIGURE 16
Latin America and Haiti: Implicit pension debt (Percentages of GDP)



Source: Bravo and Uthoff (1999, p. 88).

FIGURE 17



Source: Arenas de Mesa (2000).

^a *Bonos de reconocimiento*: Certificates entitling members of the old system to transfer entitlements to the new one.

country's per capita GDP. The result is extremely sensitive to this latter variable, which means that the amount of the universal benefit and its source of financing (income or consumption taxes) will be crucial issues in the public finance debate. In any event, a social agreement will be needed.

2. The types of reform adopted

A number of countries in Latin America opted to reform their contributory systems: they created a stronger link between contributory efforts and benefits for each individual; introduced individual capitalization as a financing criterion, wholly or in part; and allowed pension funds to be managed privately. These are known as structural reforms, and the following should be distinguished: (i) those that, like Chile's, completely

replace the old pay-as-you-go public-sector system with an individual capitalization system, in so-called substitution models (Chile, Bolivia, El Salvador, Mexico,¹¹ Dominican Republic); (ii) those that supplement the unfunded public system with an individual account capitalization component, in so-called mixed models (Argentina, Ecuador, Uruguay, Costa Rica); and (iii) those that allow members to choose between the two, in so-called parallel models (table 2). Of the parametric reforms, attention should be drawn to Brazil's reform of the General Social Security Regime (Regime Geral de Previdência Social (RGPS)); this reform establishes a capitalization rule that turns the unfunded system into a defined-

¹¹ With the Mexican Social Security Institute (IMSS).

TABLE 2

Latin America: Pension reform models and their characteristics, 2004

Model, country and starting date for reform	System	Contributions	Benefits	Financial regime	Management
With structural reforms					
<i>Substitution model</i>					
Chile: May 1981					
Bolivia: May 1997					
Mexico: September 1997	Private	Defined	Undefined	FIC ^a	Private ^b
El Salvador: May 1998					
Dominican R.: 2003-2006					
<i>Parallel model</i>					
Peru: June 1993	Public or private	Undefined	Defined	Unfunded	Public
Colombia: April 1994		Defined	Undefined	FIC	Private
<i>Mixed model</i>					
Argentina: July 1994					
Uruguay: April 1996	Public and private	Undefined	Defined	Unfunded	Public
Costa Rica: May 2001		Defined	Undefined	FIC	Multiple ^c
Ecuador: 2004					
With parametric reforms, or none					
Brazil (private Regime Geral de Previdência Social (RGPS))	Public	Defined	Undefined	Unfunded or CPC ^b	Public
<i>Brazil (others)^d</i>					
Cuba					
Guatemala					
Haiti					
Honduras	Public	Undefined	Defined	Unfunded or CPC	Public
Nicaragua: 2004					
Panama					
Paraguay					
Venezuela (Bol. Rep. of) ^d					

Source: Mesa-Lago (2004).

^a Full individual capitalization (FIC).

^b Collective partial capitalization (CPC).

^c Private, public or mixed.

^d Parametric reforms recently introduced or in progress.

contribution system (Pinheiro and Paiva, 2000) with automatic parameter adjustments.

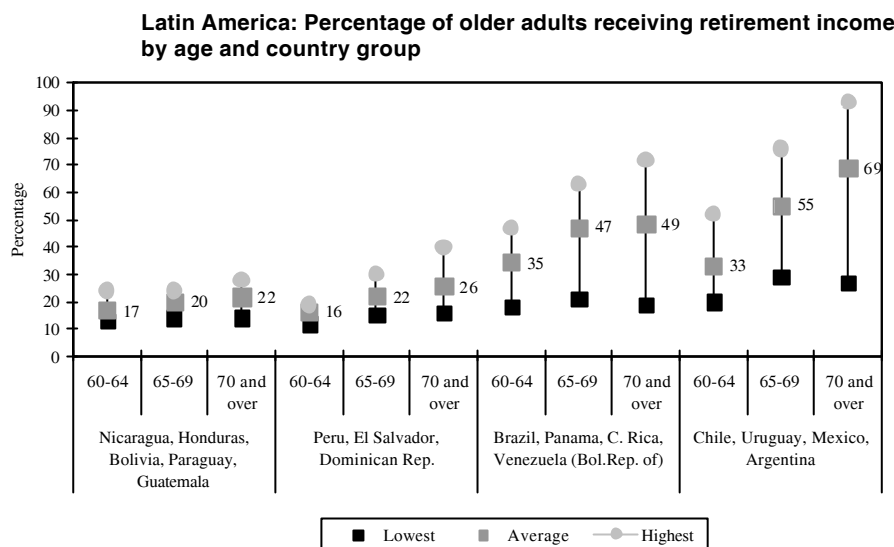
Evaluations of structural reforms are highly controversial. Some show these reforms as having positive effects on the economy (Corbo and Schmidt-Hebbel, 2003) and are used to promote their virtues. From the social protection point of view, however, evaluation results leave a good deal to be desired. Crucially, the coverage of contributory systems is still low and remains sensitive to the labour market,¹² not only in private systems but also in systems that combine active contributors (to funded and unfunded schemes). The coverage of the social protection system stands at half the economically active population in Argentina, and in the region as a whole the weighted average has fallen from 38% to 27%.¹³ In some countries that kept their public systems (Brazil and Panama), coverage has

been between twice and four times as high as in seven countries that carried out structural reform.

Given the importance of formal paid work for expanding coverage, it is possible to group the countries by their welfare State gap.¹⁴ The percentage of older adults stating that they have retirement income in household surveys varies significantly between these groups of countries (figure 18).¹⁵ Inertia is observed in insurance coverage, since in countries where the proportion of the older adult population currently covered is low, so too is the proportion of wage earners currently paying towards their future pension (table 2). Unless substantial changes are made to current systems (to improve coverage), the problem of old-age poverty will remain.¹⁶

It should come as no surprise, then, that even the World Bank, long a fervent promoter of neoliberal

FIGURE 18



Source: Special tabulations of the household surveys available from the respective countries, 2000-2002.

¹² It has been recognized, even by the World Bank, that extending coverage (especially among informal workers) by creating greater incentives for participation with the creation of a close link between contributions and pension amounts achieved a modest initial increase in two countries (Chile and Mexico), after which coverage stagnated at half the workforce in the richer countries and at an even lower level in the rest.

¹³ The comparison is not perfect for all countries (Mesa-Lago, 2004), but there are two standardized series from Chile that confirm the downward trend: from 79% in 1973 and 62% in 1975 to 58% in 2002 (Arenas de Mesa and Guzmán, 2003).

¹⁴ While this indicator ascribes the same weight to each group of employees and assumes that every formal worker is fully employed, it does nonetheless show the difficulties society faces in meeting the needs of a large percentage of the population that does not participate in the labour market in a fully productive way.

¹⁵ For formal workers to have more dependents does not necessarily mean that these dependents are needier and/or more vulnerable, given the multiplicity of family and institutional arrangements that exist to meet their needs and protect them from the risks they face. In those societies where demographic pressures are greater and the formal economy represented by their workers is limited, however, both the contributory capacity of the latter and the tax take available to the State for financing social spending are restricted.

¹⁶ The measure of coverage for current workers overestimates the degree of protection that families will have, since it only refers to wage earners. The coverage problem is thus even more serious from the point of view of contributions, which means there is scope for non-contributory pensions (Fajnzylber, 2005).

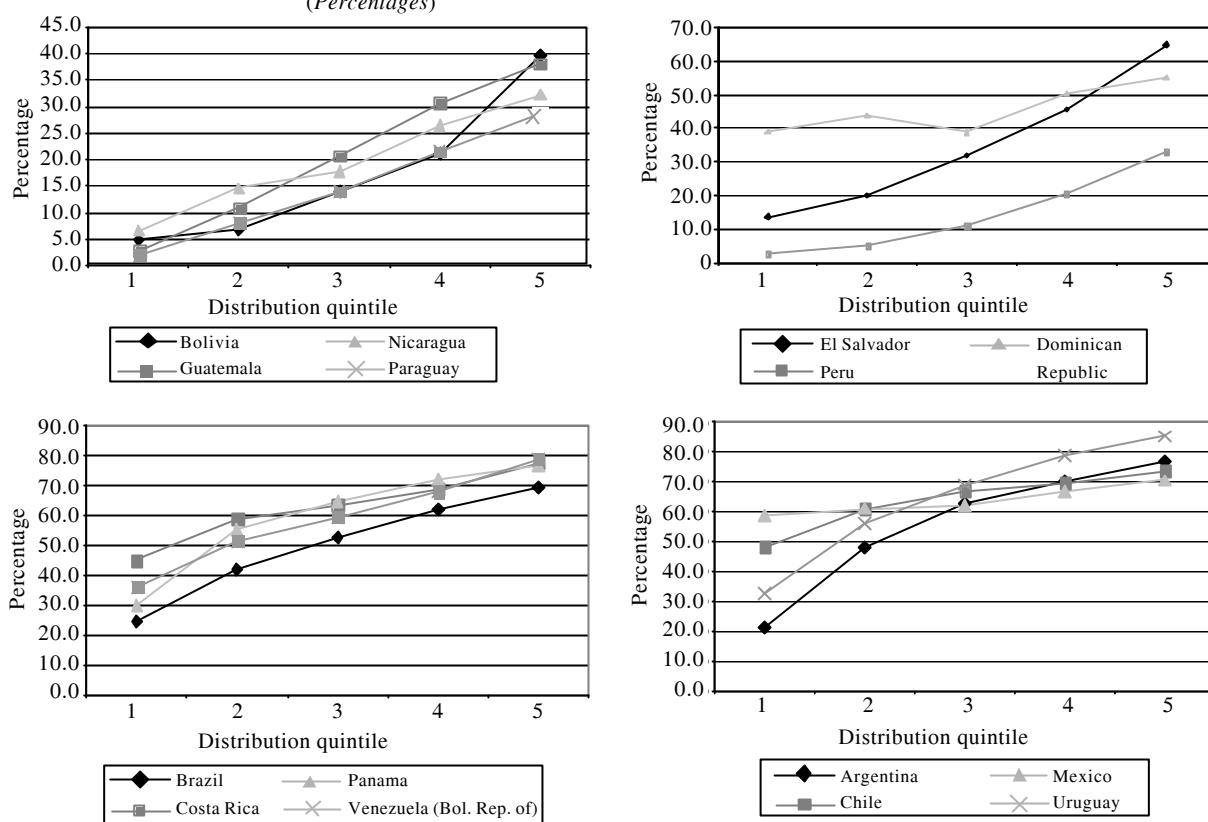
reforms to increase coverage, and indeed of pension reforms that promote individual saving, should have recognized in two reports¹⁷ that reforms concentrating exclusively on contributory subsystems will leave many citizens excluded and in poverty once they reach old age. Accordingly, one of these reports calls for the establishment of a tax-financed social protection network for old age, while the other calls for the construction of optional schemes to support families and the excluded.

In countries like Panama and Uruguay, whose social security systems go back a long way and have high coverage, there are informal-sector wage earners¹⁸ who

are excluded from contributory systems, something that ultimately represents a burden for the treasury and/or their families, since such people will look to government-guaranteed benefits or depend on their families to survive once faced with poverty in old age. The percentage contributing is greater in urban areas than rural ones and several times higher in high-income sectors than low-income ones. Coverage is below 10% in the poorest quintiles of the group of countries with the lowest incomes and the largest number of dependents per formal worker. The higher per capita income is, the greater coverage will be in the poorest quintiles of the country concerned (figure 19).¹⁹

FIGURE 19

Latin America: Working urban residents paying into social security, by distribution quintile and country group^a
(Percentages)



Source: Fajnzylber (2005).

^a Ranked highest to lowest by formal worker dependency ratio.

¹⁷ Gill, Packard and Yermo (2004); Holzmann, Hinz and others (2005).

¹⁸ In smaller companies with a low capital/labour ratio and severe restrictions on access to credit and trade markets.

¹⁹ More specific surveys (such as CASEN Chile) reveal that coverage among the working active population discriminates by income

stratum, sex and occupational category. Women are particularly unprotected (except insofar as they are treated as beneficiaries of their husbands' pensions), as are the unemployed, informal sector workers and the poorest. In highly unequal societies, contributory systems that lack a solidarity component will leave out all those who cannot save to finance their own pensions.

The empirical literature on contribution density over the active life span concludes that, even among some of the countries with the highest pension coverage such as Uruguay, Argentina and Chile, membership density is far from sufficient to provide any real prospect of significant replacement rates for the covered population.²⁰ In both Argentina and Chile, average contribution density is close to 50%. The Uruguayan methodological study that is most comparable with the studies on Argentina and Chile shows that density is slightly higher in Uruguay (60%) than in the other two cases; nonetheless, it is well below the 88% required for a “standard pension” (“jubilación común”) at 60, or even the 78% needed to retire with a pension at 65 (Bucheli, Forteza and Ferreira-Coimbra, 2005).

Given these important characteristics of system coverage, efficiency and equity, five main conclusions can be reached: (i) transition costs can ultimately be high, and this factor is so important that it has influenced the design of the reformed systems; (ii) the considerations of ethics and the principles of universality, integrality and solidarity that have to be taken into account in pension system design are diverse and very profound, and a wide consensus needs to be reached on these matters; (iii) all kinds of actors are affected by reforms, and there will be winners and losers among them, so they need to be consulted on each of the changes; (iv) privatization of system management involves major economic and financial interests, as well as changes in the social security

management power structure, which means that technical arguments concerning competitiveness and efficiency need to be studied closely.

Lastly, there is a need to moderate the influence of international institutions in promoting a particular class of reforms, chiefly in order to restore solidarity elements. In particular, it is necessary to restore the role of the State in the regulation of the pension fund market and in the distributive aspects of the system. When individual account capitalization pillars are promoted, the principle of equivalence applied to each individual member turns member payments into private contributions to a defined-contribution individual saving account, thus depriving the system of any possibility of internal solidarity. In the absence of regulation in the individual saving accounts management market, the equivalence principle crowds out the solidarity principle. Were the latter applied, benefits for the poorest, the old and the sick could be financed out of the contributions of the better-off, the young and the healthy. By authorizing private management of pension funds in the way described, the State takes upon itself a fundamental responsibility for looking after the poor in old age, but without being able to use social insurance contributions to fund pensions. Specifically, the distributive function is separated from the (private-sector) management of social pension insurance, and the financing of each of these areas is separated as well.

V

The main results

The region’s experience with pension system reforms has yielded three principal results. First, the shift from unfunded systems to capitalization systems is no guarantee of greater physical capital accumulation; on the contrary, it generates major public saving requirements that have to be met. Second, the reforms are not generating enough incentives to increase population coverage; on the contrary, the structural factors limiting the contributory coverage of systems have loomed larger. Third, there is no magic formula for improving benefits: this can only be achieved if people save more and receive

benefits for shorter periods, and this is linked to the efficiency with which savings are managed and the way benefits are adjusted to changes in life expectancy.

1. Greater physical capital accumulation?

In countries that created an individual capitalization pillar, physical capital has not increased in proportion to workers’ contributions to their individual accounts. Crucially, workers’ contributions are financial savings and need to be channelled into real investments, something that does not happen immediately but depends on the structure of the portfolio. Unless appropriate macroeconomic frameworks for long-term resource allocation have been established and there are structurally regulated and

²⁰ Fajnzylber (2005) reviews studies of the issue dealing with Argentina, Uruguay and Chile.

supervised institutions to ensure the proper working of the capital market, most portfolios will be composed of government bonds and bank deposits. A natural counterpart to the creation of individual accounts is the formation of a liability for transition costs in the form of current pensions, rights acquired by active members and the liabilities represented by guarantees.

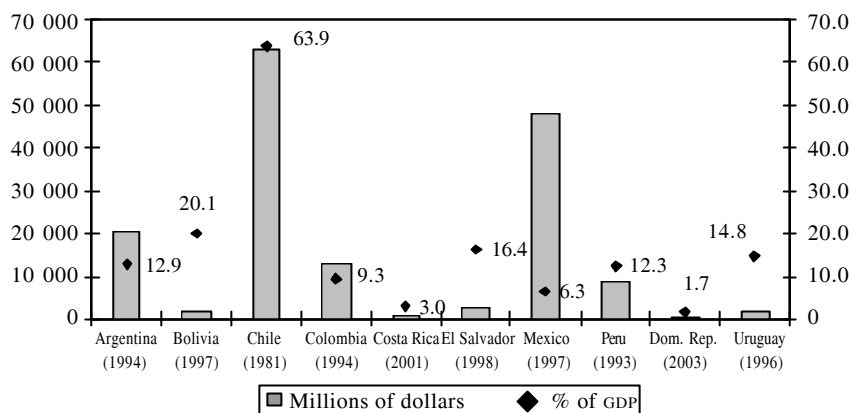
These two tendencies place countries under serious constraints when it comes to turning pension saving into physical and non-financial capital accumulation. Given the high costs of transition, many countries chose not to replace the unfunded system in its entirety, and the percentage going to individual accounts is still low, so that the accumulated fund remains small as a percentage of GDP. Because of these same transition costs and long-standing deficits in both the public finances and, often, the pension system itself, in many countries the demand for funds by the State

displaces private-sector demand for those same resources, the result being a high proportion of treasury bonds in the composition of portfolios.

In summary, the creation of individual account capitalization pillars generates a fiscal liability for the pension debt with which the old unfunded system operated, and likewise for benefits guaranteed to the armed forces and the poor in old age. The need to accept responsibility for current pensions, rights acquired under the old system by current contributors and benefits guaranteed to the armed forces and the poor (if there are constitutional guarantees) will demand an extraordinary commitment of government resources. If the government is unable to generate a primary surplus to meet this expenditure, it will end up by seeking resources from the very capital market it hopes to bring into being to fund long-term investment spending through capitalization (figures 20 and 21).

FIGURE 20

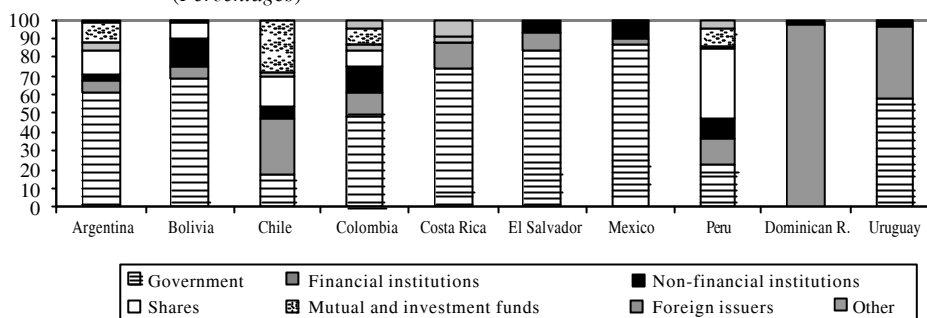
Latin America (10 countries): Funds under management, June 2005



Source: International Association of Pension Funds' Supervisory Organisations (AIOS, 2005).

FIGURE 21

Latin America (10 countries): Pension fund composition, June 2005 (Percentages)



Source: International Association of Pension Funds' Supervisory Organisations (AIOS, 2005).

2. Greater coverage?

Another worrying feature of the statistics on reformed systems is that they reveal a chronic gap between the number of system members and the number of contributors (figure 22). Effective coverage as measured by the proportion of working people actually paying into these systems remains low, and the existence of a wide gap between the numbers who have joined them at some point and the numbers paying in indicates that the density or regularity of system contributions is intermittent, and thus that the continuity of saving is irregular. All this may mean that the capital accrued by retirement is small, with major implications for benefit amounts, especially for those on low incomes and those who do not manage to contribute at an early age, so that capitalization does not work in their favour.

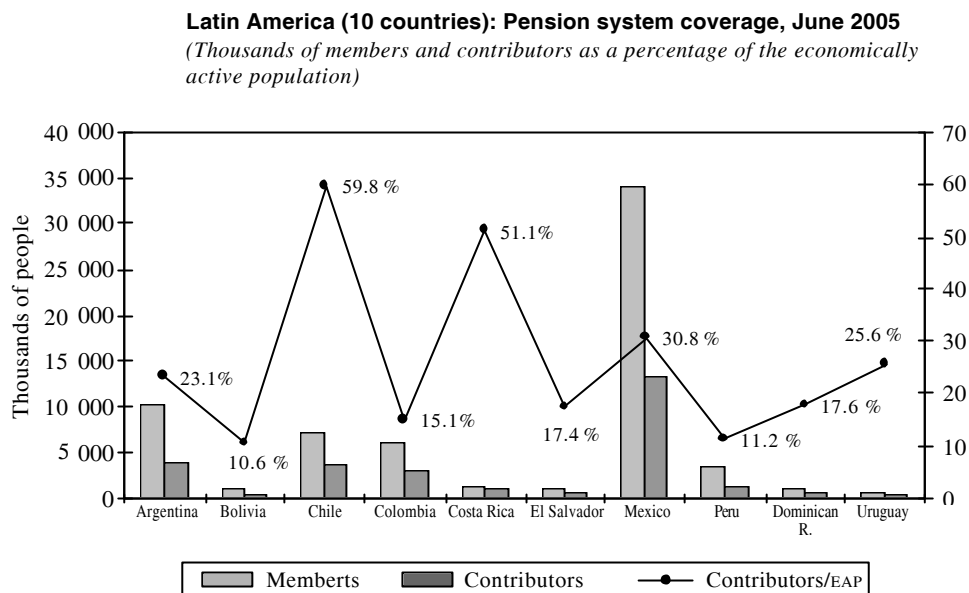
Faced with this evidence, a number of countries have initiated panel studies to examine the work and contribution record of members with a view to determining what replacement rate they will attain and whether they will be able to finance their own pensions or will qualify for State-guaranteed minimum and/or welfare pensions.

According to administrative data from different pension systems in Latin America, average contribution

density is between 50% and 70%. The average density of contributions during the working stage of life is several percentage points higher among men than among women. Densities are significantly greater in higher-income sectors (except between the ages of 18 and 25, when many people are studying) than among lower-income groups. There is a tendency, particularly in the lowest stratum, for there to be a relatively low contribution density at the age of 21 but for the frequency of contributions then to increase gradually over the course of people's working lives (table 3).

All this suggests that systems which create closer links between contributions and replacement rates will tend to reproduce the inequities of working life, turning them into pension inequities without leaving any scope for compensatory subsidies between contributors within the system (ECLAC, 2002). The least protected groups (and women in particular) will receive dramatically lower pensions owing to the low relative density of their contributions and, in the case of the lowest quintiles, to the tendency to delay contributing until a later stage in working life. The density of contributions varies greatly between men and women,²¹ and this is the determining factor in women's long contribution gaps, attributable to the amount of

FIGURE 22



Source: International Association of Pension Funds' Supervisory Organisations (AIOS, 2005).

²¹ In the bottom three quintiles of the female income distribution (the lowest-income 60%), women have average densities of less than 40% throughout almost the whole of their lives, while

even men in the second quintile have average densities that are systematically higher than this.

TABLE 3

Argentina, Uruguay and Chile: How contributions are distributed

Country	Study	Sample	Average density (%)
Argentina	Bertranou and Sánchez (2003)	Employees, private sector, age 25-65, with at least one contribution between 1994 and 2001 Administrative data	49
Uruguay	Lagomarsino and Lanzilotta (2004)	Private-sector employees with at least one contribution during the second half of 1996, contribution density between 1997 and 2003 Administrative data	70.2 69.7 (M) 70.9 (W)
	Bucheli, Forteza and Ferreira-Coimbra (2005)	Contributors to the Banco de Previsión Social (BPS) with at least one contribution between 1996 and 2004 Administrative data	60.8 62.9 (M) 58.5 (W)
Chile	Arenas de Mesa, Behrman and Bravo (2004)	Members of the AFP system with at least one contribution between 1980 and 2001 Information provided in the Social Panorama survey	52.4 59.8 (M) 41.4 (W)
	Benstein, Larraín and Pino (2005)	Members of the AFP system with at least one contribution between 1980 and 2001 Administrative data	53 59 (M) 41 (W)

Source: The authors cited in the table.

time taken up by childcare, personal responsibilities, pregnancy or housework²² (Marco, 2004; Reyes, 2004). This situation is very far removed from the contribution density requirements of the systems operating in the region (table 4).

3. Better pensions?

Moves towards defined contributions must meet three requirements if good pensions are to be ensured: (i) a high density of contributions, which, as the last section showed, is far from being the case; (ii) high returns for pension funds; and (iii) low administration costs.

Pension fund returns are subject to financial risks inherent in capital markets. Systems have been promoted on the basis of historical returns data for the Chilean model, which are in excess of 20% for those who have contributed throughout the 25 years of these funds' existence. Rates have been highly volatile,

however, with different levels of return for members who have been in the system at different periods. In other cases, moreover, it has proved impossible to insulate them from political risks, such as the systemic crisis caused by the abandonment of the Convertibility Act in Argentina (figure 23).

The fact is that the combination of different contribution periods with different levels of profitability can result in a low return for a member over the whole of his or her period of active membership. In combination with high commissions and a low contribution density, this can translate into an explosive situation for the financing of minimum and welfare pension guarantees if a large majority of members do not have the funds to finance their pensions. This possibility has been studied by the pension funds supervisor (Superintendencia de Administradoras de Fondos de Pensiones (SAFP)) in Chile.

Brazil's experience shows how important pension income can be in reducing the incidence of poverty as determined by market incomes among older adults. The country has a non-contributory pension programme with wide coverage in rural areas, and this has resulted in a sharp reduction in the incidence of poverty from the age of 60 onward. It can thus be seen that important distributive instruments are available

²² While this may be directly associated with a recognized phenomenon, the relatively low labour market participation of women in Chile, it needs to be considered in the debate about mechanisms for expanding coverage. Women are contributing significantly to a country's development by carrying out the activities referred to, even if these are not subject to formal contracts with pay and pension coverage.

TABLE 4

Latin America: Minimum densities required in public pension systems^a

Country	Retirement option	Minimum retirement age		Minimum years contributions		Minimum density at retirement age (%)		Minimum density (%)
		Women	Men	Women	Men	Women	Men	Age 20-65
Chile	Maximum replacement rate	60	65	20	20	50	44	44
Bolivia		50	55	15	15	50	43	33
Mexico		65	65	9.5	9.5	21	21	21
El Salvador		55	60	25	25	71	63	56
Dominican R.	Contributory	60	60	30	30	75	75	67
	Subsidized contributory	60	60	25	25	63	63	56
Nicaragua		60	65	-	-	-	-	-
Peru		65	65	20	20	44	44	44
Colombia		55	60	20	20	57	50	44
Argentina		60	65	30	30	75	67	67
Uruguay	Standard retirement	60	60	35	35	88	88	78
	Advanced-age retirement	70	70	15	15	30	30	33
	Old-age pension (non-contributory)	70	70	-	-	-	-	-
Costa Rica	Normal	65	65	20	20	44	44	44
	Early	59.9	61.9	38	39	95	93	86
Ecuador	Option 1	60	60	30	30	75	75	67
	Option 2	65	65	10	10	22	22	22
	Option 3	70	70	15	15	30	30	33
Brazil		60	65	15	15	38	33	33
Cuba		55	60	25 ^b	25 ^b	71	63	56
Guatemala		60	60	15	15	3	38	33
Honduras		60	65	15	15	38	33	33
Panama		57	62	15	15	41	36	33
Paraguay	Option 1	60	60	25	25	63	63	56
	Option 2	55	55	30	30	86	86	67
Venezuela (Bol. Rep. of)		55	60	14.5	14.5	41	36	32

Source: Prepared by the author on the basis of Mesa-Lago (2004, tables 4 and 15).

^a The table follows the order of presentation used by Mesa-Lago. First come the six substitution reform countries (Chile, Bolivia, Mexico, El Salvador, Dominican Republic and Nicaragua), followed by the two countries that adopted parallel schemes (Peru and Colombia), the four countries with mixed pillars (Argentina, Uruguay, Costa Rica and Ecuador) and seven countries with parametric reforms or none as of 2004.

^b The requirement in Cuba is years worked.

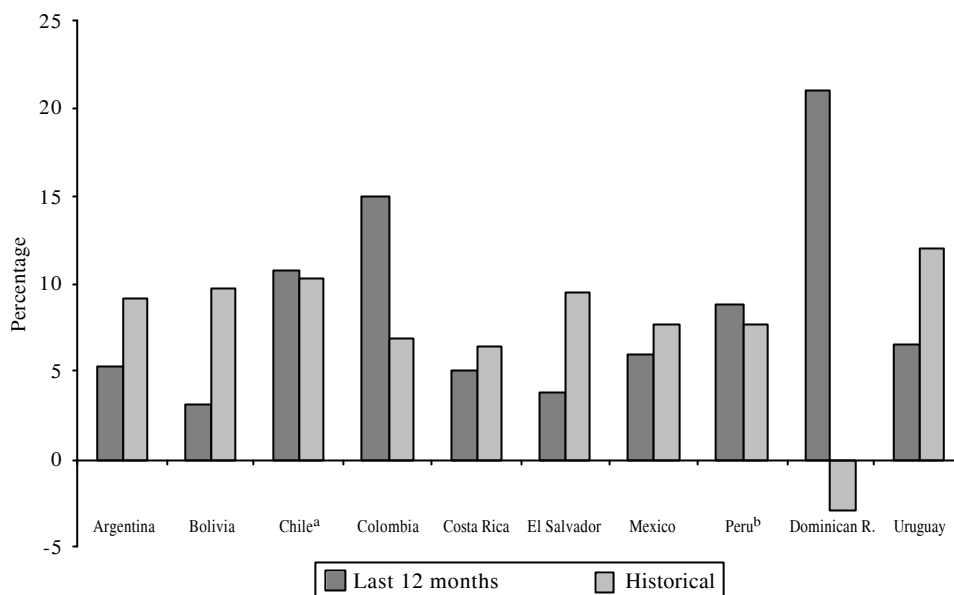
for social pensions, but these require highly complex agreements (figure 24). In the case of non-contributory pensions, there are transfers in the form of subsidies from general taxation and, in certain cases, solidarity transfers of contributions to older adults. In the case of contributory pensions, there are transfers of savings to

older adults from younger groups, whether these are contemporaries (unfunded system) or the actual member at an earlier stage in his or her life cycle (capitalization system).

A basic dilemma for pension systems are the complex relations between contributory and non-

FIGURE 23

Latin America (10 countries): Real gross pension fund returns, June 2005



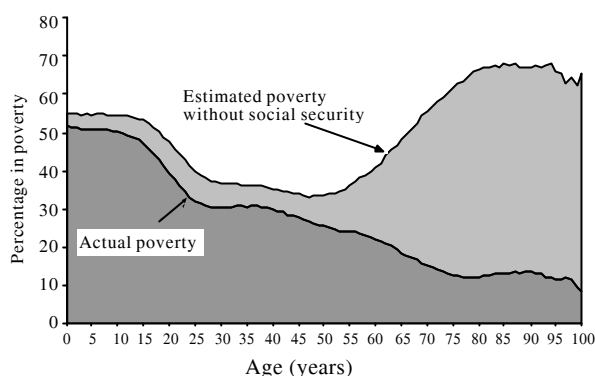
Source: International Association of Pension Funds' Supervisory Organisations (AIOS, 2005).

^a Returns in Chile are for Fund C.

^b Historical returns correspond to the last 120 months.

FIGURE 24

Brazil: The distributive role of social security, 1999
(Poverty by age)



Source: National household survey (PNAD) for 1999, Institute of Applied Economic Research (IPEA)/Ministry of Welfare and Social Assistance.

contributory financing mechanisms. Both perform the functions required for a pension system, only benefits may be non-contributory or be linked to individual contribution efforts. It is possible that the certainty of

receiving non-contributory benefits may reduce efforts to contribute to the system, in a kind of substitution effect, and thus generate perverse incentives for membership.

Although pension benefits can be very helpful in reducing the incidence of poverty among older adults, the distributive component has to be designed to complement the contributory component. Extreme cases do exist, like the New Zealand model, where all benefits are non-contributory and universal and there is a private-sector system of supplementary saving. At the other end of the scale is the Chilean model, which is contributory and involves capitalization in individual saving accounts managed by the private sector, with the State playing only a distributive role.

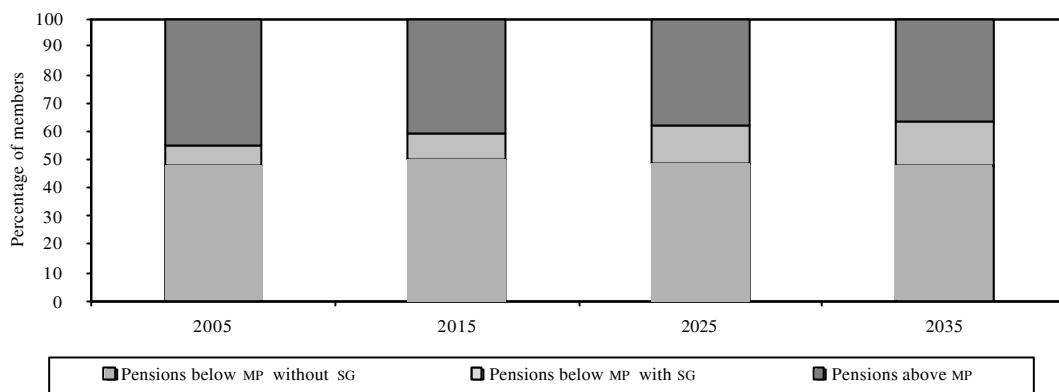
The potential for extending coverage via distributive policies that is held out by guaranteed welfare pensions needs to be handled very carefully, so that the incentive structure of the contributory component is not affected by the distributive role of the State, inside or outside the system. However, a lack of policies to guarantee stable employment will mean that contributory systems increasingly serve to select members by saving capacity and separate them into fully

insured, underinsured and uninsured. For these last two categories of members, as the case of Chile shows, there will be increasing demands for explicit guarantees, in the form either of welfare pensions or of subsidized insurance for those who, having made an effort to contribute, fail to attain a “decent” pension (figure 25).

The Chilean model guarantees a minimum benefit level for all those who have paid into the system for 240 months and are unable to finance the value of that benefit once they reach retirement age. For everyone else, however, there is no guarantee even of a welfare pension, as these are subject to quotas set in the national budget and granted in accordance with strict targeting criteria.

Projections for Chilean defined-contribution systems show that, given reasonable assumptions for growth in per capita GDP, wages and pension fund returns, members who reach retirement age will be eligible for State-guaranteed minimum pensions whether or not they are poor. A larger and larger proportion will receive a State-guaranteed minimum pension. In this way, a system that reforms the contributory component will only benefit less than half of all workers, leaving a growing distributive burden to be borne by the State. According to estimates by the Chilean Ministry of Finance, this will mean enormous contingent liabilities (Arenas de Mesa, Llanes and Miranda, 2005).

FIGURE 25

Chile: Projections of different pension types for members of the AFP system^a

Source: Bernstein and Ruiz (2005).

^a Pensions below the minimum pension (MP), with or without a State guarantee (SG), grow by 2%, wages by 2% and returns by 5%.

VI

A social cohesion covenant

The pensions issue involves complex interactions, and very substantive political and social agreements will be needed to resolve them. In particular, the rights agenda needs to be reconciled with the public finance agenda so that the pension system designed (i) promotes pension saving and (ii) provides the poor with decent old-age pensions. In addition to these two objectives, hard enough to achieve as it is, any new design is now expected to contribute to others as well: (iii) keeping the public finances solvent; (iv) generating financial saving to develop the capital market; and (v) contributing to competitiveness.

To rank and harmonize these objectives, there needs to be a very wide-ranging political agreement that allows five major strategies to be reconciled. First, at the macroeconomic and institutional level, a strategy to protect the growth and investment capacity of the economy in a context of nominal and real stability. This means that the social agreement needs to recognize the importance of a macroeconomic and institutional pillar whereby countercyclical policies are implemented through structural surplus rules and/or stabilization funds, financial and pension fund markets are strictly regulated and monitored, and clear rules

are laid down for monetary, currency and international reserves management, in order to give credibility to the real exchange rate and interest rate.

Second, a strategy for permanently reconciling (which also means adapting) the pension system to the structures and dynamics of the population, the labour market and the public finances. There is no one pension system that is right for different countries, or for any given country over time. The model needs to be continually adapting to changes in demographic structures, families, the labour market and the public finances, and must always include criteria of universality and solidarity so that, with minimum but socially accepted benefits, its financing and form of administration do not leave people underinsured or uninsured.

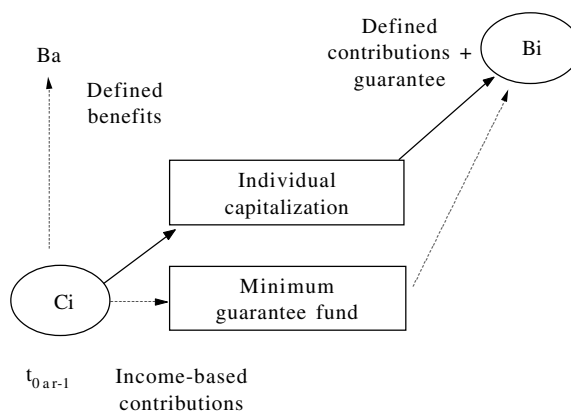
Third, a strategy for strengthening the contribution base over the long term, since as well as improving the economic and financial underpinnings of growth (macroeconomic pillar), there is also a need to improve the productive capacity of members. This strategy recognizes two further pillars: one of human capital formation through education and workforce training, and one of productive development and employment, designed to take advantage of the country's niches and potential and to stimulate the needful research and development.

Fourth, a strategy that includes both solidarity saving mechanisms to finance benefits (with special emphasis on rewarding saving efforts through defined-contribution systems) and actuarially determined guarantee funds for the provision of minimum benefits. The challenge is to regulate the way benefits are financed so that the principles of equivalence and solidarity are reconciled. The essential thing in each social contract is that benefits should not exceed duly capitalized contributions. These principles clash when equivalence is practised in individual contracts without any provision for cross-subsidies in the interests of solidarity (figure 26).

What ECLAC proposes is to give social content to the fiscal covenant by creating a social agreement that orients it, and to do this by means of five pillars, the fifth being participatory democracy (table 5). This last pillar promotes civic participation in the fundamental decisions that a society needs to take, particularly as

FIGURE 26

Illustration of a contributory pillar combined with a solidarity pillar



Source: Prepared by the author.

regards improvements to the immediate and long-term coverage and benefits of pension systems. These systems, therefore, need to be flexible enough to adapt to the different stages in a society's development, and in each case decisions will be required as to how much of the system's funds can be put into financial instruments, given the financial constraints of the society concerned and the way these manifest themselves in the heterogeneous world constituted by different types of families, production units and employment opportunities.

For coverage to be extended, considering the gaps in the welfare State, financing sources and administration mechanisms need to be highly specific. Unquestionably, however, the trio of market, family and State cannot provide universal cover until there is a social agreement dealing with (i) explicit minimum benefit guarantees, (ii) solidarity financing sources and (iii) the prerequisites for benefit entitlement. The speed at which the Latin American population is ageing, the effect that the constant adaptation of the production apparatus to new conditions of competitiveness has been having on employment, and the various ways in which society has been reacting to survive under these conditions, have made social protection in the area of pensions a core challenge, the responses to which must constantly be adapted to the characteristics of each particular situation.

TABLE 5

Components required for a social agreement compatible with a fiscal covenant

<i>Fiscal responsibilities</i>	Agreement compatible with a fiscal covenant			Democracy
	<i>Important role for education</i>	<i>More and better jobs</i>	<i>Universal, redistributive and efficient social security</i>	<i>Improved social cohesion</i>
Minimum guarantees	Universal secondary education	Measures to deal with productive heterogeneity	Reform of public-private combinations	Promotion of citizen involvement in aspects of collective interest
Improved productivity in the public provision of public or socially valuable goods	Narrowing of the gaps between elite and public education	Consideration of productive heterogeneity	Incorporation of solidarity into financing to improve access without sacrificing saving and insurance	Enhancement of governance by revising the incentives for investing in basic social services that have been privatized and improving their regulatory framework
	Preschool education for the poor	Investing for jobs	Better protection against contingent risks	
	Learning to learn	Human resources approach	Financing of housing for the poor	
	School insurance	Reduction of discrimination		
		Improved labour relations, considering the needs of innovation and the economic cycle		
		Reskilling		
		Unemployment insurance		

Source: Prepared by the author, on the basis of ECLAC (2004b and 2000).

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Heterogeneous demand and market segmentation: the Argentine pension funds system

Ignacio Apella

The purpose of this article is to assess and formalize the capacity of retirement and pension fund management companies (AFJPs) to segment the market by the income level of demand during 1995 and 2001. By taking a profit maximization model whose specifications include a non-linear price and a level of demand that is heterogeneous in terms of income level, and by then corroborating this empirically, we confirm the hypothesis that the market was segmented by the management companies and we identify two groups of firms. The first comprised companies that established a high fixed commission and a low variable one with a view to capturing high-income affiliates, while the second group consisted of firms that used the opposite pricing policy to attract low- and medium-income affiliates. The effect was to reduce direct competition between the two groups of firms.

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I

Introduction

In July 1994, the Integrated Pensions System (Sistema Integrado de Jubilaciones y Pensiones (SIJP)) came into operation in Argentina. It consisted of two regimes: the old public regime, based on a pay-as-you-go system managed by the National Social Security Administration (ANSES), and a new regime based on individual capitalization and managed by private-sector companies: the retirement and pension fund management companies (AFJPs), supervised and regulated by the Superintendency of Retirement and Pension Fund Management Companies (SAFJP). By December 2002, some 80% of potential contributors had opted to switch to the private-sector regime.

The main objective of the SIJP is to cover the contingencies of old age, disability and death. In pursuit of this common objective, the function of the private-sector capitalization system is to provide the working active population with mechanisms for choosing between fund management companies. In addition, each AFJP manages its affiliates' contributions and receives payment in return. Until December 2001 this payment (commission) consisted of a set fee in pesos plus a variable component proportional to the affiliate's taxable income; in that month, however, the set fee was abolished.

The legislation under which the new system was established places certain constraints on private-sector service providers. The organizations owning the capital of AFJPs in Argentina fall into four broad categories: public-sector banks, foreign-owned companies (banks and enterprises), insurance companies, and companies created by trade unions. To trade actively, AFJPs have to have initial capital of at least 3 million pesos and maintain a reserve investment equivalent to 1.5 million pesos or 1% of the total pension funds under their management.

Potential system demand encompasses everyone over the age of 18, whether employees or self-

employed. The rules require workers to choose between the two systems available, the pay-as-you-go system or the private-sector capitalization system, automatically transferring to the latter anyone who fails to state a preference. Those choosing the pay-as-you-go regime are entitled to change their minds and join the private individual capitalization regime. However, those opting for individual capitalization have not had an equivalent right, although they are entitled to switch AFJP.

In all cases, once the choice has been stated, membership is compulsory and the affiliate has to pay in a monthly amount calculated as a percentage of his or her regular monthly salary.

The concern for both regulators and researchers in this type of market is to understand the competition mechanisms operating there and develop incentive structures to minimize market failures. The ultimate aim is to reconcile social interests (the generation of savings and the provision of funds for retirees and pensioners) with the objectives of the firms supplying the sector. For this, it is necessary to identify the factors that determine pricing in the market, the behaviour of companies, and the strategic interaction among them and between them and the supervisor.

In particular, the objective of this study is to ascertain the degree, trend and causes of market concentration. Another aim is to gauge the ability of companies to segment the market by the characteristics of demand in order to reduce competition between them. To this end, section II discusses the theoretical framework of analysis, Section III looks at the size of the market and the concentration ratio, Section IV develops a model for maximizing a firm's profits through price selection in a market with heterogeneous demand, Section V presents the empirical results and section VI, lastly, sets out the main conclusions reached.

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II

The theoretical framework

Oligopolistic markets are characterized by the presence of a small number of interdependent firms. Companies have to be alert for both aggressive moves and defensive responses by their rivals. In this environment, the partial equilibrium solution can take two forms, one of collusion, with the participants reaching explicit or implicit agreement on pricing and/or quantities, and one of non-collusion, in which firms lack significant information on their rivals' behaviour and reactions and act competitively, employing a dominant strategy (pricing or quantities) that leads towards a Nash equilibrium in each of the subgames.

Companies participating in a highly concentrated industry have incentives to set prices higher than their marginal cost of production, with a view to appropriating profits that are greater than they would be in a situation of perfect competition. The relationship between the concentration ratio and company behaviour is not one-way, however. Given the underlying market conditions and a particular concentration ratio, companies act strategically and their decisions affect the structure of the market.

Pricing policies and strategies may prove to be the main tool available to a company in its efforts to expand, weather a crisis or even survive. Again, each company's pricing power, and the desirability of using it, will depend on the degree of competition, the characteristics of the goods and services it provides, the ability of consumers to keep abreast of the immediately available alternatives, and the cost structure.

If companies are dealing with consumers who have differing characteristics in terms of tastes, income level, willingness to pay, location, etc., they will have incentives to behave in different ways that reflect these characteristics. For example, if companies see that there are two groups of consumers who differ in their

willingness to pay, they might set differentiated prices, charging more for consumption carried out by those individuals who have greater spending power.

In situations where consumers can be differentiated by income level and/or willingness to pay, setting non-linear prices¹ can be a tool for price discrimination between them. Firms operating in a highly concentrated market, with groups of consumers differentiated by income level, might find alternative mechanisms to allow them to stay in the market and achieve extraordinary profits. These mechanisms might include the use of price discrimination to segment markets by the characteristics of demand, and product differentiation of both a vertical and a horizontal nature. Thus, diversity (in both the product and the type of consumer) weakens competition and is a major factor in the creation of non-competitive trading environments.

The ability of firms to segment the market or differentiate their product depends on the degree of dispersion in the characteristics of demand. According to Shaked and Sutton (1987), the more dispersed consumer incomes or tastes are, the greater the scope for competing firms to identify market niches and specialize. When demand is more homogeneous, on the other hand, preferences and the ability to pay vary less, so the supply becomes relatively standardized.

In markets with strong oligopolistic characteristics, therefore, participating firms could differentiate the demand bracket they supply in order to head off commercial or price wars.

¹ A non-linear price is the sum of a fixed price (independent of the amount consumed) and a variable price proportional to the amount consumed.

III

Market size and concentration

When studying the structure of a market and the competitive strategies of the companies involved in it, the first requirement is to define the market concerned. There are two stages to this. The first is to identify the market for the product, encompassing the different goods or services that compete or could compete with one another, and to establish where substitution might take place. The second concerns the geographical aspect, since the geographical scale of the market will determine the strategies of the companies operating there.

What AFJPs do is to manage a pension fund by creating a portfolio of assets. To this end, they receive a sum of money from their affiliates during their working years. The main objective of the management companies is to maximize the return on these funds by constructing a portfolio of different assets, which may include bonds issued by the country's government, negotiable instruments, term deposits, the shares of privatized enterprises and limited-liability companies, common investment funds, etc. At retirement, the worker will receive a monthly income from the individual fund built up plus the returns obtained by investing these savings.

Geographically, the relevant market will be considered to consist of the entire territory of the country, since most AFJPs compete nationally, the exceptions being a handful that operate in particular provinces.²

Table 1 shows the number of affiliates and contributors for each firm as of December 1995 and March 2004, and the percentage change between the two periods. Companies are ranked by the fifth column (percentage change in the number of affiliates). The information shown reveals an increase of 119% in the total number of affiliates between 1995 and 2004, while the number of contributors increased by only 54%. The large rise in the number of affiliates is due to the transfer of workers from the old public-sector system.

Because the two variables did not grow at the same rate over the period studied, the contributor/affiliate ratio fell. This ratio can be treated as an indicator of operational sustainability in that, while a firm only

receives income from those paying in, it has to incur costs for all its affiliates, so that a better contributor/affiliate ratio will mean better performance in relation to its peers.³

Figure 1 presents quarterly changes in this ratio for the system as a whole. The number of affiliates grew by more than the number of contributors. In March 2004, 3.6 million affiliates actually paid their contributions, giving a contributor/affiliate ratio of 37%. The gap can be put down to both personal reasons (evasion by affiliates) and the nature of the labour market (informal working): contributors stop paying into the system once they cease to be active or formal workers.

It is possible, however, to identify two periods in which the trend of the contributor/affiliate ratio altered marginally. The first shift was in March 1999, when the ratio fell. This was associated, however, with information processing problems at the SAFJP. The second shift can be identified in December 2001, when the Argentine economy abandoned its currency's fixed parity against the dollar in the midst of an economic, political and social crisis.

Following the introduction of the new system in July 1994, 26 AFJPs were authorized to start operations. This number then fell substantially, however: 17 firms were operating in the market in December 1997 and just 12 remained in the system by December 2002.

The reduction in the number of management companies does not necessarily mean greater concentration in the market; rather, it points to changes in each firm's participation in the industry. To give an idea of the degree of concentration in the industry, figure 2 presents the index of concentration to the fourth firm⁴ for the "affiliates" and "contributors" variables.

³ Although AFJPs provide significantly fewer services to non-contributors than to contributors, the former are included in these companies' cost function.

⁴ The indicator to the fourth firm is produced by taking the four firms with the most affiliates at a given point in time. An alternative indicator of concentration is the Herfindahl-Hirschman index, which fulfils the axioms referred to. This indicator yields similar results, in terms of both levels and tendency, to those obtained by calculating the ratio of concentration to the fourth firm. This suggests that there is no bias in the choice of $N = 4$, while revealing the significant weight of the top four firms in the structure of the market.

² This is the case with Unidos, which basically operates in the province of Córdoba, and Met, which chose to concentrate on major urban areas, chiefly the City of Buenos Aires, when it entered the market.

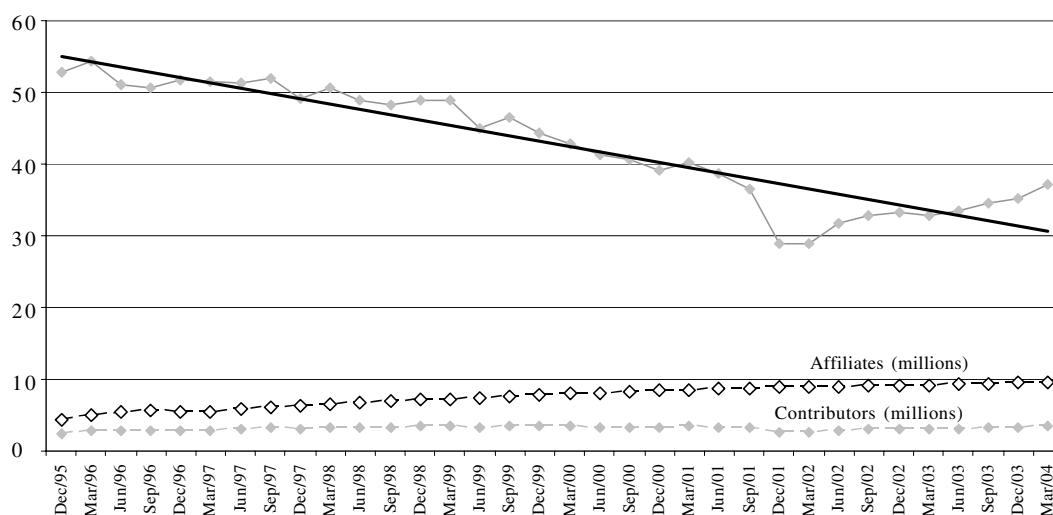
TABLE 1

Argentina: Number of affiliates and contributors and percentage change

AFJP	Affiliates Dec. 1995	Contributors Dec. 1995	Affiliates Mar. 2004	Contributors Mar. 2004	Change affiliates %	Change contributors %
Profesión Unidos	16 978	10 090	212 321	73 318	1 151	627
Arauca Bit	18 919	13 390	208 787	73 485	1 004	449
Orígenes	82 050	42 684	673 350	300 062	721	603
Prorenta	501 922	247 871	2 323 659	820 287	363	231
Futura	98 912	46 461	437 739	134 010	343	188
Previsol	43 368	33 563	162 160	47 279	274	41
Consolidar	130 605	68 008	322 545	105 178	147	55
Siembra	651 750	352 484	1 520 665	602 703	133	71
Máxima	593 709	302 949	1 342 857	491 305	126	62
Nación	620 516	310 350	1 335 087	487 457	115	57
Activa	471 755	215 885	828 319	316 351	76	47
Afianzar	131 975	61 702	0	0	-100	-100
Activa-Anticipar	21 516	10 209	0	0	-100	-100
Banat	141 125	63 936	0	0	-100	-100
Banar	462	0	0	0	-100	0
Claridad	257 381	114 862	0	0	-100	-100
Ethika	2 048	1 117	0	0	-100	-100
Ethika-Jacarandá	60 594	23 105	0	0	-100	-100
Fecunda	146 519	67 174	0	0	-100	-100
Generar	36 450	22 745	0	0	-100	-100
Más Vida	66 649	16 103	0	0	-100	-100
Patrimonio	127 117	56 390	0	0	-100	-100
Previnter	370 022	199 552	0	0	-100	-100
San José	27 462	15 284	0	0	-100	-100
Savia	46 688	11 562	0	0	-100	-100
Met		0	211 435	106 240		
<i>Total affiliates</i>	<i>4 371 876</i>	<i>2 307 476</i>	<i>9 578 924</i>	<i>3 557 675</i>	<i>119</i>	<i>54</i>

Source: Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

FIGURE 1

Argentina: System-wide contributor/affiliate ratio, December 1995 to March 2004

Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

FIGURE 2



Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

This indicator of concentration was constructed for the two key market variables: the number of affiliates and the number of contributors. It was chosen because: (i) the data needed to construct it were accessible; (ii) the result was independent of the size of the industry; (iii) the result was influenced by mergers and takeovers in the market; and (iv) the entry or exit of one firm of significant size had a negative or positive effect on the concentration index (Curry and George, 1983).

The results obtained reveal that the AFJP market has gone through a significant process of concentration. As a result, the top four firms have come to dominate its development. Thus, the index of concentration to the fourth firm for affiliates and contributors increased by 26% and 28%, respectively, between 1995 and March 2004. The rise was not even, however, throughout the period studied. During the market's first four years of existence, the degree of concentration increased gradually as a consequence of mergers and acquisitions plus the effects of the mechanism used to allocate "undecideds".

The subsequent decline in concentration, which took place between September 1998 and December 2000, was linked to the change in the system for distributing "undecideds" and a drop in the number of takeovers. Up to June 1998, the contributions of people who were obliged as employees to pay into a pension fund but had not chosen their system or AFJP were

distributed in proportion to the market shares of the different management companies. From that month onward, these contributions began to be allocated by lot among all the companies. This is indicative of how important the regulator is in the structure of the market, as it is able to generate a kind of "derived demand".

The trend began to change again in 2001, however, when Orígenes took over the whole of the Previnter customer portfolio. This operation was highly significant, as the firm acquired had a large share of the market (8%), while Orígenes had 19%.

Another major shift was caused by the entry of Met into the market in March 2001. The importance of this event is that it shows that any barrier to entry erected in the face of a credible "threat" of potential new entrants can be overcome.

The way the contributions of "undecideds" were distributed between firms changed again in December 2001, when they began to be shared out between the two firms with the lowest prices. This did not have a significant effect on market concentration.

Table 2 lists takeovers and new entries by company and date. The AFJP market in Argentina has gone through a significant process of concentration, in which the top four firms have taken 72% of the market. This can be put down both to the number of mergers and acquisitions in the industry and to the rules adopted for choosing management firms for

TABLE 2

Argentina: Takeovers and new entrants in the market

AFJP acquiring	AFJP acquired	Merger date
Siembra	Dignitas	31-05-95
Anticipar ^a	Activa	29-12-95
Activa-Anticipar	Savia	29-12-95
Profesión ^b	Auge	01-07-96
Jacarandá ^c	Ethika	01-08-96
Orígenes	Activa-Anticipar	01-01-97
Máxima	Patrimonio	01-07-97
Orígenes	Más Vida	01-09-97
Consolidar	Fecunda	10-06-98
Orígenes	Claridad	01-09-98
Prorenta	Afianzar	01-12-98
Siembra	Ethika-Jacarandá	01-07-99
Prorenta	San José	01-10-99
Orígenes	Previnter	01-01-01
Met		21-03-01
Siembra	Generar	01-10-01

Source: Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

^a The merged firm was named Activa-Anticipar.

^b The merged firm was named Profesión+Auge.

^c The merged firm was named Ethika-Jacarandá, changing to Ethika on 25/6/97.

“undecideds”. The entry of Met in March 2001, however, raised the potential threat of new competitors.

It is often observed that as concentration in an industry increases, the profits of the companies

operating there steadily rise. Again, underlying market conditions, such as size, the income distribution of potential customers or the regulatory framework in place, influence the structure of supply and the strategies which companies follow. In this respect, the main thrust of debate has followed a deterministic approach whereby this positive relationship between concentration and profits is explained through the “structure-conduct-performance” paradigm (Scherer and Ross, 1990). A highly concentrated structure gives participants greater pricing power in the market, leading to monopolistic solutions.

However, the new theory of industrial organization (Bresnahan, 1989, among others) argues that this deterministic relationship is debatable, since a high concentration ratio does not necessarily result from the use of firms’ market power, but could arise as a consequence of economic efficiency-seeking. This efficiency hypothesis states that the advantage achieved by firms operating in more concentrated markets derives from their ability to operate at lower costs. These, in turn, are the outcome of market strategies built upon a broad range of options (price, differentiation, targeting) which reformulate the original structure.

The following section will look at the behaviour of a firm at the point where it establishes the price that maximizes its profits, taking into account the potential heterogeneity of demand.

IV

The model

This section will develop a profit maximization model for firms participating in the Argentine AFJP market, whereby companies set prices in accordance with the characteristics of demand, given the degree of product differentiation they have previously decided upon. According to Tirole (1990), prices can adjust more quickly than product characteristics. With a view to formalizing this idea, it will be assumed that companies consider these characteristics when setting their prices.

Suppose there are N firms offering a single good or service j . Each product has characteristics of its own denoted by V_j and H_j . The vector V_j represents the special characteristics of a vertical product differentiation strategy, essentially the quality of the product supplied

and the advertising effort made. The vector H_j , meanwhile, represents characteristics of the good that relate to a horizontal product differentiation strategy.

Firms also use a two-part structure to set non-linear prices,⁵ namely a fixed commission in pesos and a variable commission proportional to the consumer’s taxable income, of the type:

$$p_j = p_{fj} + p_{vj} \cdot y_i \quad (1)$$

where p_{fj} represents the fixed commission in pesos, p_{vj} is the variable commission (which can range from zero to one) and y_i is the taxable income of the consumer i .

⁵ Two-part pricing was used from the start of the capitalization system until December 2001.

The price signals sent out by management companies to the market can be viewed from two different perspectives: as a percentage of the affiliate's taxable income or as the total amount payable in pesos. From the first of these perspectives, the existence of a fixed commission means that the price decreases as the taxable base income rises, while from the second, the existence of a variable commission means that the final price rises with income.

Let us also take two groups of consumers differentiated by their taxable income levels: one group with a high income level defined as y_A and a second group with a medium or low income denoted by y_B . Each group of consumers has a different (fixed- and variable-) price elasticity of demand.

Given the establishment of a non-linear two-part price, therefore, firms can opt, in accordance with their target function, to set whichever combination of fixed and variable prices is most likely to capture the largest number of affiliates from one of the groups.

Given the difference in elasticities between consumers, firms have two pricing strategies open to them: charging a fixed commission that is higher than the market average and a variable commission that is below the average or, conversely, charging a fixed commission that is lower than the system average but a variable commission that is higher. The decision will depend on the type of potential affiliates the management company wishes to attract to maximize its profits.

It is understood that the service offered by management companies is a normal good whose price elasticity of demand is negative for both the fixed and the variable price. It is also established that high-income consumers would prefer a price composed of a high fixed commission and a low variable commission, since this adds up to a smaller proportion of their income. Medium- and low-income consumers, for their part, would prefer the opposite pricing structure, as this represents a smaller proportion of their income.

It is therefore assumed that the variable-price elasticity of the demand from high-income affiliates is higher than the variable-price elasticity of the demand from medium- and low-income consumers, while the opposite holds for the fixed component of the price. Accordingly, it is established that:

$$\frac{\partial s_{jA}}{\partial p_{fj}} \cdot \frac{p_{fj}}{s_{jA}} < \frac{\partial s_{jB}}{\partial p_{fj}} \cdot \frac{p_{fj}}{s_{jB}} \quad \text{and} \quad \frac{\partial s_{jA}}{\partial p_{vj}} \cdot \frac{p_{vj}}{s_{jA}} > \frac{\partial s_{jB}}{\partial p_{vj}} \cdot \frac{p_{vj}}{s_{jB}} \quad (2)$$

where S_{jA} and S_{jB} are the shares of firm j in the high-income consumer market and the medium/low-income consumer market, respectively.

Given this, and assuming that marginal costs are equal and constant (and thus equal to average costs),⁶ the profit of firm j is given by:

$$P_j = p_j \cdot q_j - c_j \cdot q_j \quad (3)$$

where:

P_j is the profit of firm j

p_j is the price of firm j

q_j is the quantity sold by firm j

c_j is the marginal cost of firm j .

The firm's profit is given by the difference between its revenues and costs. The revenue of an AFJP is the product of the non-linear two-part price it sets and the number of affiliates (actually contributors) whose pension funds it manages:

$$I_j = (p_{fj} + p_{vj} \cdot y_i) \cdot M \cdot s_j \cdot (1 - m) \quad (4)$$

where:

M is the size of the whole market (total affiliates)

y_i is the average taxable income of affiliates of type i

s_j is the market share accounted for by affiliates of firm j

m is the evasion rate of firm j affiliates.

Firms' revenue depends not only on the number of affiliates but also on these individuals' income level and evasion rate. This evasion rate is the percentage of affiliates failing to pay their compulsory contributions. Thus, the expression $(1 - m)$ is the contributor/affiliate ratio examined in the previous section. A high average income level among affiliates and a low evasion rate would imply high revenues, and vice versa.

Considering that the total costs of firm j are the product of the firm's average cost and total membership, the profit function for the firm is given by:

$$P_j = (p_{fj} + p_{vj} \cdot y_i) \cdot M \cdot s_j \cdot (1 - m) - c_j \cdot M \cdot s_j \quad (5)$$

The exercise of selecting profit-maximizing prices yields the following combinations of fixed and variable prices:

$$p_{fj} \left[1 + \frac{1}{h_{fj}} \right] = \frac{c_j}{1 - m_j} - p_{vj} y_{ij} \quad (6)$$

$$p_{vj} \left[1 + \frac{1}{h_{vj}} \right] = \frac{c_j}{(1 - m_j) y_{ij}} - \frac{p_{fj}}{y_{ij}} \quad (7)$$

⁶ This is far from being the case, but the assumption will serve for present purposes.

Expressions (6) and (7) give the combination of fixed and variable prices, these being equal to the difference between the marginal cost and the revenues from the other type of price, plus a profit margin which depends negatively on the price elasticity of demand. The expressions given above show what the price combinations will be depending on the customer base the firm is seeking to attract.

Beginning with the expression arrived at for the fixed price, it should be noted that this depends negatively on the variable price (the one that is proportional to income). The smaller the difference between the variable price and the marginal cost, the lower the fixed price.

Setting out from this, we assume that there are two types of management companies, firm *j* and firm *r* (for the sake of analytical simplicity, both have the same contributor/affiliate ratio).⁷ The first of these firms seeks to capture high-income demand, while company *r* sets out to meet low-income demand. Given this, the fixed-price functions of each of the firms are:

$$p_{fj} \left[1 + \frac{1}{\eta_{fj}} \right] = \frac{c_j}{(1 - \mu_j)} - p_{vj} \cdot y_A >$$

$$p_{fr} \left[1 + \frac{1}{\eta_{fr}} \right] = \frac{c_r}{(1 - \mu_r)} - p_{vr} \cdot y_B$$

The fixed price established by company *j* is higher than the fixed price established by firm *r*, since the fixed-price elasticity of low-income demand is higher than the fixed-price elasticity of high-income demand.

Again, the variable price depends negatively on the level of the fixed price set. It might be suggested at this point that firm *j* will set a variable price lower than the one established by firm *r*. Both prices are given by:

$$p_{vj} \left[1 + \frac{1}{\eta_{vj}} \right] = \frac{c_j}{(1 - \mu_j) \cdot y_A} - \frac{p_{fj}}{y_A} <$$

⁷ This assumption is made for analytical purposes only. In practice, differences are observed between groups of firms, the standard deviation from the average for this indicator (0.35) being 0.06. Pursuant to the discussion in section III, heterogeneity in this indicator allows financial differences to be identified between firms, since while AFIPs receive revenue only from contributors, they incur costs for their entire customer portfolio.

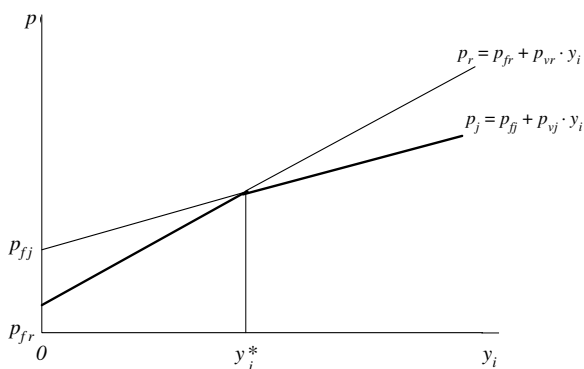
$$p_{vr} \left[1 + \frac{1}{\eta_{vr}} \right] = \frac{c_r}{(1 - \mu_r) \cdot y_B} - \frac{p_{fr}}{y_B}$$

Given that the variable-price elasticity of high-income demand is higher than the variable-price elasticity of medium- and low-income demand, the variable price set by firm *j* is lower than the one set by firm *r*. In other words, the freedom to set prices, both fixed and variable, is limited by the sensitivity of target demand to these prices.

With these two possible combinations of (fixed and variable) prices, the total price offered by the firm to the market in relation to the incomes of consumers will be as shown in figure 3.

FIGURE 3

Argentina: Prices charged at different affiliate income levels, by company demand strategy



Source: Prepared by the author.

In cases where taxable income is lower than y_i^* , the final price charged by firms setting out to meet high-income demand is significantly higher than the price charged by firms aiming at medium- and low-income customers. The opposite is true for the body of demand represented by people with incomes higher than y_i^* .

These differences in behaviour arise in pursuit of the main objective, the effort to maximize profits, for which the two groups of firms find alternative routes. The first set of companies does this by capturing high-income affiliates irrespective of market share, while the second set pursues the objective by trying to sign up as many affiliates as possible, most of them with medium or low incomes. The competition between the two groups of management companies is eased because they are targeting different segments of demand, although this is not true of competition between firms belonging to the same group.

V

The empirical evidence

The price signals sent to the market by each of the management companies are the “commissions” they charge their affiliates. From the start of the system until November 2001, the price charged by each firm had a two-part structure: a fixed price in pesos and a variable commission calculated as a percentage of taxable income. Under this pricing scheme, average commission in the system fell as taxable income rose.

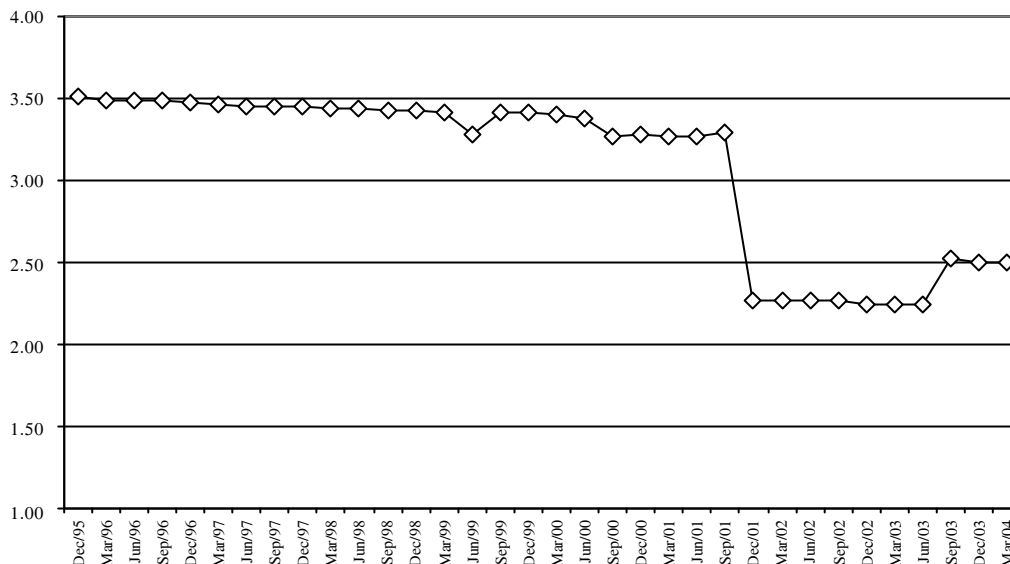
Figure 4 shows the evolution of effective average commissions as a percentage of taxable income in the system. It can be seen that the effective average commission for the system as a whole held steady over time until December 2001, when the average market price fell sharply to 2.24% of taxable income.

This fall occurred because of a reduction in the cost of disability and life insurance due to the reserves built up by management companies in 2001. Decree No. 1495/01, which abolished fixed commissions on the grounds that their effect on medium- and low-income consumers was regressive, also came into effect that month.

From the start of the system to December 2001, firms can be divided into two groups by structure and commission level. The first group consists of companies that charged a high fixed peso commission (compared to the system average) but with a low variable component. The second group, conversely, had a low fixed commission but a high variable component. Table 3 shows the dispersion of each company’s fixed commission in relation to the system average in the period 1995-2001; the ranking is in descending order by the first column. This table reveals a large dispersion in the fixed price charged by firms, and the groups referred to above can be identified accordingly. In 1995, Generar, Arauca Bit, Claridad and Savia had a fixed commission of 5 pesos, which was 159% above the system average. On the other side, there is a second group of firms with a negative dispersion of some 100%. These management companies, which included Consolidar, Futura, Prorenta, San José, Más Vida and Ethika, either charged no fixed price or had a fixed commission some 55% lower than the average.

FIGURE 4

Argentina: Effective average commission, December 1995 to March 2004
(Percentages)



Source: Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

TABLE 3

**Argentina: Percentage dispersion of fixed commission
around system average, by firm, 1995-2001**

AFJP/Year	31/12/1995	31/12/1996	31/12/1997	31/12/1998	31/12/1999	31/12/2000	30/09/2001
Generar	158.62	290.70	204.76	208.88	237.12	147.03	176.23
Arauca Bit	158.62	144.19	242.86	247.49	279.25	177.91	210.76
Claridad	158.62	144.19	90.48				
Savia	158.62						
Siembra	55.17	46.51	14.29	15.83	26.42	-7.36	3.59
Origenes	29.31	22.09	-4.76	-3.47	5.35	-22.80	-13.68
Unidos	29.31	22.09	-4.76	-3.47	5.35	-22.80	-100.00
Patrimonio	16.38	9.88					
Ethika-Jacarandá	3.45	-2.33	204.76	208.88			
Afianzar	3.45	-2.33	-23.81				
Previsol	3.45	-2.33	-23.81	-22.78	-15.72	-22.80	-13.68
Profesión	3.45	-2.33	-100.00	-100.00	-100.00	-100.00	-100.00
Previnter	0.86	-4.77	-25.71	-24.71	-17.83	-39.79	
Máxima	-1.72	-7.21	-27.62	-26.64	-19.94	-24.35	-15.41
Activa-Anticipar	-22.41	-26.74					
Fecunda	-27.59	-31.63	-46.67				
Activa	-53.45	-100.00					
Nación	-74.14	-100.00	-100.00	-100.00	-100.00	-100.00	-100.00
Consolidar	-100.00	-100.00	-100.00	-100.00	-100.00	-22.80	-13.68
Futura	-100.00	-100.00	-100.00	-100.00	-100.00	60.57	79.55
Prorrenta	-100.00	-100.00	-100.00	-100.00	-100.00	-22.80	-13.68
San José	-100.00	-100.00	-100.00	-100.00			
Mas Vida	-100.00	-100.00					
Ethika	-100.00						
Met							-100.00
<i>System average</i>	<i>1.93</i>	<i>2.05</i>	<i>2.63</i>	<i>2.59</i>	<i>2.37</i>	<i>3.24</i>	<i>2.90</i>

Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

By September 2001, after a series of mergers and acquisitions, just two firms, Arauca Bit and Generar, remained well above the average, charging fixed commissions that were 200% higher than the system norm. The other companies were still operating, although their market shares had altered as a consequence of the pricing policy changes made by some of them.⁸ Similarly, table 4 presents the percentage dispersion of the variable prices set by the firms for the period studied. The ranking is by descending order for the first column. There is a symmetry with table 3: firms whose fixed commission showed a dispersion of more than 100% in relation to the system average had low variable commissions, with a negative dispersion of more than 16% on average. These firms were Generar, Arauca Bit, Savia and Claridad. The dispersion of the remaining firms ranged from a low of -7.29% to a high of 8.2%.

⁸ For example, Consolidar, which had not previously had a fixed commission, began to charge one in the third quarter of 2000.

In 2002, the difference between firms was greater. At one extreme were Arauca Bit and Met, whose variable commission had a dispersion of -21% and -13%, respectively, while the other AFJPs had a dispersion of between -1.60% (Nación) and 6.45% (Unidos). In March 2004, again, dispersion ranged from -17.75% to 16.35%.

Figures 5 and 6 present the different peso prices charged by each firm to affiliates by income level in 1999 and 2001. These charts are the real-life version of the situation depicted in figure 3.

The division of firms into two categories by pricing structure is confirmed here. Generar and Arauca Bit had a high fixed commission structure (8.5 pesos on average) and low variable commission (2.1% of taxable income), while the other firms (excluding Met, which began trading in 2001) had the opposite system.⁹

⁹ Generar was taken over by Siembra in 2002, so that Arauca Bit and Met were left to represent the first group. The latter, however, did not charge a fixed commission when it began trading, even though its variable commission was always below the system average.

TABLE 4

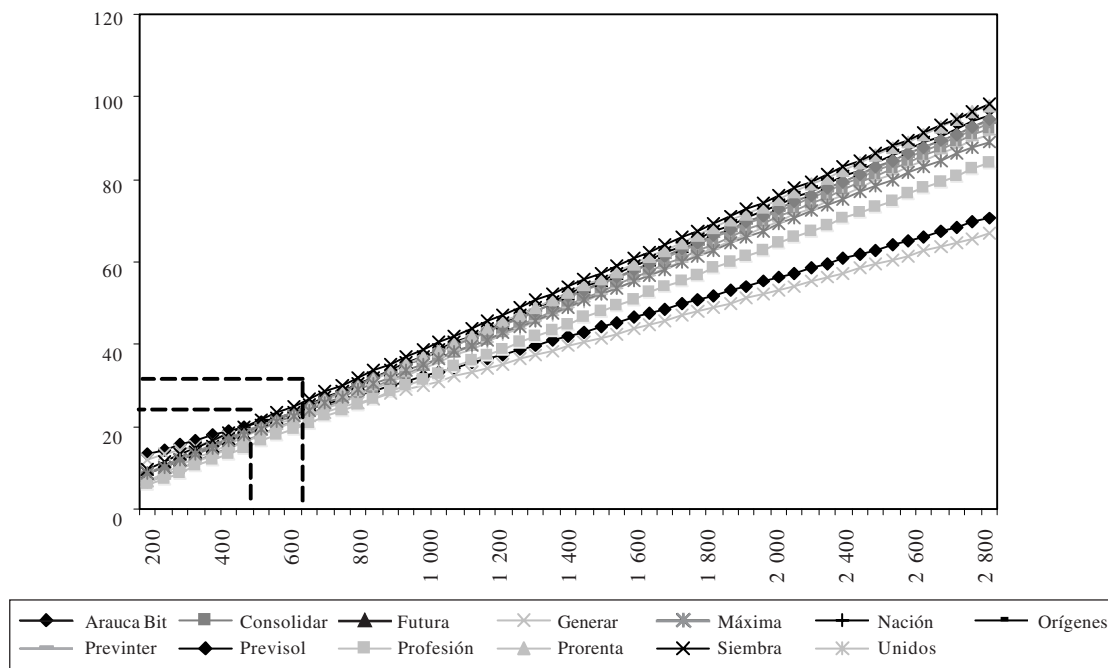
**Argentina: Percentage dispersion of variable commission
around system average, by firm, 1995-2004**

AFJP/Year	31/12/1995	31/12/1996	31/12/1997	31/12/1998	31/12/1999	31/12/2000	31/12/2001	31/12/2002	31/12/2003	31/03/2004
Generar	-19.65	-27.48	-25.54	-31.30	-31.84	-30.41				
Arauca Bit	-16.56	-14.86	-28.78	-28.03	-28.59	-27.10	-21.28	-20.95	-17.75	-17.75
Savia	-11.61									
Claridad	-8.83	-6.98	-4.50							
Futura	-7.29	-5.41	-2.88	-1.85	-2.62	-2.24	5.11	4.95	10.33	10.33
Unidos	-4.20	-2.25	0.36	1.42	0.62	2.73	6.45	6.29	14.34	14.34
Ethika-Jacarandá	-1.11	-11.71	-22.30	-21.48						
Más Vida	0.44	2.48								
Orígenes	0.44	2.48	5.22	6.32	5.49	7.70	5.11	4.95	4.31	4.31
Consolidar	1.98	4.05	6.83	7.96	7.12	7.70	3.76	3.61	3.91	3.91
Ethika	1.98									
Previnter	1.98	4.05	6.83	7.96	7.12	9.36				
Previsol	1.98	4.05	6.83	7.96	7.12	7.70	2.42	2.27	1.50	1.50
Profesión	1.98	4.05	3.60	-1.85	-2.62	-0.59	5.11	1.82	-13.74	-13.74
Activa-Anticipar	3.53	5.63								
Afianzar	3.53	-2.25	0.36							
Máxima	3.53	5.63	8.45	9.60	8.74	7.04	2.42	2.27	4.31	4.31
Patrimonio	5.07	7.21								
San José	5.07	7.21	10.07	11.23						
Siembra	5.07	7.21	10.07	11.23	10.36	7.70	2.87	2.72	16.35	16.35
Activa	8.16									
Fecunda	8.16	4.05	6.83							
Nación	8.16	2.48	5.22	6.32	5.49	-0.59	-1.60	-1.75	-5.72	-5.72
Prorrenta	8.16	10.36	13.31	14.50	13.61	11.01	2.42	6.74	-4.11	-4.11
Met							-12.78	-12.91	-13.74	-13.74
<i>System average</i>	<i>3.24</i>	<i>3.17</i>	<i>3.09</i>	<i>3.06</i>	<i>3.08</i>	<i>3.02</i>	<i>2.24</i>	<i>2.24</i>	<i>2.49</i>	<i>2.49</i>

Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

FIGURE 5

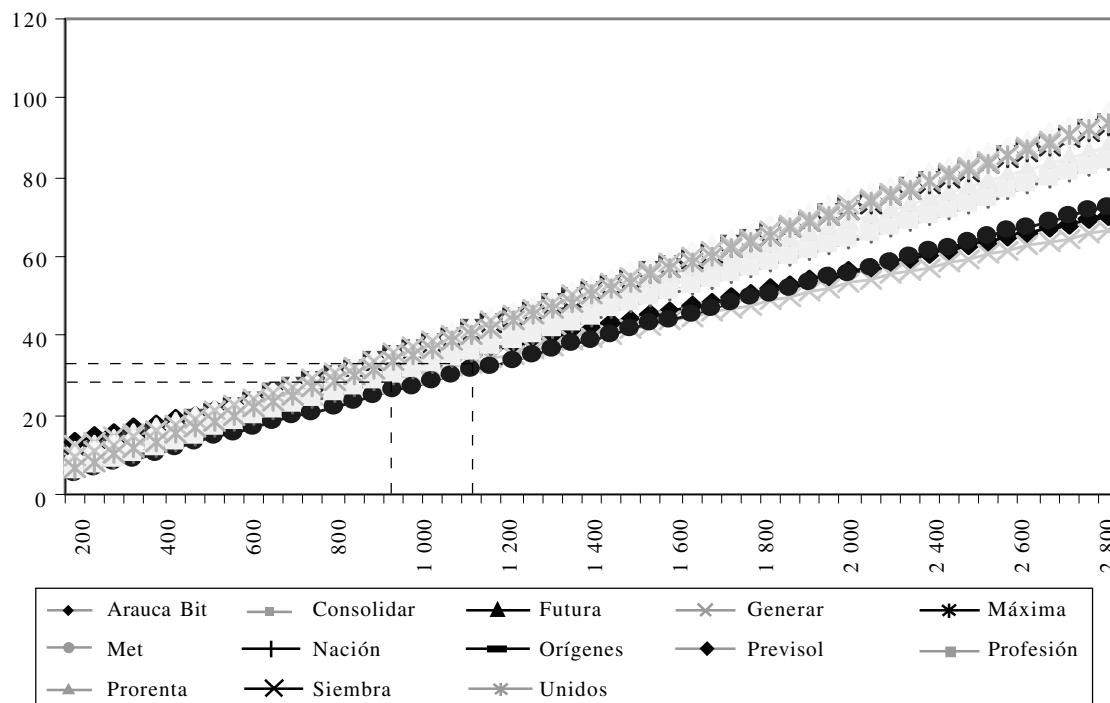
Argentina: Prices charged by firms up the income scale, pesos, 1999



Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

FIGURE 6

Argentina: Prices charged by firms up the income scale, pesos, 2001



Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

In 1999, marginal individuals were those with a taxable income of 1,200 pesos and 900 pesos, respectively, depending on whether Arauca Bit or Generar is considered. In 2001, the income values were 1,100 pesos and 900 pesos.

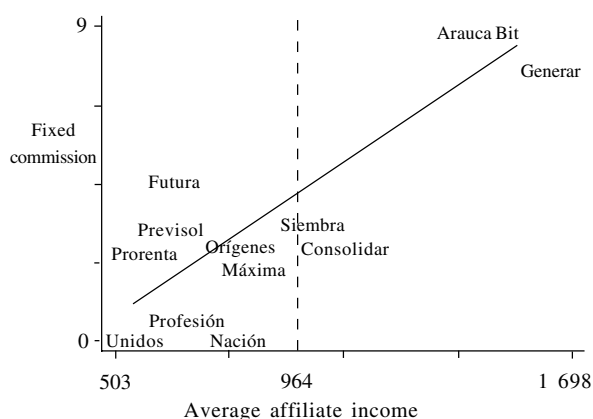
As a preliminary conclusion, two groups of firms can be identified on the basis of their pricing structures: on the one hand, firms that set a high fixed commission and a low variable commission, and on the other, firms with the opposite pricing strategy.

With a view to associating this differentiation in pricing combinations with a strategy of market segmentation by consumer income level, figure 7 shows the relationship between the average taxable income of affiliates and the fixed commission set by each AFJP for 2001.

Figure 7 excludes Met because it had a group of high-income affiliates (with an average salary of 2,391 pesos) but no fixed commission. The linear association between the two variables can be clearly observed, suggesting a positive relationship between fixed commission and affiliates' taxable income. Taking the whole of the period studied, the simple correlation index between the two variables is 0.60.

FIGURE 7

Argentina: Relationship between fixed commission and average affiliate income, 2001

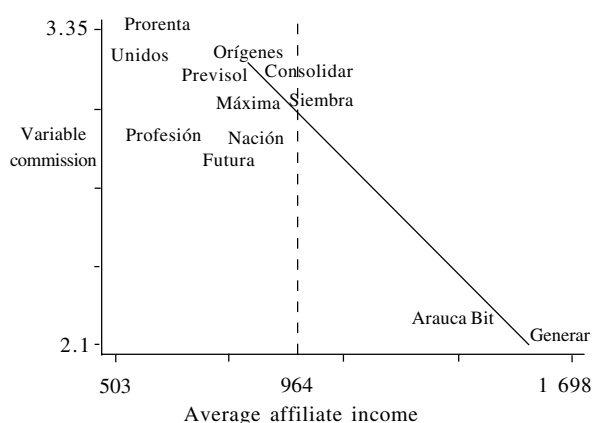


Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

Similarly, figure 8 presents the relationship between average affiliate income and variable commission in 2001. There is once again a significant relationship, negative in this case, between variable

FIGURE 8

Argentina: Relationship between variable commission and average affiliate income, 2001



Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

commission levels and affiliate incomes. Like the previous one, this chart excludes Met, which, in addition to establishing a low variable commission, took two additional measures to draw in more high-income affiliates. The first was its decision not to charge a fixed commission, and the second was its use of a business model based on branches and salesmen that targeted this group of consumers.

Again, as the last two charts show, there was significant dispersion between AFJP groups in the average income of their affiliates (the system average was 964 pesos). The average income of Arauca Bit, Generar and Met affiliates was 1,833 pesos, while affiliates of all the other system participants had an average income of 703 pesos. Both strategies had one and the same objective: to maximize average revenues. The profit equation (5) shows that the average revenues of each management company depended on the pricing structure established by the firm, the average income of its affiliates and the contributor/affiliate ratio.

On the basis of quarterly panel data for the period between December 1995 and September 2001, the linear average revenue function was estimated in natural logarithms, using least squares with fixed and random effects. The explanatory variables defined are the fixed price, the variable commission, average consumer income for each firm and the contributor/affiliate ratio. Table 5 shows the results.

The estimate arrived at using a fixed-effects intragroup estimator model is the one that fits best with

TABLE 5

Argentina: Estimated natural logarithms of average company revenue
Dependent variable: \ln (average revenue)

Variable	Fixed effect	Random effect
\ln (variable price)	-0.9144465 ^a (0.3063558)	-1.258644 ^a (0.2462656)
\ln (fixed price)	0.1174472 ^b (0.0680741)	0.0071327 (0.0536171)
\ln (average affiliate income)	0.1490118 ^a (0.0661792)	0.2384462 ^a (0.0561991)
\ln (contributors/affiliates)	1.200626 ^a (0.0652126)	1.20912 ^a (0.0599254)
Constant	-0.8827486 ^c (0.5255145)	-1.025611 ^a (0.474381)
No. of observations	269	269
R ²	0.8561	0.8761
F	141.67	
Prob > F	0.000	
Wald Chi ²		736.99
Prob > Ch ²		0.000

Source: Prepared by the author.

^a Statistically significant at the 1% level.

^b Statistically significant at the 5% level.

^c Statistically significant at the 10% level.

the Hausman test. Nonetheless, and in relation to the material analysed above, the explanatory variables of the model are partially correlated among themselves. This creates a problem of imperfect multicollinearity in the estimate, which means that the effect each of them has upon the dependent variable cannot be separated out. Given that this does not negate the significance of any of the coefficients estimated, however, and that the purpose of the present exercise is to ascertain the sign of these, the estimators are still the "best linear unbiased estimators" (BLUES).

With a good explanation of total variance (0.85), the results obtained are as expected. Variable commissions have a negative effect on firms' average revenues, while fixed commissions have the opposite effect. Again, affiliate income levels and the contributor/affiliate ratio have a positive effect on the average revenues of management companies. In summary, firms with lower variable commissions and higher fixed commissions obtain the highest revenues per affiliate. The larger the proportion of high-income affiliates in their customer base, and the higher the ratio of actual contributors, the stronger this positive effect is.

This being so, a higher contributor/affiliate ratio should mean higher average revenues and a better

financial performance, giving firms a greater capacity not only to survive in the market, but also to price their services more competitively. And the firms with the highest contributor/affiliate ratio are those that concentrate their efforts on high-income demand: Arauca Bit, Generar and Met.

This can be put down to the greater contribution payment capacity of high-income consumers, as a result of various factors such as a continuous record of formal employment and a greater financial capacity to cope with negative income shocks.¹⁰

The results obtained bear out the hypothesis of a price discrimination policy operated by two groups of clearly identified companies with a view to segmenting the market by the income level of demand, and to maximizing average revenues.

One group of firms maximizes revenues by increasing total membership irrespective of affiliate income levels, so that average revenues are low, while a second set of firms maximizes its revenues by attracting high-wage affiliates who are very likely to maintain an uninterrupted record of monthly contributions.

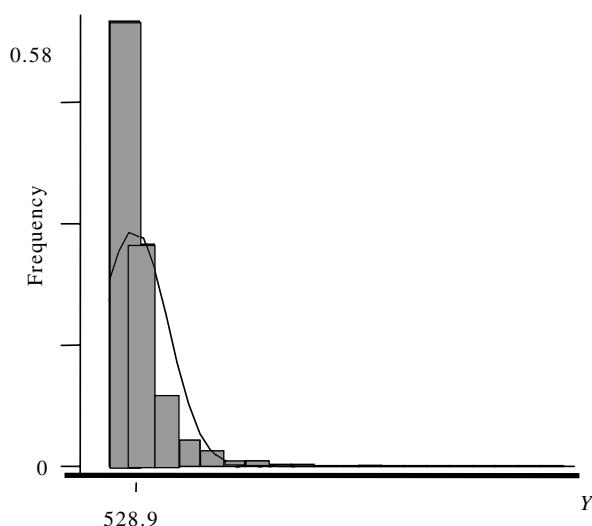
This raises a question: why did those management companies that concentrated on meeting medium- and low-income demand not react and change their business approach, particularly where pricing was concerned, so as to meet the demand from high earners and thus increase their average revenues?

Figure 9 shows the distribution of the employed economically active population by monthly income level in 2000. It can be seen that in 2000 the average income of the employed economically active population was 528.9 pesos, with a dispersion of 639.8 pesos. Thus, the population was concentrated in the lower-income brackets, while higher-income individuals represented the smallest share of the total.

For this reason, it may be suggested that while there is great dispersion in the income level of demand (employed economically active population), high-income consumers account for only a small share of the total market; consequently, the entry of new

FIGURE 9

Argentina: Distribution of the employed economically active population by monthly income level, 2000



Source: Prepared by the author on the basis of the Permanent Household Survey of the National Institute of Statistics and Censuses (INDEC, 2000).

competitors into this segment would destroy any existing economies of scale, forcing a reduction in the number of management companies targeting it.

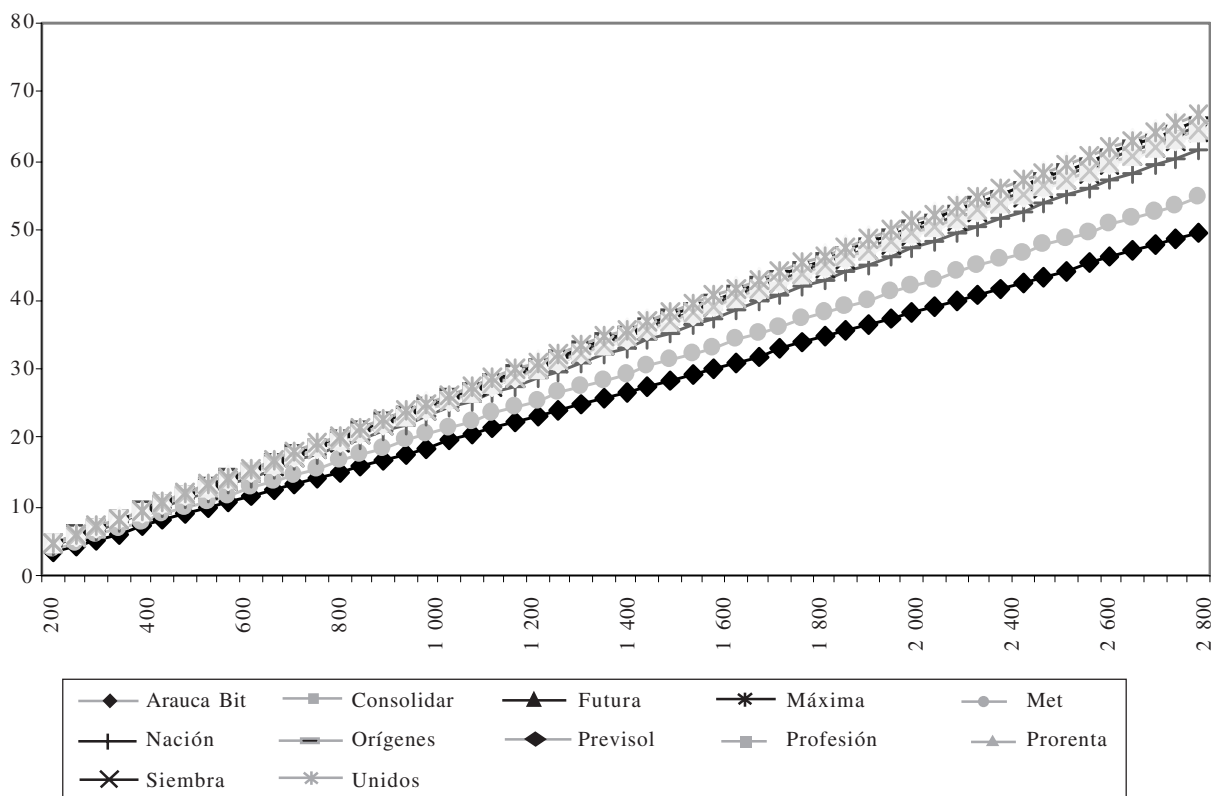
Decree No. 1495/01, which abolished fixed commissions, was approved in November 2001, reducing the potentially regressive effect of commissions on lower-income affiliates. Since then, companies have only been allowed to set a single variable commission calculated as a percentage of the affiliate's taxable income, which limits the scope for segmenting demand and forces them to set a single price (proportion of taxable income).

Figure 10 clearly shows how marginal individuals drop out of the equation, since there is just one type of price, in the form of a proportion of taxable income, and it is therefore technically impossible to segment the market.

¹⁰ An alternative hypothesis is that higher-income workers are those with more information and thus a greater appreciation of the future.

FIGURE 10

Argentina: Prices charged by firms up the income scale, pesos, 2002



Source: Prepared by the author using data from the Superintendency of Retirement and Pension Fund Management Companies (SAFJP).

VI Conclusions

With the passing of Law No. 24241, in force since July 1994, the Integrated Pensions System (SIJP) came into effect to cover the contingencies of old age, disability and death. This system consisted of two regimes: a public-sector regime of State-provided benefits financed on a pay-as-you-go basis and managed by the National Social Security Administration (ANSES), and a regime based on individual capitalization and operated by private-sector enterprises, namely the pension fund management companies (AFJPs).

The private-sector capitalization system has grown to a significant size since then, as the membership of that system has grown by more than that of the pension system as a whole, rising from a share of 66.7% of the

total in 1996 to 79.2% in 2002. Meanwhile, not only did membership of the pay-as-you-go regime decrease as a proportion of total system membership, but it actually fell in numerical terms as affiliates left it for the new private capitalization system, experiencing a negative variation of 13.66% between the two years.

Considering the results set out in section III of this paper, the AFJP market in Argentina has undergone a significant process of concentration, with the top four firms eventually capturing 72% of the market. This is a result both of mergers and acquisitions in the industry and of the regulatory framework governing the allocation of “undecideds” to management companies, chiefly in the early years of the system.

From the creation of the new private-sector capitalization regime to December 2001, management companies used a two-part non-linear charging method: a fixed component in pesos and a variable commission calculated as a percentage of the affiliate's taxable income.

As a consequence of this, two identifiable groups of firms emerged. The first consisted of management companies that set a high fixed commission and a low variable commission (in relation to the system average) with a view to capturing high-income affiliates. These included Arauca Bit, Met and Generar. The second consisted of companies that employed the opposite pricing policy with a view to capturing medium- and low-income affiliates.

This phenomenon is explained by differences in the price elasticities of demand. High-income affiliates have a lower fixed-price elasticity than medium- and low-income affiliates, given the percentage share of the fixed price in total revenue. Conversely, the variable-price elasticity of the former is higher than that of medium- and low-income affiliates.

Both these differentiated strategies were designed for a single objective: to maximize average revenues. One group of firms maximized revenues by increasing total membership irrespective of affiliate pay levels, giving low average revenues; a second set of firms, conversely, maximized their revenues by attracting high-income affiliates who were very likely to sustain a continuous record of monthly contributions.

In accordance with the profits function established in the present study, and on the basis of a quarterly panel of data from December 1995 to September 2001, the linear average revenue function was estimated in natural logarithms using least squares with fixed effects. The explanatory variables defined were the fixed price, the variable price, the affiliate's average wage and the contributor/affiliate ratio.

The results obtained suggest that variable commissions have a negative effect on companies' average revenues, while fixed commissions have the opposite effect. Again, affiliate pay levels and the contributor/affiliate ratio have a positive effect on management companies' average revenues. In

summary, firms with lower variable commissions and higher fixed commissions obtain the highest revenues per affiliate. The larger the share of high-income affiliates in their demand, and the higher the proportion of actual contributors, the more powerful this effect is.

This, then, is confirmation of the hypothesis of a price discrimination policy operated by two groups of clearly identified companies with a view to segmenting the market by the income level of demand, and to maximizing average revenues.

Nonetheless, the size of the high-income population meant that it was not economically efficient for new participants to concentrate on this segment of demand, since economies of scale would have been lost and average revenues would consequently have fallen to a point where some firms would have been forced out of the market.

The possibility of segmenting demand enabled participating companies to compete less on price and returns, since each group of AFIPs had some scope for acting in an oligopolistic manner within its own market segment. This entailed the establishment of a non-competitive equilibrium resulting in losses of surplus to consumers.

In 2002, the regulator sought to do away with the regressive effects of fixed commissions by banning the use of two-part tariffs. Since that year, companies have been required to charge a variable commission proportional to individual affiliate incomes. There is thus no technical scope for segmenting the market and a Bertrand game can be expected to ensue. However, there are alternative mechanisms for avoiding price competition in the whole market, such as product differentiation, targeted business approaches and tacit agreements that prevent an efficient market equilibrium from being attained.

What is required is the active involvement of the regulator, including the design of instruments to monitor closely the behaviour not just of supply (price levels, spending, type of advertising, etc.) but of demand as well, and to generate a greater flow of information to improve the decision-making of individuals, all this in a broader context of analysis that includes the cost structure of the industry, product differentiation policies and strategic behaviour.

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Structural change and domestic technological capabilities

Jorge Katz

This paper examines the role of structural change as a source of economic growth and institutional and technological change. With the creation of new activities in the economy, significant changes occur in institutions and in the way domestic production capabilities are organized, which alters the ultimate sources of growth in society. This is a complex process that involves ubiquitous externalities and new forms of clustering and direct interdependence between economic agents that the language of modern growth theory cannot fully capture. Neoclassical growth models construe economic growth in terms of an institution-free equilibrium algorithm that affords insufficient consideration to macro-to-micro interactions, changes in the structure of production, the co-evolution of economic, institutional and technological forces and the process of creation and destruction of production organization capabilities that obtains in the economy during the growth process. This paper argues that precisely these macro-to-micro interactions and the creation of new institutions and capabilities constitute the essence of development.

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I

Introduction

For more than three decades now, Latin American countries have conducted market-oriented structural reforms, opening up their economies to foreign competition, de-regulating markets, and privatizing economic activities, at different times and with varying degrees of success. These policy reforms represented a major departure from the inward-oriented, State-led regimes that prevailed in the immediate post-war period. The new policies –together with the rapid globalization of the world economy in the 1990s– worked a major transformation of the economic, institutional and technological environment in each of the countries. The structure of production and the operation of the institutional and socio-economic model has changed significantly in the Latin American countries and this, in turn, has affected growth, international competitiveness, equity and the development of domestic technological capabilities.

The neoclassical approach is not particularly useful for examining these issues. Modern growth theory construes economic growth in terms of an institution-free equilibrium algorithm that affords insufficient consideration to macro-to-micro interactions, changes in the structure of production, the co-evolution of economic, institutional and technological forces and the process of creation and destruction of production organization capabilities that occurs in the economy during the growth process. In our view, macro-to-micro interactions and the creation of new institutions and capabilities are crucial to understanding what economic development is all about.

The legacy of market-oriented reforms has fallen short of the expectations that policymakers and academic economists held in the 1970s, when these reforms were first promoted. This is clearly apparent from a comparison of recent GDP growth rates, international competitiveness and the economy's

capacity to create new jobs and to distribute the benefits of growth equitably among different walks of society, vis-à-vis the post war decades. Domestic technological capabilities have been hugely transformed by the destruction and creation of production capacity, yet they remain fragmentary and sorely insufficient throughout the region.

In all of the dimensions mentioned –growth, competitiveness, equity and the building up of domestic technological capabilities– the new Latin American economic model yielded much poorer results than expected (Katz, 2002 and 2003). Furthermore, notwithstanding the bonanza the region is currently enjoying thanks to buoyant world demand and high international prices for foodstuffs, raw materials and industrial commodities (what might be termed the “China effect”), the indiscriminate adoption of Washington Consensus ideas has left most of the region's countries still lacking an adequate long-term growth strategy that could simultaneously secure higher rates of economic expansion, reduce macroeconomic volatility, enhance competitiveness in world markets and yield greater equity and a more satisfactory overall technological and innovative performance. And yet, without such a strategy and performance, the Latin American countries will be hard put to narrow the productivity and income gap that separates them from the more developed industrial nations.

Throughout the 1990s, new sectors of economic activity emerged and many “old” ones were gradually phased out. Labour was pushed out of both manufacturing and agriculture and the informal sector of the economy expanded rapidly in most Latin American countries. The re-absorption of labour has not only been slowed by a low investment-to-GDP ratio, but has been further hampered by the transition to an environment in which production is organized digitally. The larger firms in the economy, many of them subsidiaries of TNCs or owned by local conglomerates, brought on board different forms of capital intensive, computer-based technologies for production organization, displacing old, more labour-intensive technologies and forms of organization. This process introduced a strong labour-saving bias into the economy. Most SMES have not reacted well to the new

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rules of the game because of capital market imperfections, a lack of technological capabilities or an imperfect understanding of the new responses required by a more open and deregulated macroeconomic policy regime. Thousands of SMEs were forced out of the market (with the closure of an estimated 8,000 SMEs in Chile and over 12,000 in Argentina in the 1980s), while the great majority of those remaining in business found themselves lagging behind large corporations in terms of productivity growth and innovation. One result of this is that average labour productivity in Latin America remains rather low by international standards. In fact, it is still apparently between 20% and 50% of average labour productivity in the United States, with Argentina and Chile in the upper part of the range and Ecuador, Paraguay and Bolivia in the lower part (Katz, 2003).

It may justifiably be argued that the market-oriented reforms and the process of world economic globalization of the last two decades have induced a major Schumpeterian episode of creation and destruction of production capacity, significantly altering the production structure and patterns of social organization. Business concentration has increased and so has the influence of foreign-owned firms in the economy. It is increasingly evident that large firms adapted better to the new policy environment than SMEs did, and the labour productivity gap between the two types has expanded significantly.

Even though the reforms have not delivered what they were expected to, they have nevertheless resulted in the emergence of a modern sector of economic activity in each of the region's countries. This sector accounts for some 40% of GDP in the richest countries and little more than some 10% in the poorest ones. It features new productive activities that were either absent from the economy just a few years ago or were performed using less modern technologies. These new activities include: (i) natural-resource-processing activities which now employ state-of-the-art technologies, such as genetically modified soybean and vegetable oil production in Argentina, salmon farming and winegrowing in Chile, fresh flowers in Colombia, and many others; (ii) high-productivity service industries including banks, telecoms, energy and tourism; and (iii) a few technology-intensive manufacturing activities, such as aeronautical design and construction in Brazil, or the assembly –mostly from imported parts and components– of motor vehicles and electronic equipment in Mexico.

Labour productivity has evolved at a much slower pace as an overall average than it has in the modern section of the economy, however. As far as average labour productivity is concerned, the region compares rather poorly with more developed industrial nations or with East Asian countries, many of which increased their long-term labour productivity throughout the 1990s. Thus, for the economy as a whole, the labour productivity gap vis-à-vis the more developed industrial economies remains as large as it was two decades ago.

The small fraction of society located in the modern sector of the economy enjoys well-above-average incomes and has gradually developed consumption patterns comparable to the great majority of citizens in developed industrial nations. For the individuals in this part of society, the question of whether convergence will ever occur is merely rhetorical, insofar as their lifestyle is quite similar to that of the citizens of, say, Madrid or Rome. Clearly, however, deeper and more intractable forms of social and economic exclusion have emerged in society and levels of informality and open unemployment are higher than in the past. A more confrontational variety of social relations –which has grown out of a climate of mounting frustration and despair– is now widespread, making political governance an increasingly difficult proposition in many Latin American countries.

This paper will look at the role of structural change as a source of economic, institutional and technological development. The importance of structural change as part of the development process, which is examined in Section II, was explicitly acknowledged by classical economists. It has been relegated to a secondary position in modern neoclassical growth models, however, which tend to construe economic growth in terms of an aggregate, economy-wide, institution-free algorithm and do not properly factor in structural change, macro-to-micro interdependencies or the co-evolution of economic, institutional and technological forces typical in the economic development process. Section III considers the empirics of this argument, showing the extent to which structural change has been a major force in Latin American growth in the past few decades. Section IV examines local technology generation in the region and section V looks at possibilities for technological development and innovation policies.

With the emergence of new activities in the economy, institutions and domestic production organization capabilities have changed significantly, affecting the ultimate sources of growth in society.

This is a complex process that involves ubiquitous externalities and new forms of clustering and direct interdependence among economic agents and public sector organizations, such as regulatory agencies, universities and municipal authorities, which the language of modern growth theory is inadequate to express. For all its highly stylized and elegant presentation, such theory simply lacks the ability to illuminate major details of the process. In order to shed light on these phenomena, we look at two specific cases in Argentina and Chile. In the case of Argentina, we examine the recent development of the genetically modified soybean and vegetable oil industry; in the case of Chile we look at salmon farming. We will show that the emergence of these new activities in the economy has been associated with the development of new institutions, new forms of clustering and the gradual expansion of domestic production organization capabilities which, as classical economists have always argued, constitute the essence of economic development –the ultimate explanation of how it occurs.

II

Structural change as a source of economic growth

In the classical tradition, which was brought back into vogue in the post-war period by such authors as S. Kusnetz, G.W.E. Salter, M. Abramovitz, N. Kaldor and, more recently, R. Nelson, S. Winter and P. Saviotti and J. L. Gaffard, structural change is considered a powerful source of economic growth. It is associated with more “roundaboutness” in the economy and with increasing returns to scale derived from specialization. A growing economy is one that becomes more complex and sophisticated as new sectors of economic activity are created and as new, more knowledge-intensive firms enter it. Concomitantly, new institutions, skills, and learning processes develop right across the productive and social structure. This is the process that led Kusnets and Abramovitz to differentiate between “immediate” and “ultimate” sources of economic growth. They view an expanding capital-to-labour ratio –resulting from a higher rate of investment to GDP– as an “immediate” source of growth, while learning, the accumulation of

Although new production activities have been successfully incorporated into the economy in the recent past, structural transformation in Latin American economies has been rather slow and average labour productivity has remained in the range of 30% to 50% of the figure in more developed industrial nations. Similarly, R&D expenditure is still just a quarter of the amount developed and emerging countries spend on creating and adopting new technologies. The diffusion of ICTs is still in its infancy in Latin America, since they reach only about a third of the population. Only the large firms in the economy have so far adopted computer-based SCM (supply chain management) and CRM (customer relationship management) techniques in their day-to-day operations. Thus, the transition to modernity is still fragmentary and unsatisfactory.

This state of affairs can be traced back to different forms of market failure and to the lack of public goods that could induce a faster rate of innovation and spur technology creation. If they are to achieve gains in innovation and productivity growth, Latin American economies need proactive government strategies and many new forms of public-private coordination.

domestic technological capabilities, institutional changes and the improvement of production organization capabilities are “ultimate” sources of economic and social development and represent hidden social forces at work under the surface. That we do not normally measure these –indeed, in many cases, we do not even know how to do so– in no way refutes their existence or negates them as the essence of development.

In this light, we believe that the long-term performance of any given economy should not be described exclusively in macro terms but rather as the outcome of the interaction between the macro and the micro and the co-evolution of economic, institutional and technological forces that converge in the process of economic development. Development (as opposed to growth) is associated essentially with the inception of new activities in the economy. It is not solely the action of good management of macroeconomic

variables upon expectations and upon the rate of capital formation; rather, it is a more complex social phenomenon in which institutional changes, changes in the division of labour (more roundaboutness in the economy), learning processes and the expansion of production organization capabilities are fundamental. Of course, macroeconomic stability is essential for these processes, but it should not be regarded as a sufficient condition in itself.

Many of these changes in the ultimate sources of growth converge in the process of inception of new activities in the economy. As production capacity expands, learning processes are triggered and new institutions (understood as long-term habits and patterns of social interaction among economic agents) emerge. The start-up of new activities is at the root of long-term transformation of society.

Contrary to conventional growth theory, which treats the production structure as given and construes its expansion over time as occurring along a balanced trajectory (like an expanding balloon –to borrow the illuminating metaphor used by A. Harberger (1998)– in which the relative size of each part of the structure remains unaltered as the balloon expands), it is apparent that structural change is actually what much of development is all about. Change in the production structure is what admits increased roundaboutness, specialization and productivity growth, as well as the gradual expansion of more knowledge-intensive production activities, including the production of capital goods and engineering services.

Furthermore, after new sectors of economic activity have developed, changes gradually occur in the industrial organization and competitive regime of the emerging activities. New firms begin to enter these activities, markets become more contested and efforts increase to differentiate products and enhance international competitiveness. New forms of collaboration and clustering emerge among firms and they develop new patterns of interaction with each other and with other organizations in the economy, such as universities, engineering companies, trade unions, banks and insurance companies, regulatory agencies, municipalities and so forth. There is no single, universal pattern to this process. No “one-size-fits-all” model of structural transformation adequately describes all the situations that arise in real life. Variety and the dynamics of social and technological transformation are the very essence of the process. Sometimes the dynamic agent driving the creation of a new economic activity is a multinational corporation (or more than one), which is

instrumental in transferring technology, opening up external markets, training domestic labour and subcontractors and enhancing domestic engineering practices. In other cases, the process is driven by family-owned SMEs or by large domestic conglomerates, which may be public, private or both. Of course, the industrial organization model and the learning process of firms and public organizations vary according to market structure and performance, the pattern of clustering and interactions between large and small firms in the economy, subcontracting practices, access to external markets and so forth. Far from being neutral in this process, the State is frequently an active agent playing a role through regulatory agencies, financial institutions, universities and municipal authorities, providing public goods, creating markets and institutions and developing the technological capabilities that act as catalysts in the process.

The differences in the way economic sectors move along the learning path and the effect of different types of government intervention in terms of inducing innovation and economic expansion came out quite clearly in the East Asian Miracle study conducted by the World Bank (World Bank, 1993). The research findings certainly surprised the World Bank researchers, who had expected conventional market forces to underlie the successful growth experience of Hong Kong, the Republic of Korea, Singapore and Taiwan Province of China. Instead, they found that the Republic of Korea was, basically, a story of *cheabol* and high business concentration, while the driving forces in Taiwan Province of China were SMEs with much less economic concentration, and development dynamics in Singapore were powered by TNCs. Nevertheless, in all three cases, the researchers also found significant public-sector involvement in supporting the start-up of new activities in the economy or creating the markets, institutions and domestic technological capabilities to backstop growth. The State took steps to coordinate firms and public-sector R&D agencies and to develop the public goods needed to accelerate the process of economic development.

By the same token, the recent expansion of salmon farming and winegrowing in Chile, of genetically-modified soybean and vegetable oil in Argentina and of the fresh flower business in Colombia all reflect quite different economic and institutional models as regards the creation of new production activities and export capabilities. They have all come about through quite different processes of institutional, social and technological transformation. In none of the three cases

can successful expansion be put down to good macroeconomic management alone. Whereas salmon farming in Chile was driven basically by SMEs, with the State playing a proactive role through the Chilean Development Corporation (CORFO) and the Chile Foundation, the development of the soybean and vegetable oil industries in Argentina was powered by large TNCs –Monsanto among others– with less public sector intervention. Also, the soybean and vegetable oil industries in Argentina exhibit much less clustering and fewer externalities than Chilean salmon farming does.

In the early years of the development of a new industry, growth is conditioned by the rate at which new production capacity can be created (Saviotti and Gaffard, 2004). On entering the economy, new firms –local and foreign alike– build new plants, hire labour and cultivate subcontractors. They make decisions on the basis of their expected profits, which depend on the existence of a large market for them to cater for and on the global macroeconomic and institutional scenario in which they operate. The expectation of a large market creates a strong incentive to build new production capacity, but the rate at which this capacity comes on stream depends on the availability of financial resources, production know-how, trained labour and country-and-sector-specific institutional and regulatory conditions.

The high gross margins normally yielded during the early period tend to narrow as imitations emerge and new firms enter the market. Market structure gradually shifts towards a more competitive model in which growth is determined by the rate of expansion

of demand, whether domestic or foreign. The industry gradually comes to a plateau in which Schumpeterian rents diminish and price competition and product differentiation become key components of individual firms' corporate strategy. This is basically the story behind the recent expansion of salmon farming in Chile and genetically modified soybean and vegetable oil production in Argentina, as this paper will go on to discuss. In both cases, the successful development of a new economic activity has given rise to new institutions and new patterns of international competitiveness in the economy.

From this perspective, the greater or lesser success of any development process has much to do with the introduction of new production activities into the economy. Chile, in particular, went through a successful process of structural transformation in the late 1980s and the 1990s. Chile's mining, telecoms, pulp and paper industry, salmon farming and transformation of winegrowing into a highly internationally competitive, state-of-the-art industry patently exemplify an economy that has come through a successful process of structural and institutional transformation. Latest-generation plants, professional management, increasingly sophisticated regulatory institutions and local clustering developed on a par with growing penetration in world markets. The public sector, far from adopting a hands-off strategy, played an active role in this process. The Chilean process is a palpable example of structural and institutional transformation that a conventional macro account of the economy's performance simply fails to capture.

III

Structural change, the emergence of new activities in the economy and the development of new sectoral regimes

This section will examine the empirical evidence on structural changes in the economy of the region over the past three decades. Table 1 shows the changing composition of manufacturing output in Argentina, Brazil, Chile, Colombia and Mexico over the period 1970-2002. It also gives a structural change index

calculated by ECLAC on the basis of its Industrial Performance Analysis Program (PADI).¹

¹ The figures shown in table 1 were calculated using the Commission's PADI software. Thanks are due to G. Stumpo and J. Marinovic of the Division of Production, Productivity and Management of ECLAC for providing access to the data and helping with calculations.

TABLE I

Latin America (five countries): Changes in the structure of industry, 1970-2002^a

	Argentina				Brazil				Chile				Colombia				Mexico			
	1970	1996	2000	2002	1970	1996	2000	2002	1970	1996	2000	2002	1970	1996	2000	2002	1970	1996	2000	2002
I	13.2	9.9	8.6	6.7	16.2	25.6	26.0	26.5	11.4	10.4	10.5	10.0	12.3	10.1	8.7	9.0	12.0	14.4	16.4	15.6
II	10.9	7.2	7.4	6.1	6.8	7.3	8.3	8.9	5.5	1.9	2.3	1.9	3.0	6.5	4.9	6.5	8.4	14.6	18.8	18.6
III+IV	47.8	62.1	65.3	71.7	37.8	43.4	41.6	41.5	58.3	59.7	60.7	61.9	46.2	55.4	57.0	57.1	43.2	43.4	39.1	40.8
V	28.1	20.7	18.7	15.6	39.2	23.7	24.0	23.1	24.9	28.0	26.5	26.2	38.5	28.1	29.4	27.3	36.4	27.6	25.8	25.0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
sci ^b		14.3	18.0	25.3		18.9	32.3	27.6		40.1	27.3	33.5		19.4	29.9	30.9		17.3	22.1	22.5

Source: Industrial Performance Analysis Program (PADI), software developed by the Industrial and Technological Development Unit of the Division of Production, Productivity and Management of ECLAC.

^a Structural change index, base year = 1970.

^b I = Engineering-intensive industries, excluding automobiles (International Standard Industrial Classification of All Economic Activities (ISIC) 381, 382, 383, 385).

II = Automobiles (ISIC 384).

III+IV = Natural-resource-intensive industries. Foodstuffs, beverages and tobacco (ISIC 311, 313, 314); resource-processing industries (ISIC, 341, 351, 354, 355, 356, 371, 372).

V = Labour-intensive industries (ISIC 321, 322, 323, 324., 331, 332, 342, 352, 361, 362, 369, 390).

Table 1 shows that Argentina, Brazil, Chile and Colombia have experienced a radical transformation in their industrial structure over the past three decades, in a shift towards natural-resource-processing industries and food production. Examples of such transformation are the production of genetically modified soybeans and vegetable oil in Argentina, winegrowing and salmon farming in Chile, fresh flowers in Colombia and steel and pulp and paper in Brazil.

Mexico's structural transformation followed a different direction. In Mexico natural-resource-processing actually contracted as a proportion of manufacturing output, while the motor vehicle industry expanded relative to other activities. As well as motor vehicles, another industry to expand in Mexico was the assembly of television sets, video recorders and computers for the United States market, mainly from imported intermediate parts and components. Maquila-type assembly industries, which make intensive use of cheap unskilled labour, are typical of the structural transformation in other countries in the region such as Honduras, El Salvador and Guatemala, as well as Mexico.

The structural change index quoted in table 1 indicates that, of all the economies, Chile's underwent the strongest process of structural transformation in 1970-1996. In the late 1990s, the Chilean structural

change index² contracted sharply, indicating that the incorporation of new productive sectors into the economy slowed in this period. In effect, between 1998 and 2003 investment as a percentage of GDP and the economic growth rate both slowed heavily in Chile, at the same time as the structural transformation of the economy lost momentum.

As noted earlier, the start-up of new production activities is normally associated with major economic, institutional and technological changes that co-evolve within the process of economic development and influence each other in ways that are complex and as yet little understood. Seeking to shed light upon this process, there follows a brief examination of two specific cases: genetically modified soybean and vegetable oil production in Argentina and salmon farming in Chile.

1. Genetically modified soybean and vegetable oil production in Argentina

Transgenic crops began to be commercialized more widely in the world in 1995. By 2002 there were nearly 60 million hectares under cultivation, 14 million of them

² The structural change index is prepared by the United Nations Industrial Development Organization (UNIDO) to measure the intensity of change in industrial structure.

in Argentina. More than 90% of the soybeans produced in Argentina today are of the genetically-modified variety and the country is the world's second largest producer, after the United States.³

The transition from conventional to genetically modified soybeans entailed a major transformation in production organization and in agricultural institutions in Argentina. Zero tillage and contract agriculture now prevail, with the traditional farmer playing a much smaller role as an agent of production organization. This role has been taken over by large independent agricultural engineering companies and subcontractors that serve a series of different farms and organize production. Risk contracts for financing and production organization are now signed with financial intermediaries and banks specializing in the financing of soybean production. The subcontracting companies use a technology package –seeds, fertilizers, herbicides– which is the private property of large TNCs such as Monsanto, Cargil, and others.⁴ This is clearly a departure from the pattern that prevailed during the green revolution of the 1960s, when agricultural technology was basically a public good distributed by State agricultural agencies.

Many new institutions (in the sense of habits of social behaviour) have emerged in the transition to genetically modified soybean in Argentina. For example, as much as 40% of the seeds used in a given agricultural season are believed to be retained from the previous year (the so-called *bolsa blanca*) and sold as unauthorized versions in violation of Monsanto's property rights over the technology. Monsanto did not adequately patent its technology for genetically modified soybeans and the associated herbicides at the

outset in Argentina, and the firm is now beginning legal action aimed at blocking Argentine exports of soy pellets to world markets, on the grounds that Argentina is infringing its intellectual property rights in this area.

A look at vegetable oil production from genetically modified soybeans yields a similar picture of major economic and institutional change. New state-of-the-art plants built in the 1990s house highly automated catalytic production facilities whose labour productivity is tenfold that of the 1970s manufacturing technology commonly found in Argentina until quite recently. The industry's level of employment generation is quite low. The oil production sector is highly concentrated and dominated by a few large local conglomerates. Foreign capital has entered the industry only recently, with acquisitions of domestic firms.

All this indicates that the development of genetically modified soybean and vegetable oil production in Argentina involved major changes in institutions, production technology and industrial organization. Increasing returns to scale, externalities and many new technological capabilities have emerged in the economy.

2. Salmon farming in Chile⁵

The Chilean salmon farming industry has attained international competitiveness in a process that has spanned the best part of two decades. During this time, many new local and foreign firms have entered the market, sector-specific institutions and skills have developed and what was originally a quasi-cottage industry has come to be professionally managed, all of which has significantly altered production organization and international marketing practices. The cumulative impact of these changes gradually led Chile to acquire world-class status as one of the world's three main salmon farming countries, together with Norway and Scotland.

In the second stage, the industry rapidly increased in size and complexity, as large numbers of suppliers of intermediate inputs and services firms entered the market and a strong sector-specific industrial cluster was built up. The role of the State changed radically in this period: it withdrew from the role of dynamic agent inducing the inception of a new activity to concentrate

³ Brazil is also a large producer of soybeans. Argentina, Brazil and the United States together account for nearly 95% of the total world supply of soybeans, but so far Brazil has not ventured into the genetically modified variety. Brazil's large output consists basically of conventional soybeans and the country has not approved genetically modified soybean for production (Trigo and others, 2002).

⁴ Interestingly enough, Monsanto, the global owner of the Roundup Ready patent, opted not to register the patent for genetically modified seeds in Argentina, distributing the product instead through private arrangements with large contractors and distributors. It is believed that this reflected the company's lack of confidence in the Argentine patent system. It will also be recalled, however, that the genetically modified seeds must be used with the correct herbicide –glyphosate– which is also owned by Monsanto. Hence, intellectual property rights and the capacity for enforcing them in a particular institutional environment constitute an important determinant of market conduct in the framework of the current industrial organization (Ablin and Paz, 2000, p. 8).

⁵ This section is based on a previous paper prepared by the author for the World Bank (see Katz, 2004).

instead on developing the regulatory framework and surveillance mechanisms that govern the sector today. The State also supported the industry in international negotiations when United States salmon farming firms made allegations of dumping against Chile.

The third stage in the industry's development was a major transformation in industrial structure, which came about through mergers and acquisitions (M&A), changes in plant ownership, foreign direct investment (FDI) and a rapid process of internationalization.

In less than twenty years, Chile's salmon exports –consisting almost entirely of farmed fish– increased from less than US\$ 50 million in 1989 to around US\$ 1.7 billion today. Salmon exports now account for close to 6% of all Chilean exports. From an almost negligible 2% in 1987, the proportion of world salmon production Chile accounts for rose to nearly a third in recent years. A large number of economic, technological, and institutional forces have been involved in the process.

In the early years of salmon farming, public organizations, foreign companies and a large number of SMEs were involved. Although the public sector clearly played an important role right from the beginning, it is also true that a new generation of Chilean entrepreneurs emerged with salmon farming and began to drive the industry. Regulatory and sanitary activities, including fishing and farming permits, environmental impact surveillance and control of salmon egg imports, are performed by government agencies such as the National Fisheries Service (SERNAPESEA) and the National Environment Commission (CONAMA). The legal infrastructure to support these activities was set up in the late 1970s and the 1980s and was later substantially improved to comply with international standards (*Aquanoticias*, 1997a).

In the early years, the industry employed quasi-cottage production practices and mainly imported genetic material. Companies still prepared salmon food, a main component of aquaculture costs, every day using fresh raw materials. The conversion rate from food to fish was more than 3:1, i.e., three kilogrammes of fresh food per kilogramme of salmon –more than triple the industry's input-output coefficient today. Clearly, then, there have been large productivity gains and individual firms have undergone major learning processes (*Aquanoticias*, 1997b, p. 24). Such examples abound in relation to cultivation tanks, vaccines, final product processing and so forth (*Aquanoticias*, 1998, p. 12).

By the late 1990s, Chilean salmon farming had attained many of the features of a mature⁶ oligopoly it has today. World prices for salmon fell significantly in the second half of the 1990s, approaching the industry's long-term unit production costs. Gross margins narrowed as competition and contestability increased in salmon markets. The industry's technological and competitive regime became more demanding as a result of mergers and acquisitions, which substantially increased average company size, capital intensiveness and technological sophistication and heightened business concentration.

A number of general conclusions may now be derived from the foregoing discussion of economic, technological and institutional factors underlying the inception of genetically modified soybean and vegetable oil production in Argentina and salmon farming in Chile.

In both Argentina and Chile, the structural change of the past two decades has been strongly biased towards natural-resource-processing activities, mainly agricultural products and foodstuffs, pulp and paper, fisheries, gas and petroleum. This structural transformation raises many new questions over the impact of the process and the biological, genetic and environmental consequences of growth based on more intensive exploitation of natural resources.

Clearly, the sustainable exploitation of agricultural land, marine resources, forests or mines demands a basic knowledge and understanding of such disciplines as biology, genetics, marine sciences, mineralogy, immunology and many others related to the conservation, depletion rate and rational exploitation of these resources. Some of this knowledge and understanding can be developed through the use of off-the-shelf knowledge and technology available in the international market. Importantly, however, much of the knowledge base needed for these activities is highly country-and-location-specific, since the physical, biological and ecological conditions vary significantly in different production locations. This is also true of the capital goods and intermediate inputs needed in each

⁶ What a mature industry is, and how the notion applies to salmon farming, was clearly illustrated in a recent public address given by Torben Petersen, Chief Executive Officer of Fjord Seafood Chile (a subsidiary of the Norwegian company of the same name). He said, "The real maturation process begins when we see that company actions are aimed at the markets and not at production, in other words, when salmon farming growth is determined by its market and not by its production" (*Aquanoticias*, 2004).

case. In other words, the metaphor of ready-made production functions waiting to be lifted from some sort of international technology shelf does not really apply to the scenarios that concern us. Applied research and development efforts are needed to adapt internationally available capital goods and intermediate inputs to local conditions and to design and bring on stream others that are specific to particular locations. Public sector R&D organizations, university-based research laboratories and domestic engineering firms should be steered into technological missions aimed at developing new country-and-location-specific know-how and production organization technologies.

An examination from this perspective prompts the usual questions about market failure, lack of public

goods and the imperfect appropriability of benefits. The need for government intervention is evident if Latin American countries are to exploit their natural resources in a rational and sustainable manner. Undoubtedly, good macroeconomic management is a *sine qua non* for success, but what is crucial –and what the public sector must carefully consider if Latin American countries are to properly realize the growth potential embodied in their rich natural-resource endowment– is the technological, economic and institutional complexity of each particular situation. This leads to the examination of how technology-generation capabilities have evolved so far in the region and what needs to be done on this front in the years ahead.

IV

Domestic technology-generation efforts in Latin America

Latin American firms have not so far shown much interest in being part of technology generation efforts to develop proprietary technology. Unlike successful firms in other catching-up economies, Latin American firms have not, until now, given much indication of significantly expanding in-house R&D activities nor of strengthening links with local universities, public sector labs and engineering firms to develop new product designs or new process technologies. Nor have they attempted to export “pure” forms of technology or know-how resulting from their internal learning processes, as Swedish and Finnish firms have done in the pulp and paper sector, Netherlands and Scottish firms in salmon farming and dairy products, and Canadian firms in cooper refining.⁷ Most Latin American firms seem to be content with a more passive stance on those matters.

Is it simply a matter of time until Latin American companies eventually work up an appetite for a more dynamic take on this front, or is this a long-term pattern of behaviour that will need a different public policy approach to inject technological dynamism into the business sector of the economy? We believe this latter to be the case, as explained below.

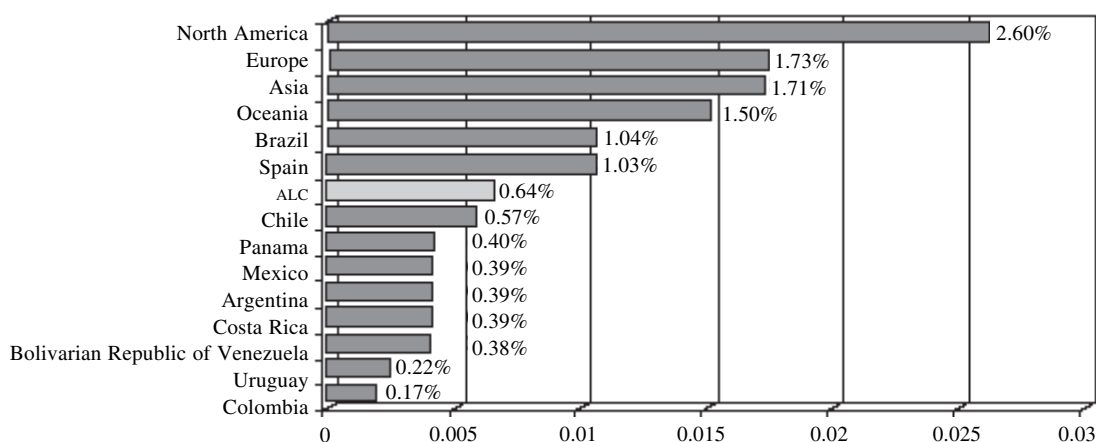
Latin American firms’ lack of involvement in technology generation appears to be a deeply-rooted feature of local production organization models deriving, on the one hand, from the fragmented and inefficient public sector knowledge-generation infrastructure Latin American countries erected during the post-war period and, on the other, from the lack of incentives for firms to expand in-house technology-generation efforts and R&D expenditure.⁸

Spending on R&D has always been low in the region, usually no more than half a percentage point of

⁷ This said, interestingly enough, Argentine, Brazilian and Mexican metalworking firms and engineering consultants exported pure technology in the form of turn-key plants and licensing contracts in the 1970s and early 1980s. This went unnoticed in the wave of highly derogative criticism of inward-oriented industrialization in the 1980s. On the topic of Latin American technology exports, see Amsdem (2001).

⁸ Many Latin American firms systematically engage in adaptive knowledge-generation for process and product improvement. Although much of this involves incremental knowledge generation and changes in production organization routines, these activities are not normally captured by conventional surveys measuring R&D efforts at the individual company level. Being informal, efforts of this sort and the spending they entail are normally underreported.

FIGURE 1

Selected countries and regions: investment in R&D as a percentage of GDP, 2002^a

Source: prepared by the author.

^a ALC = Latin American and the Caribbean.

GDP. It varies between a third and a quarter of more advanced countries' allocations to new technology development, as figure 1 indicates. Moreover, 80% of total R&D expenditure has traditionally been carried out by the State in public sector laboratories and State universities.

We still know very little about why public or private organizations and institutions work well (or not) as generators and disseminators of knowledge in any given country. We do know, however, that markets do not perform well in this respect, as a result of imperfect information, weak property rights, lack of human capital endowments and many other reasons. Much of the lack of individual firm involvement and inefficient country-wide behaviour as regards technology generation and diffusion may be put down to poor organizational design, little effort to coordinate and absence of the right kind of market and non-market incentives. How much a country spends on R&D activities is certainly an important indicator of its commitment to technology issues, but even more important than the expenditure itself is the efficiency of local R&D organizations and laboratories in transforming those resources into technological know-how for the production of goods and services. Poor functioning and slack performance on the part of institutions and an inadequate incentive regime are the main reasons for the negligible part domestic technology sources have played so far in innovation in Latin America. A long road remains to be travelled

before domestic firms, universities, engineering consultants, banks and insurance companies, professional associations, municipalities and government officials in general learn how best to deal with questions of innovation and domestic technological development. How can venture capital markets capable of financing innovation efforts be created? How can would-be entrepreneurs graduating from university laboratories be oriented? How can innovation be made affordable to SMEs? What role could technology parks or incubators play in this connection? These and many related questions have yet to be answered satisfactorily in most Latin American countries.

Furthermore, as noted earlier, when growth is based on the exploitation of natural resources further complications arise as a result of the unique economic, institutional and technological circumstances surrounding the sustainable exploitation of such resources. Some are renewable and others are not. The opportunity cost associated with depletion and renewal varies hugely from one field of economic activity to another, depending on biological and environmental circumstances. Firms' economic behavior is influenced by the cost of exploration for new sources of supply, the biological life cycle and natural rate of depletion of each location, the cost of environmental conservation, the nature of the regulatory framework and system of property rights in which the resource is to be exploited, and so forth.

These circumstances affect the planning horizon with which firms enter the activity, the long-term profit rates underlying investment programmes and the strategy according to which each firm decides to stay

in or exit the activity. The political climate that develops in each country in relation to natural–resource exploration/exploitation also bears heavily on company strategy.

V

Policies for technological development and innovation

To achieve better growth performance and enhance international competitiveness it is essential to expand domestic R&D efforts and heighten the efficiency with which domestic knowledge-generation activities are organized and performed in the economy.

In order to expand knowledge-generation and diffusion activities Latin American countries have to tackle financial, human capital and institutional constraints. In Latin America, national innovation systems are still highly fragmented and uncoordinated pieces of social machinery, whose various parts must function in a more coordinated manner in order to expand productivity growth and increase the rate of innovation.

It is crucially important for the countries to increase their resource allocations for R&D, but it must also be a high priority to enhance the productivity of the resources now allocated to knowledge- and technology-generation activities. The private sector needs to be persuaded to expand its commitment to R&D and technology absorption. Strengthening intellectual property rights and providing financial incentives are possible ways to achieve this. It is necessary to establish adequate judicial mechanisms to enforce property rights, given the weak legal environment in this respect in most of the region's countries today. This should be undertaken within an appropriate framework of competition policies that would prevent monopolistic market exploitation by those firms whose patents are to be strengthened.

The public sector certainly has an important role to play through universities and R&D laboratories, simply exploring the frontier of knowledge as regards the sustainable exploitation of natural resources, i.e., molecular biology and biotechnologies, genetics and immunology, and human and animal health sciences and biotechnologies (including those related to vaccines

and pharmaceuticals), as well as in the expansion of computer sciences and information technologies, which are fundamental in the transition to a learning economy. However, the private sector needs to be cajoled into taking a more hands-on, committed approach to the development and adoption of new technologies downstream from the basic sciences, if Latin American countries are to attain a more rapid pace of innovation and technological progress. This is essential to help the countries to expand their exports of products with higher domestic value added, on the one hand and, on the other, to provide the public goods and services for much broader-fronted environmental protection in the transition to a more natural-resource-intensive production frontier.

Other members of the national innovation system –such as banks or insurance companies, universities and municipal authorities– should also be induced to engage more actively in domestic technological matters, exploring new mechanisms to develop venture capital markets, schemes to build up human capital and institutional arrangements related to diffusion of technology in the economy and the protection of property rights and the environment. New forms of venture capital markets should be explored with a view to the financing of R&D efforts. In many countries, governments are actively seeking out alternative institutional modalities through which pension fund systems could be prevailed upon to take a more active role in this direction. Another possibility to consider is for the government to act as a second-tier financial intermediary, decentralizing the management of public R&D funds to commercial banks and inducing the banking system to be more active in financing R&D activities. Around the world, a number of countries are successfully developing new forms of social engineering in this connection.

The creation of technology parks and incubators should be explored in fields such as agribusiness, aquaculture, novel uses of timber in housing and furniture and other fields downstream from the rich natural resources now being exploited in the region. Stimuli should be provided for firms offering computer software and engineering services for SMEs, since software providers currently seem to be catering almost exclusively for the needs of large firms, thereby making computer-based production organization technologies almost inaccessible for most SMEs.

Strengthening the production fabric at the local and municipal level requires many new forms of collective action and public sector coordination. The rationale for this is that acting at the local level generates strong network externalities. The development of industrial clusters around the exploitation of natural resources creates opportunities for collaborative efforts among municipalities, regional universities, research centres and small family enterprises, exploring forms of interaction that remain essentially untapped in the region in areas such as agribusiness and pharmaceutical products. Biotechnologies seem to be opening a major window of opportunity in this area.

Admittedly, it is a complex matter to generate local-level collective action and greater coordination efforts for producing and disseminating technological know-how. Demand subsidies and public brokers could be used to help SMEs develop R&D and innovation projects for submittal to public R&D financing agencies and banks. Fruitful experiences of this type conducted recently by Brazil, Chile and Costa Rica suggest that efforts to develop capital markets may play a key role at the local and municipal level. Risk-sharing contracts, public tenders and competitive bidding should be explored in order to spur private firms' interest in technology-generation efforts.

The matter of expediting the transition to a knowledge-based economy should be a strategic policy issue for the immediate future. A broader availability

of ICT-related public goods should have a strong positive impact in terms of productivity growth and of equitable access to digital goods and services in society. This is a prominent subject on the policy agenda of many countries that are making progress in the expansion of digital infrastructure in schools, hospitals and municipalities in the world today. This process could be combined with stronger support for the development of domestic software providers and contents industries that cater specifically to the health, educational and municipal needs of regional and local communities. Expanding internet connectivity and narrowing the international and domestic digital divide will take careful intervention not only in technology and finance, but also in the regulatory sphere (in relation to the functioning of the telecoms industry). Issues of compatibility of standards and network creation should be addressed in the transition to a digital economy.

Which policies will or will not work to enhance the technological performance of any given country is difficult to assess *ex ante*. The induction of knowledge generation and diffusion efforts in the economy and the expansion of equitable access to many of the goods and services necessary for the transition to a knowledge-based digital economy are highly country-specific matters. No one-size-fits-all policy is likely to succeed. Evidently, there is no way round trial and error and a highly pragmatic approach to these issues. The experiences of the dynamic East Asian economies, whose successes and failures as regards the design and implementation of technological policies are reported in the academic literature, and the cases of Ireland, New Zealand and Israel all confirm that there are no universal recipes in this field. Different forms of capitalism exist around the world and it is time for Latin American governments to actively seek out their own brand, phasing out the old Washington-consensus ideas of the 1980s and starting to experiment with country-specific interventions aiming at developing a more vibrant national innovation system.

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Industrial policy and development

Wilson Suzigan and João Furtado

This article examines some theoretical approaches in support of industrial policy in Brazil, with special emphasis on the neo-Schumpeterian/evolutionary approach. This approach is applied to the analysis of some satisfactory experiences in the field of industrial policy and economic development in Brazil up to the end of the 1970s, and some unsuccessful attempts in this field from the 1980s on. Lastly, it evaluates the industrial policy applied by the government in the 2003-2006 period, noting that, in spite of some positive aspects –the emphasis on innovation, clear goals and a new institutional organization– that policy has some weak points, such as its incompatibility with macroeconomic policy, lack of coherence between economic instruments, shortcomings in infrastructure and in the science, technology and innovation system, and lack of coordination and political will.

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I

Introduction

One of the most characteristic aspects of the lag in the economic development and also, by extension, the social development of Brazil has been the poor performance of industry in the last 25 years. This reflects the various problems faced since the 1980s in the practical implementation of industrial policy. Although some official documents on industrial policy prepared between the mid-1980s and the mid-1990s were publicly announced, they did not come to be put into effect, except for some programmes or policies with specific objectives (reform and programmed reduction of customs tariffs, temporary protection for

some industries, quality promotion programmes, etc.) which were not sufficient in themselves to boost industrial development.

In the present study, we seek to resume the debate on industrial policy in Brazil in line with an approach which: i) discusses the theoretical bases guiding the drafting and implementation of this type of policy; ii) uses those bases to explain in general terms the reasons for the positive earlier experiences and the unsuccessful attempts to apply industrial policy as from the 1980s, and iii) evaluates present industrial, technological and foreign trade policy in terms of its value as a development policy.

II

Theoretical bases of industrial policy

The controversy on the definition and scope of industrial policy is due largely to the different positions regarding its theoretical bases. Some authors with a liberal background resort to formal theories to justify intervention through industrial policies as a way of correcting market failures or imperfections – in such matters as externalities, public goods, uncertainty, insufficient or biased information, and so on – under the hypothesis that the equilibrium of the economy is less than optimal, and on the basis of assumptions on the substantive rationality of agents behaving in a maximizing manner, fixed industrial structures, and knowledge available as a free good. According to this point of view, industrial policy is of a purely reactive and restricted nature, aimed specifically at correcting imperfections in the market, and should be applied horizontally: i.e., it would not be selective as regards

sectors or activities.¹ Even so, intervention would only be justified when its benefits were not less than its costs in terms of government (or bureaucratic) failures and rent-seeking.²

The neo-Schumpeterian authors and supporters of evolutionary economics, however, while not rejecting formal theories, base their views above all on rigorous observation of economic phenomena, which constitutes what Nelson and Winter (1982) call appreciative theory.³ When combined with

□ An earlier version of this study was presented at the seminar on political economy and Brazilian development, organized by the Centre for Development and Regional Planning of the Faculty of Economic Sciences of the Federal University of Minas Gerais (CEDEPLAR/UFMG) and held at Belo Horizonte on 7-8 April 2005.

¹ With a good deal of irony, Dosi (1988, p. 119) says with regard to the normative model based on the idea of market failures that “these ‘imperfections’ of the real world delimit the domain of institutional intervention, which –it is claimed– should make the world more similar to the theory”.

² This argument is in opposition to the new institutional economics of State intervention, which holds that the cost of information is not specific to the government and that profit-seeking is necessary in order to encourage innovation. For a good summary of this debate, see Chang (1994, chapter I).

³ As described in the paper by Nelson (2004) and in the lecture by the same author organized by the Office of the Rector of the State University of Campinas (UNICAMP), given at Campinas on 16 March 2005.

Schumpeter's views on the strategic role of innovation in economic development and the formal theories of evolutionary economics, this approach discards the equilibrium hypothesis. In line with more realistic assumptions that agents' behaviour is based on limited (or bounded) rationality and that knowledge is predominantly tacit or idiosyncratic, the neo-Schumpeterians hold that technologies, business and industrial structures and institutions in the broad sense –including institutions providing support for industry, the infrastructure, standards and regulations– coevolve, and that their motive force is innovation.⁴ According to this theory, industrial policy should be active and wide-ranging and should be aimed at industrial sectors or activities which foment technological change and at the economic and institutional environment as a whole, which conditions the evolution of business and industrial structures and the organization of institutions, including the establishment of a national innovation system. This determines the systemic competitiveness of industry and promotes economic development.⁵

This second approach is more suitable for the formulation and implementation of an industrial policy as a development strategy, and its broad scope implies the need to make industrial policy compatible with macroeconomic policy; to establish goals; to link together instruments, rules and regulations in line with the objectives set; to coordinate the progress of the various infrastructures (physical, scientific, technological, innovation-related and social) in synergy with the industrial policy adopted, and to organize the system of public institutions and representative private-sector bodies which must interact in order to put it into practice. Although the need for such broad-ranging actions is evident in the light of the fundamental bases of neo-Schumpeterian/evolutionary theory, we nevertheless feel that it is important to summarize the main points.

It is generally recognized that, as a result of the management of the two basic prices of the economy –interest rates and the exchange rate– and of the level and structure of taxation, macroeconomic policy may come into conflict with a development strategy based

on an industrial policy. It is not recognized to the same extent, however, that the latter policy can also affect macroeconomic objectives: for example, through increases in productivity. It is important that industrial policy should not become unviable as a result of very restricted or unstable macroeconomic policies. As Corden (1980, p. 183) says, “the more disturbance there is on the macroeconomic side, the more industrial policy is likely to become short-term oriented”.⁶ In various senses, industrial policy is a bridge between the present and the future, between existing structures and institutions and those which are still in the process of formation and development. Although it can be an important instrument for combating uncertainty, this cannot be eliminated altogether. If the macroeconomic environment continues to be marked by very pronounced instability, industrial policy will probably lose much of its potential and vigour. When there is uncertainty and basic indetermination about the relatively distant future but the immediate situation seems relatively stable, the structuring and transforming dimensions of industrial policy lose importance in the eyes of the agents, who concentrate above all on their own short-term objectives.

Although the establishment of goals is undoubtedly the most controversial aspect of industrial policy and is the favourite target of its critics, it is of fundamental importance in an industrial strategy driven by innovation and guided by technological and structural changes in firms and industries. The detractors of industrial policy criticize in particular interventions which involve the selection of “winners” or a “winning industrial structure”, which corresponds to a mistaken interpretation of the concept of industrial policy. Such policy does not involve the replacement of market mechanisms with bureaucratic decisions but, on the contrary, is the result of “cooperative efforts by the public and private sectors to understand the nature of technological change and to anticipate its likely economic effects”.⁷ The political scientist Chalmers Johnson, whose classic study on Japanese industrial

⁴ See Nelson and Winter (1982), Possas (1996), Dosi (1988) and Dosi and Kogut (1993).

⁵ With regard to the concept of systemic competitiveness and industrial policy, see Possas (1996). This concept is also implicit in the work by Fajnzylber (1990) on changing production patterns with equity in Latin America.

⁶ Although Corden's text (1980) corresponds to a specific period and problem –the adoption of positive adjustment-oriented industrial policies, as against purely defensive policies, in the crisis which affected the level of employment in the developed countries in the 1970s– his instructive analysis of the relations between macroeconomic and industrial policies shows that there are industrial policy ingredients in macroeconomic policy, that the latter affects the objectives of industrial policy, and that in turn industrial policy affects macroeconomic objectives.

⁷ See Johnson (1984, pp. 9-10) and also Rodrik (2004).

policy⁸ was a notable contribution in the field, is perfectly clear on the establishment of goals, asserting that: “Government does not make these decisions so much as ratify and underwrite them. Industrial policy becomes a way to evaluate their economic as well as their scientific significance. Targeting thus does not mean the promotion of technologies that are unlikely to develop at all on their own; it means, rather, helping them rapidly to achieve the necessary economies of scale and manufacturing efficiency without which they can never become internationally competitive” (Johnson, 1984, p. 10). Obviously, some of the goals may turn out to be failures, but this is a risk which must be run in all activities, in so far as they are subject to uncertainty. The critics of industrial policy exploit the fact that the failures are there for all to see, whereas it is harder to prove with arguments that cases where good results were obtained would not have been successful without government support (Johnson, 1984, p. 10).

The success of industrial policy as a development strategy centered on innovation also depends on the difficult task of linking up instruments, rules and regulations. It is these instruments for the implementation of industrial policy which create the patterns of economic signals, regulate the incentives for and restrictions on innovation, and make it possible to harmonize the activities of profit-seeking enterprises with the objectives of industrial policy designed to promote development and competitiveness.⁹ The aim is to manage the various instruments –the system of protection, financing, export promotion, fiscal incentives, defence of competition, patents law, etc.– in a harmonized way, without any ambiguities regarding the signals given to the agents, and in keeping with the objectives of the industrial strategy. This can be of fundamental importance for the success or failure of the strategy. Thus, for example, contradictory movements of the exchange rate and customs tariffs (or other instruments of the protection system, including export promotion), financing which

is insufficient or has priorities different from those laid down in the industrial policy, fiscal incentives with objectives incompatible with those of industrial policy, or legislation which gives rise to uncertainty on the competitive environment and the possibility of making use of the benefits of innovation, can all distort the desired distributive effects and prevent the industrial policy from acting as a development strategy.¹⁰

Another requisite for the success of the strategy is to coordinate advances in the field of infrastructure with the implementation of industrial policy, especially when the strategy is one of technological catching-up. Although infrastructures are great sources of externalities, many critics and even some supporters of the idea of industrial policy consider that infrastructures are outside the ambit of such policy.¹¹ As a development strategy, and above all because of its emphasis on innovation, however, industrial policy must necessarily include the infrastructures as a policy variable. Dosi (1988) refers to the “organization of externalities” and the “creation of context conditions”, consisting of the provision of efficient economic infrastructure services and the development of the science, technology and innovation system so that it not only includes training and research centres but also institutions which establish a relation between scientific and technological advances and their economic exploitation by enterprises. The need to organize the externalities of the economic infrastructure is clear: it must be ensured that they really are externalities and not external hindrances or diseconomies for enterprises. The conditions regarding the science, technology and innovation system are also of fundamental importance for the innovation process. No knowledge-intensive industry can grow without the support of a solid training and research system and various types of specific training (often the result of a long learning process) and without the simultaneous

⁸ See Johnson (1982).

⁹ In a paradigmatic article in which he seeks to create a broad policy framework within the neo-Schumpeterian/evolutionary approach, Dosi (1988) suggests five variables on which policies can act: the capabilities of the science and technology system, the capabilities of the economic agents in the search for new technologies and forms of organization, the patterns of economic signals, the forms of market organization, and the incentives, stimuli and constraints facing the agents in their adjustment and innovative processes .

¹⁰ Dosi (1988, pp. 130-131) rejects Ricardian distributive efficiency and asserts instead that the distributive options must reflect the different technological opportunities associated with different products and sectors, in order thus to attain what he calls Schumpeterian efficiency, that is to say, technological dynamism as an effect of the distribution model and the efficiency of growth, i.e., “specialization in goods with high income elasticity of demand”.

¹¹ As, for example, Chang (1994, chapter 3), who considers that broad definitions overload the concept of industrial policy and prefers instead the usual definition of selective industrial policies.

development of the synergies, standards, models and regulations typical of its institutional complexity.¹²

Lastly, and because of all the foregoing, institutional organization in the strict sense is indispensable for putting industrial policy into effect. On the one hand, coordinating or executive public institutions must be established, while on the other hand it is necessary that there should be bodies representative of the enterprises or other interest groups involved. The organization of the first-named must be flexible and responsive and must be linked up and coherent with the objectives of industrial policy. This means that these institutions cannot be run in line with the interests of the bureaucrats working in the corresponding area, nor can they be swayed by special interests (Chang, 1994, chapter 1; Rodrik, 2004, section III). The bodies representing enterprises and other interests must be legitimated and recognized as suitable interlocutors in policy formulation and implementation.

This debate touches on two central aspects of any strategy based on industrial policy: political power and coordination. In turn, the political aspect is divided into two main points. Firstly, and above all else, the adoption of an industrial policy as a development strategy must be the subject of a political decision. This is what Johnson (1984, p. 7) means to say when he asserts that industrial policy is above all an attitude, and only afterwards a technical question. Secondly, the strategy must be headed by an indisputable political authority. Rodrik (2004, pp. 19-20) suggests that it should be headed by a minister, the Vice-President, or even the President of the Republic. This would thus place industrial policy at the summit of economic policy, ensure the necessary links between the executing institutions, and make possible better coordination of activities.

The other aspect refers to the coordination which is an essential element of industrial policy, as distinct from the decentralized coordination carried out by the market mechanisms. In the latter case, the measures applied through industrial policy would be a form of *ex post* coordination, in response to market failures or imperfections. This normative model, however, does not take into account the phenomena characteristic of

the dynamic world of technological evolution, in which “*lato sensu* institutional factors appear to shape the constitution of behavioural rules, learning processes, and patterns of environmental selection, the context conditions under which economic mechanisms operate –in general, and *a fortiori* with reference to technological change” (Dosi, 1988, p. 138). Consequently, according to the neo-Schumpeterian/evolutionary approach, industrial policy is seen essentially as a form of *ex ante* coordination.

Two important observations may be made regarding this form of coordination through industrial policy: firstly, this is a form of strategic collaboration between the government, enterprises and private sector entities in the light of the objectives of industrial policy, rather than coordination centralized at the level of the State.¹³ Secondly, it involves the creation of specific institutions, in the form of collegiate bodies, as consultative, deliberative and decision-making agencies. Rodrik (2004), for example, suggests that these institutions should be public/private bodies structured as coordination and deliberation councils organized at the national, regional and sectoral levels. Although this author –in line with the industrial policy approach adopted– proposes that such councils should be places for the exchange of information and social learning, the complexity of the dynamic world described by Dosi (1988) makes it necessary for them to have a more ambitious mission and to function in effect as channels for the interaction of public-private activities and the formulation and implementation of a development strategy focused on industry and innovation.

Dosi (1988) considers that a strategy of this type makes it possible to modify the systems of comparative advantages which are determined endogenously by the evolution of international markets and –perhaps even more important– it can set in motion a learning process which can boost economic and social development.¹⁴

¹² Among the most common examples of this are the electronics industry and its synergies with telecommunications, information-processing equipment, transport equipment and consumer durables; the pharmaceutical industry, especially as regards its main assets, with their solid scientific basis and their relations with the health system, and the aircraft construction industry, with its technical safety standards.

¹³ Or, as Rodrik (2004) suggests, with a view to solving problems identified by those actors in the productive sector of the economy. This approach is a compromise between industrial policy guided by market failures and that which places the emphasis on innovation, in that it proposes that the government and the private sector should interact to identify problems and find solutions to them.

¹⁴ With regard to the industrial policy applied in Japan after the war, which is seen as a showcase example of success in change and development, Dosi (1988, p. 142) says that “One decade after the end of the Second World War, no economist would have suggested that electronics was one of the Japanese comparative advantages. Now it certainly is. If one would have

Unlike what neoclassical theory claims, development is not the pure and simple result of the accumulation of physical and human capital, but also, and above all, the result of learning new technologies and how to master them.¹⁵ Nelson (2004) says that technological

updating calls for innovation, and the capacity for innovation involves adopting and mastering ways of doing things which have already been in use for some time in the advanced economies but which are new for the country or region which is trying to “catch up”.

III

Brazilian industrial policy in the recent past

There seems to be no doubt that the rapid industrialization of Brazil in the period between the end of the war and the end of the 1970s was propelled by industrial policies. In that period, industrialization became an accepted part of the political agenda and economic policy, some political actors were strengthened, and other new ones arose – industrial associations, unions of employers and workers, and regional and sectoral bodies– while economic policy reflected the new political setting. Nationalist developmentalism and State intervention prevailed, bringing together the political forces and the economic interests of the industrialization project. The decision in favour of industrial policy and the manifestation of political leadership were reflected in particular in two events: the plan to attain a series of goals adopted under the Kubitschek government and implemented by industry-level executive groups with the participation of the private sector, and –under the dictatorship– the implementation of the second National Development Plan under the authoritative direction of the Economic Development Council. At the same time, however, albeit intermittently, there was a corresponding process of evolution of technologies, economic structures and institutions throughout the period in question.

taken the relative allocative efficiency of the different industrial sectors thirty years ago as the ground for normative prescriptions, Japan would still probably be exporting silk ties. In a sense, the use of comparative-advantage criteria as the final and sole ground for normative prescriptions is a luxury that only countries on the technological frontier can afford (...).”

¹⁵ Nelson and Pack (1999) analyse these learning processes on the basis of what they call “assimilation theory”, in contrast with “accumulation theory”. See Kim and Nelson (2005, Introduction) and Nelson (2004).

The goals pursued were established above all in the light of balance of payments problems: import substitution and, in the 1970s, an increase in the export of manufactures. In this sense, industrial policy was mainly concerned with building up sectors so as to make the industrial structure converge with the structural model of the industrialized economies, based on the engineering and chemical industries.¹⁶ At the same time, efforts were made to create a national innovation system –the National Scientific and Technological Development System– and to improve the economic infrastructure, first in the areas of energy and transport, and later of telecommunications.¹⁷ The firm establishment of the industrial structure and the infrastructure led to the

¹⁶ These two industries accounted for between two-thirds and three-quarters of the output of the most highly industrialized countries (Germany, the United States and Japan). Next came France and Italy (with a proportion of around three-fifths), while in Brazil the proportion was slightly over 50%.

¹⁷ The pioneering institutions of the National Scientific and Technological Development System were the National Council for Scientific and Technological Development (CNPq) and the Coordination for the Enhancement of the Capability of High-Level Personnel (CAPES), set up in the early 1950s. The Technical and Scientific Development Fund (FUNTEC) of the National Economic and Social Development Bank (BNDES) and the Fund for the Financing of Studies and Projects (FINEP) were formed in the 1960s. Subsequently, research and post-graduate training in the universities was structured and measures were taken to set up research and development institutes and centres in State enterprises, together with specialized laboratories and other research institutions, including some in the field of agriculture, which were the origin of those now considered to be examples of success in the international market. In those days, however, there was not yet proper interaction with the productive sectors, and this is still considered to be insufficient even today.

organization of the economic power around the well-known triple axis of the State (infrastructure and basic industries), foreign capital (fast-growing industries) and domestic capital (traditional industries and some segments of the fast-growing industries).

Throughout this period there was also an ongoing process of institution-building. The State improved its facilities in terms of organization and economic coordination by creating planning bodies, programmes of goals or sectoral plans, institutions and policies in the areas of public finance, promotion and foreign trade, specific norms and regulations on prices, public utility service charges, wages, economic concentration, technology transfer and foreign direct investment, among others. The coordination of this institutional machinery and the respective instruments was somewhat deficient, however. Throughout the period there was indiscriminate and excessive tariff protection, equally indiscriminate provision of fiscal and financial subsidies, tardy emphasis on exports, insufficient attention to training for innovation, and serious regulatory distortions affecting investments, prices, public utility charges and wages. Something similar occurred with macroeconomic policy: although this was openly expansive, except in the first few years of the dictatorship, it allowed various discriminatory exchange rate regimes, often with subsidies for imports and penalization of exports, until the system of mini-devaluations was adopted. Likewise, the tax structure was archaic and strongly regressive, and interest rates contained subsidies that kept the private financial system in a state of under-development, at least until monetary correction of financial assets was adopted.

Even so, industrialization and economic growth gathered pace and began to change the pattern of international insertion of the country, which ceased to be merely a supplier of agricultural and agroindustrial commodities and gained increasing importance as a supplier of manufactures and semi-manufactures. This was not reflected in social improvements, however, and on the contrary, social problems got worse. The concentration of the population – a phenomenon inherent in the process of industrialization – increased in urban areas, but there was no concomitant change in the educational system and the training and skills of the labour force. Because of this and of the weakening of the trade unions, real wages went down and there was a deterioration in income distribution, which favours current growth but is extremely bad for the future of the country.

It might be considered that the right moment to reform the industrial policy model was the transition

from the 1970s to the 1980s. The emphasis on the construction of sectors should have been reduced, the end of import substitution as an industrialization process should have been acknowledged, and more qualitative goals should have been set, aimed at promoting innovation, technological development, quality and productivity.¹⁸ Such changes began to be considered when there was an attempt to reform foreign trade and fiscal incentive policies in 1979. Efforts to outline a policy for the development of industries representative of the new information technologies began with the creation of the Special Secretariat for Informatics, which gave rise to the Informatics Act, promulgated in October 1984.¹⁹ The process was cut short, however, by changes in the authorities responsible for running the economy at the end of 1979 and by the macroeconomic crisis of the early 1980s.

Thus, instead of the hoped-for changes, as from 1981 the historical process was reversed, so that technologies and business, industrial and institutional structures in the broad sense (including the corresponding policies) ceased to evolve and even fell back, the infrastructures deteriorated, and the National Scientific and Technological Development System was abandoned.²⁰ In the political and economic policy field, developmentalism and State intervention lost ground and the power and leadership exerted up to 1979 by the Economic Development Council, albeit in an authoritarian manner, were weakened. In the Federal Government, there was no longer an attitude favouring industrial policy and, on the contrary, macroeconomic stabilization objectives now prevailed. From then on, stabilization policy, monetary policy objectives, and the exchange rate policy of the real prevailed over considerations of industry and the productive sector as a whole, making industrial policy unviable. The various attempts to formulate and apply an industrial policy were frustrated or only partially implemented.²¹

¹⁸ In the 1970s import substitution as a source of industrial output growth was already less important (8.3%) than the expansion of exports (14.4%). The dynamism observed was due to domestic demand (77.3%). See IPEA (1985, p. 209).

¹⁹ For a summary of the first measures proposed, see Suzigan (1979).

²⁰ Between 1979 and 1984 the resources of the National Scientific and Technological Development Fund were cut by more than two-thirds.

²¹ These attempts were made late in 1984 and early in 1985 (after the election of the “New Republic” administration); in 1988, during the Sarney administration (the New Industrial Policy); at the beginning of the Collor administration (the Industrial and Foreign Trade Policy – PICE), and at the beginning of the first term of Fernando Henrique Cardoso (1995).

All forms of coordination were abandoned. The sequence of plans for economic, scientific and technological development was interrupted, and sectoral goals and programmes were deactivated. The policy instruments which had previously helped to promote industrialization began to be administered in line with the objectives of macroeconomic stabilization. Up to the end of the 1980s, non-tariff barriers restricted access to imports even more than before. Some exports were subsidized, public investment in infrastructure was reduced, public budgets for financing industry and for the National Scientific and Technological Development System were drastically slashed, development incentives were reduced, and controls on prices and public utility charges were made tighter. There were some timid signals of change between 1988 and 1989 as a result of tariff system reform, but this finally proved to be meaningless because the prevailing protection was due to non-tariff barriers and new incentives for investment and technological development established under the New Industrial Policy. Meanwhile, the failure of the stabilization policy designed to cope with inflation put paid to any hopes of resuming industrial development.

The 1990s brought major changes, both good and bad. Although industrial development occupied a place in economic policy once again for a while, the attempt to implement an industrial policy within the framework of the Collor Plan failed, and the only element of the Industrial and Foreign Trade Policy (PICE) actually implemented was the liberalization of foreign trade. The multilateral trade agreements signed within the ambit of the World Trade Organization (WTO) and the subsequent revaluation of the real completed the trade liberalization process. In addition, there was greater openness to foreign direct investment and the State ceased to act as an industrial development agent. The industrial promotion system was abandoned, and a broad process of privatization of enterprises and infrastructure was begun. This radically changed the economic environment and exposed industry –already weakened by many years of stagnation– to the predatory competition of imports and foreign investments. As a result, there were intense denationalization processes, conflicts between the State and employers' organizations, strong sectoral pressures for protection (from the automotive sector, for example), a crisis of federalism, due to the individual states' policies designed to attract investments to fill the gaps left by industrial policy, sluggishness of industry, which was struggling to adapt to the new context, rising unemployment, and a weakening of the

trade unions. Currency stabilization caused marked economic instability –especially at the external level– and greater uncertainty and risks, due to the volatility of exchange and interest rates and the predominance of the financial sector over the productive sector. All this consequently gave rise to a vicious circle.

Industry carried out a drastic adjustment process. Firms reduced their operational structures and sought to improve the quality of their products, to increase productivity and to direct their activities towards exports, while production structures were reduced through the dismantling of chains of production –especially in the electronics, capital goods and chemicals and pharmaceutical sectors– and the deactivation of high-technology segments. The share of manufacturing in the gross domestic product (GDP) went down by several percentage points. A new power structure emerged, made up of a regulatory State, the predominance of foreign capital in some industries which were of strategic importance from the technological development standpoint, and domestic private groups which had been restructured but had only limited financial capacity and few production synergies, especially as regards new technologies.

In the late 1990s and early 2000s, the country was still without an industrial policy, and any attempts to adopt political decisions to formulate and implement such a policy came up against various obstacles:

- (i) It was necessary to overcome the ideological bias against industrial policy which had grown up after years of predominance of neoliberal economic thinking, which had installed itself largely because of the exhaustion of the old intervention models typical of the import substitution phase.
- (ii) Macroeconomic policy (interest and exchange rates, tax structure) should be less insensitive to industrial development aspects and less hostile to the need to take measures for the promotion of industry.
- (iii) The institutional organization of the public sector was not effective for the promotion of industrial development, since it had changed very little with respect to the previous normative model and its interactions with the private sector were very limited and subject to discussions in outdated sectoral chambers and forums on competitiveness which had no real influence.
- (iv) Public financing of investments in industry was limited by budget cuts and by the emphasis that the National Economic and Social Development

- Bank placed on privatization operations and those of a primarily financial nature.
- (v) The National Scientific and Technological Development System had been weakened by years of budget cuts, despite the revitalization brought about by the Sectoral Funds as from 2001-2002.
 - (vi) There were no links between policy instruments in the fields of foreign trade (within the new framework of multilateral trade agreements and regional economic integration accords), fiscal incentives (federal, state, regional and sectoral), and competition and regulation.
 - (vii) After many years of cuts in public investment, and in spite of the privatization operations, the economic infrastructure had seriously deteriorated, and there were cases of inefficiency that generated negative externalities for firms.
 - (viii) Social problems had worsened: there was growing unemployment (especially in metropolitan areas), increased poverty (only momentarily relieved by the Plan Real in 1994-1995), worsening income distribution, crises in the public health and social security systems, and the educational system was lagging behind what was desirable in a democratic and republican society in the age of information and communication technologies.

These were the circumstances conditioning the industrial policy option at the beginning of 2003, and it was in this framework that the present Industrial, Technological and Foreign Trade Policy (PITCE) was formulated and implemented. In the following section, this policy will be evaluated as a development policy.²²

IV

Brazil's Industrial, Technological and Foreign Trade Policy as a Development Policy

The implementation of PITCE at the end of 2003 is a positive event in itself, because it shows that the authorities thus finally overcame—at least in part—the bias against industrial policy which had prevailed for so long, and also because it shows that there was a political decision in that sense, even though we are still far from solving the wide range of problems raised by a development policy which is industry-centered, innovation-driven, and guided by technological and structural changes in firms and industries, in line with the neo-Schumpeterian/evolutionary approach. What is notable is that industrial policy once again came to occupy a place on the political and economic policy agenda.

In addition to some virtues, however, PITCE has many defects which make it hard for it to operate as a development policy. Its virtues include its goals, the emphasis on innovation and, to a certain extent, its recognition of the need for a new form of institutional organization to put policy coordination into effect. Its defects are due to its incompatibility with

macroeconomic policy (especially as regards interest rates and the tax structure), the lack of links among the instruments involved and between those instruments and the demands of enterprises, the precarious nature of the infrastructure, the shortcomings in the science, technology and innovation system, and the fragility of the way the industrial policy process is run and coordinated. The following sections give a brief summary of these points.

²² We do not aim to make a formal presentation of the Industrial, Technological and Foreign Trade Policy here or to evaluate its practical application. For updated information on the measures and programmes involved, see the document by the Ministry of Development, Industry and Foreign Trade (MDIC, undated). The newspaper *Valor Econômico* published a series of five reports on industrial policy, by the journalist Ricardo Balthazar, which include data and opinions that will help to understand the context of PITCE.

1. PITCE: its goals, and its emphasis on innovation and on a new form of institutional organization

As mentioned earlier, industrial policy is essentially a means for the coordination of strategic actions of the government and enterprises with the aim of developing activities that induce technological change or solve problems identified by those actors in the productive sector of the economy. This policy is not limited to the traditional industrial sector, as shown by some activities in which Brazil has reached international competitiveness, such as agribusiness and aircraft construction. The creation of the Brazilian Agricultural Research Corporation (EMBRAPA) and its interaction with enterprises in the agricultural sector, and the establishment of the Institute of Aeronautical Technology, which gave rise to the Brazilian Aircraft Corporation (EMBRAER), may be considered as typical industrial policy actions. The focus on industry is undoubtedly the most important aspect, however, because industry traditionally comprises most of the sectors that spread innovation and technical progress. Part of the innovations and production advances that many sectors manage to attain is incorporated in machinery and equipment, which, together with inputs of different characteristics and qualities, provides the means of development for so many activities. The services sectors also make a considerable contribution to change and development in many economic activities. Many of these services arose in industry, where they grew into autonomous activities classified under the general heading of "services". The informatics sector and software-related activities are the most obvious example of the way in which services perfect industrial processes and allow them to reach degrees of sophistication unimaginable under conventional methods. Consequently, industrial policy must necessarily be of broad scope, and it may be said that it is not just a policy for industry but also a policy for structuring, restructuring, improving and developing economic activities and the process of generation of wealth in general. If industry is the hub of that policy, it is because of its capacity to cause the effects to spread to the economic system as a whole.

In this sense, the selection of the activities which are to be the subject of industrial policy is strategic and must be the outcome of collaboration between the government and enterprises. The owners of enterprises, more than anyone else, know how to identify opportunities, but because of uncertainty about the expected profitability, they are often not willing to

run risks: in this case, government support is of fundamental importance, and industrial policy is the most suitable form of coordination. Both these actors must collaborate within the framework of PITCE to identify the opportunities for change that the sectors generating technical progress offer to the rest of the economy.

It must be borne in mind, however, that there are now many more restrictions on the application of industrial policy than in the past. These are due to multilateral and regional trade and economic integration agreements; to the participation of big domestic and foreign enterprises which enjoy greater freedom of action and are less subject to the "dictates" of the State and public policies; to the macroeconomic policies themselves, and to the reduced willingness of society to bear the costs of policies, especially when they affect consumption and reduce the purchasing power of individuals and families or the competitiveness of the other enterprises.

All this does not represent a total impediment to the application of an industrial policy, however. In the case of international commitments, industrial policy can still be applied by using the arms provided by the agreements themselves, as for example in the case of the measures adopted by the Brazilian government within the context of the WTO to combat United States subsidies and other unfair trade practices. Moreover, as well as being even more necessary than in the past, the current policies are different and have more ambitious objectives in qualitative terms. Whereas before they were limited to the promotion of specific sectors, now they have much more qualitative and refined objectives: building up sectors and guiding them in particular directions is no longer the only way of ensuring that the policies are sustainable.

The differences compared with the past are very marked. Industrial policies and policies aimed at the overall development of Brazil were combined for half a century, and both of them were highly successful: they produced a diversified and integrated industrial system which was almost complete in terms of its components, and they led to extraordinarily high growth rates of GDP, income and employment. There came a time, however, when they ceased to be functional, and efforts are now being made to restore this lost functionality through the present Industrial, Technological and Foreign Trade Policy. The aim is not to put into place a new industrial structure but to endow the existing one with renewed and sustainable vigour.

This movement towards new objectives is largely dependent on the definition of a common vision, shared by the actors in the economic process and their public interlocutors. The construction of this common approach must necessarily be a gradual and ongoing process. It calls, among other things, for close collaboration, the exchange of information, the establishment of mixed forums, the continuity of its participants, the explicit and deliberate expression of points of divergence, and a determined search for convergence and the definition of the successive steps to be taken. It is a gradual process whose main result will be the firm establishment of a climate of mutual confidence and respect. Governments, ministries, public institutions and government agencies, on the one hand, and firms, business associations, trade unions, federations and confederations, on the other, have essential objectives which are not identical but can undoubtedly be combined to achieve results in keeping with the missions of each of them, which are different but compatible and complementary.

The main restrictions on the formulation and implementation of an industrial policy do not come from the outside but from within. The problem is not so much to know if the WTO allows or forbids a particular measure, but to find alternatives which are acceptable to Brazilian society within the available international space (which diplomacy is seeking to expand). Let us take the example of one of the biggest successes of Brazilian industrial policy in the twentieth century: EMBRAER. Up to the end of the 1980s and the early 1990s, this was still considered by many to be a company that was somewhere between downright failure and dubious success. To some, it was yet another of those abortive initiatives that Brazil persisted in taking, running counter to what was really needed and wasting opportunities. This criticism is now totally unjustified, however, and the silence of those who made it (who even seek to avoid being identified with their previous positions) is very understandable. The success of EMBRAER in the 1990s has both recent and more remote antecedents. The most recent date back to the 1950s, when the institution for training high-level personnel in this sector was formed, while the more distant antecedents go back to the 1920s and 1930s, when the main theses on Brazil's needs and possibilities in the aircraft industry were formulated. There was no less than half a century between the initial seeds and their fruits: a period in which substantial resources enriched the fertile ground of ideas and capabilities until finally aircraft became an important item in the country's export pattern.

Would such an enormous Brazilian success, which restored our self-esteem and widened the range of opportunities and prospects, be possible today? Would we be willing to wait so long, without interrupting our efforts and investments, until the time came to harvest the fruits of our endeavours? The most likely answer to both these questions is "no". For this reason, we must temper the policies we wish to implement with the necessary doses of realism that society imposes on us. The eventual costs of an industrial policy must be measured against less distant benefits. In addition to the costs –which are generally easy to see– society must also be aware of the possible benefits of such a policy –which are generally not immediate– and its indirect effects, which are often forgotten. How much of the present prosperity of the Vale do Paraíba is due to the transfers of technology and human capital made by the Institute of Aeronautical Technology (ITA) and EMBRAER?

For these reasons, the orientation of industrial policies towards new objectives, which began in the last few months of the administration of Fernando Henrique Cardoso with the establishment of the Sectoral Funds and the proposed Innovation Act and was consolidated with the Industrial, Technological and Foreign Trade Policy (PITCE) in the first few months of the present administration, may be considered a positive event. Excessive emphasis ceased to be placed on the trade balance, especially in terms of import substitution, and export promotion gradually gained ground as a trade promotion policy, together with a tendency to pay more attention to diplomacy (of which the understanding with China is the clearest example). Quite rightly, and especially through the Industrial, Technological and Foreign Trade Policy, the emphasis was placed on innovation and technological development; sectors which help to spread technology and innovations (capital goods, software and semiconductors) were selected in order to extend the new solutions to the economy as a whole, and not just to industry in the strict sense, and two areas considered to "hold the key to the future" were defined as priorities for national scientific and technological development. It is well known that innovation is much more than just technological development, but the latter is nevertheless the main source of innovations and the only one which never dries up.

The sectors on which the Industrial, Technological and Foreign Trade Policy mainly concentrates are largely complementary and reflect the move towards more contemporary objectives. The capital goods,

software and semiconductors sectors are pervasive, since they affect both industry and the economy as a whole, and are ultimately of great importance for the productivity of the other sectors of industry, the primary and tertiary sectors and public services. In all three of these, there were heavy trade deficits which still persist even now. As already noted, capital goods incorporate technical progress and provide the other sectors with possibilities of change and development. The same can be said of semiconductors and software.

A sound trade balance must be a permanent objective of economic policy, and industrial policy is a powerful tool for attaining this goal. There is a fundamental difference, however, between seeking a trade surplus by any available means and doing so on the basis of the selected sectors. Let us take the case of capital goods. Everywhere in the world, but above all in the countries which are most advanced in industry and technology, these goods account for the major part of trade flows in both absolute and relative terms (compared with total output or consumption, for example). While the United States has a deficit, Germany and Japan have surpluses in this respect. All the advanced countries import large amounts of some capital goods and smaller amounts of many other goods. Capital goods mark a lasting commitment of firms with their future and incorporate much of their strategies. Properly chosen purchases will result in positive long-term prospects, whereas the opposite will be true in the case of unwise acquisitions. It is for this reason that firms usually give special attention to this point.

Developing a competent and dynamic capital goods sector must be one of the objectives of any development policy, but the reasons for this go far beyond those connected with the trade balance. The capital goods sector establishes close links with its main clients and users. Manufacturers listen to and check out the needs of their customers and seek to develop new attributes which will meet the latter's demands. They do not do so out of an unselfish desire to collaborate, but because of their need to gain the best possible position vis-à-vis their competitors. In this sense, having a well-qualified capital goods sector acts as a guarantee for covering needs. Gaining access to foreign markets and identifying the changes in clients' demands (whether present or potential) is more important than taking special measures to encourage the substitution of specific imports at a given moment. For this reason, the change of emphasis of industrial policy from import substitution to the formation of

capabilities and areas of competence is both healthy and promising.

The new institutional organization created in order to implement the Industrial, Technological and Foreign Trade Policy may also be considered positive in some respects. As noted earlier, having a flexible and responsive form of institutional organization, with strong political management whose leadership is widely recognized, deliberative collegiate bodies, and properly linked executive institutions is of vital importance. It is well known that in Brazil there are executive institutions which are effective in the fields of finance (the National Economic and Social Development Bank – BNDES); support for research and development activities and innovation (the Ministry of Science and Technology, the Agency for the Financing of Studies and Projects – FINEP, the Sectoral Funds, and state foundations for supporting research); trade promotion and export development (the Ministry of Foreign Affairs and the Agency for Export and Investment Promotion – APEX), and others, but there are few linkages between them and, above all, few links between the instruments adopted and the needs of firms. An even more important problem is that political management and the capacity for coordination – which are basic functions of industrial policy par excellence – are rendered more difficult by the organizational superstructure and the bureaucratization of decision-making.

The establishment of an agency for linking instruments and means (the Brazilian Industrial Development Agency (ABDI), which was officially implemented in February 2005 together with the National Industrial Development Council (CNDI)), is a favourable element. The CNDI is presided by the Minister of Development, Industry and Foreign Trade, and is made up of 12 ministers, the president of BNDES, and representatives of the private sector and of the workers. In theory, this structure should help to improve linkages and make possible better coordination. As it was set up as an autonomous social service forming part of System S,²³ however, ABDI has no power to force other institutions to collaborate with it, and it had difficulty in forming its board of management, which is made up of representatives of the ministries of

²³ System S, set up in accordance with article 149 of the Constitution of the Federative Republic of Brazil, is made up of 11 institutions with specific sources of income deriving from the social security payroll contributions paid by firms. Most of the institutions are bodies providing social services.

Finance, Planning, Budget and Management, and Science and Technology.

2. The weak points of the Industrial, Technological and Foreign Trade Policy

The implementation of this policy has been made more difficult by the adverse effects of macroeconomic policy, the lack of linkages among the instruments adopted and between them and the demands of firms, the precarious nature of the economic infrastructure, the shortcomings in the science, technology and innovation system, and the fragility of the way the industrial policy process is run and coordinated. These problems will be briefly analysed below.

The adverse effects of macroeconomic policy on industry are well known and include, among others, the use of the base interest rate as the main or even the only instrument for controlling inflation under the system of goals. The repercussions on the cost of capital are also well known: finance for current production flows and marketing is made more expensive, and investments in the productive sector are discouraged. This policy also implies great exchange rate volatility under the floating exchange rate system and –more recently– the revaluation of the real, cancelling out the efforts at export promotion made under the Industrial, Technological and Foreign Trade Policy. Furthermore, there are the effects of tax policy, which call for some more detailed remarks.

The fiscal aspect, which does not always come up in the discussions on industrial policy (and on the PITCE), needs to be clearly visible. We do not intend to repeat here the criticisms which are always levelled at high taxes. The State and the government turned a deaf ear to these criticisms and paid the price of this insensitivity in having to adopt Provisional Measure No. 232, which provided for a number of incentives for productive activities (and especially for investments).²⁴

The equality of all citizens before the law and fiscal rationality are the main factors to be taken into account. Quite apart from the actual level of the present fiscal burden, which might be considered high by those who pay their taxes in full, the tax burden and structure

have some characteristics which are very harmful for any policy that seeks to promote efficiency and competitiveness. The more the authorities delay in correcting this irrational structure, the more difficult the transition will be, because the resumption of investments in industry –which follows a natural course but is speeded up by industrial policy– promotes a form of location of industry which adapts to the prevailing fiscal irrationality but is uneconomic in all other aspects. The desire to take advantage of some fiscal loopholes, possibly connected with inefficiencies in the tax enforcement structure, leads some businessmen to take investment decisions which would be untenable in other circumstances. Two of these decisions which are quite common concern location and scale of operations.

The location of some firms is sometimes decided on the basis of fiscal advantages, which may be real, or may be created through procedures which are either frankly irregular or are typical of a “grey area”. For this reason, some ventures become structurally dependent on advantages stemming from a lack of fiscal equality, which should be corrected without delay.

The problem of scale is just as important as that of location. Incentives which are necessary and desirable for small firms must not be confused with turning a blind eye to irregular fiscal and labour practices.

Industrial location based on specious advantages and unsuitable scales of production are sources of fragility for the other firms and sectors involved, and sometimes they also affect the competitiveness of sectors situated upstream or downstream of the respective production chains. Modern industrial policies try to encourage and induce firms to adopt different forms of behaviour that promote more rational use of natural resources and the products made from them and ongoing upgrading of labour skills. By their very nature, these gains are incremental, except in just a few cases such as “radical” innovations, which are rare. How can we turn innovation into a collective and self-sustaining form of behaviour if loopholes that permit unfair competition nullify a large part of the genuine efforts made? Recognition of the fundamental role of small and medium-sized enterprises in creating jobs, increasing employment and forming business skills must on no account be confused with turning a blind eye to irregularities. If support policy for small and medium-sized enterprises is really intended to support them, even more vigorous instruments than those currently existing must be established, but without ever confusing support with the toleration of

²⁴ Provisional Measures are a kind of legislative decree originating from the Executive which make it possible to delineate the limits and judicial mandates of the Legislature. This type of measure has been frequently and increasingly used since the early 1990s.

tax evasion or laxity and labour irregularities. From this point of view, the bureaucracy connected with business ventures in general and enforcement in particular is just as serious a problem for micro-, small and medium-sized enterprises as the tax burden itself. Industrial policy, which seeks to promote investment and development, is sidelined by the fiscal dimension, which largely opposes or weakens its effects. In other words, industrial policy is weakened by tax policy, or, rather, the lack of a real tax policy. Some advances²⁵ are possible in both these fields and should form part of the political and economic agenda, with industrial policy as development policy.

Perhaps the most serious and important problem that hampers the application of the Industrial, Technological and Foreign Trade Policy is the lack of linkages of the mechanisms and instruments and the lack of coordination with their beneficiaries. In the present study we have tried to show that this policy benefits small sectors which do not have the power of entrainment of other economic sectors or segments, and it is therefore more difficult for it to become a development policy (the only sector with this characteristic is capital goods, but it is restricted by the adverse effects of macroeconomic policy on investments in the productive sector). The selection of three of the four sectors which warrant priority action is very positive, however.

The role that the small sectors can play as important vectors of a growth and development policy does not consist of influencing industry and the economy through their volume, but of providing the other sectors with renewable means for increasing their productivity and differentiating their products. It is not a question of quantity, but of quality.

In order for this to happen, it is essential to link up the capacity of the priority sectors of industrial policy to supply products and services with the demands of the other sectors and activities. In other words, in order to promote growth and development on the basis of the selected sectors, links must be established between supply and demand, capacities and needs, and solutions and problems.

For example: there are hundreds of thousands of firms in all sectors, and especially those of the Local Production Arrangements or localized production systems, which could benefit from software developed

to meet their special needs in terms of modern integrated business management. In this case, industrial policy must provide these firms with the credit resources needed in order for the production sector to set itself in motion and deal with their needs, which exist potentially but are not materialized because of the lack of linkages.

The bodies that represent industry could take a concrete initiative and link up the interests of the software producers with those of the organizations representing the firms in the Local Production Arrangements. The public authorities could finance a system for providing basic business management software for small and medium-sized enterprises by offering non-repayable resources from the National Scientific and Technological Development Fund, the Sectoral Funds, or the Informatics Act. This system would make it possible to provide small and medium-sized enterprises with management improvement programmes and business management software in a coordinated manner. The main aim of the programme would be not so much to reduce costs as to provide firms with an efficient cost management system suited to their level of development. With the financial resources linked with industrial policy (Sectoral Funds or funds under the modified Informatics Act), the various local production systems could develop applications specific to their needs based on the basic generic module, protected by modest property rights (along the lines of common rights).²⁶

The coordination of industrial policy mechanisms and instruments, which are essential links in the relations with their beneficiaries and a necessary condition for industrial policy to function as an effective development policy, is usually of dubious quality, however. In the absence of the financial resources and taxation capacity that industrial policy was given in the past (not only in Brazil but also all over the world, and especially in Asia), the efficacy of the policy will depend on the harmonization of interests and coordination on the strategic and operational levels. This brings us to the question of the discussion and evaluation of the institutional problems associated with industrial policy implementation (headed by the Brazilian Industrial Development Agency): a delicate matter which is far from being completely settled.

²⁵ Such as those achieved through the tax relief measures forming part of the Social Integration Programme/Contribution for the Financing of Social Security (PIS/COFINS).

²⁶ Forms of industrial or intellectual property rights which are midway between the traditional absolute and rigid protection and what is known as free software.

One of the biggest difficulties of the Industrial, Technological and Foreign Trade Policy and indeed of any present-day industrial policy is the view that its own main actors have of it, which is usually not devoid of stigmas and prejudices. The oft-repeated phrase “when I hear industrial policy mentioned, I put my hand on my pocket to protect my money” sums up this general view. Although many of the main arguments in favour of industrial policy are based on solid facts and explanations, they do not manage, explicitly or implicitly, to refute a number of the arguments against such policy once and for all. Close collaboration between private firms and public bodies –which is of fundamental importance for the achievement of the goals set and their broad application– is an indispensable ingredient of such policies. Far from being a source of corruption, it is a way of ensuring the regular and systematic follow-up of policy formulation and implementation, and when there is full visibility and transparency, it actually serves as an antidote against corruption. Industrial policy coordination depends precisely on the existence of close relations between the actors. The coordination and results of the process are largely conditioned by the image those actors have of the legitimacy of their intentions and roles.

Other problems which affect the economy in general but can impede the success of the Industrial, Technological and Foreign Trade Policy in particular are connected with the obvious shortcomings in the physical infrastructure (energy, transport, communications, ports). Despite some recent advances, the development of the national innovation system is still insufficient for a strategy like that of the PITCE. Although the advances made thanks to the Sectoral Funds and the prospects for the effective functioning of the Innovation Act are undeniable, other problems persist such as the insufficiency of the budgetary resources for the Ministry of Science and Technology and the Fund for the Financing of Studies and Projects, the weakening of the public universities, research organizations and laboratories, and the lack of adaptation of the educational system to the needs of a development strategy which emphasizes innovation and respects the rights of citizens.²⁷

The infrastructural problems are long-standing and reflect the macroeconomic restrictions – especially of a fiscal nature – which have historically affected public

investments. They also show that the privatization operations and the new management model based on concessions for the provision of services under public regulation and the control of regulatory agencies have not worked as expected. It is now considered that public-private partnerships are the best –if not the only– possibility for securing the resumption of investment in this area. According to Monteiro (2005), however, this form of public action suffers from “*great complexity, because of its economic, political, constitutional, organizational, administrative and accounting aspects*”, so that that author comes to the conclusion that “*the best way to strengthen the establishment of public-private partnerships is to improve the deliberative quality of the national political process, which would enable the public actors to understand the demands of the population as citizens, electors and taxpayers at least as well as private enterprise understands the realities of its consumer market*” (Monteiro, 2005, p. 24). The fact that the public-private partnerships will be under a Board of Management brings us to the general problem of the political mandate and coordination of the Industrial, Technological and Foreign Trade Policy.

In reality, the biggest impediment to the effective implementation of the PITCE as a development policy derives from the difficulty it will have in fulfilling the role that a policy of this type must carry out par excellence: the *ex ante* coordination of concerted actions by public and private actors. The political line of command is vague: although the Minister of Development, Industry and Foreign Trade presides over the new National Industrial Development Council, linked to the Office of the President of the Republic, his political leadership is watered down in the extensive range of deliberative bodies of the same or higher level. These include the Economic and Social Development Council, the Council of Government, the Economic Policy Chamber (presided by the Minister of Finance), the Economic Development Policy Chamber (presided by the Minister in charge of the Casa Civil), the Governing Council for Public-Private Partnerships, and the Inter-Ministerial Council on Local Production Arrangements. The faculties of the Brazilian Industrial Development Agency –PITCE’s executive arm– are limited, and its ability to use the policy mechanisms and instruments adopted depends on a complex network of relations with other ministries –some of which are more powerful than it is– and relatively autonomous institutions such as BNDES and the Agency for the Financing of Studies and Projects

²⁷ The present budgetary constraints imposed on EMBRAPA are eloquent in this respect.

(FINEP). This deliberative superstructure and the division of powers hamper the legitimization of leadership, hold up the taking of decisions on industrial policy, and impede the linking-up of instruments and the coordination of actions in line with the needs of firms.

V

Final remarks

The Industrial, Technological and Foreign Trade Policy, and industrial policies in general, will not be able to act as the panacea they might have been in the past. We say “might have been” because many of their defects and the ostracism they have suffered are due to past excesses which we might call, with a little exaggeration but not without some cause, “caprices of omnipotence”.

In order to be effective, industrial policy must be ambitious but prudent. It must be conceived as an instrument for change and development, yet without demanding unlimited amounts of scarce resources. Emphasis must be placed on the objectives of the industrial policy and on the mobilization of the main actors in economic life and in public and private

In view of all these difficulties, it is understandable that Rodrik (2004) suggested that the industrial policy process should be directed by the President of the Republic himself or by a Minister of State with powers delegated by the President.

institutions in order to be able to carry out the immense tasks of coordination involved. In a macroeconomic regime characterized by severe restrictions, but in which firms have shown their great dynamism and public and private institutions have always acted creatively, it is vital that the Industrial, Technological and Foreign Trade Policy should take advantage of the available business and institutional skills in order to create the intricate architecture of coordination. This is a challenge calling for persistence, gradual and patient building on achievements, follow-up, review and redefinition, and it necessarily calls for a long-term view.

(Original: Portuguese)

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A tax on currency transactions as an instrument in the war against poverty

John Williamson

This paper considers whether a tax on currency transactions could be expected to raise a significant sum of money for use in the war on poverty. It traces the detailed discussion of Kenen and the subsequent argument of Schmidt, that technical developments would now permit the tax to be levied efficiently by the five authorities who issue currencies in which transactions are settled. It notes the creation of the CLS Bank and the proposal to confine a currency transactions tax to transactions that go through that bank, but argues that this would have dangers. It notes also Spahn's proposal for a geographically limited tax, but argues that this would not be advantageous if the aim is to raise revenue. The final verdict is that a currency transactions tax of 1 basis point would be feasible and could be expected to raise a sum of the order of US\$ 20 billion per year.

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I

Introduction

The idea of levying a “modest” tax on currency transactions goes back to a lecture that James Tobin, the Nobel Laureate in Economics, delivered in 1972.¹ He envisaged a tax rate of perhaps 1% of the value of a foreign exchange transaction, which, he argued, might accomplish two purposes simultaneously. One would be to throw some sand in the wheels of international finance, which he envisaged as restoring a degree of independence to national monetary policies and curbing destructive destabilizing speculation. The second, a by-product, would be to raise money for some international good cause.

Subsequent debate has disputed these claims. The prospect of being able to stabilize the currency markets by taxing currency transactions is disputed by many, on the ground that instability is caused by the overhang of the stock of short-term assets rather than large flows of payments through the markets. Furthermore, many have claimed that a Tobin tax would be subject to such widespread evasion, through either the substitution of other transactions for those subject to the tax or the relocation of markets to untaxed jurisdictions, as to thwart the objective of giving a

significant degree of independence to national monetary policies. Similarly, many dispute the idea that a tax rate of anything like 1% (100 basis points)² could be levied without resulting in extensive evasion, arguing that it would probably lead to the existing dealer market being replaced by a broker market, which would shrink the volume of transactions enormously. One cannot estimate the yield of a currency transactions tax by taking 1% of the current value of such transactions (estimated at nearly US\$ 1.9 trillion per day in the latest survey by the Bank for International Settlements (BIS)) and conclude that it would be possible to raise trillions of dollars a year to finance some international good cause.

It may be infeasible to materially reduce the likelihood of currency crises by imposing a Tobin tax (though that is still subject to some dispute), but a relatively high tax rate (such as 25 basis points) might significantly widen international differences in monetary policies (Felix and Sau, 1996). Most relevant to the purpose of this group, and therefore to this note, even a very low tax rate could raise significant sums of money.

II

Establishing a Tax Base

A key condition that would have to be satisfied for a currency transactions tax to raise a substantial sum of money is the avoidance of significant evasion. A prerequisite for this is the establishment of an unambiguous and comprehensive tax base.

Currency transactions take a variety of forms. The plain vanilla operation is a spot transaction, where a holder exchanges (say) dollars for euros, for delivery today or tomorrow. The traditional alternative was a forward transaction, where a holder agreed a price at which he or she would buy (say) euros for dollars at some determinate date three days or more in the future. An exporter who knows he or she will be paid a foreign currency at some well-specified date in the future can hedge his or her receipts by selling the foreign currency

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¹ See Tobin 1974, amplified in Tobin 1978.

² One basis point is equivalent to one hundredth of a percentage point.

forward on the date he or she will receive it, and buying his or her home currency with the proceeds. Covered interest arbitrage takes place by an agent selling dollars (say) for euros spot, investing for some defined period in euro-denominated assets, and then selling euros forward at the termination of the investment period, so that the operation has no currency risk. The more recent alternative is a swap transaction, where a holder of dollars (say) takes temporary possession of euros but with an agreement to reacquire the dollars at an agreed price at some specified date in the future and in the meantime allows the counterparty to make use of the dollar assets. The other major form of activity involves options, where a holder of dollars purchases a right to acquire euros (say) at a specified price, but exercises that right only if the market moves to a rate that yields a profit (“puts the contract in the money”) within the period that the option holds. Yet another alternative is a futures contract, which is similar to a forward in that it promises delivery of a specified currency in return for another at a determinate exchange rate on a specified future date, but differs in that the contract can subsequently be traded on a public exchange. Futures are often settled merely by exchanging the net difference in value between the two currencies, and thus tend to appeal to those engaged in speculation rather than hedging of commercial transactions, but they would nevertheless be capable of providing a good substitute for a forward contract.

Tobin’s initial suggestion was that a currency transactions tax (CTT) should apply just to spot transactions. He argued that this would catch most forward transactions too, because a bank that makes a forward sale of a currency typically covers itself by buying that currency spot. Even if this is normally true, however, it would probably not remain true for very long after the institution of a CTT. An untaxed three-day forward sale would be too good a substitute for a taxed two-day spot sale to prevent massive substitution of the former for the latter.³ Accordingly, subsequent writers have suggested broadening the tax base in order to catch all transactions that might provide good substitutes for spot transactions.

For a long time the most thorough and influential paper dealing with these issues was that by Peter Kenen

(1996). Kenen proposed to levy the tax on forward transactions as well as on spot transactions, on the grounds presented above that these are very close substitutes and so imposition of the tax on just spot transactions would invite substitution of forwards. He suggested that one should tax futures as well, both when the contract was first struck and every time it was subsequently traded, since as also argued above these could easily emerge as good substitutes for forward transactions. Second, he proposed that the CTT be extended also to swaps. This is because a swap provides a close substitute for the simultaneous spot and forward transactions that have customarily been involved in covered interest arbitrage, and they would therefore provide an efficient method for extensive tax avoidance if they remained untaxed. Third, he suggested that each party involved in a wholesale transaction (defined as one with another registered dealer, who would have to be just a dealer and not also acting as agent of a financial institution) should pay the tax at half the standard rate that would apply to retail transactions. Fourth, he proposed to base the tax on where deals are struck rather than where they are booked or settled, on the ground that dealing rooms are far more immobile than the computers used to book deals and that settlements are customarily made on net debts rather than the gross transactions that one would want to tax. Finally, and more relevant to the discussion in the next section, he proposed that transactions with non-cooperating jurisdictions that did not levy the tax should be charged a penal rate, so as to discourage migration of dealing rooms to untaxed jurisdictions.

Kenen’s most complex discussion concerns the advisability of taxing options. He acknowledged the danger that options left untaxed might start to crowd out forwards and futures, but was nevertheless reluctant to suggest taxing them. One reason is that an option may never be exercised, and another is that even if it is exercised the beneficiary will still have to buy foreign exchange spot (and will therefore pay the tax) if his purpose is hedging rather than speculation. He also argued that there was a danger of a tax on a “plain vanilla” options contract inspiring the “rocket scientists” to design synthetic currency contracts and more complex contracts, which would expose those who were induced to switch from forwards and futures to additional risks in dealing with complex derivative instruments.

Several other issues also concerned Kenen. First, he worried that his proposed structure involved assessing taxes solely on registered foreign exchange

³ Spot transactions are defined as those in which settlement is due within two days, and forward transactions as those in which settlement is due in three days or more. Even a modest tax rate would provide a strong incentive to postpone settlement by a day in normal times if that allowed avoidance of the tax.

dealers, which would leave retail transactions between non-banks untaxed. While these may be small at the moment, there is a danger that they would rapidly grow if they were left untaxed and a substantial tax rate were imposed on transactions between dealers. Second, he suggested that “small” transactions (which he suggested might be defined as those of less than a million dollars each) be exempted. Third, he noted (but did not endorse) that many authors had taken for granted that official transactions, specifically those by currency boards, should be exempted. Finally, he noted that his structure would impose double taxation on those shifting between minor currencies, since a trade of (say) the Brazilian real for the Mexican peso is normally done by going through a vehicle currency (in practice the United States dollar) rather than directly.

Garber (1996) is one of the most influential sceptics of the feasibility of enforcing a CTT. This is partly because of the difficulties discussed in the next section of establishing universal participation among governments, but he also argued that the market would be capable of devising ways of avoiding the tax. One channel he identifies is retail transactions between non-banks: limiting these would in his view require bringing non-banks with active treasury departments into the tax net. Another avoidance technique would be possible if a foreign exchange transaction were defined as the exchange of one bank deposit for another in a different currency, since it would be possible to substitute swaps of treasury bills in countries with liquid treasury bill markets. Or else the two parties could provide credit to each other in the two currencies, collateralized by the claim that each has on the other. Yet other methods could be employed if supervisors and tax authorities saw through these subterfuges and began to tax them. Avoidance would end only when the liquidity premium on the less liquid assets that would be used was equal to the transactions tax.

Kenen’s recommendation of levying a CTT on the basis of where a deal is struck has been challenged by Schmidt (1999), whose argument has been endorsed by Clunies-Ross (2003). Schmidt argues that in view of technical developments since Kenen’s paper it would now be feasible for the monetary authorities that issue the world’s five vehicle currencies⁴ to identify and therefore to tax the gross value of all transactions into

and out of their currencies. This would involve the tax being collected by the authorities in which transactions are settled rather than agreed. Kenen dismissed this possibility on the ground that many transactions are netted before they are settled, but Schmidt argued that the monetary authorities of the vehicle-currency countries have the leverage needed to oblige offshore netting systems, as well as their own foreign exchange banks, to report gross transactions to them. This is possible because of arrangements that have already been adopted in order to protect transactors against settlement risk. In fact monetary authorities already levy charges on bank settlements of currency transactions in order to pay for use of the information software used in settlement, and since all transactions go through one of the five vehicle currencies at least once it would need only those five authorities to collect the CTT.

An agreement that involved only those five authorities would be subject to the danger of avoidance as banks shifted their operations to other currencies. To safeguard against this, Schmidt suggests that another eight or so countries with currencies that might come to be used as vehicle currencies would need to be prepared to cooperate in applying the tax if migration of the market were to occur. It would be desirable to obtain their ex ante agreement, so as to discourage market migration induced by the hope of tax avoidance.

It has been claimed that the feasibility of levying the tax at the settlement stage has been further enhanced by the opening in September 2002 of the CLS Bank.⁵ “CLS” stands for “continuous linked system” and is a private sector response to the Group of Ten’s concern with settlement risk. Under the traditional foreign exchange system, all foreign exchange trades due to be settled in a particular centre on a particular day were settled simultaneously at the end of that centre’s working day. Since many foreign exchange trades involved more than one time zone, this exposed traders to the risk that they would not receive their payment

⁴ The United States dollar, euro, yen, pound sterling, and Swiss franc.

⁵ The parent company is Swiss while the operational bank is in London. Both are regulated by the Federal Reserve. The holding company has 71 shareholders, and they and another 257 third parties settle their transactions in the 15 currencies currently covered by the system through the central banks of the countries involved (the issuers of the 5 vehicle currencies plus Australia, Canada, Denmark, Hong Kong SAR, New Zealand, Norway, Republic of Korea, Singapore, South Africa and Sweden).

because their counterparty would become insolvent in the interim (like Herstatt Bank in September 1974). The CLS Bank enables those who use it to avoid this risk, because the payment in one currency (the one that has been sold) occurs simultaneously with receipt of the other (the one that has been bought): the CLS Bank operates 24 hours a day on the basis of continuous clearing. The CLS is now estimated to have a turnover of about US\$ 1 trillion a day, which is reported to be about 45% of current market volume.

One possibility would be to confine a currency transactions tax (CTT) to those transactions that go through the CLS. This would mean sacrificing over half

of the yield of the tax, at least on present parameters. There is also an issue as to how many transactions would be diverted from the CLS if it alone were to be subjected to a tax. Obviously this would depend on the rate of tax, but even with a very low rate that possibility should be borne in mind. Presumably a member bank or registered third party is not obliged to channel all its transactions through the CLS Bank, in which case one might expect that many participants would react to a CTT by settling their routine transactions (those with highly creditworthy partners in normal times and the same time zone) outside the CLS system.

III

Governmental Participation

It has long been argued that it would be essential to operation of a CTT to have the participation of all countries with active foreign exchange markets. The reason is that non-participation by even one centre would give it an enormous competitive advantage, so that the market would rapidly migrate to that centre and undermine the tax regime. Not only is this true of established financial centres, including the ones like Hong Kong SAR and Singapore in economies that have not traditionally been classified as industrial countries, but it is argued that the market would migrate to putative financial centres like Grand Cayman or the Bahamas if they did not levy the tax. Even gaining the adherence of the traditional financial centres like London and New York would be problematic, given that the United Kingdom and the United States have for many years taken a very *laissez-faire* line on their offshore financial sectors, in part motivated by the rich financial pickings from hosting such a sector. The usual conclusion has been that general participation is doubly necessary: both in order to prevent the market migrating and the tax being undermined by that migration, and to reassure the market leaders that their position would not be undercut by any such migration occurring.

The paper of Kenen (1996) already discussed in the previous section made an important proposal that might make this challenge somewhat less demanding. If the agreement establishing a CTT were to include his

suggestion of a penal rate⁶ on transactions with jurisdictions that did not levy the CTT, this would probably make it necessary only to reach agreement among the countries that already have established financial centres, and not to get every potential tax haven like Grand Cayman and the Isle of Man on board too. But that leaves a demanding task: One is talking not only about the United States and the United Kingdom, about Hong Kong SAR and Singapore, but also about countries like Chile, South Africa and New Zealand where the foreign exchange market currently serves only local needs but could easily be expanded to deal also with dollar/euro and dollar/yen trade. On the other hand, levying the tax by the place of settlement as urged by Schmidt would be far less demanding.

An important paper by Spahn (2002) has challenged the conventional view that the tax makes sense only if imposed universally. Spahn argues that it would be feasible for the European Union to tax transactions involving the euro (and the pound sterling?) at a modest rate even if other issuers of vehicle currencies (except perhaps for Switzerland) declined to cooperate. His argument about the need for Swiss cooperation seems to rest on the tax being levied on deals agreed by trading desks (as suggested by Kenen), since it is based on the strong advantages to the trading centres being in the same

⁶ He suggested a rate a hundred times higher, of 5% rather than 0.05%.

time zones as those where trades are generated. However, this option would generate cumbersome reporting requirements, which are largely unnecessary if one resorts to the alternative espoused by Schmidt, of relating the tax to settlement. Under the option of automated, centralized tax collection at the stage of settlement, tax liability arises from the access of market participants to national gross settlement systems. Operations prior to settlement (such as the taxation of forward transactions espoused earlier) can be included by contractual requirements on those participating. Spahn argues that there would still be a need for reporting by institutions (including big multinational companies that settle many trades internally) that do not participate in official and centralized clearing and settlement. These institutions

could either join the official system or convey relevant information to it.

If one is looking to maximize the revenue yielded by a CTT, then a geographically limited tax such as that espoused by Spahn makes little sense. Only if the issuer of one or more of the vehicle currencies were adamantly opposed to even a very modest rate of CTT while the others were favourable would it make any sense to contemplate this. But one should not have any illusions that there would be potentially important effects from even a low tax rate. For example, the euro's role as a vehicle currency between (say) Poland and the Czech Republic would surely fall victim to a CTT that was imposed by the European Union but not by the United States.

IV

Revenue-Raising Potential

How much money could a CTT raise? That depends upon the design of the tax and the rate at which it is imposed. There are of course many possibilities, but it is notable that over time the tax rates that have been discussed have fallen dramatically. Tobin initially spoke of a 1% rate, but in 1995 he wrote that a 0.1% tax rate might be more prudent to avoid swamping the normal commission (Tobin 1996). At the same conference Jeffrey Frankel also spoke of a 0.1% rate, and Peter Kenen of 0.05%, while only Stephany Griffith-Jones (0.5%) and David Felix and Ranjau Sau (0.25%) suggested tax rates higher than Tobin's figure. Since then Nissanke (2005) has estimated the revenue that would be raised by tax rates of 0.01% and 0.02% (respectively 1 and 2 basis points), while Spahn (2002) suggested tax rates of 0.01 and 0.005% (respectively one basis point and half a basis point).

The most optimistic revenue estimates assume high tax rates and minimal impact of the tax in reducing the volume of transactions. As an extreme case, consider the yield of a 1% (100 basis points) tax rate on foreign exchange turnover of US\$ 1.88 trillion per day (the BIS estimate of turnover in April 2004, after netting out for double counting), assuming that there were no evasion and no decline in foreign exchange market activity induced by the tax. Such a CTT would raise nearly US\$ 19 billion a day, or US\$ 4.5 trillion per year, assuming 240 working days in a year. However,

in view of the previous discussion of the difficulties of establishing an erosion-resistant tax base and the fact that a tax rate this high would yield many thousands per cent of the traders' value added, it is fanciful to imagine that a CTT could yield anything of this order of magnitude.

Hypothesize instead a tax imposed at an equal rate on all spot foreign exchange transactions, as Tobin initially did, but at a rate typical of other indirect taxes. VAT, for example, is typically something in the vicinity of 15%. The value added in a foreign exchange transaction—the margin between buying and selling rates—is reported by Spahn to be only around one basis point for large inter-dealer wholesale transactions (what is often referred to as “hot potato trading”), which still constitute the majority of transactions.⁷ That would suggest that the tax rate might be around 0.15 basis points in order to impose a burden comparable to other indirect taxes. That may not sound much, and certainly not compared to Tobin's initial suggestion of 100 basis points, but 0.0015% of US\$ 621 billion (the latest BIS estimate of the daily value of spot transactions) is over

⁷ The latest BIS survey estimated that about 53% of foreign exchange transactions were purely between dealers. This marks a considerable decline from the 59% reported in 2001 and the 70% reported in 1992.

US\$ 9 million. Given 240 working days in a year, a CTT at this rate would yield around US\$ 2.2 billion per year if there were no evasion and no decline in foreign exchange market activity induced by the tax. Unless that decline were more than 10%, a currency transactions tax could be expected to raise over US\$ 2 billion a year in the absence of evasion. That is modest compared to the estimates that have usually been presented, but perhaps still enough to make the tax worth consideration. The cost of administration of the tax, which no one seems to have estimated, would need to be deducted, but this would presumably be rather small as the tax could be levied automatically by suitable programming of the computers used in the forex market, especially if the tax were assessed on settlement rather than deals.

There is a big gap separating US\$ 4.5 trillion and US\$ 2 billion. Is it possible to envisage a CTT that could realistically be expected to yield more than the latter sum?

How about levying the tax on the base and at the rates proposed by Kenen (1996)? This would tax forward and swap transactions as well as spot transactions, at a standard tax rate of 5 basis points and with a tax on inter-dealer transactions that would be 2½ basis points each. Given the BIS estimate of US\$ 1,880 billion turnover per day, this tax would yield US\$ 940 million per working day or US\$ 226 billion per year, in the absence of evasion and any tax-induced decline in foreign exchange market activity. If each final transaction involves one inter-dealer transaction as well, the cost of a final transaction would increase by 10 basis points, or maybe by 100%. (Margins with final consumers are of course far bigger than the inter-dealer margins referred to before.) If the demand for final foreign exchange transactions has unitary elasticity, the doubling of cost would imply a halving in the volume of foreign exchange transactions and therefore in tax revenue, to US\$ 113 billion per year, which is still a substantial sum.

With a rate as high as this, however, one has to worry about the qualifications concerning evasion and an induced decline in market activity. On inter-dealer transactions the tax rate would be about 250% of value added, which is the sort of tax rate that customarily induces strong efforts at avoidance. If the doomsday scenario—in which the tax induces collapse of the existing dealer structure of the market in favour of a structure in which foreign exchange brokers put customers directly in contact with one another—were to materialize, the tax base would shrink by at least

53% (the latest estimate of the proportion of transactions that are hot-potato inter-dealer transactions). Admittedly in that event the cost of a final transaction might rise by something short of 10 basis points, so the potential tax yield might be over US\$ 53 billion per year (which is 47% of US\$ 113 billion), perhaps in the range of US\$ 60 billion to US\$ 100 billion per year.

If one worries that Kenen's proposed rates are too high, a possible compromise would be to adopt his suggestions regarding the tax base but to adopt a tax rate of one basis point (and thus half a basis point each for inter-dealer transactions), as several other writers have discussed. This would yield 0.01% of US\$ 1.88 trillion for 240 days a year, or some US\$ 45 billion per year in the absence of evasion and any decline in foreign exchange market activity induced by the tax.⁸ Of course, one should expect that the tax would induce some decline in market activity. Again assuming that each transaction with a final consumer induced one inter-dealer transaction as well, whose cost is passed on, and unit elasticity of the demand curve for foreign exchange transactions by final consumers, the estimated yield of a currency transactions tax would be some US\$ 23 billion per year, without allowing for collection costs.

Lastly, consider finally the potential yield of a tax confined to transactions through CLS, which are stated to total about US\$ 1 trillion per day, so a 1 basis point tax rate would yield some US\$ 100 million per day or US\$ 24 billion per year, without evasion or any impact on trading volume; the latter would probably result in a tax yield of well under US\$ 20 billion a year.

These figures may be compared to those that have been advanced by other recent writers, as shown in the box.

⁸ Is this figure compatible with the US\$ 2 billion per year previously cited for a 0.15 basis point tax on spot transactions? Yes. Spot transactions are less than a third of the transactions that Kenen proposes to tax, and 0.15 basis points (the tax rate) is little more than one-seventh of the tax rate postulated here.

Box

Tobin (1996)	US\$ 94 billion, or “perhaps as little as half that”, for a tax of 10 basis points.
Frankel (1996)	US\$ 166 billion, for a tax of 10 basis points. US\$ 361 billion, for a tax of 100 basis points.
Felix and Sau (1996)	US\$ 206-268 billion, for a tax of 25 basis points. US\$ 90-97 billion, for a tax of 10 basis points.
Spahn (2002)	US\$ 15 billion, for a tax equivalent to 2 basis points, but levied only on euro transactions.
Clunies-Ross (2003)	US\$ 53 billion, for a tax rate of 2 basis points.
Nissanke (2005)	US\$ 31-35 billion, for a tax of 2 basis points. US\$ 17-19 billion, for a tax of 1 basis point.

V

Conclusions

A currency transactions tax has a natural attraction as a method of raising revenue for spending on international causes, inasmuch as it would be largely or entirely collected by a limited number of rich-country governments but would be paid by a widely spread international clientele. But many of the presentations of this idea may have served to deter potential sympathizers because of a tendency of supporters to claim that the tax could solve problems such as destabilizing speculation at the same time.

In order to maximize its appeal to those who care about the financial sector, the tax rate that is proposed needs to be drastically lower than the rates that were discussed in the older literature. Even a tax rate of 0.01% (1 basis point) is high relative to the value added involved in some of the transactions that would be taxed. My own preference would be to start with a tax rate lower than this, perhaps significantly lower, and aim to raise it gradually to a maximum of 1 basis point if it did not appear to be having untoward allocative effects.

Opinion seems to be swinging toward the view that technological developments mean that a CTT would be best collected at the settlement stage, with an obligation on those who pay the tax to report the volume of gross transactions, including forwards and swaps, rather than

just to pay a sum based on the net sums of spot transactions that go through the settlement mechanism. This would avoid the loss of revenue and the discouragement of eliminating settlement risks that would come from imposing the tax just on CLS transactions, and it would require somewhat less demanding international agreements than collecting the tax based on where the deal is struck, as proposed by Kenen.

Even the modest rate of tax envisaged here would seem capable of raising substantial revenue. Once the tax rate had reached one basis point, one might expect that it would raise something of the order of US\$ 20 billion per year. All estimates suggest that the volume of transactions in the foreign exchange market should be expected to respond even to such a seemingly modest rate of tax, but the impact of a low tax on real variables like the level of trade or FDI, or the variability of the exchange rate, would probably not be substantial. Nor should one expect that a tax at this rate would provoke substantial efforts at tax avoidance by such techniques as swapping Treasury bills in different currencies instead of bank deposits or through using rocket-science derivatives. Such mechanisms are more costly than could be justified by a tax of 1 basis point. It might be possible to contemplate a very simple tax structure, involving only one rate of tax to apply to all transactions.

Some writers have tried to argue that the incidence of such a tax would probably be progressive, either because it would squeeze the financial sector or because the main users of the currency markets tend to be the wealthy. In my view the operative word here is

“probably”. We really do not have the evidence to conclude a strong presumption about the distributive impact of a CTT, but I would concur in the presumption that it is likely to be progressive.

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Relative prices in Latin America in periods of low inflation and structural change

Pedro Sáinz and Sandra Manuelito

Relative prices and price stability have a recognized identity in economic theory and economic policy. In the last 50 years it is possible to configure numerous scenarios, according to the relative importance given by Latin American governments to price stability and relative prices. In the current debate, relative prices have been receiving less attention than price stability. Underlying this appears to be the belief that, with inflation low, the dispersion coefficient for variations in the prices of the goods and services included in the consumer price index should decline as well. The present article, in addition to describing the recent evolution of relative prices in a number of the region's countries, shows that this belief does not accord with the facts, identifies homogeneous groups of goods and services at either end of the distribution and raises some questions about the implications of this last finding.

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I

Introduction

The aims of sections I to IV of this article are, firstly, to show what a wide range of goods and services an examination of relative prices in an economy might encompass, and to point out that the present study includes just a part of this range, so that there is scope for taking it further in future. The second aim is to place the current situation as regards relative prices and price stability in Latin America in a broader historical context, to give an idea of how important the relationship between relative prices and economic stability, transformation and growth is now and will continue to be in future.

Inflation, as measured by the rate of increase in the consumer price index (CPI), and the structure and variation of relative prices, i.e., of the different goods and services making up the CPI basket, have been matters of interest for Latin American economic policymakers from the post-war period to the present day. Very briefly, the characteristics associated with the region in international comparative analyses during the 1950s and 1960s were high inflation and the use of relative prices as a policy instrument. Nonetheless, the variations of both the CPI and relative prices now occur in an economic environment far different from the situations prevailing in the region in the last 40 years of the twentieth century. By the early 2000s, the CPI was rising far more slowly – annual increases were in single digits in most of the countries. At the same time, the issue of relative prices had lost ground for a number of reasons, in particular an explicit or implicit belief that low levels of inflation were being matched by a fairly stable relative price structure; i.e., that the growth rates of different prices were subsiding fairly evenly, so that relative prices

were changing little or, to put it another way, were displaying stable or diminishing relative dispersions. Of the sections indicated, IV covers the evolution of the consumer price index in Latin America between 1972/73 and 2003 and shows the scale of the changes observed.

Sections V and VI examine the cases of Chile and Brazil, opening the way to a detailed analysis of the behaviour of consumer price indices in the 1990s and early 2000s at both the aggregate and individual component levels. This is done for product groups and individual products included in the basket used to compile the CPI, “products” being understood to mean both the goods and the services making up this index. The reason for choosing Brazil and Chile is that those two countries have managed to reduce their inflation rates significantly and have explicitly committed themselves to particular inflation goals. The conclusions drawn from the cases of these two countries will be developed to show the main regional tendencies of both CPIs and their components for a number of countries in the region. It will be demonstrated that, contrary to what is assumed by many analysts, the dispersion of price variations in the present context of low inflation is greater than in many periods of high inflation in the past.

Section VII describes the main factors that, in our opinion, largely account for the way goods and services price variations have developed in Latin America. Section VIII, lastly, presents the main conclusions of this study and some considerations concerning the importance of public policies in determining several of the goods and services prices included in the consumer price index.

II

Some conceptual considerations

Although the decision was taken, for the reasons set out above, to focus the analysis on the evolution of the consumer price index and its components, it seems advisable to place this coverage in a broader framework, as we believe that this study and its results provide compelling reasons to take the analysis further.

The most commonly used concept of inflation is the rate of increase in the cost of a basket of goods and services representing private consumption, generally expressed by the consumer price index. This approach is not necessarily the most helpful for examining the progress of the economy, and economists have found it necessary to resort to broader measures of inflation.¹

The main limitation of the CPI in terms of its ability to reflect inflation is its limited coverage of goods and services. It normally excludes certain durable consumer goods, capital goods, the value of financial assets and, above all, the value of fixed assets such as housing and land. By so doing, it fails to provide the measurements needed for one of the major areas of research in market economies, namely the relationship between price stability, monetary policy, economic cycles and financial asset prices. An additional (and related) consideration is that one of the greatest concerns for public policymakers is to prevent major crises caused by sharp falls in currencies and asset prices. Large swings in financial asset prices (financial bubbles and sharp stock market falls) occurring in combination with stable consumer price indices have been and remain a puzzle. Consequently, the CPI is not a sufficient instrument on its own for dealing with the issue of price stability or for describing the broad evolution of relative prices. Nor can other key economic issues, such as the relative prices of capital and labour, be analysed by recourse to the components of the CPI alone.

The influence of relative prices on resource allocation and personal welfare is another conceptual aspect of the greatest importance. In economic policy terms, government measures that influence the establishment of a relative price structure and its variations or stability over time are a crucial issue of permanent relevance. There are many areas for debate here. One is the legitimacy and advisability of government involvement in shaping a relative price

structure. Some believe it is most desirable for prices to be set by the market; in the view of others, measures to regulate particular prices, guided by medium- and long-term technical or political criteria, can be an indispensable tool of economic transformation and growth, especially in countries that start out at a disadvantage to the most advanced economies. Arguments have been put forward in favour of the kind of public intervention used to assist the early stages of a late industrialization process, to balance the development of a country's regions, and to control markets that are oligopolistic or monopolistic either because of their nature or owing to the concentration of economic power. It is also justified as a mechanism for transferring resources to poor or intermediate social strata. Conversely, it is attacked for giving rise to a poor allocation of resources, or as an illegitimate mechanism for defending group interests. Naturally, the importance of these conceptual aspects will vary depending on whether it is a very high-inflation process that is being analysed or one in which inflation is low.

For the reasons given, and even though analyses which use the CPI are subject to the limitations described above at both the aggregate and individual component level, the reference point used in this study will be changes in the relative prices of the goods and services making up the CPI.²

² The results of this research have clearly shown that price dispersion in the aggregate does not have a direct relationship with inflation and that underlying both phenomena are explanatory variables associated with product group prices that have opposing dispersions and are determined by specific sectoral policies, and with other prices influenced by monetary policy. In the aggregate, the hypothesis that dispersion (as measured by the dispersion coefficient) falls with inflation is not borne out. Consequently, no attempt has been made here to establish an econometric relationship between the dispersion coefficient and inflation. In the bibliography, where this issue is covered, attention is drawn to the article by Vining and Elwertowski (1976) dealing with price indices in the United States. That article examines theoretical positions concerning the mutual dependence or independence of changes in the general price index and in the goods and services prices composing it. In particular, empirical tests are carried out for the United States economy to establish whether there is a relationship between the variances of the consumer and wholesale price indices and those of the individual product prices making up these indices, the conclusions being that they are not independent but are positively correlated. Cukierman (1983) reviews the subsequent discussion.

¹ See Laidler (2003) and Goodhart (2000).

III

Relative prices and inflation in Latin America

At the present time, price stability as measured by CPI variations is a subject of far greater interest to both the public and economic policymakers than relative prices. Nonetheless, governments are taking policy measures to regulate prices for a large group of goods and services. At the conceptual level, price regulation measures applied to substantial portions of the CPI basket will influence the evolution of the CPI, a fact that deserves to be made explicit. Before dealing with the issue in today's circumstances, we shall provide a brief historical review which, as well as showing that Latin America has always had relative price policies, will help to explain why interest in the two issues has shifted on several occasions over the last 50 years.

The economic transformation in Latin America during the 1950s, 1960s and 1970s was marked by widespread use of relative prices as a policy instrument in a number of areas. The priority was to set relative prices in such a way as to guarantee or facilitate investment or production in the industrialization or infrastructure sectors or programmes that governments had identified as being of prime importance. The origins of this price intervention can be traced to the prevailing mode of accumulation and to political pacts between social strata, and it gave rise to processes of growth and change in which crises occurred with some frequency. Management of these relative prices was bound up with administrative allocations, the accomplishment of development goals, and shortages, with their consequences for the purchasing power of the population, balance-of-payments and fiscal deficits and bouts of inflation, all of which played an important part in the economic history of Latin America in the past.³ That history also included high economic growth rates, which have not recurred, and far-reaching social and political change.⁴

These policies were attacked for causing inflation and distorting the structure of domestic prices as compared with those of international trade or the price structures of developed countries, and these criticisms underlay many of the proposals for change in the development approach. The proposals called for

drastically reduced government intervention in the setting of relative prices, including balanced fiscal accounts and an end to subsidies. They also called for a relative price structure oriented by international trade prices, in the case of tradable goods, and by the free play of market forces or by regulation based on market return criteria, in the case of non-tradable goods and services.

The shift from the earlier development approach to today's was complex, as was the evolution of relative prices and inflation, but it is not the intention of the present paper to describe or study this.⁵ The crisis of the 1980s brought a second period of change. The agreements reached with the International Monetary Fund (IMF) called for efforts to bring the trade balance of the balance of payments into surplus, as a mechanism for servicing the external debt or at least some of the interest payments. National currencies devalued sharply and there were severe economic recessions. These phenomena resulted in very high inflation which, in combination with constraints on domestic demand, once again altered relative prices, acutely so in many countries. The shift in prices was so marked that in some countries economic recovery was due in part to a rise in domestic production that brought idle capacity back on stream or replaced imports in the late 1970s. One example of this is the case of Chile in the 1983-1990 period, which shows how important relative prices can become in the evolution of an economy.⁶

At the same time, the high inflation rates suffered by some countries in the late 1980s and early 1990s (in excess of 1,000% a year in Argentina, Brazil, Nicaragua and Peru) placed producers and many

³ See Pinto (1968).

⁴ See ECLAC (1985).

⁵ Nonetheless, it is worth listing some of the characteristics of this shift. The period of external borrowing in the 1970s released governments from the balance-of-payments constraints of earlier decades, lifted national currencies against the dollar, allowed tariffs to be cut and, in many countries, thereby lowered the relative prices of consumer goods, particularly durables. A gradual reduction in fiscal intervention in many countries freed up prices for certain agricultural products and somewhat increased the prices of basic services. Currency appreciation brought down inflation rates. This was the first shift in relative prices and inflation.

⁶ See Sáinz and Calcagno (1992).

sections of society in a very difficult position. As inflation intensified, governments implemented anti-inflation policies that in some cases had high social costs. From being treated as an instrument or outcome, the inflation rate became a target. These anti-inflation policies led to further shifts in relative prices, particularly in countries that used the exchange rate as an anchor in order to achieve a relatively rapid fall in inflation. Another method was to cut budget deficits, which meant reviewing price regulation policies in areas as sensitive as electricity, gas and water, agricultural products, fuels and transport. Privatization was also a factor in price changes for these goods and services.

This brief account of developments in inflation and relative prices shows that from the 1950s until well into the 1990s the region experienced powerful inflationary processes, including surges that took inflation rates to extremely high levels, and that the relative price structure underwent numerous changes and was only broadly stable in the post-war period and for brief intervals thereafter. It would be very difficult to account for economic developments in the region's countries without taking the inflation and relative price situation into account. To lose sight of the relative price picture would be to ignore a factor of fundamental importance in explaining the productive transformation and the distribution of welfare.

The very high inflation rates of the early 1990s, and increasing external liberalization in most of the countries, altered the relative importance of inflation and relative prices. Privatization and speculative capital inflows created a balance-of-payments cushion. Anti-inflation policies had more leeway, and the new openness to foreign trade gradually brought prices in tradable sectors more into line with those of international markets.⁷

Conceptually, the defenders of low inflation attributed increasing importance to the role of low inflation in the countries' economic growth and development. They argued that this and a very low fiscal deficit (or none) were a necessary or even, in the view of some, a sufficient condition for development to take off. There was one area, however, where the use of anti-inflation instruments met with considerable obstacles. Privatization policies introduced to reduce

fiscal deficits led to price rises for some important services, including electricity, water and fuels, and the obvious effects of these on the welfare of different economic strata created higher levels of resistance.

In the late 1990s and 2000s, inflation had to be dealt with in new circumstances. In 1998 the external situation began to worsen, and efforts to reduce inflation and balance-of-payments deficits played a central role in government policy responses. This approach was partly imposed by the International Monetary Fund (IMF) agreements⁸ with the countries, partly dictated by the desire of governments to reap political capital from low inflation. It is now generally accepted in Latin America that a low inflation rate is a very important objective for the economic authorities.⁹ There is also a new institutional setting in which inflation targeting by independent central banks plays a significant role.¹⁰ Its emergence in the context of IMF adjustment policies adds to its importance.¹¹ Nonetheless, there is still debate about its conceptual definition and the advisability of making it a central priority.¹² It was also in this period that the consumer price index became increasingly important as an indicator, first, of domestic price movements in the economy, and second, of the stability of these prices.

In these circumstances, the subject of relative prices became less important. Two more or less implicit assumptions seem to have prevailed. The first was that low inflation was the outcome of a general reduction in the growth rates of the different groups of prices making up the index, or that fiscal austerity and liberalization policies bore down evenly on the different components; the second was that if there were different tendencies in the evolution of relative prices for the different groups of goods, these were stable and relatively small, and balanced each other without major deviations. As was said earlier, this article will seek to ascertain how the prices of the different goods and services in the CPI basket have behaved in a context of slower growth in the aggregate indicator.

⁸ See Boughton (2004).

⁹ See Barro (1995) for a treatment of a larger number of countries.

¹⁰ See Fisher (1996). Bernanke, Laubach and others (1999) provide a detailed analysis of the scope of inflation targeting policies, case studies and the results obtained.

¹¹ Blejer, Leone and others (2002) analyse the use of inflation targeting programmes in the context of adjustment programmes applied at the behest of the IMF.

¹² On this last point, and for the case of Brazil, see IPEA (2005, p. 51).

⁷ Frenkel (1995) analyses the anti-inflation policies applied in a number of Latin American countries in the early years of the 1990s.

IV

The evolution of the consumer price index in Latin America

Reference has been made to the large decline in inflation rates in the Latin American countries in the 1990s and early 2000s. Some figures will now briefly be given to convey the level of price stability that has been achieved, with reference to the earlier situation of high inflation that characterized Latin America. In 1990, cumulative annual inflation to December as measured by the CPI was a little under 1,200%, but in 2003 the cumulative annual rate of inflation in the same period was just 8.5%, and in 2001 inflation touched a low of 6.1%. As figure 1 shows, the inflation rate plunged in 1995 and has since remained at extremely low levels by Latin American standards. Thus, the high-inflation periods occurred mainly in the 1980s and early 1990s.

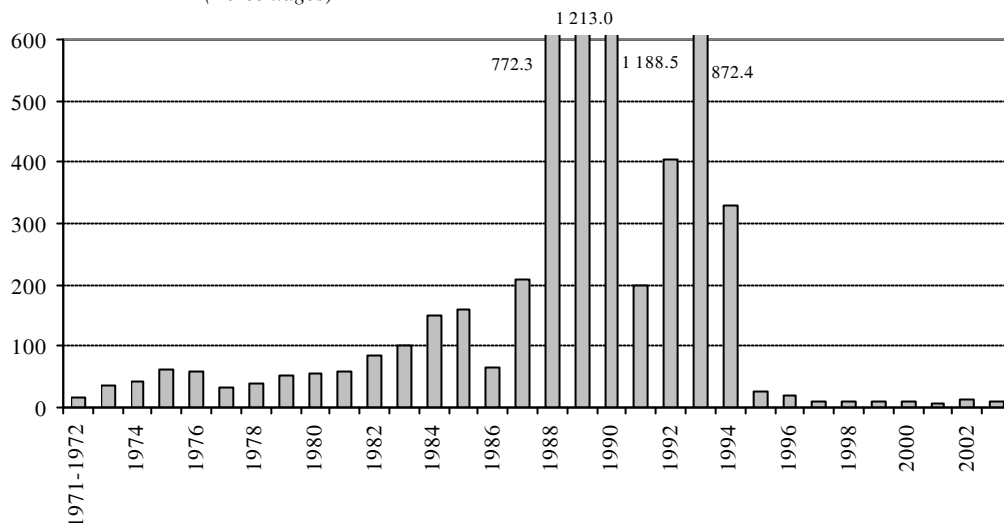
This result masks differences between the situations of the region's countries, however, and is strongly influenced by developments in Brazilian inflation rates

(table 1). This is only to be expected, given Brazil's importance in the total once the overall result is weighted by population size in the different countries.¹³ Again, the high-inflation countries were not the same in the different periods: thus, in the 1970s the countries were Argentina, Chile and Uruguay; in the 1980s, the countries with the highest inflation rates were Argentina, Bolivia, Brazil, Nicaragua, Peru and Uruguay (it was in 1989 and 1990 that inflation peaked in many of the Latin American countries); and in the 1990s, inflation fell considerably in the great majority of the region's countries, and in all cases was below 100%. Although a number of countries experienced inflationary episodes, albeit with lower rates than in earlier years, the regional inflation rate remained at historically low levels.

¹³ Brazil accounts for about 35% of the region's total population.

FIGURE 1

Latin America and the Caribbean: Annual inflation rate, December to December
(Percentages)



Source: Prepared by the authors based on official statistics.

TABLE 1

**Latin America and the Caribbean: Annual inflation rate,
December to December, selected years**
(Percentages)

	1971-1972	1975	1980	1985	1990	1995	2000	2003
Latin America and the Caribbean	17.3	60.9	56.1	159.4	1 188.5	26.0	9.0	8.5
Argentina	51.1	340.3	87.6	385.4	1 343.9	1.6	-0.7	3.7
Barbados	10.2	12.3	16.1	2.4	3.4	2.8	3.8	2.2
Bolivia	13.0	6.0	23.9	8 170.5	18.0	12.6	3.4	3.9
Brazil	16.0	29.4	95.3	239.1	1 585.2	22.4	6.0	9.3
Chile	79.3	340.7	31.2	26.4	27.3	8.2	4.5	1.1
Colombia	15.2	15.3	26.5	21.8	32.4	19.5	8.8	6.5
Costa Rica	4.0	21.5	17.8	10.9	27.3	22.6	10.2	9.9
Ecuador	6.8	13.2	14.5	24.4	49.5	22.8	91.0	6.1
El Salvador	2.3	15.1	18.6	31.9	19.3	11.4	4.3	2.6
Guatemala	0.7	13.0	9.1	27.9	59.6	8.6	5.1	5.9
Haiti	10.3	17.8	15.6	17.4	26.1	24.8	19.0	41.5
Honduras	4.1	5.9	11.5	4.2	36.4	26.8	10.1	6.8
Jamaica	0.0	14.7	28.6	23.3	29.8	25.6	6.1	14.1
Mexico	2.2	16.0	29.8	63.7	29.9	52.0	9.0	4.0
Nicaragua	0.0	0.0	24.8	334.3	13 490.2	11.1	9.9	6.6
Panama	3.9	1.8	14.4	0.4	0.8	0.8	0.7	1.5
Paraguay	7.9	8.6	8.9	23.1	44.0	10.5	8.6	9.3
Peru	6.0	25.5	59.7	158.3	7 646.8	10.2	3.7	2.5
Dominican Republic	9.3	16.5	4.6	30.9	79.9	9.2	9.0	42.7
Trinidad and Tobago	6.5	13.4	16.6	6.5	9.5	3.8	5.6	3.0
Uruguay	62.5	66.8	42.8	83.2	128.9	35.4	5.1	10.2
Venezuela (Bolivarian Rep. of)	3.2	8.0	19.6	7.3	36.5	56.6	13.4	27.1

Source: Prepared by the authors based on official statistics.

V

The consumer price index and goods and services prices: developments in Chile and Brazil

The detailed analysis of relative price developments during the 1990s and early 2000s was conducted by examining the cases of Brazil and Chile. Periods of high and low inflation were compared in both countries, and the distributions of the price variations for the different products were calculated by choosing periods in which each country used the same methodology and basket of goods to calculate the CPI. Then the most detailed product breakdown available was used to calculate the average rate of monthly variation in the price of each product, using the price index for the last and first month of the period. This yielded a distribution of average monthly rates of variation in the available product prices for the periods studied in

each country. These distributions could then be used to calculate a set of distribution parameters, which were then examined in an attempt to answer the following questions:

- (i) Did the characteristics of the distribution change when inflation fell? What were the most significant changes?
- (ii) Did the dispersion coefficients of the distributions rise or fall when inflation fell?
- (iii) Can products situated in different sections (quartiles, deciles) of the distribution be grouped using the most common categories employed to classify them (to one digit) in the CPI structure?

The first two questions can be referred back to those raised in earlier studies dealing with the forms of the distribution and also to the debate that arose among the majority of analysts who saw a direct relationship between lower inflation and a reduction in relative price dispersion.¹⁴ We did not find any applied economics studies for Latin America that might help us answer the third question, which is perhaps the most interesting of all given the effect that a stable trend in homogeneous groups might have on the allocation of resources and welfare.

The decision was made to study the evolution of the Brazilian and Chilean consumer price indices (at both the whole index and individual component level) for two reasons: first, the availability of statistical information, and second, the fact that these countries had succeeded in bringing inflation down substantially. Furthermore, as has already been pointed out, these are countries which have committed themselves explicitly in recent years to low inflation rates and price stabilization. The inflation developments in Chile and Brazil that are presented here basically occurred in the 1990s and early 2000s. Both countries had detailed information available on the evolution of prices for all products in the CPI basket. Two periods were studied for Chile: April 1989 to December 1998, and January 1999 to August 2004; in the case of Brazil, three periods were considered: July 1989 to December 1990, January 1991 to July 1999, and August 1999 to August 2004. In each case, the same methodology and product basket were used to measure prices in the different periods. In the case of Brazil, the second period was divided into two subperiods (January 1991 to June 1994, and July 1994 to July 1999) in order to bring out some major differences in the price evolution of the various products due to significant shifts in macroeconomic conditions.¹⁵

¹⁴ Roger (2000) reviews the literature analysing the distributions of variation rates (or “relative prices”, as they are called in those articles) in relation to the form of distribution of relative prices, understood as the rate of price variation in a given period.

¹⁵ In the case of Chile, the CPI for the April 1989 to December 1998 period has April 1989 = 100 as its basis; for the January 1999 to August 2004 period, the basis is December 1998 = 100. In the case of Brazil, the bases for the different periods are as follows: for July 1989 to December 1990, the basis is June 1989 = 100; for January 1991 to July 1999, the basis is December 1990 = 100; for August 1999 to August 2004, the basis is July 1999 = 100. For Brazil, the extended national consumer price index (Índice Nacional de Preços ao Consumidor Amplo (IPCA)) was used; the authors are aware of the scope of

Once the distribution was known, parameters could be calculated for it, including the average, the standard deviation, the dispersion coefficient and the characteristics of the quartiles and deciles for the different periods. The calculation procedure was as follows: first, as explained earlier, the average monthly variation rates for the different products included in the CPI were calculated using official figures from the countries (yielding a vector of variation rates z).¹⁶ Second, an average monthly rate was calculated for all these products. To this end, an unweighted arithmetical mean index of all products was calculated for the starting and ending months, and this was then used to estimate the average monthly variation of all the products; the same exercise was carried out for the official CPI. Third, the statistical parameters mentioned earlier were calculated. These calculations are presented mathematically in the appendix. In addition, the evolution¹⁷ of the official CPI in the different periods was compared with the evolution of the price indices for the different products. The same exercise was carried out at the product group level (one-digit classification), thus allowing the results to be compared.¹⁸ For simplicity's sake, we shall henceforth use the term “variation rates” for the average monthly rates of variation in the prices of the different components of the CPI basket in each of the periods.

this index and its differences from the national consumer price index (Índice Nacional de Preços ao Consumidor (INPC)), which has wider coverage, but the decision was taken to work with the IPCA because this is the reference indicator used by the authorities. In any event, when the authors used the INPC to conduct the same analysis as in the present study, for the last period considered, the conclusions about the behaviour of the price variation rates distribution were similar. The two subperiods for Brazil were chosen to reflect the timing of the Real Plan (on this subject, see Sáinz and Calcagno, 1999).

¹⁶ In studies that analyse how rates of price increase are distributed, these rates are usually called “relative prices” (the price at time t relative to the price at time $t-1$).

¹⁷ The average monthly variation rate of the consumer price index in the period was compared with the average monthly variation rates of all goods and services.

¹⁸ Indicators of kurtosis and skewness were also calculated for the two periods considered (kurtosis corresponds to the fourth moment of the distribution and skewness to the third). In the case of Chile, the distribution of the variation rates for the prices of the different goods and services shows greater kurtosis in the 1999-2004 period (5.3) than in the 1989-1998 period (-0.13). The skewness indicators behave similarly in the first period (-0.19) and the second period (-1.19).

1. Chile

To begin with, we shall examine the case of Chile (tables 2, 3 and 4). A first look at this set of indicators allows us to conclude that inflation decreased gradually and, with minor fluctuations, reached very

low average levels in the 2000s. The unweighted average of z , meanwhile, also moved downward, indeed falling by more than the official CPI inflation rate. Dispersion, as measured by the dispersion coefficient, increased in the lower-inflation period, rising as inflation fell. In turn, price changes meant that in both

TABLE 2

Chile: Growth rate of the consumer price index and the prices of its components. Statistical indicators

Full breakdown of the CPI components				One-digit breakdown of the CPI component groups				
Subperiods		April 1989-December 1998	January 1999-August 2004	Subperiods		December 1978-March 1989	April 1989-December 1998	January 1999-August 2004
CPI	Average monthly price growth rate (average monthly inflation in the period)	0.94	0.23	CPI	Average monthly price growth rate (average monthly inflation in the period)	1.29	0.76	0.54
Average monthly price growth rates of the products composing the CPI	Unweighted average	0.84	0.08	Average monthly price growth rates of the groups composing the CPI basket	Unweighted average	1.59	0.66	0.18
	Standard deviation	0.41	0.50		Standard deviation	0.16	0.34	0.34
	Dispersion coefficient	0.49	5.99		Dispersion coefficient	0.10	0.51	1.87
	Median	0.86	0.06					
	First quartile	0.60	-0.14					
	Fourth quartile	1.11	0.27					
<i>Number of components in the CPI basket</i>		368	482	<i>Number of components in the CPI basket</i>		4	5	8

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE).

TABLE 3

Chile: Growth rate of the consumer price index and the prices of its components. Indicators of dispersion in growth rates

Full breakdown of the CPI components				One-digit breakdown of the CPI component groups				
Subperiods		April 1989-December 1998	January 1999-August 2004	Subperiods		December 1978-March 1989	April 1989-December 1998	January 1999-August 2004
Average monthly growth rate of the CPI (average monthly inflation in the period)		0.94	0.23	Average monthly growth rate of the CPI (average monthly inflation in the period)		1.58	0.94	0.23
Dispersion coefficient (DC) of the monthly CPI growth rates (1)		0.78	0.34	Dispersion coefficient (DC) of the monthly CPI growth rates (1)		0.77	0.78	0.34
% of products whose monthly growth rates present $CD > (1)$		96.7	95.2	% of product groups whose monthly growth rates present $CD > (1)$		50.0	80.0	62.50
% of products whose monthly growth rates present $CD < (1)$		3.26	4.76	% of product groups whose monthly growth rates present $CD < (1)$		50.0	20.0	37.50

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE).

TABLE 4

Chile: Growth rate of the consumer price index and the prices of its components.
Statistical indicators of distribution
(Cumulative rates in the period, as percentages)

Subperiods		April 1989- December 1998	January 1999- August 2004
CPI	Cumulative growth rates over the period	194.9	16.6
Cumulative price growth rates of the products composing the CPI	Highest value of the first quartile of the distribution	100.1	-9.1
	Lowest value of the fourth quartile of the distribution	261.7	20.0
	Highest value of the first decile of the distribution	31.7	-28.8
	Lowest value of the tenth decile of the distribution	369.2	34.5
	Median	171.4	4.3

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE).

periods the average monthly CPI variation rate was greater than the unweighted average of the monthly average variation rates for the different products; this implies that a group of products whose prices rose by more than this average had a large weight in the CPI basket.

An analysis of the distribution of the variation rates included in z , in both periods, shows that this distribution presents different characteristics. In the first period studied, the median and the unweighted average are not much different, indicating that the distribution is fairly symmetrical. In the second period, however, the unweighted average is considerably lower than the CPI variation rate.¹⁹ It can be concluded, therefore, that in the second period analysed the goods and services prices that increased the most had a greater weight in the overall CPI calculation. If these products could not easily be substituted for by others whose prices increased by less, a reweighting at the end of the period could heighten the phenomenon. Furthermore, it transpires that the variation rates of the goods and services prices in the first quartile of the distribution were low enough to bring down the overall index, but at the same time their share of spending tended to fall, at least in certain social strata, owing to the difficulty of substituting for many of the goods and services in the upper part of the distribution.

In addition, although the distribution of z in the second period (January 1999-August 2004) is more

concentrated around the average, the outlying results are further from it. If a standardized analysis of the results is carried out,²⁰ the change in the form of the distribution shows that the variations are concentrated around zero and that the “tails” (i.e., prices that vary in a significantly different way from those in this “core”)²¹ are longer (figure 2). This can also be illustrated by the substantial decrease in the standard deviation of the variation rates composing the “core” between the two periods. It needs to be asked, then, whether price variations have really become more concentrated around this “core” or whether what we are seeing are not in fact more extreme variations in goods and services prices that fell or rose by more than in the earlier period. If the former is confirmed, the interpretation might be that the variation in a set of product prices formerly governed by an inertial effect became detached from the variation in other prices because de-indexation in the economy eliminated a tendency for prices in certain categories to adjust fairly automatically for inflation. At the same time, a smaller group of products that varied for non-inertial reasons now displays very high relative variations owing to the great stability around zero of the variations in the first set of products. In the second case, what would seem to be at work are more extreme price changes for goods and services whose variations have become detached from those of the group making up the “core”,

¹⁹ To take account of possible seasonal effects, a variation between January 1999 and January 2004 was calculated for the last period in Chile, and the results were similar. For example, the unweighted average of the variation rates was 0.085 and the dispersion coefficient was 6.4.

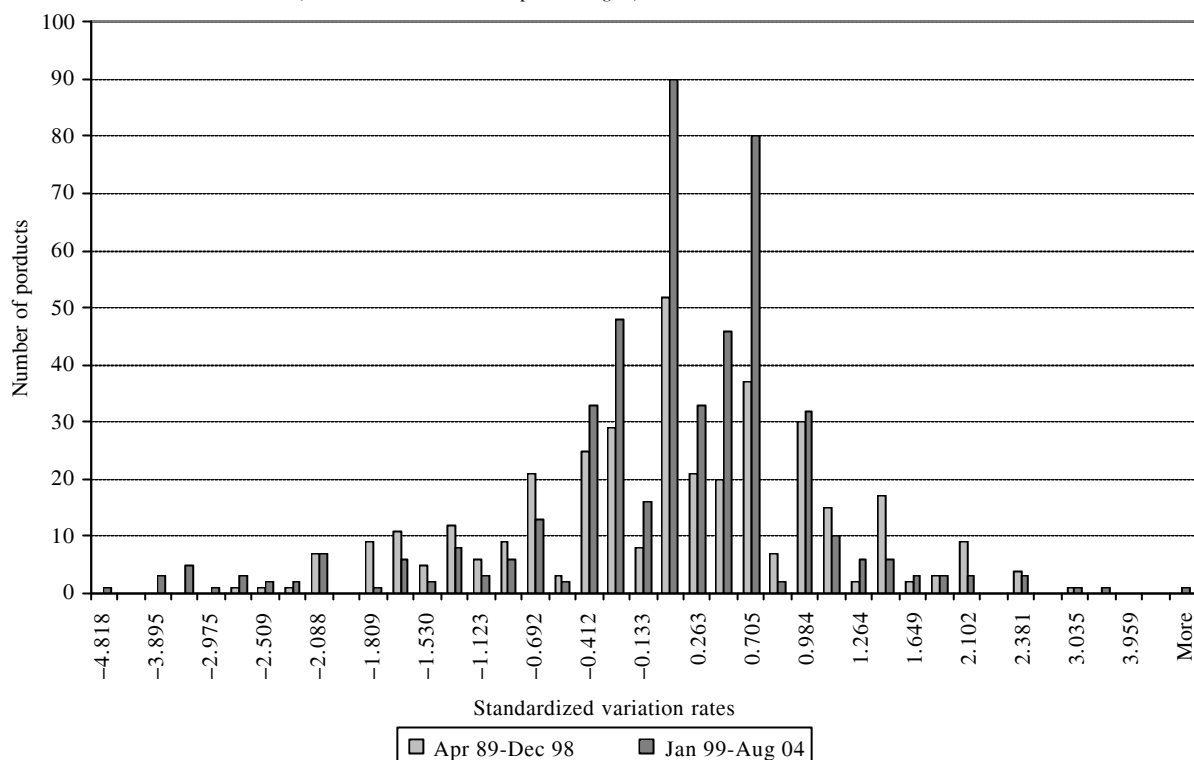
²⁰ The variation rates included in the z vector were standardized around the average in accordance with the following formula: $(X_i - \bar{X})/s_i$, where s_i is the standard deviation of the product i .

²¹ By “core” is meant the second and third quartiles of the distribution, and by “tail” is meant the first and last deciles.

FIGURE 2

Chile: Distribution of the average monthly price growth rates of the goods and services composing the CPI basket

(Standardized rates, as percentages)



Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE).

so that the supposed concentration of price variations in the core is really nothing but the effect of standardization with a considerably higher standard deviation. To elucidate the reasons for these changes, the distributions of z in the two periods were examined with the first and last deciles removed. The result shows that the “core” has similar dispersions in both cases. The reason for the change in the distribution of variation rates can thus be found in the evolution of goods and services prices whose variation rates for this period are within these deciles.

One striking result is that the first decile of the z distribution is now further from the average than the last decile.²² At the same time, concentration around the core is stronger to the right than to the left,²³ which is consistent with the observation in the previous

paragraph. When this result is compared with the average monthly CPI variation rate in each of the periods, however, it can be seen that the effect of rising prices on the CPI variation is not offset by the reduction caused by falling prices. This is reflected in the fact that the CPI variation rate was 0.23% in the second period.

It now needs to be asked whether the variation rates of the prices in the different categories are grouped in the z distribution in accordance with their product group classification (one-digit classification). The general answer is yes. It is also necessary to know how stable the positions of these concentrations are in the z distributions of the two periods. To answer this question, the procedure described above²⁴ was carried

²² It can therefore be concluded that, in standardized terms, prices for these products fell by more than prices for products whose variation rates were in the last decile rose.

²³ There is also a rise in the skewness of the distribution of product price variation rates between the two periods studied,

even though the average for these variation rates is lower. Bryan and Cecchetti (1996) analyse the relationship between the average and the skewness of the variation rate distribution and conclude that this is not necessarily positive and could well be negative.

²⁴ The parameters of the relative price distribution were calculated year on year.

out for each of the years in the different periods and the results were analysed to ascertain which categories were positioned in each of the deciles of the distributions obtained (table 5). The analysis also sought to ascertain whether the position of each of these categories was stable over the period (i.e., year on year) or whether their relative positions varied depending on the year. Further on, tables 6 and 7 present the dominant tendencies in the period as a whole. The main conclusions are that during the first period there was already a fairly stable degree of concentration for certain groups of categories, but others oscillated between one position and another. In the second period there was a stronger tendency for positions in the distribution to stabilize, especially in the first and last deciles.

As table 6 shows, in the first period considered there were some products (clothing, for example) whose prices consistently varied by less than the CPI, while the prices of other products such as health care usually

rose more quickly than the index. Food prices, on the other hand, seem to have been more variable since their relative positions changed depending on the year. In the second period (table 7), fruit and vegetables, computer equipment, household electrical appliances, clothing and financial costs were in the first quartile, with averages that in some cases were negative in absolute terms. At the other extreme was, essentially, a group of services for which in some cases poorer consumers had no substitutes available, such as transport and transportation services, and basic services (electricity, gas and water).

We can conclude that the nature of the product groups situated in the first and last deciles is very different. Those in the first decile (i.e., those whose prices rise by least or even fall) are usually goods for which substitutes are available in the expenditure structure and whose prices are on a clear downward trend in international markets. Conversely, those in the last decile (those whose prices are increasing the

TABLE 5

Chile: Growth rates of the consumer price index and of the prices of the index components. Statistical indicators of distribution

All goods and services in the CPI basket					
Subperiods		April 1989-December 1998		January 1999-August 2004	
		Standardized data		Standardized data	
CPI	Average monthly growth rate	0.94		0.23	
Average monthly price growth rates of the CPI components	Unweighted average	0.84	0.00	0.08	0.00
	Median	0.86	0.07	0.06	0.11
	Highest value of the first quartile of the distribution	0.60	-0.58	-0.14	-0.29
	Lowest value of the fourth quartile of the distribution	1.11	0.68	0.27	0.52
	Standard deviation	0.41	1.00	0.50	1.00
	Standard deviation (second and third quartiles)		0.34		0.23
Excluding goods and services whose average monthly price growth rates are in the first and last deciles					
Subperiods		April 1989-December 1998		January 1999-August 2004	
		Standardized data		Standardized data	
Average monthly price growth rates of the products composing the CPI	Unweighted average	0.85109	0.00	0.05584	0.00
	Median	0.87	0.06	0.06	0.03
	Highest value of the first quartile of the distribution	0.68	-0.68	-0.09	-0.72
	Lowest value of the fourth quartile of the distribution	1.04	0.74	0.23	0.81
	Standard deviation	0.26	1.00	0.21	1.00
	Standard deviation (second and third quartiles)		0.40		0.44

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE).

TABLE 6

Chile: Selected components of the consumer price index basket. Relative positions by distribution of average monthly price growth rates, April 1989 to December 1998

First quartile	Second and third quartiles	Fourth quartile
Fruit	Dairy products	Bread
Vegetables	Pasta	Beer
	Meat	Eggs
	Fish and seafood	
	Soft drinks	
	Ready meals	
	Mortgage/rental	Drinking water
Household electrical goods	Gas and electricity	Private telephone
	Household maintenance	
Household equipment		
Clothing	Petrol	Transport and transportation services
	Spectacle lenses	Private-sector medical services and hospitalization
		Medicines (vitamins, cough remedies, antihistamines, cardiovascular, antibiotics)
	School equipment	Education (basic, intermediate and higher)
		School and other textbooks
	Financial costs	Subscriptions
	Toys	

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE). Products are organized by their respective groups.

TABLE 7

Chile: Selected components of the consumer price index basket. Relative positions by distribution of average monthly price growth rates, January 1999 to August 2004

First quartile	Second and third quartiles	Fourth quartile
Fruit	Bread	Dairy products
Vegetables	Pasta	Beer
	Meat	Eggs
	Fish and seafood	
	Soft drinks	
	Ready meals	
	Mortgage/rental	Basic services
	Mobile telephony	Fixed telephony
Computing	Household maintenance	
Household electrical goods	Household equipment	
Clothing		Transport and transportation services
	Spectacle lenses	Medical services and hospitalization
	Medicines (cardiovascular, antibiotics, hypertension)	Medicines (vitamins, cough remedies and bronchodilators, antidepressants, antihistamines)
	School equipment	Education (basic, intermediate and higher)
	School and other textbooks	
Financial costs	Toys	Subscriptions

Source: Prepared by the authors based on figures published by the Chilean National Institute of Statistics (INE). Products are organized by their respective groups.

most) include the prices of the services that are hardest to substitute for in the spending structure; many of these prices are subject to government regulation mechanisms. The importance of these goods and services groups in the consumption baskets of the different social strata varies; the prices of the goods and services in the last decile have a greater weight in overall spending. If a stratum is forced to include faster-rising categories in its spending structure because opportunities for substitution are limited (urban transport, for example), it is less able to purchase products whose prices have fallen. Again, some prices are for services that have become segmented, with very different levels of quality on offer. This means that a more detailed analysis might show differences in the variations of the individual components.

A better picture of the cumulative effect of these variations over time can be obtained by comparing the cumulative variation in the period examined. This is particularly applicable in the second period (when the relative positions of the different products in the price variation rate distribution are more stable) and can be done by observing year-on-year results. With a cumulative variation of 16.6% in the CPI, prices in the first quartile fell by 9.1% and those in the first decile by 28.8%, while prices in the fourth quartile rose by 20% and those in the tenth decile by 34.5% (see table 4 above). Given that the relative positions of many products stabilized, these differences in variation rates had a major impact on the structure of relative prices. Again, the gap between the cumulative CPI variation rate and the median for the cumulative variation rates of the different products over the period (16.6% and 4.3%, respectively) also illustrates the degree of asymmetry in the positions of the different products, as discussed above.

2. Brazil

In Brazil, the drop in inflation was also accompanied by a rise in relative dispersion, with the dispersion coefficient for goods and services price variation rates rising sharply from about 0.1 to about 0.6. Both values are very low and significantly less than Chile's. It should be noted that when monthly variations were averaging some 30% and 25%, in the July 1989-December 1990 and January 1991-July 1994 periods, the standard deviation never really rose above 3. The extraordinary indexation of the Brazilian economy and government price-setting, especially in the earlier period, account for these values (tables 8, 9 and 10).²⁵

Although the average monthly CPI variation rate is higher than the unweighted average of the variation rates included in z , as was the case in Chile, the difference between the two is smaller. This shows that the prices of those products whose variation rates are at the top or bottom of the distribution (first and last deciles) do not have very different weights in the CPI basket. If we work at the product group level (one-digit classification), the dispersion in their price variation rates is not different from the result obtained when all products are considered, except in the August 1999-August 2004 period, when the dispersion in variation rates falls to values characteristic of the earliest periods. Again, when the standard deviation of the core of the distribution (i.e., the second and third quartiles) is examined, this proves to be very stable. Albeit to a very small extent, it is the extremes that account for the changes in the standard deviation of the core when the whole distribution is considered.

Again, the standardized distributions of the variation rates included in z enable us to draw some distinctions, both with Chile and between the periods considered. Oddly enough, the median of these variation rates (when standardized) is skewed to the right in the January 1991-July 1994 period (0.23) and to the left in the August 1994-August 1999 period; the latter situation did not arise in the case of Chile. Again by contrast with Chile, there is considerable symmetry between the first and fourth quartiles in the earliest and latest periods, except in the January 1991-July 1994 period, when there is asymmetry towards the right as in Chile. Broadly speaking, these values suggest a smaller variation in the relative prices of the different components of the CPI, and in the respective weighting changes within the basket as a whole (figures 3 and 4).

As table 11 shows, the cumulative variation rates for these goods and services concentrations over the different periods have major effects on relative prices—much more so in many cases than in periods of high inflation. Particularly striking are the major disparities in the 1994-1999 period, when the average variations of the tenth and first deciles differed by a factor of more than 10 (in the following period the factor was still about five).

²⁵ In the case of Brazil, the kurtosis indicators are positive in all the periods analysed, being higher in the January 1991-June 1994 subperiod and the August 1999-August 2004 period, while the skewness indicators are negative in these two periods.

TABLE 8

**Brazil: The consumer price index and its components.
Some statistical indicators**

Subperiods		Full breakdown of the products in the CPI				One-digit breakdown of the product groups in the CPI			
		Aug. 1989- Dec. 1990	Jan. 1991- Jun. 1994	Jul. 1994- Jul. 1999	Aug. 1999- Aug. 2004	Aug. 1989- Dec. 1990	Jan. 1991- Jun. 1994	Jul. 1994- Jul. 1999	Aug. 1999- Aug. 2004
CPI	Average monthly growth rate (average monthly inflation in the period)	30.86	25.81	0.96	0.71	30.86	25.81	0.96	0.71
Average monthly price growth rates of the products composing the CPI	Unweighted average	30.40	25.23	0.89	0.73	31.56	25.70	1.02	0.66
	Standard deviation	3.27	3.08	0.54	0.39	2.45	0.72	0.498	0.13
	Coefficient of variation	0.11	0.12	0.62	0.53	0.08	0.03	0.48	0.19
	Median	29.61	25.22	0.72	0.70				
	Highest value of the first quartile of the distribution	27.78	24.17	0.47	0.51				
	Lowest value of the fourth quartile of the distribution	31.35	25.94	1.15	0.89				
<i>Number of products in the CPI basket</i>		<i>434</i>	<i>347</i>	<i>347</i>	<i>513</i>	<i>7</i>	<i>7</i>	<i>7</i>	<i>9</i>

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

TABLE 9

**Brazil: The CPI and the prices of CPI components.
Indicators of dispersion in growth rates**

Comparison with the CPI (all products composing the CPI)					Comparison with the CPI (product groups)				
Subperiods	Aug. 1989- Dec. 1990	Jan. 1991- Jun. 1994	Jul. 1994- Jul. 1999	Aug. 1999- Aug. 2004	Subperiods	Aug. 1989- Dec. 1990	Jan. 1991- Jun. 1994	Jul. 1994- Jul. 1999	Aug. 1999- Aug. 2004
Average monthly growth rate of the CPI (average monthly inflation in the period)	30.86	25.81	0.96	0.71	Average monthly growth rate of the CPI (average monthly inflation in the period)	30.86	25.81	0.96	0.71
Dispersion coefficient (DC) of the monthly CPI growth rates (1)	0.77	0.38	1.14	0.78	Dispersion coefficient (DC) of the monthly CPI growth rates (1)	0.08	0.03	0.48	0.19
% of products whose monthly growth rates present CD > (1)	77.0	100.0	96.3	97.3	% of product groups whose monthly growth rates present CD > (1)	57.0	100.0	71.4	100.0
% of products whose monthly growth rates present CD < (1)	23.0	0.0	3.8	2.7	% of product groups whose monthly growth rates present CD < (1)	43.0	0.0	28.0	0.0

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

TABLE 10

**Brazil: Growth rate of the CPI and of the product prices composing it.
Statistical indicators of distribution**

		All goods and services in the CPI basket							
Subperiods		Jul. 1989-Dec. 1990		Jan. 1991-Jun. 1994		Jul. 1994-Jul. 1999		Aug. 1999-Aug. 2004	
		Standardized data		Standardized data		Standardized data		Standardized data	
CPI	Average monthly growth rate	30.86		25.81		0.96		0.71	
Average monthly price growth rates of the CPI components	Unweighted average	30.4	0.00	25.23	0.00	0.89	0.00	0.73	-0.00
	Median	29.61	-0.02	25.22	0.23	0.72	-0.19	0.70	-0.02
	Highest value of the first quartile of the distribution	27.78	-0.58	24.17	-0.11	0.47	-0.67	0.51	-0.50
	Lowest value of the fourth quartile of the distribution	31.35	0.51	25.94	0.46	1.15	0.60	0.89	0.47
	Standard deviation	3.27	1.00	3.08	1.00	0.54	1.00	0.39	1.00
	Standard deviation (second and third quartiles)		0.30		0.16		0.36		0.27
Excluding goods and services whose average monthly price growth rates are in the first and last deciles of the distribution									
Subperiods		Jul. 1989-Dec. 1990		Jan. 1991-Jun. 1994		Jul. 1994-Jul. 1999		Aug. 1999-Aug. 2004	
		Standardized data		Standardized data		Standardized data		Standardized data	
Average monthly price growth rates of the products composing the CPI	Unweighted average	29.59		25.09		0.78		0.70	
	Median	29.61	1.19	25.22	0.15	0.72	-0.18	0.70	-0.02
	Highest value of the first quartile of the distribution	28.18	-0.76	24.43	-0.71	0.50	-0.89	0.56	-0.73
	Lowest value of the fourth quartile of the distribution	30.93	0.72	25.82	0.80	1.01	0.69	0.84	0.73
	Standard deviation	1.85	1.00	0.92	1.00	0.33	1.00	0.19	1.00
	Standard deviation (second and third quartiles)		0.41		0.43		0.46		0.41

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

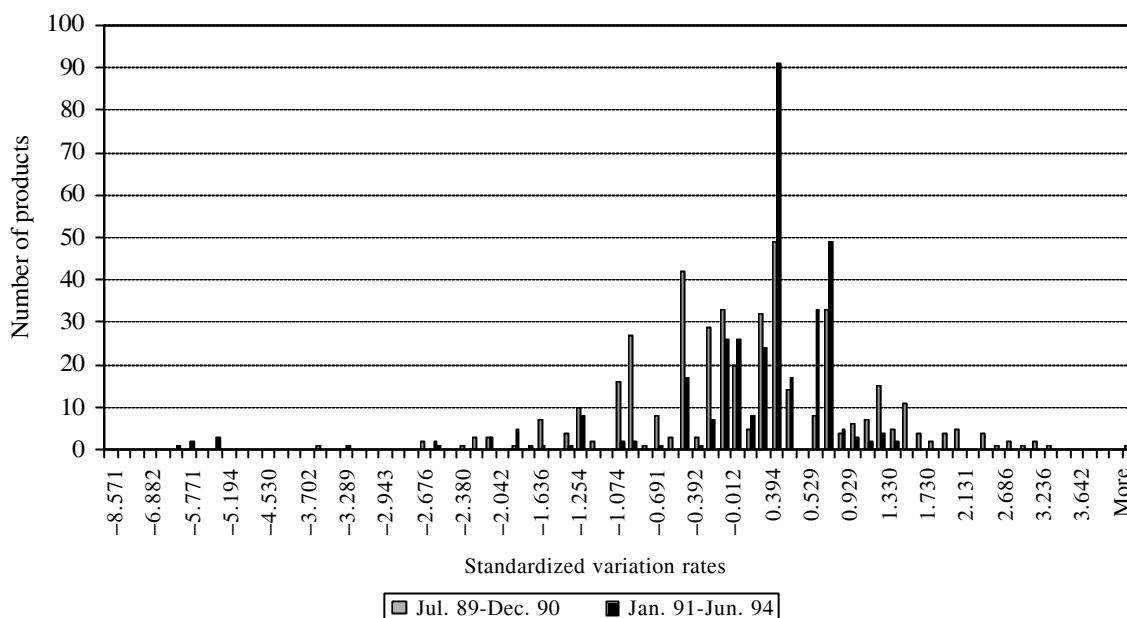
Lastly, the positions of the different components in the z distribution in the last period considered (tables 12 and 13) show some similarities to the situation in Chile, examples being lower price rises for products such as computer and household electrical equipment and clothing, together with some different products such as medical and hospitalization services. At the other extreme, we likewise find the prices of transport and transportation services, and basic services. By contrast with Chile, however, a number of widely

consumed foodstuffs appear, such as rice, beans and oil, while education does not. This highlights the powerful effects of certain factors and the range of manoeuvre of others, particularly services provided or regulated by the State, as the price regulation criteria followed can heavily influence inflation levels and dispersion coefficients.

From the above analysis, which is valid for both Chile and Brazil, it may be concluded that the products making up the CPI behave in different ways. While there is a group of goods whose prices consistently rise by

FIGURE 3

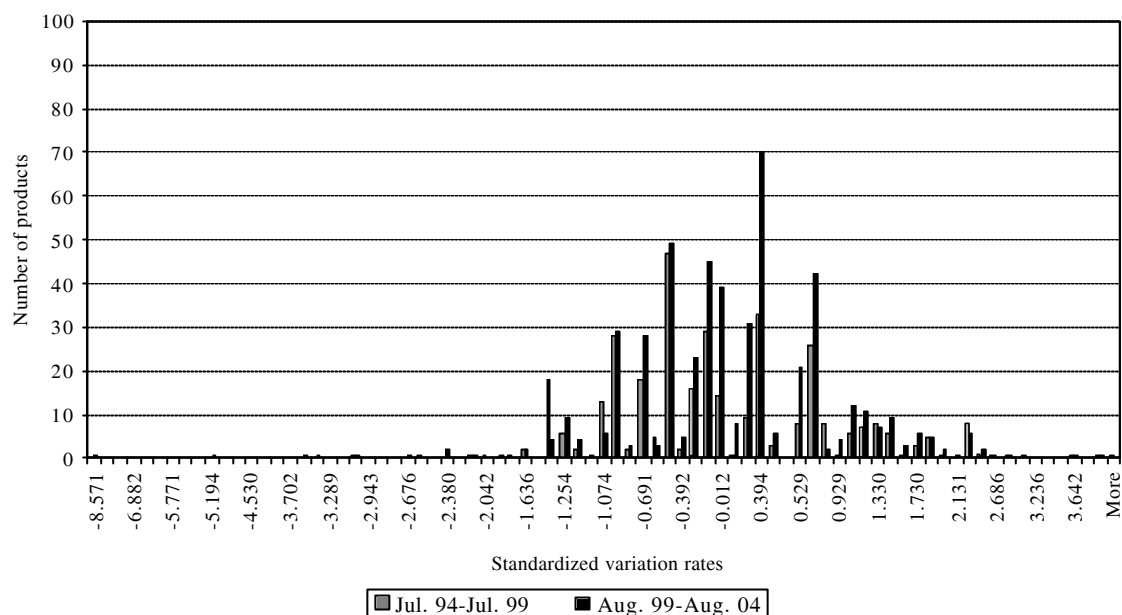
Brazil: Distribution of the average monthly price growth rates of the goods and services composing the CPI basket
(Standardized rates, as percentages)



Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

FIGURE 4

Brazil: Distribution of the average monthly price growth rates of the goods and services composing the CPI basket
(Standardized rates, as percentages)



Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

TABLE 11

Brazil: Growth rate of the consumer price index and of the prices of its components. Statistical indicators of distribution
(Cumulative rates in the period, as percentages)

		August 1989- December 1990	January 1991- June 1994	July 1994- July 1999	August 1999- August 2004
CPI	Growth rate in the period	12 556.6	1 542 419.2	78.8	53.0
Price growth rates of the products composing the CPI	Highest value of the first quartile of the distribution	8 147.7	889 932.9	30.5	35.3
	Lowest value of the fourth quartile of the distribution	13 446.7	1 610 835.1	95.8	70.1
	Highest value of the first decile of the distribution	6 168.3	541 176.6	12.5	21.3
	Lowest value of the tenth decile of the distribution	18 156.4	1 977 492.3	147.5	95.8
	Median	10 560.7	1 267 390.7	53.3	51.7

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE).

TABLE 12

Brazil: Selected components of the consumer price index basket. Relative positions by distribution of average monthly price growth rates, January 1991 to June 1994

First quartile	Second and third quartiles	Fourth quartile
Rice	Pasta Flour Fish and seafood Meat Vegetables Cassava	Black beans Potatoes Vegetables Dairy products
Rental/condominium costs	Basic services	
Household electrical appliances	Household equipment Taxi, bus, petrol New cars	Aircraft, metro
Clothing	Medical and hospitalization services	Medicines (painkillers, flu and cough remedies, psychotropic drugs) Toys School textbooks

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE). Products are organized by their respective groups.

less than the overall CPI (clothing and household equipment, for example), others consistently rise by more (education, health and transport services, for

example). The behaviour of food prices varies. All this occurs in the context of a general deceleration in the CPI inflation rate.

TABLE 13

Brazil: Selected components of the CPI basket. Relative positions by distribution of average monthly price growth rates, August 1999 to August 2004

First quartile	Second and third quartiles	Fourth quartile
	Fruit	Beans
	Flour	Potatoes
	Fish and seafood	Vegetables
	Meat	Meat
	Coffee	Cooking oil
	Cheese	
	Beer	
	Ready meals	
Computing	Household maintenance equipment	
Household electrical appliances	Household equipment	
Clothing		
	Rental/condominium costs	Coal, gas and electricity, water services
	Taxi, train, boat, metro	Transport and transportation services
		Bus, plane, tolls, petrol, alcohol, diesel
		Mail, fixed-line telephony
Medical and hospitalization services		
Personal services	Recreational items and hotels	
	Education	
	School equipment	
	Public telephones, mobile telephony, cable TV	
	Toys	

Source: Prepared by the authors based on figures published by the Brazilian Geographical and Statistical Institute (IBGE). Products are organized by their respective groups.

VI

Regional tendencies judged in the light of the results and conclusions from Chile and Brazil

The tendencies described above were identified by analysing the relative positions by price variation rate of the different components of the CPI in Chile and Brazil, but they can be extended, up to a point, to the countries of the region generally. Although we could not obtain full information on all the components of their respective CPI baskets, when we looked at the evolution of consumer price indices in other Latin American countries²⁶ by considering the overall index

and the goods and services groups composing it (one-digit classification), some of the same tendencies re-emerged.²⁷

To compare the evolution of price variation rates in the different product groups making up the CPI, we calculated the average monthly rates of increase in the respective price indices and then standardized them, thus making the distribution parameters comparable both between countries and between periods. As in the

²⁶ The countries referred to are: Argentina, Bolivia, Colombia, Costa Rica, Ecuador, Mexico, Peru, Uruguay and the Bolivarian Republic of Venezuela.

²⁷ The analysis was carried out by calculating average monthly variation rates for both the overall consumer price index and the goods and services groups composing it, in different time periods.

cases of Chile and Brazil, the periods chosen were usually ones in which the same basket of goods was used. In cases where major economic events occurred at particular points in time, however, such as a significant devaluation in the national currency, the periods concerned were split into subperiods so that the behaviour of aggregate prices could be observed and compared (by product group) at times of particular interest for economic analysis. The results are shown in figure 5.

Because the monthly variation rates in figure 5 are standardized,²⁸ the number of the ordinate indicates standard deviations from the average monthly variation, and not inflation rates. A negative standard deviation represents products whose variations were lower than average and led the downward tendency. For some countries where very low inflation was achieved in the periods analysed, negative deviations represent negative rates of absolute growth. Conversely, positive deviations represent products whose prices rose by more than the average and on occasion, such as in post-devaluation periods, were responsible for raising inflation.

Figure 5 shows some significant phenomena. The general idea is to see which product groups experienced (standardized) variations persistently in excess of the average, or whether there were fluctuations, and if so how large they were. Starting in the early 1990s, prices for clothing and for the household equipment considered tended to rise by less, and in some cases significantly less, than the CPI as a whole. In cases where the prices for these products rose by more than the CPI, this tended to happen in periods when there was a significant devaluation in the national currency. The sharp devaluations of the Argentine and Uruguayan currencies in early 2002, for example, led to a moderate rise in inflation that year and a large shift in relative prices (in Uruguay, this happened with household equipment). Devaluation, combined with a pick-up in domestic demand from the low levels it had reached after the recessions in these countries, led to a

recovery in the prices of these products, which rose by about the same as or more than the CPI. Something similar happened in Mexico after the devaluation of late 1994.

Prices for services generally have increased by more than the CPI. However, both the type of services and the scale of price rises have varied from one country to another. For certain countries in particular periods the position of service sector prices relative to goods prices has been influenced by fluctuations in the local currency, particularly when there have been large devaluations; these have made goods significantly more expensive as prices for imported goods or for inputs used to produce finished goods within the country have risen, or margins for domestic products have widened. In other countries, particularly those that are more dependent on imports to supply them with oil and fuels, higher prices for transportation services have been significantly influenced in recent years by high international oil prices and the tendency for State subsidies to be abolished.

The prices of basic services have also shown a clear upward trend in many countries, owing not only to higher fuel costs but also to concession and privatization decisions made by the relevant authorities. In other countries and/or periods, however, the authorities have chosen to provide subsidies or regulate tariffs for these same services, and prices have risen more slowly than the CPI as a result.

Another aspect that can influence variations in services prices is the methodology used to compile the price data and then include them in the general CPI calculation. In Colombia, for example, prices in the housing category mainly reflect the value of rents imputed to families. Because these notional rents stay fairly stable and have a large weighting in the overall CPI, their influence on relative prices and the overall CPI is large.

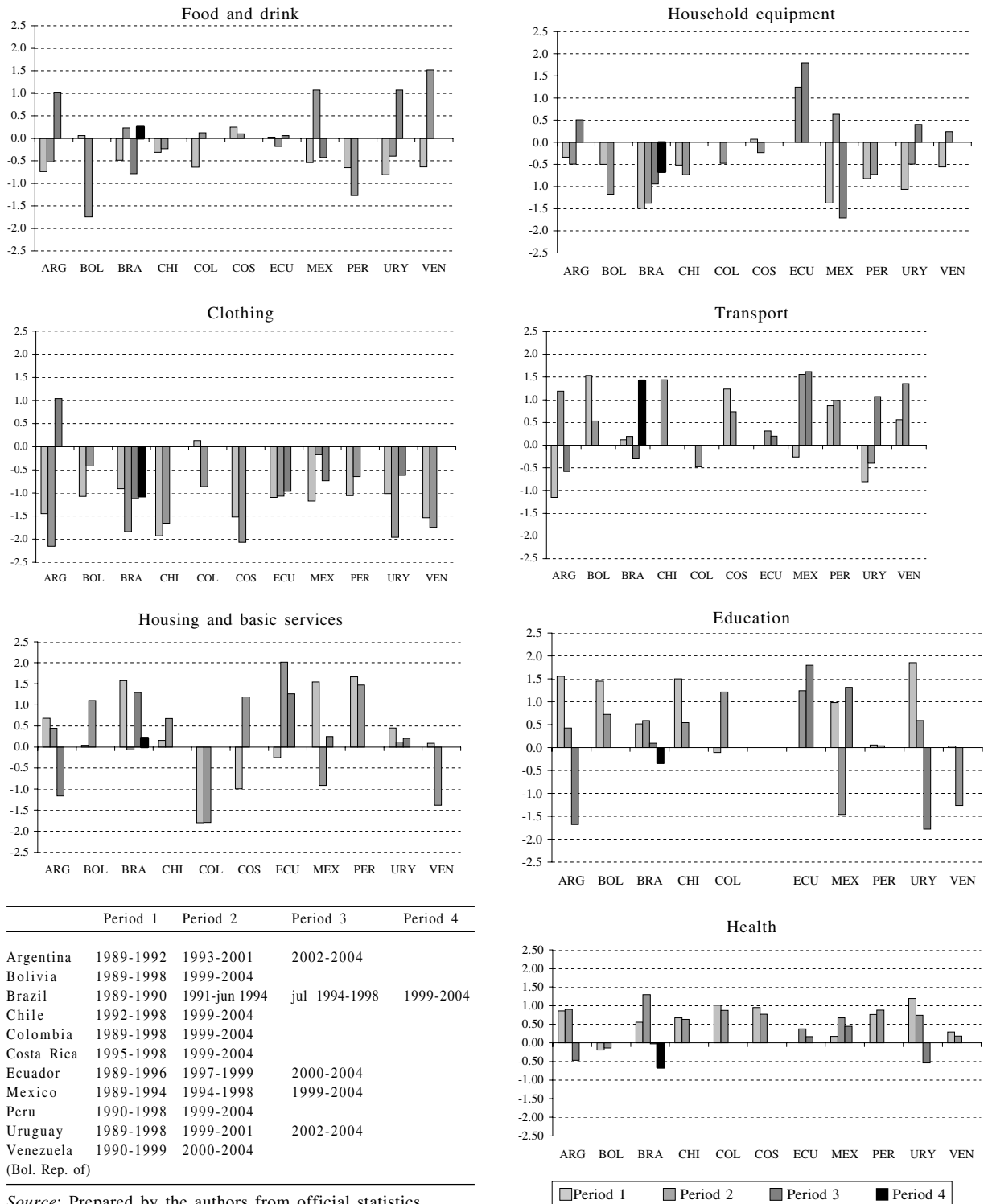
Given all this, it is possible to arrive at some conclusions concerning the evolution of relative prices for the components of CPI baskets in the countries observed. First, the data mentioned show that, in very aggregate terms, there has not been a homogeneous trend in prices as there was, for example, in Brazil during the 1991-1994 period examined earlier.²⁹ Not all goods prices are falling in relative terms (where prices are falling is for semi-durable goods, such as

²⁸ To standardize the average monthly variation rates, the average of the monthly price variation rates of the different product groups was subtracted from the average monthly price variation rate of each of the groups and the result was divided by the standard deviation of the average monthly price variation rates of the product groups. The calculation did not take account of the average monthly CPI variation rate, since this is obtained by combining the weighted price variation rates of the different product groups.

²⁹ This was a period when the rate of increase in the price index slowed significantly.

FIGURE 5

Latin America (11 countries): Average monthly price growth rates of the product groups composing the CPI
(Standardized data)



Source: Prepared by the authors from official statistics.

clothing and footwear, textiles and household equipment). Food prices are rising in a number of countries,³⁰ as are prices for a number of services. The largest price increases have been for education, health and transport services and basic services. Prices for personal services and “other services”, meanwhile, have not risen as much, so that not all service prices have behaved alike.

Another tendency that recurs to a greater or lesser degree among the countries analysed is that low CPI inflation is not necessarily accompanied by low dispersion in the prices of the different goods and services groups. On the contrary, when the dispersion coefficients for the highest- and lowest-inflation

periods are compared, it transpires that in all the countries analysed this coefficient is higher when inflation is at lower levels. This is illustrated by the data in table 14, which show that in periods when the countries' inflation was reasonably low (a cumulative 2% to 3% a year), the dispersion coefficient for the prices of the different goods and services groups making up the overall CPI was higher than the coefficient for periods when average inflation was above these rates.

Although the difference between average inflation rates in the product groups making up the CPI and the overall CPI inflation rate is generally small in the different periods, there are exceptions. In addition, the

TABLE 14

Latin America (selected countries): Relationship between consumer price index growth rates and those of the product groups composing the CPI
(Average monthly growth rates in the period and statistical indicators)

		CPI	Product	Deviation	Coefficient of			Product	Deviation	Coefficient of	
		(1) ^a	groups	((1)/(2))-1	variation ^c			groups	((1)/(2))-1	variation ^c	
		(1) ^a	(2) ^b				(1) ^a	(2) ^b			
Argentina	1989-1992	13.90	14.35	-0.03	0.09	Ecuador	1989-1996	2.71	2.71	0.00	0.08
	1993-2001	0.09	0.09	-0.08	1.80		1997-1999	5.61	5.78	-0.03	0.16
	2002-2004	1.32	1.23	0.07	0.40		2000-2004	1.75	1.71	0.02	0.34
Bolivia	1989-1998	0.86	0.86	0.01	0.12	Mexico	1989-1994	1.22	1.22	0.00	0.28
	1999-2004	0.24	0.30	-0.21	0.31		1994-1998	2.06	2.02	0.02	0.10
							1999-2004	0.54	0.54	-0.01	0.31
Brazil	1989-1990	29.39	29.36	0.00	0.07	Peru	1990-1998	5.98	6.15	-0.03	0.11
	1991-jun 1994	25.85	25.83	0.00	0.03		1999-2004	0.21	0.28	-0.26	0.47
	jul 1994 -1998	0.99	1.16	-0.14	0.57						
	1999-2004	0.70	0.68	0.03	0.21						
Chile	1992-1998	0.68	0.69	-0.02	0.51	Uruguay	1989-1998	3.44	3.51	-0.02	0.09
	1999-2004	0.23	0.15	0.52	2.28		1999-2001	0.35	0.33	0.07	0.64
							2002-2004	1.27	1.15	0.10	0.25
Colombia	1989-1998	1.73	1.77	-0.02	0.15	Venezuela (Bol. Rep. of)	1990-1999	3.13	3.26	-0.04	0.13
	1999-2004	0.62	0.63	-0.02	0.39		2000-2004	1.59	1.52	0.04	0.19
Costa Rica	1995-1998	1.04	1.03	0.01	0.22						
	1999-2004	0.85	0.82	0.04	0.28						

Source: Prepared by the authors from official statistics.

^a (1) = Average monthly growth rate of the consumer price index in the period.

^b (2) = Mean of the average monthly price growth rates of the goods and services composing the CPI basket.

^c Coefficient of variation for the average monthly price growth rates of the different product groups composing the CPI basket.

³⁰ There are possible reasons for this. Explanations may include international price trends for some foods; the degree to which the food products included in the consumption basket are processed, as this is closely related to a country's consumption patterns,

particularly among the high- and middle-income groups which have the greatest influence on the structure of the CPI; weather conditions that affect farm production; or phytosanitary regulations in countries that limit trade in fresh foods (including imports).

analysis carried out for Chile and Brazil showed that greater product disaggregation brought more marked differences to light.

The information presented provides at least a partial answer to the questions formulated earlier. Not only did the dispersion coefficient not fall with inflation, but it actually rose considerably. Again, even though fairly low on an annual basis, inflation becomes significant when the differences in price variations between the first and last deciles and quartiles in several years are added together. Perhaps most importantly, there were homogeneous product groups that stayed in these extreme deciles and quartiles year after year, giving a stable direction to relative prices changes –something that was unusual in the region in earlier periods.

This price behaviour raises questions that, while not the main focus of this article, do point to further research. To what extent do these price variations reflect a reallocation of resources due to the growing liberalization of the international economy? Or are they the result of public policies, especially those for service sectors, which do after all sometimes follow divergent approaches from country to country? What role is being played in price regulation policies by the growing

economic power of certain actors that are dominating larger and larger percentages of markets through mergers and acquisitions? What influence are government-applied price regulation policies having? How do price regulation policies affect the leeway of central banks when they come to set monetary policy? Can CPI weightings or poverty line structures be kept stable in the medium and long term in the face of these variations in relative prices? Do we know enough about the scope for substitution in the consumption baskets of the different social strata for different product groups at the present time? Where products that account for a large share of spending by the poorer strata have risen in price by much more than the average, is it right to use the consumer price index as a benchmark for wage settlements without altering CPI weightings that have stayed the same for years?

We shall now explore some of the issues surrounding these questions: first, the factors that underlie both inflation developments and changes in relative prices and, second, the potential need for governments to have a relative price strategy. It is important for these aspects to be considered when policy is made in this area.

VII

The main factors associated with price developments in consumer price indices

Broadly speaking, a range of factors underlie price shifts. These include technological change, the evolution of demand, the availability and allocation of resources, and the configuration of markets. These factors can be modified by public policies. In the 1990s and early 2000s, particular emphasis was placed on the consequences of policies that opened up national economies to the outside world. Indeed, there is now a quite intense debate about the effects of this liberalization on different prices (for example, the way workforces in markets as different as China and Germany, with such contrasting laws, practices and demographic situations, are made to compete in the international market). There is also thinking going on about changes in the price of capital and in the relative prices of capital and labour in a new context: the massive influx of workers into the global market because of this new economic openness.³¹

This study has shown the effects of trade liberalization on the prices of a range of goods, including the beneficial downward pressure this has placed on price indices and the major shifts in relative prices it has caused.

The policies adopted by transnational companies, driven by their cost structure or location policies and their handling of production or sales, have had similar effects. One example of this is the fall in international prices for final consumption goods as a result of higher productivity or lower labour costs; this development has been most visible in the cases of clothing, textiles and footwear, some household equipment and certain products used for education and recreation, such as toys, stationery and everything connected with computing.

³¹ See *The Economist* (2005).

Opening up economies also led to changes in the supply of goods. The new prices clearly affected the production structure, the distribution of employment, wages and the balance of payments, depending on the country. Every time a trade liberalization treaty is signed, there are different effects on the different agents in this new relative price structure. What we are trying to emphasize here is that the new prices have had a major impact, that they did not originate independently of the policy measures adopted, and that their consequences can be structural. This is a factor, then, that helps to hold down inflation and increase the welfare of those who benefit from lower relative (and sometimes absolute) goods prices, but that has very disparate effects on different social and productive strata.

Another development that had major effects on inflation and relative prices was de-indexation, which bore down significantly on inertial inflation. This happened because de-indexation broke the mechanisms whereby past inflation determined expectations of future inflation. In periods of high inflation, of course, corporate price adjustment strategies could be vital to survival, and widespread indexation, like that used in Brazil in some periods, ensured that relative price changes would be kept within limited ranges. As we demonstrate below, however, the phasing out of indexation was accompanied by new factors that worked in combination with the price adjustment strategies of agents. Nonetheless, some products have continued to be indexed in one way or another, and this has influenced relative prices.

Fiscal policy decisions have influenced changes in the relative prices of some goods and services. At the same time, fiscal policy has generally been constrictive in most Latin American countries. Decisions concerning the size and coverage of subsidies have also affected relative prices. Education and health services are examples of this: these were normally subsidized in the past in many of the region's countries, but have now been privatized to some extent in many of them, and prices have accordingly risen.

Transport prices, meanwhile, are increasingly reflecting international developments in fuel prices. In many countries, nonetheless, the economic authorities subsidize or cap the prices paid by consumers. In almost all the countries, again, changes in basic service prices are determined by government-set caps on the prices charged to consumers. Thus, price developments in these areas are partially determined

by government fiscal and social policy decisions, and particularly by the level of investment returns deemed acceptable.

Another important factor has been the handling of monetary and exchange-rate policy in the region's countries. The use of inflation targeting programmes, with all their consequences for interest rates and their possible impact on economic activity, has been reflected in the evolution of consumer prices. A very interesting debate on the subject is now in progress in a number of Latin American countries, centring on the explicit relationship between inflation and monetary policymaking which makes the latter dependent on domestic price changes. In cases like this, if monetary policy is run by central banks (which in many countries are autonomous bodies with independent decision-making powers), and if the explicit objective of bringing or keeping down inflation is inflexible and the rates pursued are very low, it is possible that this form of management may hinder economic recovery at certain times and be incompatible with the economic stimulation objectives pursued by the government authorities. In particular, though, these policies affect certain prices and not others (regulated ones, for example), so that they also have the effect of altering relative prices.

Many countries in Latin America have used exchange rates as a way of controlling inflation. The result has often been an overvalued currency, ultimately making the relationship between tradable and non-tradable goods prices unsustainable. In cases where relative price shifts have created major imbalances in the balance of payments and the exchange rate has become impossible to maintain, relative prices have been corrected by sharp devaluations that have favoured goods (essentially tradable) over services (generally non-tradable). This has happened to very differing degrees from one country to another, however, and has usually marked a departure from the historical norm. In any event, this is a policy measure that has influenced both relative prices and inflation, and the effects can linger and indeed intensify over time.

Another important factor has been the ability of wholesalers to pass on price rises to retailers and consumers when domestic currencies have devalued or the international price of particular products has increased. Whether or not they can do so is largely determined by domestic demand, and in particular private consumption, in the Latin American countries. Underlying the behaviour of relative prices is the fact

that these countries' growth has largely been based on the development of their external sector, while domestic demand has expanded at a considerably more modest pace. This clearly constrains inflationary pressures. Examples include the indicators of both investment and private consumption by families in recent years. From 1998 to 2003, gross fixed capital formation fell by 10.9% in real terms, while in 2002-2003 private consumption was about 0.5% lower than in 2001. In addition, mergers and acquisitions, especially in the commerce sector, shifted the relative power of commerce and production in markets, along with the margins for the two activities. Thus, this factor affected both inflation and relative prices.

This last factor is also reflected in differences in the variation rates of consumer price indices and

wholesale price indices. While it is true that they cannot be accurately compared,³² their evolution provides an idea of how they are behaving. This being so, the different behaviour of the two indices could be indicative of one of the following situations: a time lag, in which case rises in wholesale prices could be transferred to consumer prices in the near future; a decision by wholesalers to reduce their margins (chiefly owing to low consumer demand) to levels that are still profitable but do not pass on price increases to consumers in full; and, lastly, a decision by wholesalers to maintain their margins but change the mix of goods they supply, favouring domestic or imported products as relative prices dictate and holding down or even cutting prices for the consumer.

VIII

Conclusions

This article has looked at the evolution of relative prices in various periods during the 1990s and early 2000s. It has analysed the relationship between falling inflation and changes in dispersion, as measured by the dispersion coefficient, in the price variations of the different goods and services. It has shown that lower inflation was accompanied in most cases by greater dispersion, a situation that contrasts with earlier experience in other countries. The scale of this dispersion has been identified and, perhaps most importantly, it has been shown that homogeneous product groups maintained a fairly stable presence in the top and bottom deciles and quartiles of the price variations, a subject not addressed in earlier research.

It is thus clear that lower inflation coincided with significant policy changes that led to structural shifts in the workings of the countries' economies. This has produced a new set of relative prices which, by contrast with what happened in the past, are targeted at the level of the individual goods and services groups. Not enough thought seems to have been given to the broader relative price situation that has ensued.

The relative price shifts associated with the developments described have undoubtedly influenced the allocation of resources and welfare in the different social strata. In the different productive branches, production functions, cost structures, the balance

between domestic and imported goods, and occupational density have all shifted. They therefore merit more attention than they have received. Those responsible for the national accounts could help clarify the effects of the new relative prices by focusing on these changes in their own publications. The developments described have been accompanied by a shift in the way the role and importance of relative prices are perceived. It is now generally agreed that price stability policies which use the CPI variation rate as an indicator have become preponderant in public policies and particularly in the monetary policies of central banks. At the same time, as we have pointed out, not enough thought has been given to the broader relative price situation when economic policy has been planned.

The information presented shows that aggregate CPI figures are the outcome of quite opposing tendencies and that CPI variations have been accompanied by substantial changes in the relative prices of homogeneous groups of these indices' components. At the lower end of the distribution are goods and services that are more responsive to trade liberalization measures, the exchange rate and price falls influenced by changes in the structure of the world

³² These indices have different baskets and coverage; the wholesale price index contains only goods.

supply of tradable goods, and that are more sensitive to the fluctuations of the global economy and the consequences of these for the balance of payments and exchange rate. Broadly speaking, these products made a major contribution to lower inflation from the mid-1990s to the mid-2000s. At the upper end are products affected by the application of liberalization policies to service provision and by concessions of various kinds; in the case of concessions, governments have followed quite disparate price-setting criteria, but the overall effect on prices has been upward. Here, pricing is the outcome of public policies in which monetary policy has played only a small part. Fuels are also at the upper end of the scale, the main recent influences in this case being liberalization and ever-increasing price rises, with public policy playing a more passive role than in the past. All these items have tended to lift inflation. In the core of the distribution are the goods and services which are most likely to be affected by monetary policy and whose prices relative to those at the top and bottom shift as a result of this.³³ Thus, inflation developments cannot be separated from two types of factors in which policies other than monetary policy, each with its own objective, play a significant role. As we have said, this has given rise to some debate about the scope and influence of monetary policy.

At the same time, structural changes in economies have led to alterations in income distribution and the

structure of supply. We have seen the emergence of consumption patterns which differ significantly between the different social strata, and in which the relative price structure plays an important role. The scope for substitution in CPI baskets varies greatly, so that certain sectors of society have fewer opportunities to take advantage of more slowly rising prices to increase their welfare. The CPI weightings and baskets used to determine poverty lines are slow to reflect these phenomena because their structure changes only over the long term. Nonetheless, growing political pressure from the worst-affected groups is highlighting the need to consider relative prices in their entirety.

In these circumstances, the supposed independence of individual policies designed for specific important ends is questionable, since they actually have residual effects on the range of action of monetary policy and, in particular, varying effects on the welfare of the different social strata, as these have very different incomes and a very different capacity to react to relative price changes. In our opinion, the scale of relative price shifts calls for research to provide a better quantification of the effects they have been causing. It is also worth asking whether the changes identified will maintain their tendency or whether the factors underlying them will weaken or alter (one example being the shift from recession in the early 2000s to a period of expansion like 2004-2006).

³³ The products in the highest and lowest quartiles and in the core are described in sections V and VI.

APPENDIX

V matrix

		Price indices				A	Z
		t_0	t_1	t_m		
CPI		I_{CPI_0}	I_{CPI_1}	I_{CPI_m}	$\begin{pmatrix} A_{CPI} \\ A_{P_1} \\ A_{P_2} \\ \cdot \\ \cdot \\ A_{P_n} \\ A_M \end{pmatrix}$	$\begin{pmatrix} Z_{CPI} \\ Z \\ Z \\ \cdot \\ \cdot \\ Z \\ Z_M \end{pmatrix}$
P_1		$I_{P_{1_0}}$	$I_{P_{1_1}}$	... ..	$I_{P_{1_m}}$	
P_2		$I_{P_{2_0}}$	$I_{P_{2_1}}$	... ..	$I_{P_{2_m}}$	
\cdot		\cdot	\cdot	\cdot		
\cdot		\cdot	\cdot	\cdot		
P_n		$I_{P_{n_0}}$	$I_{P_{n_1}}$	... ..	$I_{P_{n_m}}$	
M		$M_0 = (\sum I_{P_{i_0}}) / n$	$M_1 = (\sum I_{P_{i_1}}) / n$	... ..	$M_m = (\sum I_{P_{i_m}}) / n$	

V is a matrix of monthly price indices in which:

CPI is the consumer price index published by the country
 P_i represents the goods and services (products) making up the basket used by the country to compile the CPI in each of the periods

M is the unweighted average of all the P_i price indices
 A is a vector containing the cumulative variation rates for the period covered by the CPI, each of the P_i and M
 Z is a vector containing the average monthly variation rates of the period covered by the CPI, each of the P_i and M
 t is time, measured in months

The A and Z vectors were produced as follows:

$$A = \begin{pmatrix} \frac{A_{CPI} = (I_{CPI_m} / I_{CPI_0}) - 1}{(I/t_m - t_0)} \\ A_{P_1} = (I_{P_{1_m}} / I_{P_{1_0}}) - 1 \\ A_{P_2} = (I_{P_{2_m}} / I_{P_{2_0}}) - 1 \\ \cdot \\ \cdot \\ A_{P_n} = (I_{P_{n_m}} / I_{P_{n_0}}) - 1 \\ A_M = (M_m / M_0) - 1 \end{pmatrix}$$

$$Z = \begin{pmatrix} \frac{Z_{CPI} = (I_{CPI_m} / I_{CPI_0}) - 1}{(I/t_m - t_0)} \\ Z_{P_1} = (I_{P_{1_m}} / I_{P_{1_0}}) - 1 \\ \frac{(I/t_m - t_0)}{Z_{P_2} = (I_{P_{2_m}} / I_{P_{2_0}}) - 1} \\ \cdot \\ \cdot \\ \frac{(I/t_m - t_0)}{Z_{P_n} = (I_{P_{n_m}} / I_{P_{n_0}}) - 1} \\ \frac{(I/t_m - t_0)}{Z_M = (M_m / M_0) - 1} \end{pmatrix}$$

The following indicators were calculated for the data included in the Z vector:

- 1) The unweighted mean of the average monthly variation rate for all the goods and services making up the CPI basket

$$Media\ z = \left\{ \frac{\sum (I_{P_{i_m}} / I_{P_{i_0}}) - 1 / n}{(I/t_m - t_0)} = \sum (Z_{P_i}) / n \right\}$$

where n is the number of goods and services included in the CPI basket in each of the periods

- 2) The median of the distribution of Z_{p_i}
- 3) The standard deviation of these average monthly variation rates

$S_{Z=}$ standard deviation of the Z_{p_i} variation rates

- 4) The dispersion coefficient

$$CV_Z = S_Z / M_Z$$

- 5) Cumulative averages, medians and variations in the quartiles and deciles of the Z_{p_i} distribution

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Income instability, mobility and distribution in Argentina

Luis Beccaria and Fernando Groisman

This article analyses changes in the instability of labour incomes in Greater Buenos Aires between the late 1980s and early 2000s. It aims to study the impact of those changes on different individual and household groups, and then to evaluate the influence of current-income variability on income concentration. For the latter, the average inequality of current incomes is compared with the inequality of average (i.e. more permanent) incomes. The results obtained strengthen the argument for combining cross-section with other data that track the income paths of individuals through time.

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I

Introduction

The distribution of both individual and family incomes in Argentina has become steadily more concentrated since the mid-1970s. This trend lasted throughout the 1980s, which were largely years of instability and stagnation, and into the following decade, despite better macroeconomic performance.¹

Throughout this period, there were also sharp changes in inflation: very high rates in the 1970s and 1980s, including hyperinflationary spikes towards the end of the latter decade and in the early 1990s, before substantial price stability was restored in the remainder of the last decade of the twentieth century. As inflation is a key factor in explaining the stability of real incomes, the latter ought to have worsened in the 1970s, and especially in the 1980s, and then should have improved in the following decade. Nonetheless, there is also evidence of high levels of job instability, particularly in the 1990s,² which also affects income variability at both the individual and household levels.

It is therefore worth making a more in-depth analysis of income instability in Argentina's different macroeconomic situations, given the adverse effects of such instability on individual welfare levels. In particular, instability increases risk and thus diminishes the utility of a given flow of resources; and it can also undermine consumption levels even when predictable.

Instability may go hand-in-hand with mobility, which generally means changes in the relative position of incomes in the distribution, or changes in the distance between them. The existence of a mobility process has an impact on the income distribution. In particular, it could make the degree of concentration, measured by a given year's incomes, overstate inequality in the distribution of more permanent incomes measured as an average over several years. More importantly for the purposes of many diagnostic studies, changes in the degree of mobility may cause changes in current-income inequality to inadequately reflect changes in the inequality of average incomes.

Given the importance of income variability for analysing their level and distribution, this paper will examine the changes that have occurred since the late 1980s. Despite the importance of such issues, few studies have addressed them in the past. Moreover, the few analyses that have been undertaken³ use a shorter timeframe than considered here; and, in particular, they do not include periods of high inflation. They also fail to explicitly relate the phenomena of instability, risk, mobility and concentration in average incomes.

The research summarized in this article studied the key factors determining instability and its differential intensity between household groups. It also assessed the extent to which changes in instability have affected changes in the income distribution. The aim, therefore, is to explore the hypothesis that an increase in inequality, when studied using data from each period, or cross-section data (i.e. with current incomes) also reflects changes in the distribution of average incomes. To complement this, average household income was adjusted for the effect of variability, and its behaviour was compared with that of unadjusted average income.

The analysis, covering the period 1988-2001, will distinguish four periods that are relatively homogeneous in terms of a set of variables that are important for the aims being pursued. Data for Greater Buenos Aires will be used, since this is Argentina's main metropolitan area and home to nearly one third of the population. The temporal and geographic section chosen reflect the availability of statistical information, since microdata are only continuously available for that region and for those years of household surveys. The study omits 2002-2003, since these are difficult years to analyse with the methodology used in this paper.⁴

³ See Albornoz and Menéndez (2002), Cruces and Wodon (2003), Gutiérrez (2004), and Fields and Sánchez Puerta (2005).

⁴ As will be seen below, instability is evaluated from data showing changes in individual incomes over 18-month periods. To include the initial months of 2002 would be heterogeneous in terms of inflation, because they include times of relative stability, thereby making it impossible to adequately characterize this phase. The phase also covers different moments in the dynamic of aggregate output.

□ The authors are grateful for comments by Mariana González, Roxana Maurizio, Paula Monsalve and Valeria Esquivel.

¹ See, for example, Altimir and Beccaria (2001).

² See Hopenhayn (2001), Galiani and Hopenhayn (2000), and Beccaria and Maurizio (2004).

Section II, which follows, contextualizes the analysis of mobility in Argentina, by briefly summarizing the behaviour of the macroeconomy and the income distribution. Section III reviews a number of the different approaches to be found in the literature on income dynamics and highlights the various concerns that motivate analysis of this topic. Section

IV sets out the article’s specific objectives and describes the analytical methods applied; while section V describes the data source used. The core of the article consists of sections VI and VII, which describe and analyse the figures for Argentina in terms of variability and mobility, respectively. Section VIII offers conclusions.

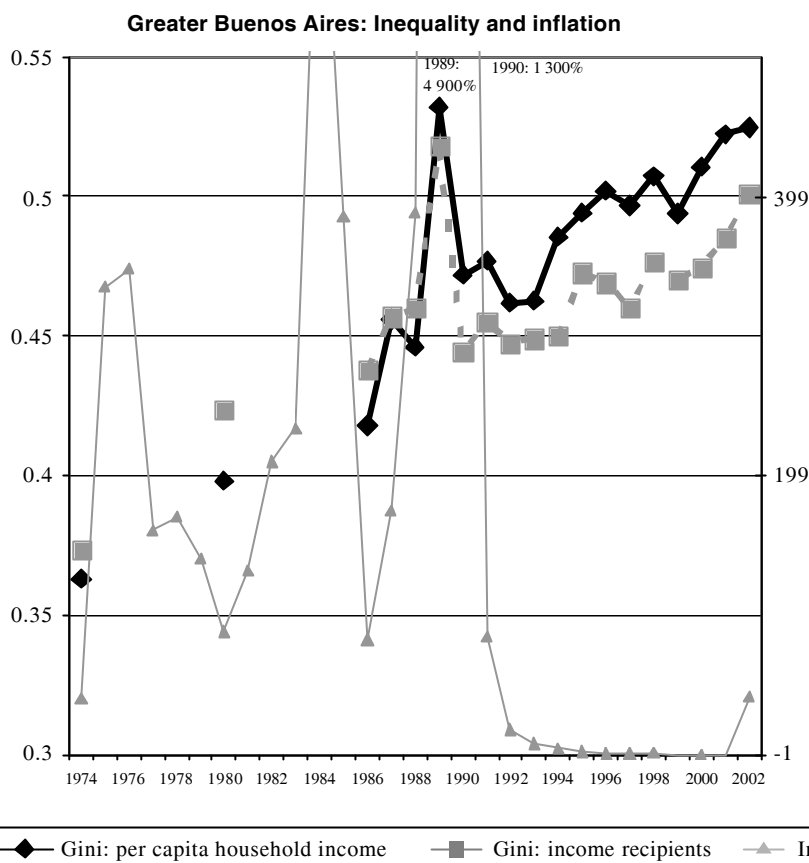
II

Macroeconomic behaviour and income distribution since the mid-1970s

The mid-1970s marked the start of a 15-year period of macroeconomic instability and productive stagnation. Gross domestic product (GDP) was broadly unchanged throughout that period, and inflation remained at high

levels (figure 1). This performance was associated with an external constraint arising from the high level of external debt, which in turn was generated by the policies implemented, particularly between 1978 and

FIGURE 1



Source: Authors’ estimates on the basis of data provided by the National Institute of Statistics and Censuses (INDEC)

1981. The measures adopted subsequently –throughout the 1980s– were unable to successfully address a number of structural aspects of the Argentine economy, such as the management of public accounts and the “high inflation regime” (although the two factors are not independent). The latter is very important for understanding both the domestic effects of external borrowing and the difficulties in achieving sustained stabilization.

This process of macroeconomic instability culminated in the hyperinflationary episodes of 1989 and 1990. The Government that took office in 1989 was initially unable to improve the situation, and it was left to the economic team appointed in late January 1991 to implement a stabilization programme that managed to halt inflation and generate activity growth. The cornerstone of that programme was the Convertibility Act, which fixed the exchange rate, established the convertibility of all currency in circulation and prohibited monetary issuance that was not backed by external assets. This measure, together with a number of others implemented in the fiscal and other domains, allowed for a rapid reduction in inflation: the variation in the consumer price index was brought down to 3%⁵ in May 1991, and to levels close to 1% by the end of that year. Stability firstly allowed for an improvement in the purchasing power of wages and, secondly, an expansion of credit. These developments were associated with significant consumption growth, particularly in the case of durable goods and construction. Investments made by privatized enterprises also contributed to the expansion of domestic demand,⁶ while the reduction in inflation made it possible to improve levels of tax revenue.

The vigorous inflow of foreign capital between 1991 and 1994 –attracted by the greater confidence generated by stability and the orientation of economic policy, but also due to a larger supply of funds on the international financial market– boosted the growth of domestic demand. Nonetheless, the Mexican crisis in late 1994 revealed the fragility of an economy in which expansion was based on capital inflows from abroad,

although the Argentine recession associated with this event was brief, and the economy resumed a rapid growth path as soon as conditions on the international capital market improved. In 1998, however, when this market became more problematic again and Brazil (a major export destination) went into recession, there was a new downswing in GDP which, unlike the previous episode, lasted an uncommonly long time and triggered abandonment of the fixed exchange rate system shortly after the start of 2002.

The serious macroeconomic instability experienced since the mid-1970s is one of the explanations for the significant deterioration in the income distribution since that time. Initially, the increase in inequality probably stemmed from the differential impact of the rise in inflation in 1975 and 1976 on the relative wages of individuals with different skill levels. Income inequality remained high in the 1980s, with individual incomes maintaining their concentration while family incomes became more concentrated.

Despite an improvement in the macroeconomic setting and the introduction of structural reforms, inequality continued to worsen in the 1990s, except during the initial expansionary phase (1991-1994). Although an in-depth analysis of that trend is beyond the scope of this article, it is crucial to keep in mind the effects of the significant deterioration in the labour market. Unemployment, for example, rose from 6% at the start of that decade to 12% in 1994 and 18% in 2001; and it remained at 15% even during the recovery of 1995-1998. This phenomenon had its greatest effect on wages, employment possibilities and job quality, particularly for the lower skilled.

One consequence of the unsatisfactory employment trend in the 1990s was an increase in job mobility. As mentioned in the introduction, a number of studies report an increase in the quit rate, particularly in non-wage and precarious wage-earning jobs that were not registered with social security. An increase in the proportion of the latter, which displayed less average stability, was an additional factor leading to a shorter average duration of jobs.

⁵ The rate fluctuated around 7% between October 1990 and January 1991, before rising to 27% in February as a result of the devaluation and other measures (such as rate hikes).

⁶ The privatization process was implemented rapidly, because in addition to supporting the goal of withdrawing the State from productive activity, capital inflows were essential to support the external and fiscal account balances.

III

The different aims of studies on income dynamics

Numerous papers have studied changes in individual and/or family incomes over time, using panel data. Some of these analyse income instability by evaluating its intensity and variation through time, or between groups of individuals, or else by investigating the impact of instability on individual and family welfare. A clearly larger volume of research, however, focuses on income mobility, i.e. changes in the relative position of incomes in the distribution, or in the distances between them, over time. Such studies reflect two types of concern: some investigate the magnitude and characteristics of mobility and how it has changed over time, while others examine the effects of mobility on inequality.

1. Income mobility

Many studies analyse the paths of personal or household incomes with a view to evaluating changes in their relative position in the distribution through time. Changes in the ranking of income recipient units in the income distribution are generally referred to as income “mobility”.

Income paths can also be tracked for the purpose of analysing the direction and magnitude of the changes they experience, whether or not accompanied by alterations in the ranking. This is known in the specialized literature as “absolute mobility”.

The two approaches are complementary and can occur simultaneously and with different intensities: for example, high/low mobility in the ranking can occur in conjunction with a low/high absolute mobility. This depends partly on the inequality that exists in the distribution of current income, because, when inequality is high, the absolute change in income needed to cause a change in the ranking will be greater than in a low-concentration situation.

The proportion of income recipients that change their position in the distribution is normally analysed through matrices that show transitions from one quantile of the distribution to another, between two periods. Although this is the most common procedure in the specialized literature, it has limitations: in particular, it fails to capture changes that take place within the bounds

of the selected quantiles.⁷ Some authors have tried to correct these shortcomings, e.g. by making the boundaries of income quantiles flexible (Hills, 1998). Other ways to obtain quantitative evidence of mobility are through measures of association such as the simple and rank correlation coefficients, of Pearson and Spearman, respectively (OECD, 1996). It should be kept in mind, however, that the first of these coefficients is not restricted to changes of rank.

Moreover, both the matrices and the correlation coefficients can only be used to evaluate changes between two periods. They are not suitable for analysing absolute mobility, because transition matrices, for example, do not record income changes that do not entail changes of rank. Accordingly, when a change of rank is not a concern, procedures that specifically quantify the magnitude of the change in incomes are generally used.

For example, Fields (2004) uses the following indicator of absolute variation, where i represents each income recipient, and y represents incomes in $t_0=1$ and $t_1=2$,

$$\Omega = (1/n) \sum_{i=1}^n |y_{2i} - y_i| \quad (1)$$

although an evaluation is also made of the differences between the logarithms of incomes, or a given income recipient's share of the total. These indicators express the degree of mobility without indicating the direction of the change. Including the sign of the change makes it possible to incorporate the direction of the mean variation which is reflected in Ω^* .

$$\Omega^* = (1/n) \sum_{i=1}^n (y_{2i} - y_i) \quad (2)$$

A particular concern is to analyse the extent to which the presence of mobility is associated with income convergence. The latter, also known as

⁷ It is also a measure that is sensitive to the degree of inequality in the society, and, therefore, is unsuitable for comparison between countries. For example, the same 10% increase in incomes could represent a quantile change in one country, whereas in another it could mean staying in the same income bracket.

microconvergence, occurs when incomes experience changes that bring them closer to the mean income in the distribution. The analysis in this case usually focuses on the sign of the coefficient β in a model such as:

$$\Delta \ln y_i = \alpha + \beta \ln y_{i0} + \varepsilon_i \quad (3)$$

where $\Delta \ln y_i$ is the difference of the logarithm of income between two periods, t_0 and t_1 , and $\ln y_{i0}$ is the logarithm of the initial period. When the coefficient β takes a negative (positive) value, there will be convergence towards (divergence from) the mean.⁸ An advantage of regression analysis is that it can include numerous income observations for each recipient and also evaluate the factors driving changes in incomes.

2. The impact of mobility on inequality

A second type of research, closely related to the aim of mobility analysis, seeks to evaluate the impact of changes in individual incomes on the income distribution. In particular, it asks whether the degree of inequality measured with cross-section data differs, and by how much, from that corresponding to “permanent” income, measured as average income over several periods.

Much of the literature on income dynamics has focused on estimating the equalizing effect of mobility, to obtain an approximate measurement of more permanent inequality in society. Such studies tend to compare the various inequality indexes calculated from cross-section income data, with indicators based on longer-run incomes. In general, the Shorrocks (1978) methodology has been used, which analyses the intensity of this equalizing effect through an “adjustment of inequality for mobility” index (R) which compares the concentration of average income in the period under consideration with the average of the inequalities of those various observations.

$$R(W_T) = \frac{I(\bar{w})}{\sum_{t=1}^T \eta_t I(w_t)} - 1 \quad (4)$$

where I is the inequality indicator, \bar{w} is average income over T periods, w_t is income in period t , and η_t is the weighting factor defined as the units’ share of total income in period t with respect to the income in the set

of T periods. Fields (2004) argues that if the aim is to evaluate the extent to which mobility altered the inequality measured at a given point in time, the comparison should be made directly between $I(w_t)$ and $I(\bar{w}_t)$, i.e. between inequality in initial period and the inequality of average income. R tends to zero as a maximum value when there is no mobility, and decreases as the effect of mobility on the distribution intensifies.

The time period over which more permanent incomes are calculated matters, because the longer the period, the smaller one would expect the differences between average incomes to be.

3. Changes in the intensity of mobility

Panel data contribute to a better evaluation of the dynamic of inequality under the hypothesis of changes in the intensity of mobility. But if the latter were constant, measurements of inequality using cross section data would adequately reflect what would happen to the direction of the change in the concentration of more permanent incomes. An increase in static inequality will not imply greater inequity in the distribution of more permanent incomes only if there is a concomitant increase in income mobility. Specifically, as shown by Gottschalk and Danziger (1998), the variance of average incomes is a function of the average of the variances of the distributions of each observation and the average of the covariances between the different observations.

4. The welfare effect of income instability

A different concern is to evaluate the intensity of the instability of individual incomes insofar as this diminishes the utility of a given volume of economic resources. In particular, variability increases risk,⁹ and, although it can be anticipated, it can also change utility, particularly in countries with poorly developed credit markets. If two households received the same average income at the end of the year, but one of them had no income for half of that year, whereas the other received 1/12 of its annual income every month, the welfare levels of the two recipients are likely to have been very different.

The evaluation of income fluctuations is generally based on estimating the degree of intertemporal variation around an expected income or observed

⁸ Sometimes “quantile” regressions are used; see, for example, Fontenay, Gorgens and Liu (2002).

⁹ See Arrow (1970).

average income. The traditional indicator for this purpose is the coefficient of variation, although the variance or mean deviation of the logarithm of incomes (Gottschalk and Danziger, 1998 and Shorrocks, 1978) are also used. Some authors also use the residuals from fixed-effects wage-regression models as a measure of variability (Burgess, Gardiner and others, 2000).

Other procedures use the variability of observed incomes to estimate an “income corrected for fluctuations”, which normally entails applying risk functions to estimate an average income which, if fixed, would provide the same utility as that actually received.¹⁰ This is based on the idea that individuals (i.e. income recipients) are risk-averse; so, the greater the variability of incomes the smaller the utility obtained from them. The utility functions used –strictly concave– are defined by a parameter of aversion to variability, ρ , which determines the instability discount suffered by income recipients.

An example of a function that takes account of risk aversion is the following:

$$v(y) = \begin{cases} \frac{y^{1-\rho}}{1-\rho} & \text{if } \rho \neq 1 \\ \ln Y & \text{if } \rho = 1 \end{cases} \quad (5)$$

which shows that the utility of a given income decreases as risk aversion (the coefficient ρ) rises.

In this case, “corrected income” y^c (the level of constant income that provides the same utility as the flow of observed incomes) is calculated as follows:

$$y^c = \left[\sum_{t=1}^T g(t) y_t^{1-\rho} \right]^{\frac{1}{1-\rho}} \quad (6)$$

where

$$\sum_{t=1}^T g(t) = 1$$

IV

Objectives and methods

Given the wide range of interests represented in the literature on income dynamics that make use of panel data, it is worth clarifying here the specific aims of the research whose initial results are presented in this article. Firstly, the degree of instability of real incomes was analysed, since this has an adverse affect on individual and family welfare. Analysis of income variability over short periods is a relatively unexplored topic, probably because it is not a significant phenomenon in the world’s leading economies. Nonetheless, in countries such as Argentina, where macroeconomic stability has been a feature throughout much of its modern history, income variability is particularly relevant, irrespective of any distributive impacts –especially, as will be seen, when it seems to persist even in situations of price stability.

Secondly, the research evaluated the degree of income mobility, along with its impact on the distribution of more permanent incomes.

Two analytical approaches were used to measure income instability. The first of these measured the variability of observed current incomes (of individuals and families) around the mean, using the coefficient of variation (CV_i for individuals and CV_h for households).

$$CV_i = \frac{\sqrt{\sum_{t=1}^T (u_t - \bar{u}_i)^2}}{\bar{u}_i}, \quad \text{where} \quad \bar{u}_i = \frac{\sum_{t=1}^T u_t}{T} \quad (7)$$

$$CV_h = \frac{\sqrt{\sum_{t=1}^T (y_{ht} - \bar{y}_h)^2}}{\bar{y}_h} \quad (8)$$

where $y_{ht} = \sum_{i=1}^m u_{ht}$

where, T is the number of observations available, and i identifies each of the m household members who were employed in at least one of the four observations.

$$\bar{y}_h = \frac{\sum_{t=1}^T y_{ht}}{T}$$

¹⁰ These procedures stem from distribution analyses based on the social welfare approach formulated by Atkinson (1970). See Cowell (2000).

Mean variability arises directly from averaging the CVs of each individual and household. As the impact of instability was assumed to vary across income recipients and among families (greater impact among less skilled workers and lower-income families), disaggregated estimates were made for both cases, using groups based on the level of schooling of the individual or head of household as a proxy for socioeconomic status.

Steps were also taken to obtain evidence on the importance of phenomena directly related to variability. For example, instability in real individual incomes is associated with changes in hourly pay and with changes in occupational status (employed/unemployed). The intensity of the latter will change especially when job mobility varies; whereas variations in nominal wages are associated, among other factors, with the degree of price stability, and are likely to be larger and more frequent in inflationary settings.¹¹ The time for which a person works can also be specified in greater detail and broken down into two parts: occupational variability and variability of the number of hours a person works while employed.

To demonstrate the impact of some of these variables, a procedure was carried out to identify the variability of incomes when the effects of job instability and the variability of monthly remuneration (which therefore also reflect changes in hours worked) are successively isolated. In the first case, to measure the effect of changes in remuneration, the coefficient of variation of remuneration from the jobs of each individual is calculated, i.e. that arising from positive incomes only, excluding observations corresponding to situations in which the person was not employed (CV_i^{ao}).

$$CV_i^{ao} = \frac{\sqrt{\sum_{t=1}^{n_i} (w_{it} - w_i^*)^2}}{w_i^*} \quad \text{for } w_{it} > 0 \quad (9)$$

where n_i is the number of observations in which individual i has a positive income (i.e. where) $w_{it} > 0$.

$$w_i^* = \frac{\sum_{t=1}^{n_i} w_{it}}{n_i}$$

¹¹ Nominal hourly incomes can vary merely as a result of changes in earnings from a given job; but they can also vary as a result of moving from one job to another. The impact of this effect was not calculated.

To obtain an indicator that isolates changes in remuneration, a coefficient of variation is calculated on values which, when positive, correspond to the first observation in which the person was employed.

$$CV_i^{ar} = \frac{\sqrt{\sum_{t=1}^T (A_{it} - w_i^{**})^2}}{w_i^{**}} \quad (10)$$

$$\text{with } A_{it} = \begin{cases} w_{it} \rightarrow w_{it} > 0; \\ 0 \rightarrow w_{it} = 0 \end{cases}; \quad w_i^{**} = \frac{\sum_{t=1}^T A_{it}}{T}$$

where w_{i1} represents remuneration in the first observation with a positive value.

Two factors are assumed to affect the variability of nominal household labour incomes: variations in the number of income earners in the household and variability in the incomes received by them. As these two factors can work in opposite directions they may offset each other, either partially or completely; in the latter case the resultant change in the variability of household incomes is zero. Variations in the number of household income earners may reflect changes in the size of the household, changes in the employment rate of a household in which the number of members does not change, or both factors together. This paper does not distinguish between the causes of such variation.

The magnitude of the instability of remuneration is deduced from the coefficient of variation of the income of each household, calculated assuming the number of employed members (CV_h^{ao}) is unchanged. In this case, household members who were employed at some point had an income imputed to them for period(s) in which they were unemployed, equivalent to that received in the nearest period (either before or after) in which their remuneration was positive, adjusted for the mean variation in incomes between the two periods.

$$CV_h^{ao} = \frac{\sqrt{\sum_{t=1}^T (y_{ht}^* - \bar{y}_h^*)^2}}{\bar{y}_h^*} \quad (11)$$

where:

$$\bar{y}_h^* = \frac{\sum_{t=1}^T y_{ht}^*}{T}$$

$$y_{ht}^* = \sum_{i=1}^m B_{iht} \quad ; \quad B_{iht} = \begin{cases} w_{iht} \rightarrow w_{iht} > 0; \\ \bar{w}_{iht} \rightarrow w_{iht} = 0 \end{cases}$$

$$w_t = \sum_{i=1}^n \sum_{h=1}^H w_{iht} ; \quad \overline{w_{iht}} = w_{ihts} \left(\frac{w_t}{w_s} \right)$$

with s being the positive-income period nearest to t , while w_t is the average wage in period t , n is the number of persons employed in the period, and H is the number of households.

To evaluate the significance of changes in the number of employed persons, the coefficient of variation of family income was calculated, and it was assumed that the monthly remuneration of all employed members remained fixed and equal to the first positive observation in each case (CV_h^{ar}).

$$CV_h^{ar} = \frac{\sqrt{\sum_{t=1}^T (y_{ht}^{**} - y_h^{**})^2}}{y_h^{**}} \quad (12)$$

where $y_{ht}^{**} = \sum_{j=1}^n A_{jht}$

$$A_{jht} = \begin{cases} w_{iht} \rightarrow w_{iht} > 0 \\ 0 \rightarrow w_{iht} = 0 \end{cases}$$

where w_{iht} is the remuneration in the first period with a positive value.

The second analytical approach to income instability recognizes how utility declines when income becomes more variable, using the standard, strictly concave utility function with constant relative risk aversion, to stylize the fact that risk declines with the level of income and increases with variability.

$$y^*_i = \left[\frac{1}{n} \sum_{t=s}^{s+n} y_{it}^{1-\rho} \right]^{\frac{1}{1-\rho}} \quad (13)$$

where y^*_i is risk-adjusted income, y is the income of the period, i identifies the household, and ρ is the

coefficient of risk aversion. The latter was assigned a value of two for the calculation.¹²

This procedure “downgrades” the level of average income obtained by an individual or household through time, when that average has resulted from a variable path.

With regard to income mobility –the second of the stated objectives– its intensity in Argentina, and particularly its variations between the phases identified, was analysed on the basis on household movements between income quintiles. In other words, distribution quintiles were calculated for each of the observations, and each household’s position was identified in each case. It was then possible to identify different paths. As noted above, this approach, which analyses paths between income quintiles can be called into question, because it fails to take account of intra-quintile movements, and also because it treats paths involving very different changes in income in the same way. The approach was therefore complemented by analysing correlation coefficients between the household incomes obtained from the four observations, making it possible to evaluate changes in the positions and relative differentials between income recipients in the income distribution. The smaller the correlation, the larger the differences between the incomes obtained by the same households in two periods of time, and, therefore, the greater the mobility of income. The Pearson and Spearman (rank) correlations were used for this.

Lastly, to quantify the influence of mobility on the income distribution, the Shorrocks “adjustment of inequality for mobility” index, mentioned above, was calculated.¹³

¹² Estimations made with larger coefficients did not alter the results obtained.

¹³ Fields and Sánchez Puerta (2005) and Albornoz and Menéndez (2002) address a similar topic to mobility, by analysing the

relation between the intensity of the change in incomes and their level, using the models represented in equation (3). They also examine the relation between mobility and inequality.

V

The database used

Evaluating income instability and mobility, along with their impact on levels and changes in the distribution of income, is only possible when longitudinal data are available, i.e. data showing the different incomes received by the same person or household through time. Although Argentina does not undertake longitudinal surveys, the permanent household survey (EPH), performed regularly by INDEC,¹⁴ provides data of that type that are useful for analysing these issues.

Although EPH does not directly investigate changes in the variables through time, it is possible to construct data of this type because its sample panel rotates, and households are interviewed on four successive occasions. Consequently, by comparing the situation of an individual in those four “waves” one can deduce the changes experienced in a number variables, including income and employment. EPH data were used showing the changes experienced in incomes, activity status and occupation for each income unit (individual or household). Units can also be characterized by a series of sociodemographic and employment attributes.

The EPH sample consists of four rotation groups, one of which enters and another exits in each of the two “waves” made each year (in May and October). On each occasion, therefore, 25% of the sample is renewed, so 75% of cases can be compared between two successive waves. Accordingly, if one wanted to track households for the maximum possible time, i.e. during the four waves in which they remain in the survey during an 18-month period, it would only be possible to evaluate a subset representing 25% of the total sample. The proportion of households and individuals actually reinterviewed is less than these amounts, however, because cases fall by the wayside – a degree of natural reduction (*attrition*) – for various reasons, such as households leaving the panel or changing address, or difficulties arising in the field work. As the sample size was insufficient, a commonly used procedure was employed to construct bases by pooling rotation groups that entered the sample at different points in time.¹⁵ This means that individuals (and

households) who responded to the survey at different times were considered simultaneously: in other words, the method aggregates changes that occurred in neighbouring but different periods.

The data used refer to Greater Buenos Aires only,¹⁶ since microdata are not available for the other zones included in the survey. In any event, the evolution of the employment situation and income distribution in the metropolitan area has not differed from that experienced in other urban zones, so the conclusions to be reached here may reasonably be extrapolated to the whole set of regions.¹⁷

To analyse income paths, panel data were prepared for each of the four stages identified. The following scheme shows the different rotation groups for each case. Table 1 shows the number of individuals who were employed at some point in time, and the households corresponding to each phase.

Comparing successive waves of the survey underestimates the number of changes that actually occurred, because transitions are being identified by comparing two observations roughly six months apart. Accordingly, individuals could make two or more movements in the interval between the two waves (e.g. from inactivity to unemployment and vice-versa), without these movements being captured.

It should also be noted that the procedure only analyses the subset of incomes obtained by household members as a result of their labour-market participation as wage earners, own-account workers or employers. This restricted definition of income facilitates a clearer relation between the dynamics of inequality and income instability and the labour-market factors that appear as their determinants. Household income is, consequently, measured by adding together the labour incomes of all employed members. It also needs to be

¹⁴ For a description of the EPH methodology, see www.indec.gov.ar. The survey scheme was changed substantially in 2003.

¹⁵ Although this procedure makes it possible to work with a large number of observations, the phenomenon of attrition can introduce sample biases which have not yet been investigated.

¹⁶ This is Argentina’s main urban agglomeration, accounting for 30% of the country’s population and 40% of its total urban inhabitants.

¹⁷ See, for example, Beccaria, Esquivel and Maurizio (2002).

TABLE 1

Greater Buenos Aires: rotation groups comprising the sample in each phase

Phases	First observation	Second observation	Third observation	Fourth observation
High inflation	Oct 1987	May 1988	Oct 1988	May 1989
	May 1988	Oct 1988	May 1989	Oct 1989
	Oct 1988	May 1989	Oct 1989	May 1990
	May 1989	Oct 1989	May 1990	Oct 1990
	Oct 1989	May 1990	Oct 1990	May 1991
	May 1990	Oct 1990	May 1991	Oct 1991
No. of individuals: 1 877				
No. of households: 1 141				
Stabilization	May 1991	Oct 1991	May 1992	Oct 1992
	Oct 1991	May 1992	Oct 1992	May 1993
	May 1992	Oct 1992	May 1993	Oct 1993
	Oct 1992	May 1993	Oct 1993	May 1994
	May 1993	Oct 1993	May 1994	Oct 1994
No. of individuals: 1 773				
No. of households: 976				
Recovery	Oct 1995	May 1996	Oct 1996	May 1997
	May 1996	Oct 1996	May 1997	Oct 1997
	Oct 1996	May 1997	Oct 1997	May 1998
	May 1997	Oct 1997	May 1998	Oct 1998
No. of individuals: 2 391				
No. of households: 1 263				
Recession	May 1998	Oct 1998	May 1999	Oct 1999
	Oct 1998	May 1999	Oct 1999	May 2000
	May 1999	Oct 1999	May 2000	Oct 2000
	Oct 1999	May 2000	Oct 2000	May 2001
	May 2000	Oct 2000	May 2001	Oct 2001
No. of individuals: 3 129				
No. of households: 1 651				

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

borne in mind that the household survey used here, as is true of many others in the region, does not adequately capture –and significantly under-records– the current resources that households obtain from their ownership of capital. Evidence of this is the similarity of changes recorded by indicators of inequality in total and labour income. Similarly, the universe of households that were studied was limited to those headed by individuals not over 65 years old.

When studying the instability of individual labour incomes, the analysis included persons who were employed in at least one of the observations, i.e. those who registered some positive income from employment.

To obtain results in terms of the instability of purchasing power, which is the relevant concept, nominal values were corrected for variations in the consumer price index (CPI).

VI

Income instability in Argentina in the 1990s

This section addresses one of the article's two objectives, namely to study income instability and its effects on the level of welfare. The first part analyses changes in the degree of variability of incomes, their sources and the effect on different groups of workers and households. The second part reviews the impact on welfare and changes therein during the period under analysis.

1. Instability of individual and household incomes

(a) *Instability of individual incomes*

As shown in table 2, there were no significant changes in the coefficient of variation of labour incomes among individuals who were employed at some time during the four phases analysed. This result

TABLE 2

Greater Buenos Aires: coefficient of variation of incomes of persons who were employed at some time

Individuals under 65 years of age who were employed at some point	High inflation phase			Stabilization phase			Recovery phase			Recession phase		
	Average	Confidence interval		Average	Confidence interval		Average	Confidence interval		Average	Confidence interval	
		Lower bound	Upper bound		Lower bound	Upper bound		Lower bound	Upper bound		Lower bound	Upper bound
<i>Total</i>												
Actual	0.562	0.540	0.583	0.558	0.533	0.582	0.565	0.543	0.587	0.578	0.559	0.598
Effect of variation in real remunerations (simulated controlling for job instability)	0.280	0.271	0.288	0.211	0.202	0.219	0.194	0.187	0.202	0.190	0.183	0.196
Effect of occupational variation (simulated controlling for instability of remunerations)	0.326	0.301	0.351	0.389	0.362	0.417	0.421	0.397	0.446	0.439	0.417	0.461
<i>Low-education individuals</i>												
Actual	0.606	0.579	0.634	0.605	0.574	0.636	0.641	0.611	0.671	0.673	0.646	0.700
Effect of variation in real remunerations	0.285	0.274	0.296	0.212	0.202	0.223	0.204	0.194	0.214	0.198	0.189	0.207
Effect of occupational variation	0.374	0.342	0.406	0.441	0.406	0.476	0.497	0.464	0.531	0.533	0.503	0.563
<i>Medium-education individuals</i>												
Actual	0.525	0.481	0.568	0.489	0.444	0.534	0.496	0.456	0.535	0.494	0.460	0.528
Effect of variation in real remunerations	0.263	0.247	0.280	0.206	0.191	0.221	0.175	0.162	0.188	0.176	0.164	0.187
Effect of occupational variation	0.294	0.243	0.345	0.317	0.267	0.368	0.362	0.319	0.405	0.364	0.327	0.400
<i>High-education individuals</i>												
Actual	0.346	0.308	0.384	0.384	0.310	0.458	0.334	0.284	0.385	0.339	0.297	0.381
Effect of variation in real remunerations	0.281	0.259	0.302	0.209	0.183	0.236	0.187	0.167	0.207	0.178	0.162	0.194
Effect of occupational variation	0.079	0.038	0.120	0.194	0.113	0.274	0.169	0.116	0.222	0.184	0.140	0.229

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

is curious because, contrary to expectations, the sharp drop in inflation that occurred between the first of those periods (covering the years before the Convertibility Act) and the other three did not affect the average variability of current incomes. As mentioned above, inflation influences the variability of an individual's real labour income through time, via its impact on changes in the remuneration obtained in a given job. Thus, the drop in inflation—especially from such high rates as those recorded between 1987 and 1991—helped to reduce the instability of real wages. This is also shown in table 2, which evaluates income variability when the effects of job instability are isolated: the coefficient of variation of labour remuneration—considering only positive incomes and excluding observations corresponding to situations in which the person was not employed—falls in the second period compared to the first, and again in the next one.¹⁸ At the same time, however, income variability associated with job instability increased, as can be deduced from the increase in the coefficient of variation of incomes, controlling for changes in remuneration.

It can be concluded, therefore, that the average variability of incomes among individuals who were employed at some point remained constant throughout the period, despite the significant drop in inflation achieved since the early 1990s. This does not mean that more stable prices have not had the expected effects in terms of stabilizing the purchasing power of remunerations, but those effects were counteracted by events in the labour market that increased job instability.

Another way to verify this is to note that, in the late 1980s, 69% of those who were employed at some point had been employed in all four observations, whereas the proportion decreases by five percentage points in the following phase. This trend continued, albeit less intensively, in the next two phases; and, as a result, the proportion of employed persons with stable income paths shrank by 10 percentage points between the beginning and end phases.

¹⁸ As mentioned in note 16, the effects of variations in remuneration arising from changes of job or hours worked by individuals that remain employed are not isolated. Accordingly, income variability arising from job factors (controlling for variations in real wages) could be even greater if these effects are incorporated. It should also be noted that an additional source of income variability is data or measurement error in respect of declared incomes. An exercise that excluded cases in which this error may have occurred (i.e. changes in income not associated with changes of occupation or hours worked) did not alter the results obtained.

A least-squares model was applied to evaluate the extent to which certain individual and household variables were associated with instability of income and its occupational and remuneration components. Status in terms of education,¹⁹ head of household, age and gender are considered usually to have a direct effect on income variability or some of its determinants.²⁰ Table 3 shows that all these attributes were generally significant and had the expected signs. Negative and positive signs are confirmed in the case of age and age squared, respectively, reflecting the expected influence of the life cycle: instability declines as the age advances, but at a decreasing rate. Only when the dependent variable is “pure” remuneration variability, however, is the low education coefficient not significant in the first period, thereby indicating that the effects of inflation were felt by the employed population at large. This situation was repeated following the stabilization of prices in the early 1990s, i.e. during the stabilization phase, which also shows that the process would have benefited all individuals, independently of other attributes. In the other two phases, however, the low education coefficient was significant, suggesting that instability declined by less among such individuals, or even increased.

Among low-skilled employed persons, income instability was greater towards the end of the period analysed than at the start. This is shown directly in table 2 and can also be deduced from the model reported in table 3 for each of the four periods.²¹ The significance of this result, however, emerges from an exercise (values not shown here), in which a similar model was applied to the set of observations in the four periods for low-education individuals only, with dummy variables representing the different phases. The dummy variable corresponding to the recessionary phase (1998-2001) was positive and significant with respect to the first phase (high inflation, considered as the base), but this was not the case with the those representing the other two phases.

¹⁹ Stratification according to educational level was as follows: Low education encompasses those with incomplete secondary schooling; medium education represents those with up to tertiary education incomplete; and high education those that had completed the latter. In the least-squares analysis, a dummy variable was used for low education, which was given the value of 0 for the medium and high education levels.

²⁰ There is ample evidence of the influence of those variables on job instability; see, for example, Farber (1999) and Nickel, Jones and Quintini (2000).

²¹ A similar result was obtained by Gutiérrez (2004) for the recessionary period 1998-2002.

TABLE 3

**Greater Buenos Aires: estimation of factors determining
income instability^a**

	High inflation phase	Stabilization phase	Recovery phase	Recession phase
<i>Dependent variable: Effective coefficient of variation</i>				
Low education	0.155	0.166	0.202	0.241
Male	-0.201	-0.228	-0.154	-0.149
Age	-0.051	-0.030	-0.056	-0.053
Age squared	0.001	0.000	0.001	0.001
Head	-0.129	-0.240	-0.165	-0.159
Constant	1.582	1.198	1.638	1.610
<i>Dependent variable: Simulated coefficient of variation, controlling for job instability</i>				
Low education	0.015 ^b	0.000 ^b	0.020	0.015
Male	0.017 ^b	0.035	0.022	0.021
Age	0.008	0.000 ^b	0.004	0.003 ^b
Age squared	0.000	0.000 ^b	0.000 ^b	0.000 ^b
Head	0.019 ^b	0.029	0.011 ^b	0.016 ^c
Constant	0.096	0.174	0.083	0.098
<i>Dependent variable: Simulated coefficient of variation, controlling for remuneration instability</i>				
Low education	0.068	0.094	0.099	0.110
Male	-0.114	-0.157	-0.093	-0.086
Age	-0.048	-0.021	-0.050	-0.052
Age squared	0.001	0.000	0.001	0.001
Head	-0.045 ^b	-0.122	-0.112	-0.086
Constant	1.111	0.706	1.200	1.230

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

^a Unless otherwise indicated, the coefficients are significant at the 5% level.

^b Not significant at 5%.

^c Not significant at 10%.

In contrast, there were no significant differences when the exercise was repeated for higher-education individuals. Table 2, above, shows the increase in instability for the low-education group, which remains unchanged for the other two groups.

This procedure was also used to analyse the significance of variations in income instability among the different educational groups, associated either with fluctuations in remuneration or with occupational status. Among individuals with little schooling, occupational variability was already increasing at the start of the 1990s while pure income instability was not changing significantly. In contrast, the other group did not show changes in either measure.

As the foregoing analysis shows, not only does the individual income variability among people employed at some point in time differ according to their level of schooling, but its persistence between

the phases analysed conceals different behaviour patterns between groups defined in this way. The coefficients of variation of incomes in the medium and high education strata (table 2) were broadly unchanged throughout the four periods, whereas the less educated experienced even greater income instability in the final period than in the high-inflation phase.

(b) *Instability of household incomes*

We now consider the variability of household incomes, which is important not only for the analysis but also to evaluate the extent to which this was affected by the instability of labour incomes received by individuals who were employed at some point. The relation will not necessarily be direct, since it could have been offset by the effect of other variables.

Table 4 shows a significant decrease in the coefficient of variation (18%) of household labour incomes, between

TABLE 4

**Greater Buenos Aires: coefficients of variation of real labour incomes
of households and number of employed**

	High inflation phase			Stabilization phase			Recovery phase			Recession phase		
	Average	Confidence interval		Average	Confidence interval		Average	Confidence interval		Average	Confidence interval	
		Lower bound	Lower bound		Lower bound	Lower bound		Lower bound	Lower bound			
<i>Households headed by persons under 65 years of age</i>												
Employed members	0.172	0.163	0.180	0.178	0.170	0.187	0.217	0.208	0.225	0.235	0.227	0.243
Household labour income	0.364	0.355	0.372	0.300	0.292	0.308	0.317	0.309	0.326	0.332	0.324	0.340
Household labour income controlling for job instability	0.312	0.305	0.318	0.244	0.238	0.249	0.259	0.252	0.266	0.255	0.249	0.262
Household labour income controlling for remuneration instability	0.094	0.086	0.102	0.130	0.120	0.140	0.127	0.119	0.135	0.147	0.140	0.155
<i>Households headed by persons under 65 years of age, with low education level</i>												
Employed members	0.186	0.176	0.197	0.194	0.184	0.204	0.245	0.234	0.256	0.263	0.253	0.274
Household labour income	0.378	0.368	0.388	0.315	0.306	0.325	0.348	0.337	0.359	0.368	0.358	0.378
Household labour income controlling for job instability	0.318	0.310	0.326	0.252	0.245	0.259	0.282	0.273	0.291	0.281	0.273	0.290
Household labour income controlling for remuneration instability	0.106	0.096	0.115	0.141	0.130	0.153	0.145	0.135	0.155	0.174	0.164	0.184
<i>Households headed by persons under 65 years of age, with medium education level</i>												
Employed members	0.153	0.135	0.171	0.131	0.115	0.147	0.178	0.162	0.195	0.185	0.170	0.201
Household labour income	0.336	0.319	0.354	0.263	0.245	0.280	0.268	0.251	0.285	0.269	0.254	0.285
Household labour income controlling for job instability	0.296	0.281	0.311	0.229	0.217	0.242	0.214	0.201	0.226	0.202	0.190	0.213
Household labour income controlling for remuneration instability	0.081	0.062	0.100	0.100	0.079	0.122	0.099	0.082	0.115	0.111	0.097	0.124
<i>Households headed by persons under 65 years of age, with high education level</i>												
Employed members	0.078	0.061	0.096	0.110	0.088	0.132	0.081	0.068	0.093	0.149	0.133	0.165
Household labour income	0.290	0.275	0.305	0.207	0.187	0.227	0.187	0.172	0.201	0.234	0.218	0.250
Household labour income controlling for job instability	0.286	0.272	0.300	0.184	0.168	0.201	0.175	0.162	0.188	0.207	0.194	0.221
Household labour income controlling for remuneration instability	0.017	0.008	0.026	0.049	0.032	0.066	0.050	0.029	0.071	0.049	0.037	0.061

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

the first and second periods in the early 1990s, resulting from an increase in average job instability among households and a decrease in the variability of remuneration. Then, during the expansionary and recessionary phases that followed the middle of the decade, family income variability increased again (by 6% and 5% respectively) on the back of rising job instability. Nonetheless, the variability of family labour incomes in the last of the periods was 9% less than the value recorded in the late 1980s; and although this aggregate result conflates significantly different experiences across strata defined by the education level of household heads, on

average it reflects a different situation than for individual income variability.

The relevance of growing job instability is revealed by a persistent rise in the coefficient of variation of family incomes calculated after controlling for changes in variations in the remuneration of employed household members (table 4). This rose by 38% with the stabilization in the early 1990s, whereas the pure real remuneration change decreased by 22%. Considering the two end phases, however, the differences between the two measures were greater: income variability caused by job instability increased

by 56%, whereas that stemming from fluctuations in remunerations was 18% below the level recorded in the years of high inflation. In keeping with the analysis of individual incomes, income variability associated with job instability increased most in households headed by individuals with low levels of schooling.

It should be kept in mind that the procedure used to measure variability caused by job changes also captures effects arising from the strategies deployed by household members in response to events affecting them. Specifically, substitution and complementarity mechanisms operate among active members within households; and these affect income instability through both jobs and remuneration, with the final outcome depending on which effect prevails.²² A clear example of this is the change in income that can be associated with “perfect” substitution of employed household members (i.e. if one member becomes unemployed, another finds a job). If the income of the new worker is different than that of the family member who becomes unemployed, household income is altered without any change in the number of employed members; this change should be attributed to the job factor and not to fluctuations in remunerations.

The variability of real household incomes was calculated in the same way as the instability of individual incomes, with determinants including the socioeconomic attributes of the head of household such as sex, level of schooling (low education), age, age squared; and variables reflecting household composition, such as size and the presence of members under 18 years of age (table 5).

The variability of household labour incomes is negatively related to the education level of the head of household, and this relation strengthens as from the second expansionary phase. Other factors that had a significant influence were age, with a negative sign, and age-squared, with a positive sign; whereas the coefficient of household size and the presence of children was associated with greater variability throughout the 1990s.

In addition to applying least-squares analysis to overall income instability, the influence of these independent variables on the number of employed household members was also studied, along with that arising from the variation of remunerations among those members. The same model was also estimated for the case of pure income variability, which takes

account of changes in the number of employed family members. The education level of heads of household also seems to negatively affect the variability of income recipients, income instability associated with occupational variability and pure income instability.

Table 4 showed that the reduction in the instability of family incomes associated with the control of inflation affected heads of household with different educational levels. Nonetheless, the pattern became more divergent following the post-1995 recovery, with variability increasing among households headed by individuals with low levels of schooling, whereas in other groups no changes were recorded after the reduction associated with stabilization. This broadly reflects what happened with the variability of employed household members, which increased more in the first group. Among these, the pure variability of remunerations also increased while remaining unchanged for the other groups. The changes in the coefficient of the variable “head of household with low education” between the second and third phases (table 5) also shows the uneven behaviour of instability across households from different strata.

Towards the end of the 1990s, therefore, a difference had emerged in levels of household income instability, which was even greater than that recorded at the start of the decade. Although, in the case of variability of the number of income recipients, the gap between high and low strata households was narrowed by the sharp increase in the former during the recessionary phase, differentials in remuneration variability widened.

The foregoing analysis on individual and family income instability can be summarized by stating that it decreased in the second of the phases identified (from the early 1990s) as a result of macroeconomic stabilization. Nonetheless, in the middle of that decade, occupational paths started to become more unstable; and, in the final phase considered, real household incomes became highly unstable, thereby partly losing the benefit of the drop in inflation. This was particularly true among households headed by low-education individuals, in which the additional job instability fully offset the lesser instability of remunerations.

2. Instability and welfare

As noted above, fluctuations in the flow of resources received by households are damaging, because they generate uncertainty regarding future values, which may affect levels of consumption and the programming

²² See Beccaria and Groisman (2005).

TABLE 5

Greater Buenos Aires: estimation of the determinants of household income and job instability^a

	High inflation phase	Stabilization phase	Recovery phase	Recession phase
<i>Dependent variable: effective coefficient of variation of labour incomes</i>				
Age	-0.010	-0.011	-0.007	-0.006 ^b
Age squared	0.000	0.000	0.000	0.000
Male head of household	-0.007 ^c	-0.011 ^c	-0.001	-0.017 ^b
Head of household with low education level	0.049	0.053	0.091	0.094
Size of household	-0.007 ^c	-0.036	-0.027	-0.026
Children up to 18 years of age	0.014	0.048	0.043	0.048
Constant	0.496	0.449	0.376	0.360
<i>Dependent variable: coefficient of variation of employed household members</i>				
Age	-0.009	0.001 ^c	-0.001	-0.001 ^c
Age squared	0.000	0.000 ^b	0.000 ^c	0.000 ^c
Male head of household	-0.006 ^c	-0.010 ^c	-0.003 ^c	-0.027
Head of household with low education level	0.048	0.052	0.085	0.073
Size of household	0.002 ^c	-0.026	-0.001 ^c	0.000 ^c
Children up to 18 years of age	-0.001 ^c	0.032	0.010 ^b	0.012
Constant	0.253	0.047 ^c	0.104 ^c	0.143
<i>Dependent variable: coefficient of variation of labour income controlling for occupational variability</i>				
Age	-0.004	-0.007	-0.004 ^c	-0.004 ^c
Age squared	0.000 ^b	0.000	0.000 ^b	0.000
Male head of household	-0.014 ^b	-0.005 ^c	0.002 ^c	-0.007 ^c
Head of household with low education level	0.021	0.027	0.069	0.067
Size of household	-0.019	-0.005 ^c	-0.012	-0.015
Children up to 18 years of age	0.032	0.013	0.022	0.030
Constant	0.388	0.338	0.273	0.260
<i>Dependent variable: coefficient of variation of labour incomes controlling for variability of remunerations</i>				
Age	-0.008	-0.008	-0.005 ^c	-0.004 ^c
Age squared	0.000	0.000	0.000 ^b	0.000 ^c
Male head of household	0.008 ^c	-0.009 ^c	-0.001 ^c	-0.016 ^b
Head of household with low education level	0.036	0.032	0.052	0.069
Size of household	0.026	-0.020	-0.003 ^c	-0.003 ^c
Children up to 18 years of age	-0.029	0.032	0.013	0.016
Constant	0.130	0.170	0.179	0.158

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

^a Unless indicated otherwise, the coefficients are significant at the 5% level.

^b Not significant at 5%.

^c Not significant at 10%.

of expenses, or cause difficulties in cushioning the effects even when variability can be anticipated. As described in the methodology section (section IV), taking account of this factor requires the use of utility functions to estimate an income corrected for the effects

of fluctuations. This risk correction is also used even when variability has always been rising or falling. Nonetheless, as noted below (section VII, part one), households with rising paths represent less than 5% of all cases.

The results confirm that adjusted income grew by more than measured income between the ends of the period, thanks to the reduction in the variability of real incomes noted above. Nonetheless, this improvement differed in intensity across groups; among low-

education households, the average increase in both income measures was similar, whereas in households headed by individuals with higher levels of schooling, the risk-adjusted increase rose by 52%, compared to a 29% rise in average actual incomes (table 6).²³

TABLE 6

Household labour income: Actual average and risk-adjusted average
(in 2001 pesos)

	High inflation phase		Stabilization phase		Recovery phase		Recession phase					
	Average	Confidence interval		Average	Confidence interval		Average	Confidence interval				
		Lower bound	Lower bound		Lower bound	Lower bound		Lower bound	Lower bound			
Households headed by persons under 65 years old												
Risk-adjusted	597	564	630	874	823	925	855	804	905	851	806	895
Actual	707	669	746	982	926	1037	958	911	1005	950	909	992
<i>Households headed by person of low education level</i>												
Risk-adjusted	433	411	454	682	646	718	591	561	621	576	544	609
Actual	520	495	545	788	753	824	687	653	721	668	637	698
<i>Households headed by person of medium or high education level</i>												
Risk-adjusted	658	598	718	870	790	948	1 014	925	1 103	1 000	930	1 070
Actual	942	868	1 016	1 235	1 132	1 338	1 273	1 176	1 371	1 215	1 137	1 293

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

VII

Mobility and inequality

This section of the article will evaluate the extent to which changes in income instability have been accompanied by changes in distributional inequality. As noted in section II, what has happened with income mobility is a key to assessing the relation between those two variables. The first part of this section will review the changes that have occurred in mobility, while the second will investigate how these have affected the income distribution.

1. The evolution of income mobility

As analysed above, in the early 1990s, household labour income became less variable, reflecting the impact of the macroeconomic stabilization programme applied until then. This coincided with a reduction in levels of income concentration, which had been very accentuated during the years of high inflation (see section II). Nonetheless,

and despite the maintenance of price stability, household labour incomes gradually became more variable in the third and fourth phases (i.e. throughout the last half of the 1990s); and the same happened with inequality, which grew until the middle of that decade, before flattening out in the downswing phase.

Variability does not have to be accompanied by changes in the ranking of recipients' incomes, or even in the differentials between them. Nonetheless, such situations are unlikely to occur, since income variability usually results in changes in the relative positions of income recipients and/or in the gaps between their incomes, particularly when labour-market events such as a period of unemployment are taken into account.

²³ Similar results are confirmed in the analysis by Cruces and Wodon (2003) for 1995-2002.

Analysis of income mobility initially focused on the way households moved between income quintiles over the four observations. This data made it possible to identify different paths, which, following an established typology²⁴ were classified as: flat, rising, falling, blip and zig-zag. The first included cases of households that remained in the same income quintile throughout the four observations, or moved at most to the immediately higher or lower level than at the start (irrespective of whether or not they returned to the original quintile). Rising (falling) paths are defined by households that move up (down) by at least two income quintiles with respect to the initial one, and either remain in that situation or rise (fall) further. The situation referred to as a “blip” included increases (decreases) of two or more quintiles from the initial one, followed by a return to the initial or even one quintile lower (higher) than at the start. Other more fluctuating alternatives are classified as zig-zag. This classification procedure makes it possible to describe the patterns of household mobility across defined thresholds (quintile boundaries).

Between the first and second phases, with the stabilization of the early 1990s, the prevalence of flat paths increased from 55% to 59% of households, whereas the proportion of households experiencing blips decreased from 25% to 20% (table 7). The other categories were broadly unchanged. In the post-1995 recovery, inter-quintile paths reveal a substantial change in income mobility, with flat movements accounting for 72% of households while the other types of transition declined. Lastly, in the final recessionary phase, the previous mobility pattern was maintained, with the proportion of flat paths increasing again.

To complement the analysis, the Pearson and Spearman correlation coefficients were calculated for household incomes. Table 7 shows the average of the six coefficients that can be calculated from all observation pairs for each phase.²⁵ Both correlation coefficients of household incomes increased in the last two phases (table 8), suggesting that not only did changes in the ranking of incomes decline, but the distances between them also narrowed, which is consistent with the results of the path analysis. In fact, the difference between the third- and fourth-phase coefficients was significantly larger than between the

²⁴ See, for example, Hills (1998) or Jarvis and Jenkins (1998).

²⁵ The results of the comparison would not be altered by taking the average of the three coefficients that can be calculated between pairs of consecutive observations.

TABLE 7

Greater Buenos Aires: Mobility of household labour incomes
(Percentages)

Paths	High inflation phase	Stabilization phase	Recovery phase	Recession phase
Flat	55.3	59.1	71.7	73.5
Rising	5.1	5.6	3.9	2.9
Falling	3.7	3.4	3.4	2.9
Blip	25.7	20.7	15.3	14.7
Zig-zag	10.2	11.3	5.7	6.1
<i>Total</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

TABLE 8

Greater Buenos Aires: Correlation coefficients of household labour incomes^a

Households headed by individuals under 65 of age	High inflation	Stabilization phase	Recovery phase	Recession phase
Pearson	0.695	0.715	0.817	0.875
Spearman	0.703	0.731	0.782	0.791

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

^a All coefficients calculated between the two periods were significant at the 1% level. The amounts shown in the table are simple averages of the six coefficients that can be calculated between observation pairs of the second phase.

first and second phases.²⁶ Increases were significant in the third phase (economic expansion following the “tequila” crisis), and they continued their rising trend in the final phase (table 8). In contrast, between the first and second phases, along with a steeper reduction in income variability, the income correlation was unchanged. This would reflect the generalization of the effects of controlling inflation and is compatible with the greater prevalence of flat income paths mentioned above. As will be recalled, the sharp rise in income correlation that occurred between the initial stabilization and economic recovery phases was accompanied by greater variability. This result demonstrates the need to

²⁶ This emerges from a consideration of confidence intervals for the differences in correlations calculated by bootstrapping techniques. Such techniques are a statistical method for calculating the distribution of the estimator and confirming that a new sample gives the same result as the previous one.

study the degree of mobility that accompanies instability, because the two do not always behave in the same way. What happened between the second and third phases analysed is indicative of that situation and reflects the fact that the differentials associated with changes in income narrowed, even as they were becoming increasingly frequent.

The combination of evidence that arises from the procedures used in this section reveals a process in which family labour income mobility has decreased since the late 1980s, which is consistent with a consolidation of the positions occupied by households in the income distribution. This means increasing segmentation between households of different types; and, in particular, it is becoming increasingly difficult for lower-income households to rise, either in absolute or in relative terms. This result is explained by the evolution of the labour market during the period in question. As mentioned when analysing the instability of individual incomes, there were increases in the degree of rotation between economic activity status and between occupations. This individual behaviour was largely projected on to households, given their revealed inability to implement compensation mechanisms in response to fluctuations in individual labour incomes.

2. Distribution of current incomes and average incomes

As described in the previous section, Argentina experienced a process of decreasing mobility of family incomes from the late 1980s and 1990s onwards. Secondly, section III showed that inequality in the

distribution of current incomes has intensified since the mid-1990s. These two pieces of evidence suggest that the concentration of more permanent incomes expanded faster than that of current incomes. Put another way, income mobility affected the dynamic of inequality in the income distribution less and less intensely. To quantify this effect, an “adjustment of inequality for mobility” index was calculated, as described in the methodological note (section IV); and the Gini coefficient was used as the inequality index.²⁷

The mobility adjustment made to inequality was around 8% for the set of households in the first phase (late 1980s/early 1990s) and was maintained at similar levels in the second phase, covering the first half of the 1990s (table 9). This index then dropped in the next two phases to a level of around 5% in the second of them. In these phases, therefore, the discount for mobility was less than during periods of high inflation.

The fact that the correction of static inequality to take account of income mobility has become ever smaller reflects the aforementioned consolidation of household positions in the income distribution.

It can be concluded, therefore, that the increase in inequality since the mid-1990s, documented in several studies based on cross-section data, partly underestimated the increase in the concentration of permanent household incomes. The increase in inequality measured by the average of Gini coefficients grew by 11% between the second and last periods, while the concentration of average incomes rose by 14%.

²⁷ Similar results were obtained with other indicators of inequality.

TABLE 9

Greater Buenos Aires: Gini coefficients of the inequality of household labour incomes

	High inflation phase		Stabilization phase		Recovery phase		Recession phase					
	Coeffi- cient	Confidence interval		Coeffi- cient	Confidence interval		Coeffi- cient	Confidence interval				
		Lower bound	Upper bound		Lower bound	Upper bound		Lower bound	Upper bound	Lower bound	Upper bound	
Total households												
Gini coefficient of average income	0.452	0.432	0.472	0.392	0.375	0.409	0.444	0.428	0.459	0.447	0.430	0.463
Average of cross-section Gini coefficients	0.492	0.476	0.507	0.423	0.405	0.443	0.472	0.468	0.475	0.472	0.462	0.482
Gini coefficient of risk-adjusted average income	0.491	0.469	0.513	0.441	0.423	0.460	0.497	0.477	0.516	0.504	0.487	0.521
Coefficient R: Adjustment of inequality for mobility (%)		-8			7.5			-5.9			-5.4	

Source: Authors' estimates on the basis of data from the Permanent Household Survey (EPH).

The analysis of risk-adjusted income inequality provides an overview that strengthens these results, since

that measure of inequality changed in a similar yet more pronounced way than the average of actual incomes.

VII

Conclusions

The macroeconomic stabilization achieved in the early 1990s reduced the variability of family incomes. Nonetheless, the growth of occupational instability as from the middle of that decade meant that fluctuations in current family incomes persisted into the early twenty-first century and remained high, although less so than in the high inflation phase. It is worth noting here the differential impact of the reduction of inflation on households in the different strata. In the case of households headed by individuals with low levels of schooling, the stabilizing effect was fully discounted by occupational variability. When analysing individual incomes, the impact of that variability is greater, because there is no reduction in income instability for the group, which actually increases among employed persons of low education levels.

These patterns of current-income fluctuations are reflected in the difference between the behaviour of average family labour income and family labour income adjusted for risk, which was lower in low-strata households.

In conjunction with the (slight) reduction in the instability of household incomes recorded between the end phases analysed, the distances moved by family incomes became increasingly smaller. As a result, the positions of households in the income distribution tended to consolidate, causing growing segmentation

between households of different types. The above shows that low-income families not only benefited less from income stabilization, but also faced additional difficulties in improving their relative position.

The panorama of growing inequality in the income distribution since the early 1990s, as reported by various studies based on current incomes, is also appropriate for describing what happened to changes in the distribution of more permanent incomes. Inequality in the latter actually increased slightly more than in current incomes, because of the decrease in mobility recorded throughout that period.

A general conclusion to be drawn from the analysis of this article is that inequality in the early 2000s was similar to that recorded in the late 1980s. An evaluation of this similarity should take account of the fact that periods of high inflation were accompanied by sharply worsening distribution. Even when the comparison is made with the third (growth) phase, rather than the final (recessionary) phase, there is no reduction compared to the years of hyperinflation.

This would appear to support the hypothesis that increasing differentiation in terms of labour instability accentuated the increase in inequality among more permanent incomes.

(Original: Spanish)

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Labour mobility in Argentina since the mid-1990s: the hard road back to formal employment

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This paper analyses the magnitude and type of employment mobility found in Argentina from the mid-1990s onward using data from the *Observatorio de Empleo y Dinámica Empresarial* (Employment and Business Dynamics Observatory) of the Ministry of Labour and Social Security of Argentina. The Observatory was developed using social security records of registered private-sector wage employment in the manufacturing, commerce and services sectors. Such employment, however, played a minor role (25%) in the employment structure of Argentina during the period studied. The main finding of this study was a significant level of labour mobility. This article shows that, during the period in question, which was characterized by macroeconomic instability and high dollar labour costs, the dominant labour mobility trend among registered workers was toward exclusion from the formal labour market (through unemployment, inactivity or employment in jobs not registered with the social security system).

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I

Introduction

This paper is one of a series of research studies on labour mobility and short-term employment trends that have been conducted from a variety of perspectives, taking into account the prevailing institutional frameworks of the labour market concerned. Such studies also analyse the effect of business demography on occupational dynamics and the reallocation of employment from and toward different firms, sectors and regions.

Accordingly, the purpose of this paper is to analyse the magnitude and characteristics of the mobility of registered employment in Argentina from the mid-1990s onward, and to determine whether the labour market is segmented such that workers in the primary sector hold jobs in the same firm for longer periods of time, or enjoy greater career continuity in other firms.

This article employs data obtained from the Employment and Business Dynamics Observatory of the Ministry of Labour of Argentina. The Observatory was constructed using the administrative records of the social security system, which includes all registered wage workers in the private sector (approximately 3.5 million workers). This type of employment, however, represented a minority (25%) of the occupational structure of Argentina during the period studied. During that period, unregistered wage work made up

28% of the country's occupational structure; non-wage employment accounted for 26%, and public-sector employment and employment plans made up the remaining 22%. For this study, a panel was developed showing the series of firms that employed each individual worker, as well as the transition indicators for each period between 1996 and 2004, depending on the availability of source information.

Section II lays out the article's conceptual framework, and provides certain background information obtained from local and international studies. Section III provides a brief description of the macroeconomic environment and workings of the Argentine labour market during the period in question. Section IV describes the labour transitions experienced by registered Argentine wage workers during this period, and discusses several hypotheses regarding work. Section V assesses the short-term labour trajectories of registered wage workers who were employed when the crisis began (1998), and uses a probit model¹ to evaluate the variables that explain the job tenure of workers in a given firm from that point forward, as well as to provide additional input for the discussion of the hypotheses. The main conclusions of the article are presented in Section VI.

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preliminary draft of this study was presented at the Globelics 2005 Africa conference – "Innovation Systems Promoting Economic Growth, Social Cohesion and Good Governance". The data base was developed by Oscar Berlari and Veronica Miganne. Comments from an anonymous referee are gratefully acknowledged.

¹ Probit models are binomial discrete choice models –that is, models with two alternatives.

II

Conceptual framework

Studies of labour mobility have a long history, and their relevance has increased over the last few decades, as the globalization of markets has eroded job security. They have benefited from the emergence of new sources of information, which have made the estimation of new indicators possible.

The concept of labour mobility, which refers to the job changes experienced by workers, differs from employment mobility, which refers to the creation and destruction of jobs as a result of firm closures, the creation of new firms or changes in the average size of firms remaining in the market. Labour mobility is a broader concept, which includes the movement of workers resulting from the creation and destruction of jobs, as well as the mobility generated by vacancy chains. It involves the series of movements (exits and entries) which can occur when an available job is taken by a worker, who in turn vacates his or her former position, which is itself occupied by another worker, until the process ends with the entry into employment of a new worker² (Sorensen and Tuma, 1981).

The literature covers several aspects of labour mobility, which may be “inclusive”, or “exclusionary” when workers become unemployed, inactive or precariously employed. Mobility may also be “inward” or “outward”, depending on whether a worker obtains a new position within the same company or goes to work for a new employer (Diprete, 1993); “voluntary” or “involuntary”, depending on whether a worker is dismissed or resigns (Hachen, 1988); “upward”, “downward” or “lateral”, depending on the difference between the wages of the previous job and those of the new job (Shin, 2004). It may also involve continuity or change in a professional career (Shin, 2004; Stambol, 2003), and, under certain circumstances, it may lead to the diffusion of technical competencies among firms (Lundmark and Power, 2004; Dahl, 2002).

The manifestations of these various aspects of labour mobility generate different mobility regimes or patterns. Thus, labour mobility may be beneficial for society, workers and firms if it improves access to

employment and increases overall productivity. A positive case is that of upwardly mobile careers, characterised by social inclusion and the diffusion of knowledge and competencies. Mobility takes on a very different hue when it excludes people from work, interrupting the accumulation of individual and collective skills.

The magnitude and patterns (regimes) of labour mobility vary according to the structure of the production sector and the institutional framework of labour markets in a particular economy. The macroeconomic environment is also a determining factor, since the economic cycle affects the market for goods and demand for labour. When the overall employment level contracts, mobility toward exclusion from the labour market (unemployment, insecure employment or inactivity) becomes more prominent, and opportunities for voluntary, upward mobility decline (Burgess and Rees, 1996; Schettkat, 1996; Lundmark and Power, 2004; Moscarini and Vella, 2002). Under such conditions, open unemployment and insecure employment hinder upward, inclusive mobility patterns.

Two paradigmatic, diametrically opposed labour mobility regimes may be used to illustrate this point. Studies of the United States, England and western Germany show that labour markets in those countries are dominated by long-term employment, and that the technological changes and deregulation of the last few decades have not significantly affected such employment. While labour mobility in those countries is high, it does not make employment for the average worker unstable (short-lived), since long-term employment relationships exist side-by-side with a segment of unstable jobs (Farber, 1998; Mertens, 1999). In the case of Latin America, studies of Brazil and Argentina during the second half of the 1990s have shown labour mobility in those countries to be high, with average mobility tilting away from registered wage employment and toward job insecurity or unemployment (Paz, 2003; Araujo Guimarães, 2004; Galiani and Hopenhayn, 2003; Castillo, Ferlan, and others, 2005).

While the average labour mobility pattern of an economy is a telling measure of different realities, the

² Vacancy chains may have different lengths and degrees of complexity, bringing about movement for varying numbers of workers.

existence of different levels of segmentation within labour markets requires a more complex analysis, in order to identify the coexistence of different labour mobility regimes at a given point in time, within a given country. A long line of empirical segmentation studies has shown that, generally speaking, primary sectors –defined as such based on (i) production structure, (ii) worker profile or (iii) region– are characterized by steadier employment relationships (less outward mobility) than the rest of the economy. Mobility in these primary sectors also tends to be of the upward variety (Shin, 2004; Thomson, 2003; Stambol, 2003).

Labour market segmentation, defined in terms of the structural heterogeneity of the production system, is caused by a number of factors, such as technology, the organizational structure of firms, the nature of product demand (monopoly power) and the degree of unionization (Thomson, 2003). Beck, Horan and Tolbert II (1978) employ this approach to identify core and periphery sectors, based on the relationship between product market and industry structure. The core sector is dominated by large corporate enterprises which constitute an oligopolistic system of production. The core sector is differentiated from the periphery sector, which is characterised by smaller firms, operating in a more competitive environment. Firms operating in more stable markets generate more primary-sector (steadier) jobs, while firms facing shifting demand functions operate in the secondary sector of the labour market. Other forms of segmentation arise from the poor chances of survival of new businesses, as well as the reallocation of resources among firms with different levels of productivity. A significant portion of (involuntary) employment mobility occurs when relatively young firms exit the market. Destruction is less common among older firms (Dunne, Roberts and Samuelson, 1988). Resource mobility among firms with different levels of productivity accounts for almost half the growth of manufacturing productivity in the United States (Haltiwanger, Lane and Spletzer, 2000).

An analysis of segmentation based on worker profile shows that different mobility patterns exist for different market sectors. Better-educated workers enjoy a greater degree of upward mobility; intersectoral mobility is more frequent among younger workers who have not yet acquired specific skills during their careers (Stambol, 2003); women are generally concentrated in secondary sectors of the labour market, with less secure jobs and fewer prospects for upward mobility

(Thompson, 2003; Hall, 1982; Mertens, 1999). Internal labour market theory suggests that firms protect a limited (primary) sector of their workforce, comprised of professional³ and managerial workers, while the secondary sector is associated with workers with lower occupational status (Doeringer and Piore, 1971). Internal labour markets, characterized by upwardly mobile careers, promotions and incentives, form around this primary segment (Doeringer and Piore, 1971). In large organizations, inward mobility among workers is the primary pattern of mobility. Extensive career-development programs and the prospect of a long stay at the firm discourage voluntary outward mobility. Since outward mobility is rare and selective, when these primary workers choose to change firms they usually move upward.

When labour market segmentation is analysed in terms of the regional division of labour, heterogeneous mobility patterns also emerge. This type of segmentation involves a number of separate sub-markets, all of which are configured differently and are characterised by low outward mobility and high inward mobility. This is the case with production clusters, which make intensive use of knowledge, employing a local labour force characterised by a high degree of economic and technological specialization, which is a result of agglomeration economies and processes that foster collective efficiency (Dahl, 2002). A number of studies conducted in Silicon Valley and similar clusters in Scandinavian countries show that the diffusion of knowledge resulting from worker mobility within the cluster increases collective competencies and generates economies within the industry and outside the firm (Dahl, 2002; Lundmark and Power, 2004; Stambol, 2003). This, in turn, benefits workers, who move upward, continuing their careers at other firms within the cluster. In this case, mobility favours both workers and firms.

From that perspective, the labour mobility process contributes to the development of firm competencies, if one assumes that workers are bearers of knowledge and ideas (which are already embedded in their minds). If the knowledge borne by workers is relevant, other firms will promote mobility. Knowledge flows between firms are thus driven mainly by the movement of workers (Dahl, 2002; Lundmark and Power, 2004). As mentioned above, this pattern of mobility has been

³ Moscarini and Vella (2002) have found that, in the case of the United States, there is an inverse relationship between outward mobility and schooling, age and family obligations.

widely studied in knowledge-based production clusters, where the institutional culture encourages it. Numerous case studies have also analysed sectors of the traditional labour market, such as the sector comprised of the primary workers of knowledge-intensive firms, which develop strategies to attract the primary workers of their competitors, in order to gain control of knowledge.

Within that conceptual framework, the intensity and pattern of labour mobility for the average registered worker in Argentina between 1996 and 2004 will now be analysed. In order to better understand these processes, the following section provides a description of the macroeconomic environment, which, as mentioned above, is a determining factor in labour mobility.

III

The macroeconomic context and labour market of Argentina between 1996 and 2004

During the 1990s, the Argentine economy experienced profound transformations, which affected its labour market. Structural reforms were adopted as a result of the Washington consensus (liberalization, privatization and market deregulation), new technologies emerged and labour regulations underwent significant changes (Kosacoff, Yoguel and others, 2000; Gatto and Ferraro, 1997; Yoguel, 2000a), within the framework of a financial liberalization process that was to become one of the chief factors in the crisis which began during the fourth quarter of 1998 (Stiglitz, 2003).

Consequently, as the exchange rate was revalued, the macroeconomic environment forced sectors which produced tradable goods –particularly the manufacturing sector– to deal with falling sales prices, as a result of increased exposure to competition from imported goods, high dollar production costs and growing uncertainty.

While significant regulatory reforms were adopted during this period to reduce non-wage labour costs and make working hours more flexible, the increasing dollar unit cost of labour became a strong incentive to replace work with capital (Altimir and Beccaria, 1999). Stability, access to imported parts and equipment, the deregulation of severance procedures, attractive investment conditions for transnationals and the recreation of commercial and bank credit all contributed to the destruction of jobs, particularly in the manufacturing sector.

During this period, labour legislation underwent a number of changes intended to make the labour market more flexible, on the assumption that such

reforms would make firms more competitive and increase labour demand. The evidence, however, suggests that these measures did not have a positive effect, given the sharp increase in unregistered employment that became one of the signature manifestations of job insecurity during the 1990s. Between 1991 and 2000, for example, unregistered employment rose from 29% to 37%.

Since firms adopted very different strategies to adapt to the changing environment, the significant increase which occurred in overall productivity, coupled with a drop in labour demand, was caused by very different factors: the offensive strategies of some firms, and the survival strategies of others. Many firms disappeared, while new ones joined the industrial structure. So-called “offensive” restructuring processes involved heavy investment in machinery and equipment, accompanied by profound organizational changes. “Surviving” firms adapted to the new conditions by cutting jobs, thereby achieving the same level of productivity with fewer employees, and by implementing organizational changes and eliminating downtime. As a result of these processes, the share of manufacturing in overall employment fell from 28% in 1995 to 23% in 2000. Fifty-seven thousand manufacturing jobs were lost as a result (Castillo, Cesa and others, 2002).

Occupational mobility will be analysed in the context of this macro-economically unstable environment, as well as the aforementioned changes in the organization of the production model, the introduction of new technologies, the declining share of manufacturing in overall employment and job insecurity.

An analysis of the unemployment rate reveals the existence of three distinct stages, which coincide with the phases of recent economic trends. The first phase (1996-1998) was expansive, and was characterised by falling unemployment, rising employment rates and steady labour force participation rates; the second phase (1999-2002) was recessionary, and was characterised by a general worsening of conditions in the labour market, a sharp increase in unemployment and drops in the employment and economic participation rates; finally, in 2003 and 2004, an economic recovery which continued into 2005 was accompanied by a clear shift: unemployment fell, and the labour force participation and employment rates increased.

Worker mobility was also specifically affected by the changes which began in the mid-1990s. Employment histories are the result of a variety of

actions adopted in response to the issues facing the country. In order to study different labour mobility trends, this analysis will focus on the three stages mentioned above.

As of 2004 (third quarter), the structure of the Argentine labour market was “atypical”. In an environment characterised by high unemployment (13%), private, registered wage workers represented a minority (25%) of the employment structure. Unregistered wage work and non-wage work represented 28% and 26% of the employment structure, respectively. Public-sector employment and employment plans accounted for the remaining 22%.

The following sections will show that breaks in employment histories influenced the development of competencies, job security, the stability of household income⁴ and the chances of retirement.

IV

Labour transitions among registered wage workers in Argentina between 1996 and 2004

In this section, we analyse the outward labour mobility of registered wage workers by studying the flows of individuals entering or exiting registered employment, remaining with the same employer or switching employers. The data presented below are expressed as one-year periods, beginning at the fourth quarter of each consecutive year.

The information used in this section was obtained from the administrative database of the *Sistema Integrado de Jubilaciones y Pensiones* (Integrated Retirement and Pension System, or *SIJP*), which can measure declared employment between 1996 and 2004. Those data were used to construct yearly transition matrices for private-sector wage workers who were registered with the social security system in the manufacturing, commerce and services sectors. These matrices, which were used to calculate worker flows, cover only workers of active age (under 65 years), in order to exclude possible transitions toward the pension system, which would occur upon retirement at age 66 (see appendix on methodology).

On average, 3.3 million wage workers under the age of 65 years were registered with the social security system each year between 1996 and 2004, in the manufacturing, commerce and services sectors. An

average of 2.4 million workers remained with the same employer from one year to the next; 592,000 entered the system, and approximately 550,000 exited it. During the sub-periods considered (the period of rising employment which occurred during the ascendant phase of the convertibility plan, the recession and crisis of 2002 and the post-convertibility recovery), employment flows were a reflection of changes in the macroeconomic environment of the country. During the recessionary period of 1999-2002, exits from the system exceeded entries. This suggests that registered employment decreased yearly (negative net changes). During growth years, on the contrary – particularly during the last phase – entries into the system exceeded exits.

As a result of these flows, labour mobility during this period was high, affecting 39% of employed workers each year (table 1). This percentage includes workers entering registered employment (15%), displaced workers (14%) and workers who switched employers (10%).

⁴ It should be noted that most registered wage workers in the private sector are heads of household – particularly in the manufacturing sector.

TABLE 1

Argentina: Labour mobility indicators for employed wage workers under 65 years of age registered by private firms in the manufacturing, commerce and services sectors, 1997-2004
(Percentages)

Mobility rates from and toward the SIJP	1997-1998	1999-2002	2003-2004	Average, 1997-2004
Entry rate ^a	18	13	19	16
Exit rate ^b	13	16	10	14
Percentage of employer changes ^c	11	9	9	10
Mobility rate (a)+(b)+(c)	42	38	38	39
Net growth of employment (entries-exits)/employment at <i>t</i>	6.0	-3.1	11.0	2.4

Source: Employment and Business Dynamics Observatory of Argentina (OEDE, several years), on the basis of the Integrated Retirement and Pension System (SIJP). The Observatory belongs to the Sub-secretariat for Technical Planning and Labour Studies of the Ministry of Labour, Employment and Social Security of Argentina.

^a Entries / (entries + exits + stays in the system).

^b Exits / (entries + exits + stays in the system).

^c *Código Único de Identificación Tributaria* (Unified Tax Identification Code) changes / (entries + exits + stays in the system).

The average percentage of workers who held registered jobs from one year to the next during the period studied was 84%. This percentage was procyclical, and was higher (88%) during the final growth phase than it was during the crisis (82%) and during the first stage of expanding activity (84%).⁵ The rate of duration with the same employer was 72% – a percentage which grew significantly during the final growth phase (77%).⁶

⁵ These values are close to those estimated by other authors, on the basis of the Permanent Household Survey, for the average semester between 1997 and 2002 (Paz, 2003; Pessino and Andrés, 2000).

⁶ Interestingly, the percentage of workers who stayed with the same firm remained relatively stable (70%), during both recessionary and expansionary years between 1996 and 2001. From 2002 onward, however, the percentage of workers remaining at the same firm increased. This was due both to falling dollar labour costs resulting from devaluation and increased dismissal costs (in January 2002, the *Ley de Emergencia Pública y Reforma del Régimen Cambiario No. 25,561* (Public Emergency and Exchange Rate Regime Reform Act No. 25,561) devalued the peso and, in response to the severe economic and social crisis afflicting the country, doubled dismissal compensation for all workers).

In aggregate terms, the percentage of workers who switched firms was somewhat lower than that of workers who exited registered wage labour. An analysis of the new jobs taken by workers who switched employers shows that only a third of them remained in the same field (according to the two-digit classification of activities in the International Standard Industrial Classification of All Economic Activities (ISIC), third revision). This suggests that the possibility of knowledge diffusion among firms through worker mobility was limited (table 2).

TABLE 2

Argentina: Labour transition rates for employed wage workers under 65 years of age registered by private firms in the manufacturing, commerce and services sectors – 1997-2004
(Percentages)

Transitions	1997-1998	1999-2002	2003-2004	Average, 1997-2004
Remained with the same firm	70	71	77	72
Switched firms	14	11	11	12
Switched firms within the same industry	4	4	4	4
Switched industries within the sector	4	3	3	3
Switched sectors	6	4	4	5
Remained in the SIJP	84	82	88	84
Exited the SIJP	16	18	12	16
Overall employment at <i>t-1</i>	100	100	100	100

Source: See table 1.

The participation of workers who switched employers while remaining within the formal system was procyclical, rising during growth periods and contracting during recessionary periods. This may be partly due to voluntary resignations by workers seeking to improve their income and working conditions. Such resignations are more likely to occur during the ascendant phase of the cycle; job opportunities are more scarce during recessionary periods, and workers behave more cautiously.

Our information source does not specify the ultimate fate, in labour terms, of workers who exited the SIJP. Supplementary information can be obtained, however, from other sources, such as the Permanent Household Survey. Between 1997 and 2002, most wage workers with social security benefits who exited the

system took wage jobs with no social security coverage, became unemployed or became inactive, in that order of importance. The proportion of workers who started their own businesses from one year to the next was very small (Paz, 2003).

Once the significant yearly percentage of workers of active age who exit jobs with social security coverage has been quantified, the probability of such persons re-entering the system in later years must be established. To that end, re-entry levels for workers who exited the system over the course of the seven years between 1996 and 2003 were estimated (table 3).

Firstly, from a structural standpoint, save for a few variations resulting from the economic cycle, returns to formal employment are more likely to occur up to one year after exiting the system. The chances of re-entry decrease after that point, perhaps because the most frequent job-seeking strategy is to rely on personal contacts and networks, which deteriorate over time. Firms prefer to hire workers who are in the market, rather than those who are unemployed. Generally speaking, taking into account the demographic factor, once seven years have passed, nearly 60% of workers fail to find registered employment in the manufacturing, commerce or services sectors, and are thus excluded from the social security system. The low probability of re-entry may be explained by the high rate of non-registration, the low share of registered wage labour in the overall employment structure and the weakness of job-placement institutions.

In addition, table 4 shows the percentage of persons who entered the system in 2003 and 2004, and were forced out of registered employment from 1996 onward.

TABLE 3

Argentina: Returns to registered employment among wage workers under 55 years of age who had exited private firms in the manufacturing, commerce and services sectors, 1996-2003
(Annual percentage rates)

Years elapsed after exiting the system	IV 1996	IV 1997	IV 1998	IV 1999	IV 2000	IV 2001	IV 2002	Average
	IV 1997	IV 1998	IV 1999	IV 2000	IV 2001	IV 2002	IV 2003	
1	20	18	18	15	13	21	22	18
2	8	9	7	6	12	12		10
3	5	5	4	7	9			6
4	3	2	5	7				4
5	2	4	5					4
6	2	4						3
7	3							2
Not yet re-entered	57	59	61	65	66	67	78	64
<i>Total exits</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>	<i>100</i>

Source: See table 1.

TABLE 4

Argentina: Re-entries into registered employment among wage workers under 55 years of age who had exited private firms in the manufacturing, commerce and services sectors: 2003-2004
(Annual percentage rates)

Years	Re-entries (in thousands)	Total entries (thousands)	Re-entries/ total entries
2003	251	675	37
2004	259	809	32
<i>Average</i>	<i>255</i>	<i>742</i>	<i>34</i>

Source: See table 1.

On average, setting aside firm changes, 34% of the persons entering registered employment during these two years were re-entrants. The remaining 66% were workers who had never held a registered job that lasted more than a year. A significant proportion of workers re-entering registered employment (25% in 2004 and 40% in 2003) had exited the system recently.

These results confirm that the new expansionary phase of employment which began in 2003 witnessed the re-entry of a small percentage of workers who, having held registered jobs during earlier periods, were forced into insecure jobs, unemployment or inactivity.

The high rate at which the system expelled workers of active age, year after year, coupled with the low chances of re-entering wage employment in the medium term, led to continuous career interruptions, the destruction of competencies and exclusion from employment covered by social security.

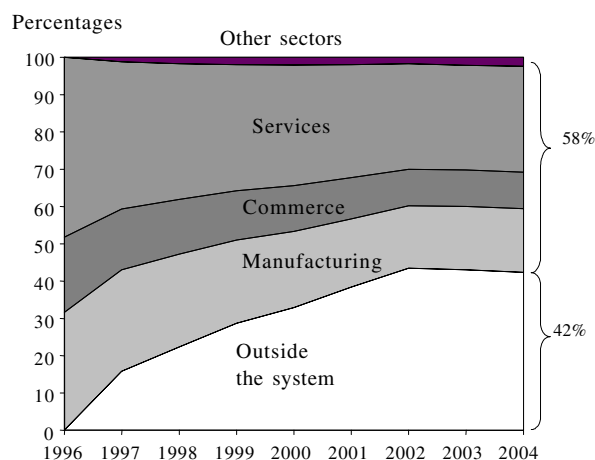
In order to measure the impact of these processes on the aggregate labour trajectories of workers in the medium term, we have studied the cohort of workers who were employed in manufacturing, commercial and services firms in 1996, and were under 55 years of age at the time.⁷ This analysis did not include workers who entered registered employment during subsequent years.

As of 2004, only 26% of the workers studied remained at the same firm, accruing eight years of seniority. Fifty-eight percent of those workers continued to hold registered jobs in the aforementioned sectors, either in the same activity or a different one (32% had switched firms). Forty-two percent had exited the system, taking insecure jobs or becoming unemployed or inactive, and beginning trajectories that might lead to exclusion (figure 1).

This trajectory can be specified for each of the sectors considered. In the manufacturing sector, especially, the proportion of wage workers of active age who remained employed was slightly higher than the proportion excluded from the system, while only 10% were able to re-enter commercial and service activities. This shows that the tertiarization of registered employment between 1996 and 2004 –understood as a decline in the share of manufacturing in overall employment, accompanied by an increase in the share of commerce and services– was a result of the substitution of new workers in the tertiary sector for the

FIGURE 1

Argentina: Intersectoral labour trajectories of cohort of workers under 55 years of age who were employed in 1996, 1996-2004



Source: See table 1.

wage workers who had been displaced in manufacturing, rather than the reconversion of manufacturing employment into service-sector employment. Finally, it is interesting to note that, in 2003, the curve of the manufacturing employment cohort began to change. This was a reflection of the slowing rate of expulsion of these manufacturing workers, as well as the return of some of the workers who had previously been displaced.

V

Segmentation of the labour market and labour stability

In the preceding section it was noted that the situation in Argentina differs from circumstances in other virtuous models, where mobility is high both within a given production cluster or local system and with respect to firms that are not part of the predominant form of organization. Here, the prevailing pattern of labour mobility was one of exclusion from the entrepreneurial structure and from classic labour relations.

This section deals with the question of whether mobility regimes and employment stability differ from the average in the primary sectors of the labour market.

⁷ Workers who were eligible for retirement at any point during the years studied were excluded from the cohort.

The period analysed was 1998-2004, which witnessed a deep, prolonged recession (1998-2002), followed by two years of recovery (2003-2004).

Over the last few decades, the economic literature has often used duration models for studies of issues relating to labour mobility, such as the probability of a worker remaining in a given job. These models explain such a probability from the standpoint of cumulative seniority and the special characteristics of individual workers⁸ (Lancaster, 1990).

⁸ Duration models describe the conditional probability that a given event will be completed. They are called duration models because they involve estimating an individual's survival in the

The administrative records used for this study, however, do not include complete information on the seniority of workers; this variable was constructed from the job duration observed after the records were created (in 1995).⁹ In other words, for the 1998 cohort of workers, cumulative seniority is known only from 1995 onward; because of this limitation, traditional duration models were not used. Consequently, two probit models were used to estimate both the probability of a worker's remaining in the same firm and the probability of his or her remaining in registered employment (table 5).

Among the possible variables, we chose the group with the best explanatory capacity in the numerous labour segmentation and mobility studies reviewed (see section I). The following characteristics of firms were taken into account: size, sector and seniority. As

regards the characteristics of workers, gender, age, wage level and seniority were analysed as substitutes for human capital (a dimension which is not included in the information source used), even though, as noted earlier, the relevance of duration is not based solely on its association with human capital.¹⁰

The sectors analysed were manufacturing, commerce and services. The performance of workers in the manufacturing sector is expected to be different from that of workers in the other two sectors. As noted in section III, during the second half of the 1990s, the macroeconomic environment of Argentina did not favour the development of the manufacturing sector. In fact, throughout the 1998-2004 period, the loss of 9% of manufacturing jobs pushed a significant number of former workers toward exclusion, as mentioned in

TABLE 5

Argentina: Probability of remaining in the SJP in 2004, 1998 cohort, workers under 55 years of age
(Probit estimate signs)

Variables	Remain with the same firm	Remain in the system (in the same firm or a different one)
Males (ref. females)	-	+
Ages (between 26 and 35 years of age)		
Under 25 years of age	-	+
Between 35 and 55 years of age	+	-
Remuneration (ref. high medium)		
Low	-	-
Low medium	-	-
High	+	+
Job seniority (ref. 1 and 2 years)		
No seniority (outside the firm)	-	-
No seniority (within the firm)	-	+
Three years or more	+	+
Sector (ref. services)		
Manufacturing	+	-
Commerce	-	-
Size of firm (ref. medium)		
Large	+	-
Small	-	-
Microenterprises	-	-
Firms established before 1990 (ref. new)	+	+

Source: See table 1.

cycle and the risk of the cycle ending, based on observations of the duration of an event, following a cumulative distribution function.

⁹ In other words, for the 1998 cohort of workers selected for this exercise, known initial seniority is annotated as follows: three years or more, two years, one year, and newly hired.

¹⁰ These variables, as well as others that were excluded from the analysis due to limitations in the information source used, have been emphasized in most of the literature discussed in the second section. The structure of demand and the development of technological competencies on the part of firms are some of the levels affecting the aforementioned transitions which were not included in the analysis.

section IV. During the same period, the commerce and services sectors performed better, experiencing a 9% increase in employment.

Hypothesis: Based on the change in sectoral distribution of employment (tertiarization), manufacturing workers –particularly those with lower levels of skills (or labour status)– are expected to show greater mobility, following the rationale of the vacancy chains mentioned in section II. Stays at a single firm should be shorter, given that the labour demand of the sector was contracting. Inclusive mobility (the probability of reconversion to other sectors) should be lower, especially among older workers, since their profiles are less diversified and their average level of schooling is lower than the mean for the economy.

Firms have been classified in four strata (large, medium-sized, small and microenterprises), based on the number of persons they employed during the baseline year of the study (1998).

Hypothesis: Stays at the same firm are expected to be more likely in large firms, since those organizations offer career development opportunities within the firm (inward markets), particularly for primary-sector workers. Outward mobility among such workers in large firms is usually selective, and tends to mean that they will continue their careers at other firms.

In addition, throughout the period studied, firms in Argentina had a high mortality rate. This was especially true of firms that were smaller, in relative terms. Employment relationships became more difficult to maintain, as the firm's chances of survival decreased. The literature on job creation and destruction suggests that job rotation decreases with the size of the agents involved (Davis, Haltiwanger and Schuh, 1997; Castillo, Cesa and others, 2002; Castillo, Ferlan and others, 2005; OECD, several years).

From the standpoint of a firm's structure, its age –counted from the first year of the study– is a variable that helps to explain the duration and exit rates of its workers. The variable is incorporated in two segments. The first was made up of very young firms –those founded after 1990– which were less than eight years old in 1998 and had lower chances of survival than older firms. The other segment included old, well-established firms with a higher chance of survival. The literature suggests that a substantial part of employment mobility can be explained by the relatively short life span of start-up firms that are replaced by new ones, many of which will also probably be short-lived (Dunne, Roberts and Samuelson, 1988; Castillo, Cesa and others, 2002).¹¹

Hypothesis: In other words, the probability of remaining in the same firm is expected to be higher for older firms than for new firms, since the probability of surviving a recession is higher for older firms.

This set of dimensions may show that job duration depends on the stability of the firms in the market, as well as on their size, sector and age. These features are usually associated with the profile of agents that have greater technical competencies.

From the standpoint of labour market segmentation based on the personal characteristics of workers, gender and age are included –taken from the first year of the study– in three segments.

Hypothesis: Job stability is expected to be lower for the segment made up of younger workers, since they have not accumulated the necessary competencies to be included among primary workers. Their intersectoral labour mobility is expected to be high, however, since they have not yet acquired specific skills during their careers. Similarly, older segments are expected to remain in the firm longer and have a lower rate of outward mobility.

The literature indicates that women tend to be concentrated in secondary sectors of the labour market, with less secure jobs and fewer prospects for upward mobility.

Hypothesis: Women are expected to enjoy less labour stability.

Another variable that seems to have a positive correlation with the probability of remaining at a firm and in the system is that of seniority, counted from the first year of the study. Studies on the probability of remaining at the same job based on seniority have shown a positive correlation between stability and seniority in the United States and certain European countries. While most jobs have a limited duration, workers who last more than five years at a job will very

¹¹ In addition to the results of the model, it is interesting to note that two thirds of wage workers who, as of 1998, were working in firms that shut down were forced out of the system, regardless of the sector in which they worked. Moreover, slightly less than one third of those who worked in firms that closed remain in the sector, with less weight in commerce and manufacturing. On the other hand, the proportion of wage workers who exit the system in “continuing” firms is lower. The low re-entry level of workers from firms that close highlights the need to not only promote the creation of new firms, but also, more importantly, to achieve significantly higher survival rates than those which currently prevail among new firms. From that standpoint, in an economy with a high rate of structural unemployment, it is not enough, as studies of firm creation usually argue, for the birth rate to be higher than the death rate.

likely remain there (Hall, 1982; Mertens, 1999). This is consistent with the theories of human capital and with neo-Schumpeterian theories of competency creation. As far as workers who lacked seniority in 1998 are concerned, a distinction is made between those who entered the firm that year after switching employers and those who entered the firm with no prior experience in registered employment.

Hypothesis: The probability of remaining at a job is expected to be higher for workers coming from other firms than for those who have not participated in registered employment.

The source used does not include information on the level of schooling or the level of skills of workers, both of which are described in the literature as determinants of the probability of remaining at a job. To compensate for this shortcoming in the model, the quintile of remuneration received by workers was used as an alternative variable for their skill level, given that, in the Argentine labour market, the level of remuneration increases with the level of skills.

Hypothesis: Labour stability is expected to be higher among workers who are better paid and have more skills. Inclusive, upwardly mobile labour patterns are also expected.

The main results are shown in table 5.

All of the variables were individually and globally significant, and in almost all cases the signs obtained were as expected (see Appendix B).

Using the services sector as a benchmark, the probability of remaining in the same job was found to be higher in manufacturing and lower in commerce. This was not expected. It suggests that the decline in manufacturing employment is due to the fact that a large share of jobs that had been destroyed were not replaced by new jobs, even though manufacturing had a higher job-retention rate. The duration of manufacturing workers in the registered employment system was lower than in services, however; this suggests that once a job has been lost, re-entry is unlikely. The probability of remaining in the same firm is higher for workers in large firms and lower for small and medium-sized firms, taking medium-sized firms as the benchmark. Workers from medium-sized firms are, however, more likely to remain in registered employment. As expected, both the probability of remaining in the same firm and that of remaining in the system was higher for workers from older firms (established before 1990) than it was for those from younger firms.

The characteristics of workers also suggest different transition probabilities. As expected, the probability of

remaining in the firm is lower among younger workers (under 25 years), compared to the next age group (26-35 years), and higher for the age group of 36-55 years. Also as expected, however, young people have a higher probability of remaining in the system—that is, of moving to other firms after exiting a job. Contrary to expectations, women are more likely to remain in the same firm than men. They are less likely than men to remain in registered employment, however, since they find reinsertion into other firms more difficult. Workers with more than three years of seniority on the job have a greater probability of remaining, both at the same firm and in registered employment, than those with less seniority. In the case of workers with no seniority, those who entered the firm from another firm have a greater probability of remaining in registered employment than workers with little seniority. Finally, the probability of remaining at the same firm or in the formal sector is greater among workers with high remuneration (compared with high-middle-income workers) and is lower in all other cases. This shows that firms are more interested in keeping higher-paid workers, who are usually believed to possess a higher level of human capital and to have accumulated more technical competencies throughout their careers.¹²

In other words, the labour market is segmented, both in terms of the profile of employed workers and in that of the firms where they work. This is evident in job stability and in the possibility of following mobility patterns other than those that entail exclusion from registered employment.

In section IV we showed that, on average in the economy, only 32% of workers remained in the same firm between 1998 and 2004. Following is an estimate of the probability of remaining in the same job for a set of agents similar to those in the primary sector of the Argentine labour market.

This sector was defined as that of workers employed in large firms in the manufacturing industry or the services sector that had been in the market for more than eight years, and had remained there throughout the serious recession. The primary sector of workers of these firms was also taken into account;

¹² Similarly, continuity at a firm is associated with starting wage levels. While only 13% of lower-income workers remain at the same firm, this percentage rises to 36% among those earning relatively higher wages. These trends are stronger in the services and manufacturing sectors. Moreover, the proportion of wage workers who exit the system is inversely related to the starting wage level of workers, while the rate of transition to other firms in the sector or in other sectors is not associated with original wage levels.

these were defined as those workers with high and high medium wage levels and more than three years of seniority at the firm. In order to determine whether workers in the primary sector of the market enjoyed greater labour stability, the above model was applied, using the aforementioned variables but taking into account the panel of surviving firms. The signs obtained were the same as those of the previous model, except for the size variable. In that case, wage workers at relatively smaller firms are the most likely to remain. This underscores the negative effect which the exit of firms from the structure has on labour trajectories (see again Appendix B).

The results obtained suggest that job stability is considerably higher (67%) for these workers than it is on average (32%). This analysis also shows that job seniority and the level of remuneration (a variable employed as an alternative for human capital), which are dimensions pertaining to the definition of the primary sector of workers, contribute the most to increasing stability (table 6).

These results show that greater development of technical competencies may be associated with greater labour stability, even in an overall environment in which employment stability is low and mobility usually leads to exclusion from employment.

TABLE 6

Argentina: Elasticities. Probability of remaining at the same firm in 2004, 1998 cohort, workers under 55 years of age. Workers with high medium and high remuneration; with three or more years of seniority, large firms in manufacturing and services that have lasted more than eight years, survivors

Variables	Probability 67%	
	Sign	Elasticity (%)
Remuneration (ref. low medium)		
Low	–	–9.5
High medium	+	5.3
High	+	6.8
Job seniority (ref. 1 and 2 years)		
No seniority (outside the firm)	–	–14.9
No seniority (within the firm)	–	–5.1
3 years or more	+	17.9
Sector (ref. commerce)		
Manufacturing	+	2.4
Services	+	2.9
Size of firm (ref. medium)		
Large	–	–4.2
Small	+	2.5
Microenterprises	+	5.6
Age of firm		
Prior to 1990	+	1.8

Source: See table 1.

VI

Conclusions

This paper studied the mobility of registered wage employment in Argentina among private manufacturing, commerce and services firms between 1996 and 2004, using transitions and labour mobility to examine the flows of workers who entered or exited registered employment, remained with the same employer or switched employers.

The magnitude and pattern of labour mobility cannot be analysed without taking into account the production structure and the macroeconomic environment of the period, which was characterised by severe instability. This instability manifested itself in the labour market in the form of high unemployment and the emergence of a large sector of wage employment outside of the social security system. The economic cycle was strongly felt during this period; between 1998 and 2002, the economy experienced a serious, prolonged recession, which resulted in the loss of 11% of private-sector jobs in the manufacturing, commerce and services sectors.

Labour mobility among Argentine workers has been high over the last eight years. The mobility rate, which includes both movement originating with the creation and destruction of jobs and that caused by the substitution of other workers for those who have left their jobs, reached a yearly average of 39%. This mobility manifested itself in the form of low job stability. Thus, of the cohort of persons under 55 years of age who were registered wage workers in the private manufacturing, commerce and services sectors in 1996, only 26% remained with the same employer in 2004.

This low job-retention rate among firms is consistent with the limited development of technological competencies and innovation during the convertibility period (Bisang, Lugones and Yoguel, 2002; Bisang, Sztulwark and Yoguel, 2004; Erbes, Motta and others, 2005), and presumably afterward, given the inertial nature of these processes.

The magnitude of labour mobility is not the only issue of interest; the impact of these processes on production and society can also be evaluated based on the prevailing pattern such mobility assumes. In Argentina, during the period studied, the dominant pattern was exclusion from the labour market; 46% of the cohort of workers who were registered in 1996 were excluded from registered wage employment in 2004 –that is, they held unregistered jobs, or were unemployed, or were inactive. Only 29% of workers were able to continue their careers at other firms. Consequently, the prevailing mobility regime, which was exclusionary, hindered the diffusion of knowledge through worker migration within the production structure.

In this general environment, however, strong evidence of labour market segmentation was found. This segmentation was based both on the heterogeneity of firms and the profile of workers. In primary sectors, employment is more stable, and mobility may adopt virtuous patterns characterised by knowledge diffusion, which increases firm productivity, and upwardly mobile trajectories for workers. Firms in the primary sector of the labour market are also the most advanced in terms of technological competencies, according to the industry surveys conducted in the country.

These specific results lead to a final question regarding the specialization profile which the Argentine economy has been adopting over the course of the last thirty years, particularly during the 1990s. Is this significant level of worker mobility the result of a productive profile which specializes in the intensive use of commodities and natural resources, and has become progressively more precarious from the standpoint of its place in the production chain, as well as the significant role of imported components with a higher knowledge content?

APPENDIX A

Construction of a panel of labour trajectories: transition and dynamics indicators

In order to construct a register of jobs with which to study labour trajectories, a list of all possible firm/person combinations was developed, using the Unified Labour Identification Codes (CUIL) and the Unified Tax Identification Codes (CUIT) listed in the SUP during the period studied. This register summarizes the employment history of workers, from general data and personal information to the characteristics of each firm. The general information section lists the firms that currently employ (2003) and have employed (1995) each worker during the period in question, the total number of persons employed each year by each firm, the dates on which each employment relationship began and ended (total duration) and individual remuneration in each case. The personal information section lists the age and sex of each worker. The section on firm characteristics states the type of activity performed by each firm, according to the two-digit classification used by the International Standard Industrial Classification of All Economic Activities (ISIC, third revision), and specifies the age of each firm, its size,¹³ the average wage quintile to which it belongs, its survival/rotation and whether it is public or private.

A panel detailing total quarterly gross remuneration was also constructed for each job. The development of the panel entailed the following: (i) choosing which months of the year would be used to measure remuneration;¹⁴ (ii) estimating remuneration¹⁵ and (iii) eliminating non-valid values.¹⁶

¹³ In order to classify agents in each category according to size, a fixed annual sales figure was used for each stratum (micro, small, medium and large). Consequently, the interval of employed persons varies for each category of activity.

¹⁴ In order to accommodate the seasonal nature of the statutory year-end bonus (SAC), average remuneration for March, April and May was used as the basis for calculation. Calendar quarters were not used; since the SAC may be paid in June, July, December or January, it may affect all calendar quarters, thereby creating distortions when wages are compared at two different points in time, depending on the month involved.

¹⁵ Income subject to social security taxation was excluded, since it has a cap (US\$ 4,800) which would lead to wages being underestimated, particularly in certain sectors. The other potentially useful variable for determining wages is total gross remuneration. This includes total compensatory payments, severance pay and months off, which would distort the estimate. This problem was addressed by excluding the first and last times a Unified Labour Identification Code (CUIL) was declared, and using only the months in between.

¹⁶ Lost values (null remuneration) were identified and excluded from the estimate. Consequently, quarterly averages were calculated on the basis of March, April and May, excluding the first and last declaration of each CUIL and using the valid values in the system. An even better approach is to eliminate entries with monthly wages of less than 50 pesos.

The register of workers and the remuneration panel were used to plot labour trajectories, based on the type of activity that generated the most income for a worker. The tracking methodology employed eliminated false lows and highs among the total number of firms opening and closing.

In order to observe the movements of workers between firms, categories and sectors, gross flows indicating status changes or transitions among the individuals studied were estimated. The panel data on trajectories were organized using transition matrices that show the status changes involved.

Two separate transition matrices can be established for activity categories and sectors. These matrices provide an assessment of the status changes being analysed. Horizontal quotients can be calculated to obtain the so-called transition rates that measure the proportion of persons migrating from a firm, a category or a sector to a different status, as well as the duration rate, which indicates the percentage of persons remaining at a firm or within a category or sector.

$$TT = (X_{12} + \dots + X_{1n}) / X_{1,t-1}$$

$$TP = X_{11} / X_{1,t-1}$$

where TT is the transition rate and TP is the duration rate.

The matrix provides a mobility rate (TM) which indicates the percentage of persons switching firms, and is defined as follows:

The number of employed persons is represented by the letter x and the sub-indices 1, 2, ..., and n is used to enumerate firms. Consequently, the formal labour market at two different points in time ($t-1$ and t) can be represented using the following Unified Tax Identification Code (CUIT) transition matrix, where X_{ij} represents wage workers who worked at firm i at $t-1$ and work at firm j at t .

$$TM = 1 - (X_{11} + \dots + X_{nn}) / X$$

The entry rate (TE), the exit rate (TS) and the replacement rate (TR) are defined as follows:

$$TE_1 = (X_{21} + \dots + X_{n1}) / X$$

$$TS_1 = (X_{12} + \dots + X_{1m}) / X$$

$$TR_1 = TE_1 / TS_1$$

Both entries and exits can be broken down as entries (exits) from the system, firm changes within a category, category changes within a sector and sector changes.

TABLE A.1

Argentina: Transition matrix of employer changes
(Unified Tax Identification Code (CUIT))

		Employer at t				Displaced from the SJP	Total
		Cuit t_1	Cuit t_2	...	Cuit t_n		
Employer at $t-1$	Cuit t_1	X_{11}	X_{12}	...	X_{1d}	X_{1d}	$X_{1\ t-1}$
	Cuit t_2	X_{21}	X_{22}	...	X_{2n}	X_{2d}	$X_{2\ t-1}$

	Cuit t_3	X_{n1}	X_{n2}	...	X_{nn}	X_{nd}	$X_{n\ t-1}$
	Incorporated in the system	X_{ji}	X_{j2}	...	X_{jn}		X_j
	Total	X_{1t}	X_{2t}	...	X_{nt}	X_d	X

APPENDIX B

Probit model estimates (developed using STATA)

Model 1: Probability of remaining in the same firm in 2004 for the cohort of 1998 workers under 55 years of age

Number of observations	=	3 128 757
LR chi ² (15)	=	348 411.94
Prob > chi ²	=	0.0000
Pseudo R ²	=	0.088
Maximum likelihood	=	-1 788 936.6

Dichotomous variables	Coefficient	Standard error	z	$P > z$	Confidence interval 95%	
Males	-0.1166359	0.0017043	-68.44	0.000	-0.1199763	-0.1132955
Under 25 years of age	-0.1220224	0.0023494	-51.94	0.000	-0.1266271	-0.1174177
Between 36 and 55 years of age	0.1077425	0.0017301	62.28	0.000	0.1043516	0.1111334
No seniority (outside the firm)	-0.3491746	0.0022242	-156.99	0.000	-0.3535340	-0.3448152
No seniority (within the firm)	-0.1940453	0.0042257	-45.92	0.000	-0.2023276	-0.1857631
Three years of job seniority or more	0.3421145	0.0019610	174.46	0.000	0.3382710	0.3459580
Low remuneration	-0.3724984	0.0024342	-153.02	0.000	-0.3772694	-0.3677274
Low-medium	-0.1476501	0.0021938	-67.30	0.000	-0.1519497	-0.1433504
High	0.0570613	0.0021263	26.84	0.000	0.0528939	0.0612287
Large firms	0.0137431	0.0020980	6.55	0.000	0.0096311	0.0178551
Small firms	-0.0525585	0.0024430	-21.51	0.000	-0.0573466	-0.0477704
Microenterprises	-0.1056150	0.0029524	-35.77	0.000	-0.1114016	-0.0998284
Manufacturing	0.0285696	0.0018454	15.48	0.000	0.0249528	0.0321865
Commerce	-0.0567523	0.0021240	-26.72	0.000	-0.0609152	-0.0525893
Firms established before 1990	0.1582080	0.0017566	90.07	0.000	0.1547652	0.1616508
Constant	-0.4428057	0.0029508	-150.06	0.000	-0.4485892	-0.4370222

Goodness of fit

$c = 0.5$. If the probability predicted exceeds c , the worker remains; if not, the worker is displaced.

Prediction	Observed value		Total
	0	1	
0	1 864 297	694 726	2 559 023
1	260 837	308 897	569 734
<i>Total</i>	<i>2 125 134</i>	<i>1 003 623</i>	<i>3 128 757</i>

Accuracy ratio: 69%

Model 2: Probability of remaining in the same firm in 2004 for the cohort of 1998 workers under 55 years of age

Number of observations	=	3 128 757
LR chi ² (15)	=	168 415.78
Prob > chi ²	=	0.0000
Pseudo R ²	=	0.0401
Maximum likelihood	=	-2 013 459.5

Dichotomous variables	Coefficient	Standard error	z	P>z	Confidence interval 95%	
Males	0.0470104	0.0016046	29.30	0.000	0.0438655	0.0501553
Under 25 years of age	0.0440610	0.0020886	21.10	0.000	0.0399675	0.0481546
Between 36 and 55 years of age	-0.0659239	0.0016878	-39.06	0.000	-0.0692319	-0.0626160
No seniority (outside the firm)	-0.2371862	0.0019719	-120.28	0.000	-0.2410510	-0.2333214
No seniority (within the firm)	0.0369355	0.0038739	9.56	0.000	0.0293427	0.0445282
Three years of job seniority or more	0.1854828	0.0019392	95.65	0.000	0.1816821	0.1892835
Low remuneration	-0.3529746	0.0022149	-159.36	0.000	-0.3573157	-0.3486334
Low medium	-0.1383586	0.0021093	-65.59	0.000	-0.1424928	-0.1342244
High	0.0742079	0.0021613	34.34	0.000	0.0699719	0.0784439
Large firms	0.0153469	0.0020121	7.63	0.000	0.0114032	0.0192906
Small firms	-0.0675980	0.0022855	-29.58	0.000	-0.0720774	-0.0631186
Microenterprises	-0.1580432	0.0026832	-58.90	0.000	-0.1633023	-0.1527842
Manufacturing	-0.0665868	0.0017828	-37.35	0.000	-0.0700810	-0.0630926
Commerce	-0.1152796	0.0019699	-58.52	0.000	-0.1191406	-0.1114186
Firms established before 1990	0.0556851	0.0016618	33.51	0.000	0.0524279	0.0589422
Constant	0.4002829	0.0028442	140.74	0.000	0.3947083	0.4058575

Goodness of fit

$c = 0.5$. If the probability predicted exceeds c , the worker remains; if not, the worker is displaced.

Prediction	Observed value		Total
	0	1	
0	367 883	278 445	646 328
1	864 439	1 617 990	2 482 429
<i>Total</i>	<i>1 232 322</i>	<i>1 896 435</i>	<i>3 128 757</i>

Accuracy ratio: 63%

Model 3: Probability of remaining in the same firm in 2004 for the cohort of 1998 workers under 55 years of age, probit estimates.

Surviving firms

Number of observations	=	2 238 630
LR chi ² (15)	=	249 809.98
Prob > chi ²	=	0.0000
Pseudo R ²	=	0.0811
Maximum likelihood	=	-1 414 810.6

Dichotomous variables	Coefficient	Standard error	z	P>z	Confidence interval 95%	
No seniority (outside the firm)	-0.3868891	0.0024747	-156.34	0.000	-0.3917394	-0.3820389
No seniority (within the firm)	-0.1369946	0.0047960	-28.56	0.000	-0.1463946	-0.1275946
Three years of job seniority or more	0.4619812	0.0021798	211.94	0.000	0.4577088	0.4662535
Low remuneration	-0.2508602	0.0027529	-91.13	0.000	-0.2562558	-0.2454646
High medium	0.1436496	0.0025084	57.27	0.000	0.1387333	0.1485660
High	0.1812021	0.0026476	68.44	0.000	0.1760130	0.1863912
Large firms	-0.1204136	0.0023421	-51.41	0.000	-0.1250040	-0.1158231
Small firms	0.0701340	0.0028471	24.63	0.000	0.0645538	0.0757142
Microenterprises	0.1607260	0.0036038	44.60	0.000	0.1536628	0.1677893
Manufacturing	-0.0159479	0.0020295	-7.86	0.000	-0.1199256	-0.0119702
Commerce	-0.0817416	0.0024125	-33.88	0.000	-0.0864701	-0.0770132
Firms established before 1990	0.0495516	0.0019961	24.82	0.000	0.0456393	0.0534639
Constant	-0.2544375	0.0030310	-83.95	0.000	-0.2603782	-0.2484969

Goodness of fit

$c = 0.5$. If the probability predicted exceeds c , the worker remains; if not, the worker is displaced.

Prediction	Observed value		Total
	0	1	
0	874 860	427 660	1 302 520
1	360 172	575 938	936 110
<i>Total</i>	<i>1 235 032</i>	<i>1 003 598</i>	<i>2 238 630</i>

Accuracy ratio: 65%

Marginal effects

Workers with high medium and high remuneration and three or more years of seniority on the job. Large firms in manufacturing and services that have lasted more than eight years, survivors

$$\begin{aligned} \text{Marginal effects after probit} \\ y &= \text{Pr}(\text{dtr98_05}) \text{ (prediction)} \\ &= 0.67205166 \end{aligned}$$

Dichotomous variables	dy/dx ^a	Std.	Err.	z	P>z	Confidence interval 95%	
No seniority (outside the firm)	-0.1486486	0.0010000	-148.67	0.000	-0.1506080	-0.1466890	0.0000000
No seniority (within the firm)	-0.0508680	0.0018300	-27.87	0.000	-0.0544450	-0.0472910	0.0000000
Three years of job seniority or more	0.1785923	0.0008600	206.90	0.000	0.1769000	0.1802840	1.0000000
Low remuneration	-0.0948557	0.0011200	-84.84	0.000	-0.0970470	-0.0926640	0.0000000
High medium	0.0534021	0.0009100	58.69	0.000	0.0516190	0.0551860	1.0000000
High	0.0677939	0.0009700	69.85	0.000	0.0658920	0.0696960	1.0000000
Large firms	-0.0422511	0.0008000	-52.61	0.000	-0.0438250	-0.0406770	1.0000000
Small firms	0.0249232	0.0009900	25.12	0.000	0.0229780	0.0268680	0.0000000
Microenterprises	0.0557944	0.0011900	46.96	0.000	0.0534660	0.0581230	0.0000000
Manufacturing	-0.0057404	0.0007300	-7.86	0.000	-0.0071730	-0.0043080	1.0000000
Commerce	-0.0300390	0.0009100	-33.18	0.000	-0.0318130	-0.0282650	0.0000000
Firms established before 1990	0.0180917	0.0007400	24.56	0.000	0.0166480	0.0195350	1.0000000

^a dy/dx indicates a discrete change in the dummy variable from 0 to 1.

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Poverty dynamics in Costa Rica with panel data from cross-sections

Pablo Slon and Edwin Zúñiga

An analysis of the dynamics of poverty requires longitudinal data. In Costa Rica, as in most Latin American countries, such data are unavailable. In order to examine the dynamic aspects of poverty, this article uses cross-sectional information to develop a set of panel data. Given a stable macroeconomic environment and a constant poverty rate, these data show that the poor households studied over a three-year period were not always made up of the same units, as significant turnover rates were found to exist between the poor and the non-poor.

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I

Introduction

In order to study the dynamics of poverty, this article employs a methodology which uses observations from a cross-sectional survey to build a set of panel data. The successive samples of this survey are not independent.

The effort to combat poverty in Latin America between 1999 and 2002 was marked by a stalled poverty rate (ECLAC, 2004). Costa Rica was no exception; for almost a decade, beginning in 1994, the poverty rate held more or less steady at around 20% of households. In addition to a flat poverty rate, GDP growth between 2000 and 2002 was 1.8%, 1.0% and 2.9% – relatively stable figures – and inflation remained relatively steady as well, at 10.25%, 10.96% and 9.68%. This raises a number of questions. To what extent do poor households in Costa Rica consistently correspond to the same units? Is there a turnover rate between the poor and the non-poor, characterized by an underlying stratum of chronically poor households? And if so, what is the level of this turnover rate, what is the magnitude of chronic poverty, and what are the main determining factors in each case?

The study of the dynamics of poverty focuses on the evolution of poverty over time. Typical issues in

this field include the nature and determinants of changes in the poverty status of households over time, or the duration of poor or non-poor spells among the individuals who comprise a social cluster. This approach to the study of poverty has produced original concepts and terms, such as: “transitions”, “chronic poverty”, “transitory poverty”, “persistent poverty”, “occasional poverty” and “poverty spells”. A “transition” is a change in the poverty status of a household or an individual. “Chronic poverty” occurs when a household or individual remains poor for a period equal to or greater than an arbitrarily established benchmark value. “Transitory poverty” is a state of poverty in which a transition to non-poor status is experienced within a relatively short period of time. “Occasional poverty” is defined as poverty which occurs episodically within a given time frame. A “poverty spell” can be defined as poverty experienced during a given period of time.

The purpose of this article is to analyse certain aspects of the dynamics of poverty in Costa Rica, while also disseminating a methodological alternative for the development of the panel data set needed to achieve that objective, using information gathered through a cross-sectional survey.

II

The dynamic approach to poverty analysis

Dynamic analyses focus on the evolution of variables over time. In the case of poverty, such analyses study trends in the poverty status (poor or non-poor) of each individual or household comprising a population over a given time period.

Data on the evolution of the poverty status of a group of individuals or households can be used to generate information on the flows of variables that account for net changes in the pool of variables usually employed to characterize poverty at a given point in

time. Consequently, while a static analysis provides information on the number of poor individuals at two successive moments in time, a dynamic analysis explains how one situation evolved into another and indicates how many persons remained poor after the change, how many exited poverty, how many were non-poor and entered poverty, and how many were non-poor at both points in time.

Dynamic studies of poverty seek not only to quantify the explanatory flows of changes in variable pools, but also to determine their possible causes. Consequently, the databases used by such studies are not limited to poverty status, but also include other socio-economic and demographic variables, measured

□ This article is based on the research of Slon and Zúñiga (2004).

at successive points in time –for example, age, sex, relationship to the head of household, schooling or education, type of economic activity and income.

A dynamic analysis of poverty therefore requires a set of observations regarding a certain number of variables, for the same group of individuals, at two or more points in time. Such data sets are known as panel data, or simply as panels.

The observations that make up a panel are of the X_{ijt} type, where i represents a variable or characteristic, such as the number of individuals in a household, monthly income, or some other item ($i = 1, 2, 3, \dots, K$), j represents a unit of analysis, such as a household, an individual, or some other item ($j = 1, 2, 3 \dots N$), and t represents the period covered by the information ($t = 1, 2, 3, \dots, T$). In panel terminology, every data set that matches one of the T moments which make up a panel is known as a “wave”. Each wave of the panel is a cross-section.

According to Deaton (1997), Baltagi (1995), and Buck, Ermisch and Jenkins (1995), the advantages of panel data include their ability to show changes in the magnitudes displayed by individual households in a survey, as well as the greater accuracy they provide when estimates of aggregate quantities or averages are required. Disadvantages cited by these authors include the fact that, for whatever reason, some households are lost from a survey as time goes by. This phenomenon is known as “attrition”. Panel design, the ability or failure to follow up on individuals who leave their original household or move out of the original survey area, and non-response all play a role in this regard.¹ Furthermore, panel data involve short time series which may be prone to bias (due to attrition and the small size of sub-groups after attrition), which lose members to the general population and which are more sensitive to the response margin.

Longitudinal surveys spanning long periods of time are conducted in some developed countries. These surveys are specifically designed to obtain panel data for the study of socio-economic phenomena. One such survey is the Panel Study of Income Dynamics (PSID), conducted by the Survey Research Centre of the University of Michigan (United States). According to Baltagi (1995), this survey began in 1968 with 4,802 families.

According to Deaton (1997), however, panel surveys in general are rare, particularly in developing countries. The dynamics of poverty in these countries

have been studied using data from short-term panels, with small samples or samples constructed by reconciling cross-sectional survey data through one or another method for the identification of recurrently selected individuals or households.²

The dynamics of poverty can be analysed using several different types of tabulations derived from panel data. One such method uses transition matrices. These are square matrices consisting of rows, which represent the possible categories or ranges of variation of a variable or feature of interest over a given period of time, and columns, which represent these same categories or ranges of variation, in the same order, at a later period. Thus, the components of the matrix represent the number of cases or percentages of a population that have experienced change between one period and the next.

If a stationary population³ is classified according to the evolution of the poverty status of its households, as follows:

Π_{pp} = number of households that are poor at $t = 0$ and $t = 1$

Π_{pn} = number of households that are poor at $t = 0$ and non-poor at $t = 1$

Π_{np} = number of households that are non-poor at $t = 0$ and poor at $t = 1$

Π_{nn} = number of households that are non-poor at $t = 0$ and $t = 1$

then the following table can be constructed:

TABLE 1

Transitions in the poverty status of households between $t = 0$ and $t = 1$

Poverty status at $t = 0$	Poverty status at $t = 1$		
	Poor	Non-poor	Total
Poor	Π_{pp}	Π_{pn}	P_0
Non-poor	Π_{np}	Π_{nn}	N_0
Total	P_1	N_1	Π

Source: Data compiled by the authors.

In the table shown above, P_1 represents the total number of households that were poor at $t = 1$; N_1 represents the total number of households that were

² In Latin America, the work of Herrera (2001) and Paz (2002) should be noted in this regard.

³ A population is said to be stationary if it consists of a group of units of analysis whose composition does not change over time.

¹ Roberts (2000) explains attrition in similar terms.

non-poor at $t = 1$; and P represents the overall number of households.

The fields containing the terms Π_{pp} , Π_{pn} , Π_{np} and Π_{nn} , in the shaded section of the table, constitute the transition matrix of poverty between time points $t = 0$ and $t = 1$. A poverty transition matrix shows the number of households that have been poor and non-poor in each period, as well as the number of households that have exited and entered poverty. The elements inside the main diagonal pertain to households that remain poor, while those outside show the number of households that have migrated from one status to another.

These transition matrices are usually presented in relative terms, so that percentages can be assigned to their components. Thus, for example, each one of the Π_{pp} , Π_{pn} , Π_{np} and Π_{nn} components of the matrix shown above can be divided by Π to determine the share of each one of the four possible types of transition. If the results are represented as π_{pp} , π_{pn} , π_{np} and π_{nn} , respectively, the transition matrix, in relative terms, would be as follows:

TABLE 2
Transitions in the poverty status of households between $t = 0$ and $t = 1$

Poverty status at $t = 0$	Poverty status at $t = 1$		
	Poor	Non-poor	Total
Poor	π_{pp}	π_{pn}	H_0
Non-poor	π_{np}	π_{nn}	$1 - H_0$
Total	H_1	$1 - H_1$	1

H_0 and H_1 represent poverty rate indices⁴ at $t = 0$ and $t = 1$, respectively, since $H_0 = P_0/\Pi$ and $H_1 = P_1/\Pi$.

One common variation in such transition matrices is to present them in relative terms, but in such a way as to match the elements in the first row with the percentages observed in poor households at $t = 0$, depending on whether they were poor or non-poor at $t = 1$, and those in the second row with the percentages observed in non-poor households at $t = 0$, depending on whether they were poor or non-poor at $t = 1$. The following definitions can then be formulated:

Hence, λ_{pp} is the proportion of poor households at $t = 0$ that remain poor at $t = 1$, λ_{pn} is the proportion of poor households at $t = 0$ that are non-poor at $t = 1$, λ_{np}

is the proportion of non-poor households at $t = 0$ that are poor at $t = 1$, and λ_{nn} is the proportion of non-poor households at $t = 0$ that are non-poor at $t = 1$.

The transition matrix can then be reformulated as shown in table 3.

TABLE 3
Transitions in the poverty status of households between $t = 0$ and $t = 1$

Poverty status at $t = 0$	Poverty status at $t = 1$		
	Poor	Non-poor	Total
Poor	λ_{pp}	λ_{pn}	1
Non-poor	λ_{np}	λ_{nn}	1

In the matrix shown above, λ_{pn} represents what is usually referred to as the poverty exit rate, which may be understood as the (conditional) probability that a household may not be poor in one year, having been poor the year before. Similarly, λ_{np} represents what is known as the poverty entry rate, which may be understood as the (conditional) probability that a household may be poor in one year, having been non-poor the year before.

Similarly, λ_{pp} represents the duration of poverty, which is the (conditional) probability that a household will remain poor in one year, having also been poor the year before. λ_{nn} represents the duration of non-poverty, which is the (conditional) probability that a household will remain non-poor in one year, having also been non-poor the year before.

It should be noted that $\lambda_{pn} = 1 - \lambda_{pp}$, and $\lambda_{np} = 1 - \lambda_{nn}$. Moreover, the poverty rate, in a stationary population where poverty exit and entry rates remain constant over time, tends to approach the value $H^* = I/[1 + (\lambda_{pn}/\lambda_{np})]$, which is known as the headcount or stationary status index.

If the poverty and non-poverty duration and exit rates that comprise a poverty transition matrix are interpreted as the conditional probabilities that a household (or individual) in a stationary population will experience a transition, having been poor at an earlier point in time, then the poverty status of households (or individuals) describes what is known as a first-order Markov process or chain.

In addition to tabulation-based analyses, econometric techniques are frequently used in the field of poverty dynamics to plot the behaviour of the variables involved.

According to Bane and Ellwood (1983), two main approaches can be identified. One involves using a

⁴ The poverty rate or poverty headcount index can be defined as a q/n ratio, where q represents the number of poor individuals or households, and n represents the total number of individuals or households at a given point in time.

variety of methods to try to directly calculate the duration of poverty spells, as well as the probability of observable transitions. The other seeks to calculate a variable that represents well-being in order to isolate the permanent component of well-being from the transitory fluctuations that surround it.

According to Cantó (1998), the approach which seeks to directly measure spell durations and transition probabilities is associated with a trend which focuses on models that include discrete dependent variables. Bane and Ellwood (1983) employ a three-step approach to develop their basic methodology for estimating the duration of poverty spells. First, they identify spells. Then they calculate exit probabilities by year, and then use exit probabilities to generate distributions of spell lengths for new spells and for completed and uncompleted spells observed at a point in time.

Stevens (1995) takes poverty-spell analysis a step further, examining the potential impact of multiple poverty spells within a given time frame on the chances of exiting and re-entering poverty.

Baulch and McCulloch (1998) and Paz (2002) employ what is known as a proportional hazard model to estimate the effect of various demographic and socio-economic explanatory variables on the probability of a household or individual experiencing

a poverty transition. This proportional hazard model is closely related to the Logit model applied to binary choice cases, which was used to obtain some of the results presented below.

The approach which seeks to measure an indicator of well-being, applied by Lillard and Willis (1978) and Rodgers and Rodgers (1991), involves calculating a well-being indicator in order to isolate the permanent component of an individual's well-being from the transitory fluctuations surrounding it. Chronic poverty is measured by the degree to which this permanent component falls below the poverty line. Situations of poverty attributable to deviations surrounding the permanent component are defined as transitory poverty. According to Bane and Ellwood (1983), the advantage of this approach is that it mirrors the Friedman theoretical decomposition of permanent and transitory income and also deals explicitly with the problem that the poverty line is an arbitrarily defined standard, around which income can fluctuate randomly. The chronically poor may be defined as those whose long-term per capita consumption (or permanent income, according to the life-cycle theory) is below the poverty line; the difference between observed poverty and permanent poverty lies in the transitory component of the latter.

III

Development of a cross-sectional panel

The purpose of this research was to study the dynamics of poverty in Costa Rica between 2000 and 2002. This required a panel of households capable of providing information on poverty status and other socio-economic and demographic variables for each of the three years in question. In Costa Rica, however, no such panel surveys are conducted.

The study of poverty in Costa Rica focuses on the data collected by the Multi-purpose Household Survey (EHPM), which is conducted on a yearly basis, every July, by the National Institute of Statistics and Census (INEC).

The EHPM, which covers the entire country, re-uses a certain subset of its household sample from one year to the next, as will be explained in greater detail below. This provides a very useful launching point from which to identify households that are surveyed on successive occasions for more than one year.

The sample design employed by the EHPM is probabilistic, area-based, stratified and divided into two stages. A two-stage sample design is employed because the sampling process is similarly divided. The first stage involves selecting segments composed of limited, defined geographic areas which, taken together, cover the entire country. The second stage involves the systematic selection of households within each of the segments chosen during the first stage.

The survey has been employing the same first-stage segments since 1999, when the current sample frame began its run.

Most of the households selected during the second stage of sampling are the same each year, but 25% of them undergo a process known as "rotation", whereby households that have been systematically selected are replaced with geographically adjacent ones.

Accordingly, during two successive survey years, 75% of the segments making up the sample are comprised of the same households; if three successive years are examined, this percentage drops to 50%, and so on. Since a different 25% of the segments is rotated each year, the entire sample changes every four years. Consequently, the survey sample used during any given year is not independent from the one used during the years before.

INEC maintains two separate databases for the EHPM. One is devoted to segments, and is used to store sample-frame data – that is, information regarding the segments selected during the first stage of the sampling process. Each household is assigned a number that is then used to locate it on a map of the segment to which it belongs. The name of each household head is also recorded, as is the number of the form or questionnaire which will be used to conduct the interview during the fieldwork stage.

The second database is devoted to households and is used to store the information obtained from the forms or questionnaires employed during interviews, including the full range of demographic and socio-economic variables compiled by the survey. It also includes other variables derived from these demographic and socio-economic variables. This database does not include household numbers or individual names, but it does include segment and questionnaire or form numbers.⁵

The process of developing the required household panel from the information in the segment database began with the identification of households that had received consecutive survey visits during the years in question and that were headed by individuals whose names, as recorded in the survey, were either the same each year or suggested a family relationship.

During the second stage of the process, segment and questionnaire numbers for each year and household were used to retrieve the information recorded in each questionnaire from the household database, thereby creating a file of households that were eligible for the panel. The questionnaire is the key that links the segment and household databases.

During the third stage, households found to be headed by the same person, whose identity had been confirmed by the gender variable, who had been listed as the head of household for at least one of the three

years in question and whose stated age had progressed in a manner which allowed a maximum error margin of one year were selected for the panel.

Finally, cases in which income was zero or unknown for one or more of the three years comprising the panel were excluded, since the definition of poverty to be used by the study was based on poverty lines and would therefore require information on household income.

This process resulted in the development of a panel data set comprised of 1,420 households with known income levels throughout the three years in question. The panel sample represents 16.5%, 16.6% and 15.2% of the overall size of the survey sample in 2000, 2001 and 2002, respectively.

This approach to the construction of a household panel entails a loss of information when households move to locations that are not visited the following year. No attempt was made to locate these households, however, given the limited resources of the study.

In order to obtain results of the same order of magnitude for poverty dynamics as those obtained for cross-sections (which are published using the EHPM), another expansion factor, aside from the one already included in the survey databases, was considered necessary in order to obtain population values. This additional factor was defined as the quotient resulting from the division of the size of the survey sample during the first year of the panel by the size of the panel sample, by stratum.⁶ By expanding the panel observations, a total of 803,989 households with known income levels over the three years comprising the study were obtained. This figure is 0.2% lower than the estimate for 2000, which was based on the overall cross-sectional sample (805,533 households).

In order to determine how representative the panel data could be, the relative distributions of certain variables included in both the panel and the EHPM sample were compared; they were found to be substantially similar.

With regard to the sex variable (for the head of household), the differences between the distribution values produced by the sample and those produced by the panel were lower than half a percentage point in every case.

The relative distribution of the age variable (of the head of household) in the panel sample is also very similar to that of the survey sample, as shown in table 4 and figure 1.

⁵ Individual names are manually recorded on the survey form, but are not included in the database. Household numbers were added to the form and database in 2004.

⁶ As mentioned above, the EHPM employs a stratified sample design, which consists of 12 strata –one urban and one rural for each of the six planning regions that comprise the country.

TABLE 4

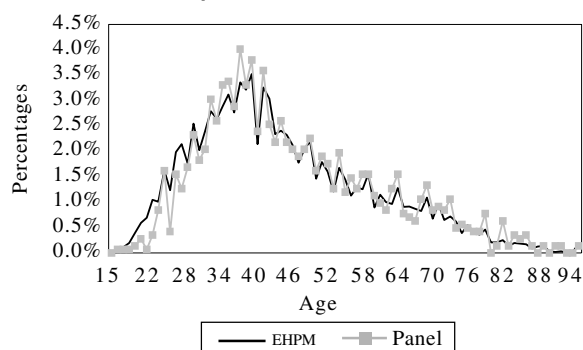
**Costa Rica: Age variable statistics for heads of household
in the Multi-purpose Household Survey and the panel, 2000-2002**

	2000		2001		2002	
	EHPM	Panel	EHPM	Panel	EHPM	Panel
Sample size	8 593	1 420	8 555	1 420	9 344	1 420
Mean	45.66	47.22	45.79	48.28	45.56	49.14
Median	43.00	44.00	43.00	45.00	43.00	46.00
Maximum value	99.00	99.00	99.00	99.00	99.00	99.00
Minimum value	15.00	16.00	16.00	19.00	15.00	17.00
Standard deviation	15.17	15.14	15.35	15.06	15.34	15.08
Asymmetry	0.69	0.71	0.71	0.69	0.70	0.69
Kurtosis	2.96	2.91	3.01	2.85	3.01	2.86
Jarque-Bera	682.50	121.28	716.39	113.50	772.08	113.80
Probability	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors calculations using 2000-2002 Multi-purpose Household Survey (EHPM) and panel data.

FIGURE 1

Costa Rica: Relative distribution of the age variable (head of household) in the Multi-Purpose Household Survey (EHPM) and the panel, 2000



Source: Authors calculations using data from the 2000 Multi-purpose Household Survey (EHPM) and panel data.

In the case of the age variable, the mean and the median increase by one year with each successive year on the panel. This is consistent with the existence of the panel itself. The standard deviation is also virtually identical in both the EHPM and the panel.

As shown in figure 1, the relative distribution of the age variable is almost identical in the EHPM and the panel.

Other variables, such as household size and the expansion factor, display behaviour similar to that of the age variable.

In addition to the comparisons made between sample variables, certain population values obtained by expanding EHPM and panel data were also compared.

When the overall number of households was compared by stratum, for example, deviations displayed

by the expanded panel data with respect to the expanded EHPM were found to be under 1% (in terms of absolute value) for all strata –and for the country as a whole. The only exception was the stratum comprising the urban area of the Huetar Norte region in 2000 and 2001, which displayed deviations of -3.0% and -1.82%, respectively. This suggests that the relative distribution by region and area of households with known income levels is almost identical in the two cases.

Poverty status is another variable that could be compared. The poverty rate figures for the country as a whole that were obtained from the panel data are quite similar to those obtained from the EHPM (differences amount to 1.9 percentage points, at most, with respect to a 20.6% poverty rate in 2002).

An additional panel data experiment involved calculating the Gini coefficient using those data, and then comparing it to that obtained from the EHPM. The results are shown in table 5.

Table 5

Costa Rica: Gini Coefficient of household income distribution obtained from the Multi-Purpose Household Survey and the panel, 2000, 2001 and 2002^a

	EHPM (1)	Panel (2)	Difference (3)=(1)-(2)
2000	0.4004	0.3919	0.0085
2001	0.4230	0.4084	0.0146
2002	0.4215	0.4082	0.0133

Source: Authors' calculations using EHPM data.

^a The Gini coefficient was calculated by grouping households according to per capita income deciles, adjusted for underreporting.

As shown above, the Gini coefficient is consistently –though not substantially– lower when calculated using panel data than it is when using EHPM information. The panel data also reflect the same trend as the sample data, namely, a substantial increase between 2000 and 2001, and a very slight drop between 2001 and 2002.

Finally, in order to briefly examine the consistency of the panel as a longitudinal data set, a random sample of 14 households (1% of the overall sample) was selected, and the behaviour of certain demographic

and socio-economic variables among their members was visually verified. It was determined that, even if stricter criteria were used to establish whether or not a household was the same one surveyed earlier, including tracking changes in the demographic or educational characteristics of other household members (as well as in the sex and age of the head of household), in 100% of these randomly selected cases there was sufficient evidence to conclude that the same households had indeed been examined throughout the three years of the study.

IV

Main results of the study of poverty dynamics

Table 6 summarizes the results of the study of the dynamics of poverty between 2000 and 2002, according to the panel.

These findings show that, between 2000 and 2002, 62.97% of households were non-poor throughout the three-year period in question; consequently, during the same period, 37.03% of households experienced poverty for at least one year. This figure considerably exceeds (indeed, almost doubles) the approximate poverty rate for each specific year comprising the period, which is 20%.

Households that qualify as chronically poor (those which were poor throughout the period) account for 8.84% of all households studied. These households

are more heavily concentrated in rural areas than are poor households as a whole in each year and are headed by individuals with very little schooling. In 91% of cases, in every year studied, the head of household had attended only primary school. The proportion of chronically poor households headed by employed persons is quite low (between 53% and 59% during the period in question). Most heads of household in this group are employed in agriculture, as own-account workers or employees of private businesses. Many of those who are economically inactive are older persons with no income.

The rest of the households that experienced poverty during the period in question (28.19% of the total) were poor for one or two of the three years studied.

Figure 2 illustrates how, with the 2000 poverty rate as a point of reference, transitions between poverty and non-poverty determined the composition of poor and non-poor clusters over the next two years. The poverty rate, calculated using expanded panel data, did not vary significantly between 2000 and 2001 or between 2001 and 2002, hovering between 21% and 22%. Despite the relative stability of the poverty rate, significant movement was observed between poverty and non-poverty status over the course of the two transitions studied (2000-2001 and 2001-2002).

As shown in table 7, between 2000 and 2001 the poverty status of 9.53% of all households studied shifted from non-poor to poor, and a very similar percentage (9.22%) shifted from poor to non-poor. During the following transition, between 2001 and 2002, 9.48% (= 6.23% + 3.25%) of all households shifted from non-

TABLE 6

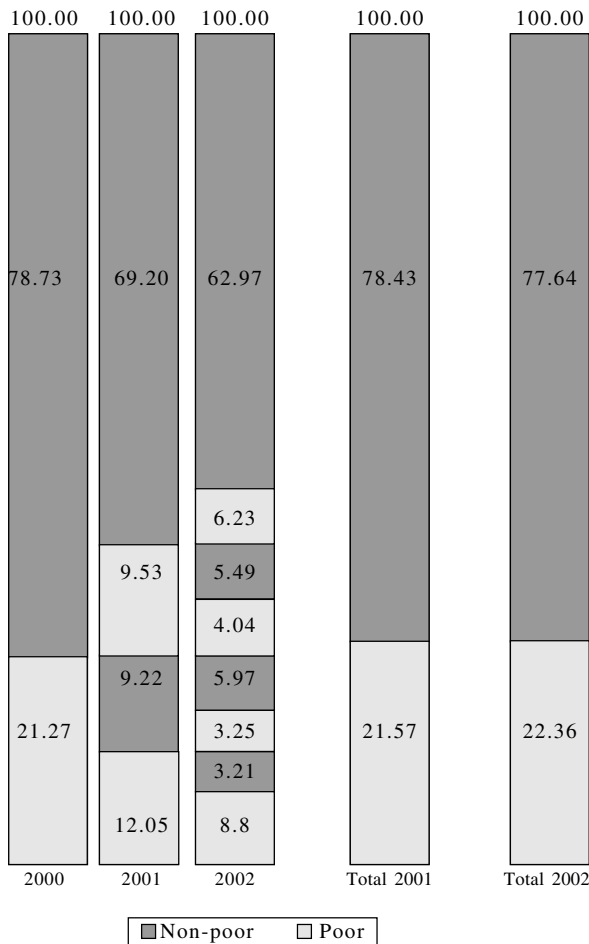
Costa Rica: Frequency of household poverty transitions between 2000 and 2002

No.	Sequence type		Expanded panel results	
	Literal description	Algebraic description	Absolute	Relative
1	(N, N, N)	(0, 0, 0)	506 300	62.97
2	(N, N, P)	(0, 0, 1)	50 073	6.23
3	(N, P, N)	(0, 1, 0)	44 133	5.49
4	(N, P, P)	(0, 1, 1)	32 449	4.04
5	(P, N, N)	(1, 0, 0)	48 027	5.97
6	(P, N, P)	(1, 0, 1)	26 140	3.25
7	(P, P, N)	(1, 1, 0)	25 784	3.21
8	(P, P, P)	(1, 1, 1)	71 083	8.84
<i>Total</i>			803 989	100.00

Source: Authors' calculations using panel data.

Figure 2

Costa Rica: Household poverty trends. 2000-2002
(Percentages)



Source: Authors' calculations using panel data.

poor to poor, while 8.70% (= 5.49% + 3.21%) shifted from poor to non-poor. The similarity of these percentages is consistent with the fact that the poverty rate remained almost unchanged during the period in question.

TABLE 7

Costa Rica: Household poverty dynamics indicators, 2000-2002^a

Transition	λ_{pp}	λ_{pn}	λ_{np}	λ_{nn}	H^*	C
2000-2001	0.5664	0.4336	0.1210	0.8790	0.2181	0.1875
2001-2002	0.5969	0.4031	0.1209	0.8791	0.2307	0.1818

Source: Authors' calculation using data from table 6.

^a λ_{pp} = poverty duration rate; λ_{pn} = poverty exit rate; λ_{np} = poverty entry rate; λ_{nn} = non-poverty duration rate; H^* = stationary status index; C = proportion of households which migrated from one poverty status to another.

Transition matrices were used to develop table 7, which shows poverty exit and entry rates, poverty and non-poverty duration rates, the stationary status index and other poverty dynamics indicators.

Of all households that were poor in 2000, 56.64% remained poor in 2001, and 43.36% exited poverty. Of all households that were non-poor in 2000, 12.10% entered poverty in 2001, while 87.90% remained non-poor that year. Given these poverty exit and entry rates, the stationary status index (H^*), which represents the long-term equilibrium value of the poverty headcount rate, given a constant population and steady poverty entry and exit rates, would be equivalent to 21.81%. Eighteen-point-seventy-five percent of all households experienced some form of transition between 2000 and 2001.

The 2001-2002 period witnessed a drop in the poverty exit rate, from 43.36% in 2001 to 40.31% in 2002, while the poverty entry and non-poverty duration rates remained virtually unchanged. This led to a considerable increase in the stationary status index, which rose by 1.26 percentage points – a figure consistent with the increase in the household poverty rate during this period (0.3 percentage points), according to official INEC figures.

Of the households that were observed to be poor in 2000 and exited poverty in 2001 (which total 74,167 units), 64.76% were able to avoid poverty in 2002, while the remaining 35.24% slipped back in. Of the 76,582 households that were observed to be non-poor in 2000 and slipped into poverty in 2001, 57.63% managed to leave it in 2002, while 42.37% remained poor.

Data from Peru and Argentina offer an interesting comparison in this regard. In the case of Peru, Herrera (2001) reports a poverty exit rate of 25.5% and an entry rate of 23.8% among persons who experienced transitions between 1997 and 1999. In this case, the poverty exit rate was considerably lower than that observed for Costa Rican households between 2000 and 2002, while the entry rate was almost twice that of Costa Rica. In Argentina, according to Paz (2002),

poverty entry rates between 1998 and 2000 were slightly lower than those observed in Costa Rica between 2000 and 2002, hovering between 9.9% and 11.5% in three successive waves. Poverty exit rates, however, were substantially lower, hovering between 23.3% and 30.0% during the same period (compared to an exit rate of approximately 40% in Costa Rica between 2000 and 2002).

Households suffering from extreme poverty displayed considerable mobility. During the 2000-2001 transition, one third of such households (32.80%) exited poverty, while 30.70% joined a category made up of poor households whose basic food needs are met, and 36.50% remained in extreme poverty. During the following transition (2001-2002), matters deteriorated somewhat for the extremely poor, as the poverty exit rate lost 4.87 percentage points to the extreme poverty exit rate.

The experience of the non-poor was similar during each transition. Approximately 88% avoided poverty; of those who entered poverty, about one fifth slipped into extreme poverty.⁷

The study analysed transition matrices for poor and non-poor households using a number of relevant variables. One general observation resulting from this analysis is that the socio-economic and demographic variables associated with increased poverty rates from a static perspective also shed considerable light on poverty duration and entry from a dynamic perspective.

The two sets of tables shown below illustrate the transitions observed, breaking them down according to area and sex. The first two tables, 8 and 9, show the transitions experienced by poor households according to area of residence.

The poverty exit rate was observed to be significantly higher in urban areas than in rural areas, during both the 2000-2001 and the 2001-2002 transitions; even during the former, the exit rate in urban areas exceeded the poverty duration rate, unlike the overall rates. This suggests that urban areas may offer a more diverse range of employment opportunities than rural areas.

⁷ Herrera (2001) reports similar results for Peru in 1997-1999.

TABLE 8

Costa Rica: Transitions experienced in 2000-2001 by households observed to be poor in 2000, by area of residence^a

Area	Total		Remained poor			Exited poverty		
	Absolute	%	Absolute	%	λ_{pp}	Absolute	%	λ_{pn}
Total	171 034	100.00	96 867	100.00	56.64	74 167	100.00	43.36
Urban	85 870	50.21	41 702	43.05	48.56	44 168	59.55	51.44
Rural	85 164	49.79	55 165	56.95	64.78	29 999	40.45	35.22

Source: Authors calculations using panel data.

^a λ_{pp} = poverty duration rate; λ_{pn} = poverty exit rate.

TABLE 9

Costa Rica: transitions experienced in 2001-2002 by households observed to be poor in 2001, by area of residence^a

Area	Total		Remained poor			Exited poverty		
	Absolute	%	Absolute	%	λ_{pp}	Absolute	%	λ_{pn}
Total	173 449	100.00	103 532	100.00	59.69	69 917	100.00	40.31
Urban	79 966	46.10	42 884	41.42	53.63	37 082	53.04	46.37
Rural	93 483	53.90	60 648	58.58	64.88	32 835	46.96	35.12

Source: Authors calculations using panel data.

^a λ_{pp} = poverty duration rate; λ_{pn} = poverty exit rate.

It is also interesting to note that, when the overall poverty exit rate drops (as it did during the 2001-2002 transition), the effect of the drop is concentrated in urban areas. In rural areas, the poverty exit rate appears to be somewhat rigid, as it remained virtually constant, at approximately 35%, during both periods.

Tables 10 and 11 show the transitions experienced by non-poor households, according to the sex of the head of household.

Non-poor households headed by females appear to be at greater risk of slipping back into poverty than male-headed households. This was especially clear during the 2000-2001 transition.

Other important findings derived from transition matrices suggest that a household is more likely to exit poverty if its head is better educated, if its membership is decreasing or if the number of income-generating members is increasing and if the household head is employed in a field other than agriculture and livestock.

A household's risk of slipping back into poverty is even greater if it is located in a rural area or in a region other than the central region (which is home to the country's main cities), if it is headed by a woman

and if the head of household is employed in agriculture or has little schooling.

In addition to the transition matrix analysis performed, two econometric Logit models were developed—one to explain the probability of households exiting poverty, the other to estimate the probability of re-entry. The results are shown in table 12.

The null hypothesis would be that the value of the coefficient of each one of the variables in the estimate is zero; this was rejected for every variable used in the estimates, with a level of significance exceeding 99%.

Explanatory variables played a significant role in both models, indicating that households in the central region of the country are more likely to exit poverty than households in any other region. Households headed by males have a better chance of escaping poverty than those headed by females. The higher the ratio between per capita household income and the poverty line, the greater the chances are of exiting poverty. Moreover, if a head of household is looking for work, is on disability or is employed, the household's chances of exiting poverty are greater than they would be if the head were economically inactive.

TABLE 10

Costa Rica: Transitions experienced in 2000-2001 by households observed to be non-poor in 2000, by sex of household head in 2000^a

Sex of household head	Total		Remained non-poor			Entered poverty		
	Absolute	%	Absolute	%	λ_{nn}	Absolute	%	λ_{np}
Total	632 955	100.00	556 373	100.00	87.90	76 582	100.00	12.10
Male	491 803	77.70	439 582	79.01	89.38	52 221	68.19	10.62
Female	141 152	22.30	116 791	20.99	82.74	24 361	31.81	17.26

Source: Authors calculations using panel data.

^a λ_{nn} = non-poverty duration rate; λ_{np} = poverty entry rate.

TABLE 11

Costa Rica: Transitions experienced in 2001-2002 by households observed to be non-poor in 2001, by sex of household head in 2001^a

Sex of household head	Total		Remained non-poor			Entered poverty		
	Absolute	%	Absolute	%	λ_{nn}	Absolute	%	λ_{np}
Total	630 540	100.00	554 327	100.00	87.91	76 213	100.00	12.09
Male	486 308	77.13	429 936	77.56	88.41	56 372	73.97	11.59
Female	144 232	22.87	124 391	22.44	86.24	19 841	26.03	13.76

Source: Authors calculations using panel data.

^a λ_{nn} = non-poverty duration rate; λ_{np} = poverty entry rate.

TABLE 12

Costa Rica: Results of probability model estimates that explain poverty exit and entry, 2000-2002

Variables	Poverty exit		Poverty entry	
	Coefficient (standard error)	Z value ($P > |z|$)	Coefficient (standard error)	Z value ($P > |z|$)
Central region (<i>regionce</i>)	0.1381 (0.0097)	14.27 0.000	-0.2056 (0.0069)	-29.85 0.000
Urban areas (<i>zonaurb</i>)	0.4475 (0.0108)	41.51 0.000	0.1135 (0.0074)	15.39 0.000
Per capita income / poverty line ratio (<i>distline</i>)	1.0815 (0.0191)	56.50 0.000	-0.2926 (0.0027)	-106.95 0.000
Type of agricultural activity (<i>agric</i>)	-0.3696 (0.0128)	-28.86 0.000	0.8464 (0.0092)	91.71 0.000
Active	0.5038 (0.0133)	37.98 0.000	-0.2079 (0.0099)	-20.99 0.000
Male	0.2054 (0.0111)	18.45 0.000	-0.5253 (0.0078)	-67.25 0.000
Age	-0.1434 (0.0004)	-37.85 0.00062	-0.0043 (0.0003)	-15.44 0.000
Education (<i>educ</i>)	0.3645 (0.0058)	62.45 0.000	-0.3319 (0.0031)	-105.96 0.000
Dependents per wage earner (<i>deporper</i>)	-0.2540 (0.0030)	-84.27 0.000	0.1375 (0.0029)	48.10 0.000
Change in household size (<i>dtamahog</i>)	-0.3116 (0.0051)	-61.32 0.000	...	...
Constant	0.0260 (0.0293)	0.89 0.376	0.4027 (0.0205)	19.64 0.000
<i>Model statistics</i>				
Observations		247 617		707 122
Model Chi ²		34 650.69		92 239.68
Chi ² probability		0.0000		0.0000
Pseudo R ²		0.1250		0.1029
Overall percentage of correct predictions		65.0		78.5

Source: Authors calculations using regression results.

Another statistically significant variable that explains the probability of exiting poverty is the ratio between dependants and wage earners (*deporper*): the larger the number of individuals that depend on the income of a wage earner, the greater the volume of needs that must be satisfied with that wage earner's income.

The "change in household size" (*dtamahog*) variable was also statistically significant. The more the number of household members changes, the lower the household's chances are of exiting poverty. All

variables proved to be statistically significant during the development of the poverty entry model. The sign of the coefficients was also as expected for all variables, except for the urban areas (*zonaurb*) variable. Households headed by females employed in agriculture are more likely to enter poverty. The greater the age of the head of household, the lower the probability of entering poverty.

Logit model results can be used to calculate the marginal effects of the model's explanatory variables

on the probabilities of observing the phenomenon studied. In other words, marginal effects show the proportion by which the probability of exiting or entering poverty varies as a result of a single change in the explanatory variables. The results obtained for these variables are shown in table 13.

If the vector of the estimated coefficients is multiplied by X from the preceding table, and the result is used as an argument in the function derived from the logistic regression, the probability of entering poverty in Costa Rica for non-poor households is obtained, provided the variables of the preceding model are assumed to be explanatory and their mean values are

used. According to this model, the probability of entering poverty during the period studied is 15.4%, which does not differ significantly from the 12.0% obtained from the above transition matrices. This result suggests that the poverty entry probability model explained above works well and is capable of providing an overall estimate of the direction of poverty entry probability variations resulting from changes in independent variables.

After calculating marginal effect values, the poverty exit probability model places the poverty exit rate at 59.5%, compared to the 40%-43% rate obtained by the transition matrices, as explained earlier.

TABLE 13

Costa Rica: poverty entry probability model - marginal effects

Variables ^a	dy/dx	Standard error	z	$P > |z|$	X
<i>regionce</i>	-0.0273992	0.00094	-29.07	0.000	0.664663
<i>zонаurb</i>	0.0146498	0.00095	15.50	0.000	0.603390
<i>distline</i>	-0.0380754	0.0003	-126.56	0.000	3.46301
<i>agric</i>	0.1346584	0.00176	76.72	0.000	0.136805
<i>active</i>	-0.0281875	0.0014	-20.12	0.000	0.783390
<i>male</i>	-0.0751096	0.00123	-61.12	0.000	0.761579
<i>age</i>	-0.0005629	0.00004	-15.43	0.000	48.2432
<i>educ</i>	-0.0431979	0.0004	-106.68	0.000	1.69709
<i>deporper</i>	0.0179003	0.00038	47.26	0.000	1.40086

Source: Authors calculations using regression results.

^a For full variable names, see table 12.

V

Conclusions

This study shows that panel data sets can be constructed using cross-sections from a survey for which a portion of the sample is changed over time.

The procedure used to construct the panel constitutes an alternative for the study of poverty dynamics in developing countries, where surveys are based on successive samples that are not fully independent.

Within the limitations imposed by the characteristics of the data set used, this study shows that a significant number of households in Costa Rica enter and exit poverty over time, despite the relative stability of the country's poverty rate and economic environment.

If a broader definition of household poverty were adopted (for example, if a household which has experienced poverty at least once during a consecutive three-year period were defined as poor), then the number of poor households would rise to 37%, which is almost twice the general trend rate of 20% observed over the last few years. This means that, during the three-year period studied, 37% of households would have experienced poverty, although only slightly more than half that percentage would have been poor during any given year.

Moreover, 60% of poor households tend to remain poor, while the remaining 40% manage to escape poverty. Eighty-eight percent of non-poor households

tend to remain non-poor, while 12% slip into poverty each year. Of the latter, almost one fifth lapse into extreme poverty.

One general conclusion which may be drawn from the study is that certain variables (such as education, area of residence and number of wage earners) associated with poverty from a static perspective can also be linked to poverty from a longitudinal perspective.

The study also found that a significant proportion of households experience poverty transitions, despite the stability of macroeconomic indicators such as

inflation, unemployment, the production structure of the country and the poverty rate itself.

Given the fact that the poor constitute a group with a shifting membership, government leaders must fine-tune their approach in order to devise and execute policies that take into account the dynamic nature of the phenomenon. As a matter of general principle, government policies aimed at combatting poverty should promote not only those factors which help households exit poverty, but also those which prevent poverty entry.

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Import substitution in Brazil between 1995 and 2000

Renato Baumann and Ana Maria de Paiva Franco

The Brazilian economy suffered major changes in the second half of the 1990s, when price stabilization, trade liberalization with an overvalued exchange rate and privatizations altered productive processes in various sectors and led to import substitution, among other phenomena. Import substitution occurred in particular following the reform of the exchange-rate regime, which entailed a substantial devaluation in early 1999. This article seeks to measure the intensity of that process, distinguishing effects that can be related to exchange-rate variations induced by relative prices alone (spontaneous import substitution) from those that reflect levels of effective protection (import substitution induced by trade policy).

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I

Introduction

The need to reduce the country's external vulnerability, through ever larger trade surpluses, and to strengthen the productive chain in certain key sectors of the economy, has been a topic of recurrent debate both in governmental and business domains, and among institutions linked to industry and foreign trade (Melo, Rios and Gutiérrez, 2001; Rosa, 2001; Alem, Barros and Giambiagi, 2002). While there is consensus on the need to make products more competitive on the domestic and world markets, there are very clear differences of opinion as to the appropriate degree of State intervention in the process.¹

In 1995-2000 a number of sectors of the Brazilian economy showed signs of an import substitution process, stemming from the devaluation of the *real* in 1999 (Moreira and Puga, 2001; Levy and Serra, 2002). This article analyses data from that period to verify the existence of such a process and decide whether it occurred spontaneously or as a result of the Government's interventionist policies. For this

purpose, an adjusted linear regression model was applied to the industry data set, using tariff levels and exchange rates as explanatory variables, and a measure of import substitution as the dependent variable.

The analysis is limited to the second half of the 1990s, since the latest available data on rates of effective protection in Brazil are for 1998.

As shown in figure 1, the exchange rate fluctuated sharply after 1998, and in 2002 there was overshooting as the *real* devalued against the dollar and a 13-currency basket of Brazil's main trading partners, before rebounding strongly.

Even if trade policy is considered constant in that period, it is reasonable to assume that the spontaneous import substitution process would have changed direction between 2000-2002 and 2003-2005. The available indicators on import coefficients in manufacturing industry allow a number of indirect conjectures to be made, as shown in table 1.

The import coefficient in manufacturing production peaked in 2001 and then began to fall. Although the effects in terms of import substitution can only be verified through specific estimations, the type of analysis presented in this paper is feasible only up to 2000 for the reasons mentioned above.

¹ For a debate on a new industrial policy profile in Brazil, see Barros and Goldenstein (1997) and Alem, Barros and Giambiagi (2002).

FIGURE 1



Source: www.funcex.com.br.

^a IPCA: Extended national consumer price index.

TABLE 1

Brazil: Import coefficients of manufacturing industry

Year	Total	Total excluding Agriculture
Average 1995-99	11.6	12.1
2000	12.7	13.1
2001	14.7	15.1
2002	13.0	13.6
2003	11.0	11.7
2004	10.9	12.1

Source: www.funcex.com.br.

The rest of this article is organized as follows: section II introduces the concept of import substitution as defined in the specialist literature, and section III

II

The concept of import substitution

Definitions of the terms “import substitution”, “protection” and “promotion” –which date back to the debates on developing-country trade policies in the second half of the nineteenth century– are often ambiguous. Tavares (1977) defines import substitution as a development process whereby, in response to external trade constraints such as those experienced by the Southern Cone countries in the four post-war decades, the aim was to rapidly replicate the industrialization experience of the developed countries, albeit under different historical conditions.

The general aim was to build an economy that was flexible and diversified enough to overcome crises, create real and continuous growth opportunities and generate welfare for the population. The basic rationale of the import-substitution strategy is that, as developing countries industrialize, their industries need protection against competition from imported products (Bruton, 1989, p. 1603). According to Chenery, as quoted by Díaz-Alejandro (1975), import substitution takes place when the import share of the supply of a specific good shrinks in relation to that of domestic production, either because a new tariff is levied on imports of that product, or because devaluation raises import prices, or for other reasons, including the interruption of trade operations because of war.

Desai (1969) distinguishes two types of import substitution measure: (i) measures that compare to an optimum; and (ii) others that simply describe changes in the domestic pattern of imports and production.

summarizes how Brazil’s trade policy changed from 1998 onwards as it opened its market to world trade. Section IV defines the measure of import substitution to be used in the rest of the article, based on production and import data from a number of sectors of Brazilian manufacturing industry in 1989-2000; it then examines the relation between tariff levels, the exchange rate and import substitution. Section V analyses the effects of the effective tariff and the real effective exchange rate index (i.e. the *real* against a basket of 13 currencies) on the import substitution index for 34 sectors of manufacturing industry over the period 1995-2000. Section VI presents the main conclusions and policy recommendations.

Import substitution does not refer to a simple operation in which certain items are withdrawn from the import basket, or their volume reduced, to be replaced by domestic substitutes. To understand it in this way might suggest a strategy of eliminating all imports, i.e. autarchy. Instead, it is a complex process in which other goods take the place of the substituted products, and, as the process unfolds, derived demand for imports grows (for intermediate and capital goods), possibly resulting in even greater dependency on abroad. The apparent substitution may thus conceal the essence of the phenomenon:

- (i) Although the volume or share of certain products in the import basket may not decrease, substitution can occur as domestic production expands and provides a larger share of total supply, with a consequent reduction in the economy’s import coefficient.
- (ii) Comparative analysis of the import basket between different periods may be distorted as new products emerge on the international market. One therefore needs to identify whether an increase in imports of a given product displaces domestic production, or whether it involves a new product that is not made in the country.
- (iii) Imports of certain products may decrease as a result of trade sanctions, discriminatory policy or other factors of that type. There will only be real import substitution if domestic production is stimulated.

(iv) The real or effective substitution is generally much less than what appears in terms of a decline in imports of specific products. Domestic production of a given good only replaces part of the value added that was previously generated outside. Accordingly, a dynamic increase in the derived demand for imports may outweigh the foreign-exchange saving obtained through the replacement production.

Consequently, when speaking of promoting import substitution, it needs to be understood, firstly, that domestic production must be stimulated; and, secondly, that the process may actually worsen the trade balance and result in greater foreign dependency, both because of the need to import intermediate and capital goods, and because of the effect on demand arising from the additional income generated by the increase in domestic production in the benefited sectors (Tavares, 1977).

III

Changes in Brazil's trade regime: from market reserve to economic openness

This article makes a distinction between two types of import substitution process: induced and spontaneous.

Import substitution can be induced through interventionist policies to stimulate the domestic production of a specific product that the country currently imports. Apart from offering favourable prices, one of its effects is to create barriers to competitive imports. Spontaneous substitution, in contrast, occurs naturally when the relative prices of domestic production fall in relation to foreign production, thus making the domestic product cheaper.

A change in relative prices may be linked either to greater productivity gains in the domestic industry or to a depreciation of the domestic currency against foreign currencies; both make the domestically manufactured product relatively more competitive.

The import substitution model that prevailed in Brazil until the late 1980s used numerous policy tools to keep out foreign products, including import licences, quotas, foreign-exchange auctions and tariffs. From then on, however, far-reaching changes were made to foreign-trade policy for the purpose of opening up the domestic economy. That process gathered pace in the following decade, when several trade agreements were signed, including the treaty creating the Southern Common Market (MERCOSUR) in 1991.

The policy to reduce import barriers was implemented in three stages (Kume, Piani and Souza, 2000, pp. 1-10), corresponding to the periods 1988-1989, 1990-1993 and 1994 onwards. The economic liberalization process faltered in 1995-98, following the Mexican crisis in December 1994, when it became

unviable to finance the growing trade deficit (owing to the exchange-rate revaluation and greater openness at the start of the Real Plan). It should be noted that the most important non-tariff barriers were withdrawn in 1990 and, as a result, imports were mainly affected by tariffs and the exchange rate virtually throughout the decade.

The first of these stages witnessed two tariff reforms (June 1988 and September 1989) which reduced the redundant component of the nominal tariff without greatly altering the volume of imports. In 1990-1993 non-tariff barriers and special tax regimes were eliminated, and a timetable was applied for gradually lowering import duties. In 1994, the tariff reductions promoted at the start of the Real Plan were implemented, with a view to controlling domestic prices through greater external competition. In 1995-1998, the trade liberalization programme slackened, as tariffs were increased on certain consumer goods and administrative barriers to imports were reintroduced (Kume, Piani and Souza, 2000, pp. 3-4).² Rates of duty were raised on imports of automobiles, motorcycles, bicycles, tractors, consumer electronic appliances, fabrics, blankets and sports footwear – goods that were causing the import expansion. At the same time, the Government lowered rates on another group of imports to avoid domestic price increases (Kume, Piani and Souza, 2000, p. 9).

² These included the requirement for payment on demand in foreign purchases with external financing over less than a year, creation of a list of products for which prior import permits were required, and the application of safeguards.

The MERCOSUR common external tariff entered into force in Brazil for most products in September 1994, ahead of the January 1995 date anticipated in the previous schedule (Baumann, Rivero and Zavattiero, 1997). This meant a loss of autonomy in the management of tariff policy. To implement the measures mentioned above, the Government had to include some of the products on their MERCOSUR schedule of national exemptions, which was later replaced by a new schedule with rates that were valid for a year. In general, the common external tariff prevented major changes in the tariff structure, which attained their greatest stability in the period 1995-1998. Lastly, in November 1997, the Government temporarily raised tariffs by 3% to reduce the current-account deficit, in response to the international financial crisis.

Trade barriers were thus progressively lowered to the point where they were confined basically to the established nominal tariffs, which had gradually become more uniform between the different sectors. This process is illustrated in figure 2, which was prepared using data

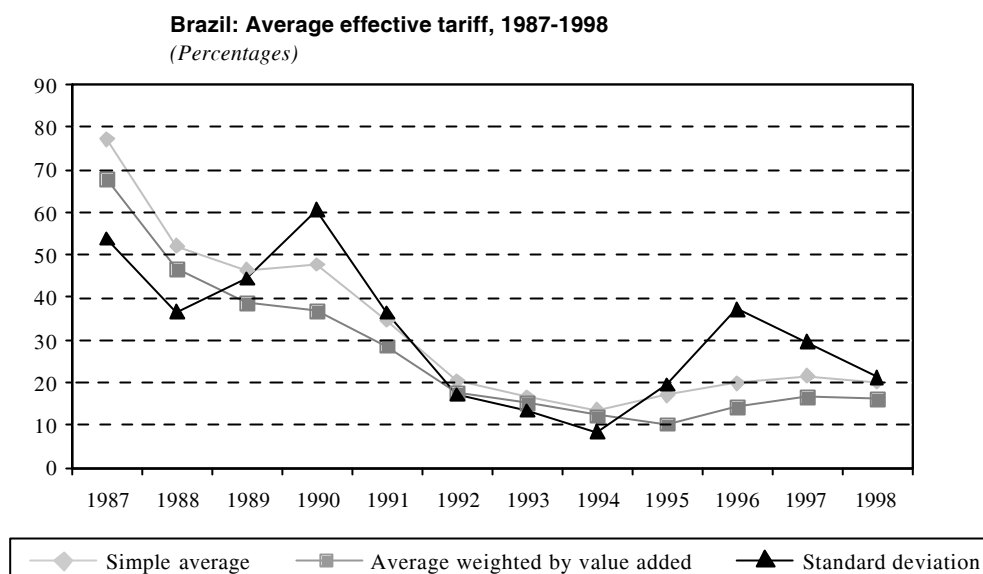
on the average effective tariff weighted by free-trade value added in each sector, for the period 1987-1998.³

As the figure shows, the main reductions in the average effective tariff and its standard deviation occurred between 1987 and 1994, leading to more uniform protection in the various sectors of the economy and, hence, to a reduction in the distortions caused by such protection. After 1995, although average tariffs rose slightly, they remained around 18% in nominal terms and 20% in effective terms (Kume, Piani and Souza, 2000, pp. 11 and 16).

The fact that those values were maintained, linked to the performance of production, suggests a favourable setting for induced import substitution through trade protection throughout the 1990s. To verify that hypothesis, the import substitution process needs to be quantified.

³ The trend of the mean nominal tariff was not shown on the graph, since this behaves very similarly to the effective tariff, with a correlation of 0.87 between the two in the period analysed.

FIGURE 2



Source: Authors' calculations using data from Kume, Piani and Souza (2000, p. 17).

IV

Methodology

1. Measuring the import substitution process

There are several ways to make statistical calculations on import substitution (Desai, 1969) and thus link the effects of trade policies and the relation between the trade balance and domestic production in a given industry or sector, based on import and supply data for each item of merchandise in two successive time periods.

Imports and supply of good a in periods 1 and 2 will be identified as follows:

- M^a_1 = imports of good a in period 1
 S^a_1 = supply of good a in period 1
 M^a_2 = imports of good a in period 2
 S^a_2 = supply of good a in period 2.

If $M^a_2/S^a_2 < M^a_1/S^a_1$, then import substitution occurred in period 2. On that basis, two import substitution measures are established –variant 1 and variant 2.

Variant 1

One way to measure import substitution is to calculate the difference between the availability of imported products in the two selected periods, both in absolute terms (for variant 1a) and in relative terms (for variant 1b). This makes it possible to construct two measures, defined as SI_{1a} and SI_{1b} :

$$SI_{1a} = M_2/S_2 - M_1/S_1 \quad (1)$$

$$SI_{1b} = (M_2/S_2 - M_1/S_1)/M_1/S_1 \quad (2)$$

SI_{1a} is the variant 1a measure of import substitution, which occurs in a given sector of industry when $M_2/S_2 - M_1/S_1 < 0$. Comparing two sectors, import substitution will have been greater in the sector that has the lower SI_{1a} index.

SI_{1b} is the variant 1b import-substitution measure, and is simply a version of SI_{1a} expressed in relative terms. Import substitution occurs when $(M_2/S_2 - M_1/S_1)/M_1/S_1 < 0$, i.e. when SI_{1b} is less than zero. Each of these measures has the disadvantage of being a decreasing function of the degree of import

substitution in the sectors concerned. Import substitution is indicated by negative values of the SI_{1a} or SI_{1b} indices, so before they can be used in the regression analyses described below they need to be transformed into positive values: $SI_i = SI (-1)$, such that the larger the value of SI_i the more intensive the process will have been.

Variant 2

Import substitution can be defined indirectly as the difference between the growth of a product without any change in the rate of imports, and the growth that actually took place.

Starting from the basic identity:

$$Q + M \equiv R + D + E$$

where:

- Q = domestic production
 M = imports
 R = demand for intermediate goods
 D = final domestic demand (including inventory building)
 E = exports

the following identity is obtained for the corresponding variations:

$$\Delta Q + \Delta M = \Delta R + \Delta D + \Delta E$$

If $S = Q + M$ = total supply, then $\Delta S = \Delta R + \Delta D + \Delta E$. Let us assume that $u_1 = Q_1/S_1$ in the base year. If u_1 remains fixed, the variation in domestic production ΔQ is obtained from $u_1 \cdot \Delta S$ or $u_1 \cdot (\Delta R + \Delta D + \Delta E)$. If u_1 changes to $u_2 = Q_2/S_2$, the variation will be:

$$\Delta Q = u_1 (\Delta R + \Delta D) + u_1 (\Delta E) + (u_2 - u_1) S_2 \quad (3)$$

Relation (3) divides the additional domestic production (ΔQ) into three parts:

- a) $u_1 (\Delta R + \Delta D)$ is the part destined for final and intermediate demand, according to the hypothesis that the domestically produced share of total supply does not change;

- b) $u_1 (\Delta E)$ is the portion destined for exports, holding u_1 constant;
- c) $(u_2 - u_1) S_2$ is the variation in supply arising from the change in the share of domestic production in total supply.

The term c measures the additional domestic production that would result exclusively from a change in the domestically produced share of total supply. That additional production, divided by the variation in domestic production (ΔQ), becomes variant 2 expressed by SI_2 to measure import substitution:

$$SI_2 = (u_2 - u_1) S_2 / \Delta Q \quad (4)$$

According to this measure, import substitution occurs when $(u_2 - u_1) S_2 / (\Delta Q)$ is greater than zero (i.e. when $SI_2 > 0$).

According to Desai (1969) the measures SI_A , SI_B and SI_2 –all based on changes in import rates with respect to the base year– should theoretically change in the same direction, whether there was import substitution or not. Nonetheless, the magnitude of the effects of import substitution and the ranking of sectors may vary according to the measure used. The values obtained with the measures SI_B and SI_2 proved unsuitable for this article for the following reasons: (i) the variations observed in SI_B were largely due to the weighting that this measure receives ($1/(M_1/S_1)$) and could not be explained by exchange-rate and tariff variables; (ii) the measure SI_2 displayed large discrepancies with respect to the results of SI_A and SI_B because the value of domestic production in certain sectors (at constant 1998 prices) decreased between the two periods, suggesting the presence of an import-substitution process when what really happened was that the denominator of this index ($Q_2 - Q_1$) changed sign. For that reason, the index of import substitution used in this paper is the SI_A measure.

Using the Moreira and Puga (2001) database, SI_A measures were calculated for the periods 1989-1994, 1994-1998, 1998-2000 and 1989-2000 with respect to seven categories of use (table 2).

The choice of periods reflects the phases in Brazil's economic liberalization process since the late 1980s. The first period (1989-1994) was when the main changes in the trade regime took place, including the largest cuts in tariff barriers. In the second period (1994-1998) the liberalization process slackened slightly (see figure 2 above). In 1998-2000, devaluation of the *real* in January 1999 added a new ingredient to the analysis

TABLE 2

Brazil: Values of the SI_A measure of import substitution in the economy^a

Period and Industry Group	SI_A
1989-1994	
Consumer durables	-9.35
Consumer non-durables	-4.25
Intermediate goods	-7.62
Processed intermediate goods	-10.42
Capital goods	-21.80
Transport equipment	-14.79
<i>Industry total</i>	-9.82
1994-1998	
Consumer durables	-3.23
Consumer non-durables	-0.24
Intermediate goods	0.81
Processed intermediate goods	-2.40
Capital goods	-13.93
Transport equipment	-1.37
<i>Industry total</i>	-1.94
1998-2000	
Consumer durables	2.09
Consumer non-durables	0.84
Intermediate goods	-1.07
Processed intermediate goods	2.34
Capital goods	0.44
Transport equipment	4.94
<i>Industry total</i>	1.55
1989-2000	
Consumer durables	-10.49
Consumer non-durables	-3.65
Intermediate goods	-7.88
Processed intermediate goods	-10.48
Capital goods	-35.29
Transport equipment	-11.22
<i>Industry total</i>	-10.21

Source: Authors' calculations on the basis of data from Moreira and Puga (2001).

^a See the text for the definition of the measure used.

of the country's foreign trade results. The results for this period can also be compared with those obtained by Moreira and Puga (2001). The calculation of the SI_A indices for 1989-2000 is also important, since it relates two quite different periods in terms of the country's external policy: the base year is 1989, when trade barriers still prevailed, and this is compared with 2000 when the economy was more open to trade and more competitive as a result of exchange-rate variations.

Table 2 shows that in the period 1989-1994 there was no import substitution in any of the categories

analysed. On the contrary, the import share increased and the domestically produced share of total supply declined. This is as expected, because the economy was exposed to major external competition in that period, resulting from the appreciation of the *real* and the price and wealth effects caused by domestic price stabilization.

The rising share of imports in total supply was not reversed in the period 1994-1998, except in the intermediate goods sector, when import substitution occurred on a minor scale.

According to table 2, the sectors in which import substitution occurred in 1998-2000, were as follows, in order of importance: transport equipment, processed intermediate goods, consumer durables, consumer non-durables and capital goods. The only sector in which there was no import substitution according to the SI_A measure was intermediate goods. The results obtained by Moreira and Puga (2001) were not identical to those obtained with the SI_A measure in terms of the incidence and intensity of the import substitution process in the different sectors throughout the period studied.⁴ Nonetheless, the two approaches agree that there was an import-substitution process in manufacturing industry as a whole in 1998-2000. This was most pronounced in the transport equipment sector, followed by processed intermediate goods, whereas no import substitution occurred in the intermediate goods sector.

Comparing 1989 with 2000, the indices in all sectors were negative and their absolute values very large. Whereas in 1989 the average effective tariff in manufacturing industry was roughly 70%, by 2000 it had dropped to about 20% (see again figure 2). The SI_A indices for that period show that there was no import substitution and that the domestically produced share of total supply shrank considerably, owing to the economy's greater exposure to international competition.

Consequently, the effects of import substitution were concentrated mostly in the final years of the series, between 1998 and 2000. As the exchange rate depreciated sharply in January 1999, without this attenuating the tariff-reduction process (and thus maintaining the level of effective protection in the

different sectors), it can be assumed that import substitution in those years was essentially spontaneous, i.e. derived from the competitiveness of domestic production linked to the exchange-rate variation.

2. Relation between tariffs, the exchange rate and import substitution

To determine whether variations in import-substitution indices in the various sectors reflected changes in tariff levels and exchange rates, the corresponding variables were analysed for certain sectors of manufacturing industry in the period 1995-2000. The analysis does not include the previous period because, as shown in table 2, there was no import substitution between 1989 and 1994. Moreover, given the sharp devaluation of the *real* in 1999, it is in the 1995-2000 period that one sees phenomena that could have contributed both to induced import substitution (in response to tariff policy) and to natural import substitution reflecting the exchange-rate depreciation that occurred from 1999 onwards).

The exchange-rate indicator used is the real effective exchange rate index published by *Boletim Funcex de câmbio* (1998 and 2002). This is calculated on the basis of the real exchange rates of Brazil's 13 leading trade partners, weighted by the each country's average share in Brazil's trade flow (imports and exports) (table 3). For the purposes of this article, that exchange rate measure has an advantage over bilateral exchange rates with other countries.⁵

To analyse the effect of the variables "exchange rate" and "effective tariff" on the import substitution index, a regression was performed using data from the period 1995-2000, covering 34 of the 49 industrial sectors for which

TABLE 3
Brazil: Real effective exchange rate index
(R\$/basket of 13 currencies)
(August 1994 = 100)

Year	Index
1995	96.1
1996	99.1
1997	94.6
1998	99.8
1999	116.4
2000	107.2

Source: Up to 1997, *Boletim Funcex de câmbio* (1998); for 1998-2000, *Boletim Funcex de câmbio* (2002).

⁴ According to Moreira and Puga (2001), the sectors in which import substitution occurred in 1998-2000, in order of importance (greatest reduction in the import/apparent consumption ratio), were: transport equipment (26.8% reduction), processed intermediate goods (14% reduction) and consumer non-durables (10.5% reduction). The sectors in which the import coefficient increased during 1998-2000 were: consumer durables (24%), intermediate goods (11.54%) and capital goods (3.5%).

⁵ The real effective exchange rate reflects changes in the purchasing power of the local currency compared to the currencies of Brazil's leading trade partners, for which reason it is assumed to have more influence over the country's import and export flows.

data were available. The figures on effective tariffs were taken from Kume, Piani and Souza (2000). Table 4 shows the SI_A indices for the 34 sectors analysed.

Performing the desired analysis required tariff values for 1999 and 2000. As these data were not available, an approximation was made by arbitrarily assuming that the structure of the effective tariff had not changed since 1998.

The hypothesis underlying this simulation is that the tariff-reduction process stabilized in most sectors as from 1995, since, according to Kume, Piani and Souza (2000), in 1998 the variations in observed nominal tariffs were already very small compared to those of the previous year.

To process those data, we will use panel analysis as described below.

a) *Statistical models for panel data with one factor*

Observations on a response variable of interest y , and a vector \mathbf{x} of explanatory variables for N different sectors of the economy in each of T successive years (t), constitute a panel data set.⁶ Various linear regression models have been proposed for this type of data. In general, the model establishes that, for a given

⁶ The main advantage of the panel dataset is that it allows great flexibility in defining differences of behaviour between units such as the target sectors of this paper. The specific effects represent singular characteristics of each group, either observable (inputs with more intensive technology use, use of imported inputs, and others), or non-observable (management ability, among others), and are assumed constant throughout time (which does not necessarily mean that they are non-stochastic).

TABLE 4

Brazil: SI_A indices for 34 sectors of manufacturing industry, 1995-2000

Sector	1995	1996	1997	1998	1999	2000
Iron and steel	-1.82	0.54	-1.00	-1.19	2.40	-0.61
Non-ferrous metallurgy	-7.41	2.71	-3.05	0.05	3.57	-1.22
Other metallurgical products	-2.65	-2.67	-2.78	0.32	2.75	0.76
Tractors and road-building machinery, parts and accessories	-4.99	1.37	-7.49	-3.24	5.44	1.36
Conductors and other electric materials, except for vehicles	-1.34	-4.13	-7.64	-4.51	0.48	-1.72
Electronic and communications material and appliances	-8.34	-2.83	-6.10	-8.69	-5.14	-2.28
Automobiles, trucks and buses	-13.68	12.52	-6.78	-6.28	11.97	0.26
Engines and vehicle parts	-8.01	0.06	2.39	8.33	13.49	-2.52
Other vehicles	-6.60	-4.05	-13.60	-2.48	2.38	-3.05
Wood industry	-0.72	-1.75	-2.73	0.89	3.74	0.10
Cellulose and mechanical pulp	-0.86	0.14	-0.22	-0.25	0.24	-0.13
Paper, cardboard and paper articles	-10.71	2.12	-0.48	-1.22	6.36	-0.18
Rubber industry	-6.65	0.85	-2.29	-0.73	5.08	-0.60
Chemical elements (excluding petrochemicals or carbon-based chemicals)	-7.81	-1.54	-0.32	-0.76	4.93	3.05
Refined petroleum	-6.74	-6.13	-0.52	4.47	0.76	-6.17
Miscellaneous chemical products	-4.88	-0.25	-2.24	-1.05	1.54	0.10
Pharmaceutical industry	-7.38	-5.27	-4.03	-5.08	-4.92	3.68
Perfume, soaps and candle industry	-1.89	0.14	-0.83	-0.47	0.30	0.11
Plastic sheeting	-1.96	0.80	0.56	-0.35	0.31	-0.30
Plastic articles	-7.78	-3.15	-3.33	0.60	1.64	-0.30
Processing, sewing and weaving of natural fibres	-3.67	-4.11	0.71	4.76	3.65	1.19
Sewing and weaving of artificial or synthetic fibres	-7.24	3.71	-0.94	-0.01	0.17	-2.25
Other textile industries	-5.38	-0.92	-4.75	-0.66	2.10	-1.01
Clothing and accessories	-3.50	0.12	-0.75	0.82	2.15	0.20
Footwear	-1.35	0.31	0.00	1.02	0.67	0.12
Coffee industry	-0.07	0.01	-0.03	0.07	-0.01	0.00
Wheat milling	-2.16	11.47	-10.94	2.40	1.22	-4.16
Fruit and vegetable preserves, juices and condiments	-1.12	0.52	-0.35	0.28	0.65	0.27
Animal slaughtering and preparation of meats	-1.95	3.54	-2.12	1.40	5.39	-1.67
Poultry slaughtering and preparation	-0.03	0.01	-0.02	0.00	0.04	-0.01
Refrigeration and preparation of milk and dairy products	-4.05	1.88	0.99	-0.70	0.52	0.77
Sugar industry	0.14	0.15	0.18	0.04	-0.03	-0.10
Refining of vegetable oils and manufacture of fats for foodstuffs	-2.58	-3.72	1.30	-1.93	5.09	0.32
Other food industries	-9.80	-1.54	1.89	0.67	6.44	1.04

Source: Authors' calculations on the basis of data from Moreira and Puga (2001). See the text for the definition of the measure used.

sector i in a given period t , the response $y(i,t)$ is related to the coefficients a_i , the vector of variables $x(i,t)$ and random disturbances $e(i,t)$, according to the following expression:

$$y(i,t) = a_i + \mathbf{b}(i)'x(i,t) + e(i,t), \quad (1)$$

for $i = 1 \dots N, t = \dots T$.

The various models proposed in the specialist literature make different assumptions on the coefficients a_i , the vectors of coefficients $b(i)$ and the distribution of random terms $e(i,t)$ (Greene, 1997, p. 612). In this paper, the different sectors were allowed to have different a_i intercepts, but the regression coefficients $b(i)$ with respect to the variables x (estimation of which is the main purpose of the panel data analysis) are the same for the various sectors, i.e. $b(i) = b$ for $i = 1 \dots N$. It was thus assumed that the various sectors respond with the same velocity to variations in tariffs and the exchange rate, although they may have different initial response levels. This is known as a sectoral “fixed

effects” model.⁷ When, in addition to specifying a different intercept for each sector, it is also assumed that the covariance matrix of the disturbances $e(i,t)$ is diagonal and homoscedastic, the coefficients a_i and b can be calculated using ordinary least squares, with dummy variables indicating the various sectors. If the covariance matrix of the disturbances $e(i,t)$ is diagonal and heteroscedastic, the coefficients a_i and b can also be calculated by least squares; but a robust estimation of the covariance matrix for the b estimators will need to be made, e.g. using the White matrix (Greene 1997, p. 635).

The fixed effects model was thus used for panel data to infer the repercussions of tariff changes and exchange-rate movements on the import substitution index SI_A for the 34 industry sectors studied. After adapting a model with different fixed effects for each sector, a test was made on the null hypothesis (H_0) of equal constants a_i . If the test indicates acceptance of H_0 the final model will be a regression with the same basic intercept, $y(i,t) = a + bx(i,t) + e(i,t)$.

V

Results

The sudden change in the exchange-rate plateau in 1999 probably altered its effect on the import substitution index SI_A , which led to the decision to analyse the periods 1995-1998 and 1999-2000 separately. The fitted models were referred to as regression I and regression II, respectively.

In the first period studied (1995-1998) the sector effects were considerable; the values of the fixed effects a_i ($i = 1 \dots 34$) for each of the 34 sectors analysed are detailed in table 5. The average of those values was -68.04.

As the observations are heterogeneous, the appropriate covariance matrix was estimated using the White matrix, and the value of R^2 was 0.51.

Table 6 shows the values of the coefficients of regression I (1995-1998) for the explanatory variables; the coefficients on the tariff and exchange-rate are positive and significant.

In the final fitted model SI_A depends on specific fixed effects of the tariff and exchange rate for the sectors:

$$SI_A(i,t) = a_i + 0.2143 \text{ Tariff} + 0.6341 \text{ Exchange rate} + e(i,t).$$

In the 1999-2000 period (regression II), the sectors effect was not significant, such that in the final fitted model, SI_A only depends on an intercept a (which is common to all sectors) along with the explanatory variables “tariff” and “exchange rate”.

Table 7 shows the regression II coefficients for the explanatory variables. The value of R^2 was 0.2923.

The intercept a and the coefficients on the tariff and exchange rate are significant in the second period (regression II).

Consequently, the fitted model (regression II) was:

$$SI_A(i,t) = 35.8650 + 0.0486 \text{ Tariff} + 0.3207 \text{ Exchange rate} + e(i,t).$$

⁷ Some models also consider the randomness of the vector of b parameters between the cross-section units. These are an extension of simpler fixed and random effects models for panel data. The main difficulty in applying such “random-coefficient models” is that the panel normally refers to short time periods, so there are few observations with which to calculate b_i . For further details on this methodology, see Greene (2002, p. 309) and Pesaran and Smith (1995).

TABLE 5

Brazil: Values of sector fixed effects (a_j) in the first regression

Sector	Effect	SD ^a	<i>t</i>
1 Iron and steel	-65.24	10.78	-6.05
2 Non-ferrous metallurgy	-65.92	10.79	-6.11
3 Other metallurgical products	-68.68	10.75	-6.39
4 Tractors and road-building machinery, parts and accessories	-69.20	10.76	-6.43
5 Conductors and other electric materials, except for vehicles	-71.71	10.75	-6.67
6 Electronic and communications material and appliances	-72.23	10.76	-6.71
7 Automobiles, trucks and buses	-99.47	11.06	-8.99
8 Engines and vehicle parts	-65.43	10.76	-6.08
9 Other vehicles	-72.81	10.76	-6.77
10 Wood industry	-65.71	10.78	-6.10
11 Cellulose and mechanical pulp	-64.71	10.78	-6.00
12 Paper, cardboard and paper articles	-66.98	10.78	-6.21
13 Rubber industry	-67.24	10.77	-6.24
14 Chemical elements (excluding petrochemicals or carbon-based chemicals)	-67.30	10.78	-6.25
15 Refined petroleum	-65.01	10.80	-6.02
16 Miscellaneous chemical products	-66.18	10.78	-6.14
17 Pharmaceutical industry	-69.06	10.79	-6.40
18 Perfume, soaps and candle industry	-64.38	10.79	-5.97
19 Plastic sheeting	-66.50	10.76	-6.18
20 Plastic articles	-69.68	10.76	-6.48
21 Processing, sewing and weaving of natural fibres	-67.34	10.75	-6.26
22 Sewing and weaving of artificial or synthetic fibres	-67.89	10.75	-6.31
23 Other textile industries	-69.69	10.75	-6.48
24 Clothing and accessories	-67.88	10.75	-6.32
25 Footwear	-66.17	10.76	-6.15
26 Coffee industry	-64.62	10.78	-6.00
27 Wheat milling	-65.63	10.76	-6.10
28 Fruit and vegetable preserves, juices and condiments	-65.99	10.76	-6.13
29 Animal slaughtering and preparation of meats	-63.78	10.79	-5.91
30 Poultry slaughtering and preparation	-64.01	10.79	-5.93
31 Refrigeration and preparation of milk and dairy products	-66.78	10.76	-6.21
32 Sugar industry	-65.56	10.76	-6.09
33 Refining of vegetable oils and manufacture of fats for food	-65.63	10.79	-6.08
34 Other food industries	-68.79	10.75	-6.40
Average value of sector fixed effects = -68.04			

Source: Authors' calculations.

^a SD = Standard deviation.

TABLE 6

Brazil: Values of regression I parameters, *t*-statistic and significance level *P*

Variable	Coefficient	Estimate	SD ^a	<i>t</i> ₀	<i>P</i> [<i>t</i> > <i>t</i> ₀]
Tariff	b_1	0.2143	0.0270	7.943	0.0000
Exchange rate	b_2	0.6341	0.1099	5.770	0.0000

Source: Authors' calculations.

^a Standard deviation obtained from the White covariance matrix.

TABLE 7

Brazil: Values of regression II parameters, t-statistic and significance level P

Variable	Coefficient	Estimate	SD ^a	t_0	$P[|t > t_0|]$
Tariff	b_1	0.0486	0.0174	2.801	0.0067
Exchange rate	b_2	0.3207	0.0736	4.358	0.0000
Intercept	A	35.8650	8.2425	-4.351	0.0000

Source: Authors' calculations.

^a Standard deviation obtained from the White covariance matrix.

Comparing the data of table 6 and 7 reveals that the coefficients of the explanatory variables "tariff" and "exchange rate" decreased in the second period, and the regression R^2 dropped from 0.5081 to 0.2923. This suggests that other variables apart from those considered in this paper had a greater effect on the behaviour of SI_A in that period.

The influence of the explanatory variables "effective tariff" and "exchange rate" on the import substitution index will be now be analysed.

A simple review of the regression coefficients estimated after fitting a model is not sufficient to decide which of the explanatory variables causes the largest change in the response variable. This is because of the difference between the distributions of the explanatory variables, which can be inferred from the data in table 8 on the value of the mean, standard deviation and mean plus half a standard deviation of the explanatory variables "tariff" and "exchange rate", with respect to the dataset used in regression I.

Table 9 shows the same information for the data used in regression II.

The value of the predicted SI_A index was calculated on the basis of parameters estimated in regressions I and II for the variables tariff and exchange rate (table 7 and 8), and the values of the mean and standard deviation of these variables in the period 1995-1998 and 1999-2000 (tables 9 and 10).

According to regression I, when the values of the effective tariff and exchange rate are equal to their respective mean values in the period analysed, the predicted value of SI_A is -1.7951. When half a standard deviation is added to the average tariff and the mean value of the exchange rate is held constant, the predicted SI_A rises to 0.9782. When half a standard deviation is added to the mean of the exchange rate, holding the average value of the tariff constant, the predicted SI_A falls to -1.118. Consequently, according to regression I, which uses data from the first period analysed (1995-1998), the effective tariff variable exerted a greater influence on variations in the SI_A index

TABLE 8

Brazil: Statistics on the distribution of the effective tariff and exchange rate in regression I

	Tariff	Exchange rate
Mean	20.89	97.40
Standard deviation	25.89	2.13
Mean + 0.5 SD	33.84	98.47

Source: Authors' calculations.

TABLE 9

Brazil: Statistics on the distribution of the effective tariff and exchange rate in regression II

	Tariff	Exchange rate
Mean	21.49	111.80
Standard deviation	19.65	4.63
Mean + 0.5 SD	31.31	114.12

Source: Authors' calculations.

than the exchange rate variable. These data are summarized in table 10.

In regression II, the predicted SI_A index, based on values of the average tariff and exchange rate in the period (table 9), is 1.034. Adding half a standard deviation to the average tariff and holding the mean value of the exchange rate constant raises the predicted SI_A to 1.511. When half a standard deviation is added to the average exchange rate, holding the mean value of the tariff constant, the predicted SI_A rises to 1.7803. Consequently, according to regression II, which corresponds to 1999-2000, the exchange-rate variable exerts greater influence on variations in the SI_A index and the effective tariff variable. These data are summarized in table 11.

These results show that variations in effective tariffs and the exchange rate influenced the SI_A index throughout the period analysed (1995-2000), and that SI_A is a rising function both of the exchange rate and of the effective tariff level in the 34 sectors of

TABLE 10

Brazil: Predicted SI_A index in regression I for selected values of the explanatory variables “effective tariff” and “exchange-rate”, in 1995-1998^a

Effective tariff	Exchange-rate	Predicted SI_A Index
M_{TARIFF}	$M_{\text{EXCHANGE RATE}}$	-1.7951
$M_{\text{TARIFF}} + 0.5 SD_{\text{TARIFF}}$	$M_{\text{EXCHANGE RATE}}$	0.9782
M_{TARIFF}	$M_{\text{EXCHANGE RATE}} + 0.5 SD_{\text{EXCHANGE RATE}}$	-1.118

Source: Authors' calculations.

^a M = Mean; SD = Standard deviation.

TABLE 11

Brazil: Predicted SI_A index in regression II for selected values of the explanatory variables “effective tariff” and “exchange rate”, in 1999-2000^a

Effective tariff	Exchange-rate	Predicted SI_A Index
M_{TARIFF}	$M_{\text{EXCHANGE RATE}}$	1.034
$M_{\text{TARIFF}} + 0.5 SD_{\text{TARIFF}}$	$M_{\text{EXCHANGE RATE}}$	1.511
M_{TARIFF}	$M_{\text{EXCHANGE RATE}} + 0.5 SD_{\text{EXCHANGE RATE}}$	1.7803

Source: Authors' calculations.

^a M = Mean; SD = Standard deviation

manufacturing industries studied. Nonetheless, inter-sectoral fluctuations of the SI_A index in the period prior to the devaluation (1995-1998) were more reflective of inter-sectoral fluctuations in effective tariff levels, whereas in the subsequent period (1999-2000) they mainly responded to exchange-rate movements. This result means that if 1995-1998 was the period of greatest stability in nominal and effective tariffs in the last decade, and this lasted until 2000, the exchange-rate variation observed as from January 1999 was mainly responsible for the import

substitution in those sectors in 1999 and 2000, compared to 1998.

Thus the import substitution that occurred in 1995-1998 was induced by the maintenance of significant tariffs (trade liberalization measures notwithstanding) and a degree of dispersion in the tariff structure, which resulted in significant levels of effective protection. After 1999, following the sharp exchange-rate devaluation, the relative price effect was stronger than protection as a force inducing import substitution, the pace of which slackened following the revaluation of the *real* in 2000.

VI

Conclusions

This paper has used regression analysis to evaluate the influence of the effective tariff and real effective exchange rate on the import substitution index (SI_A) during the period 1995-2000. The analysis shows that the two variables had considerable repercussions on variations in that index. From 1999 onwards, the real effective exchange rate had a greater effect than the effective tariff, since nominal and effective tariffs varied very little after 1998, while the exchange rate depreciated sharply in January 1999. This suggests that the import

substitution process of the recent period was probably natural or spontaneous rather than induced.

This is a significant result, because it highlights the importance of productive sectors' having well-adjusted relative prices. Greater transparency in market signals is what makes it possible to efficiently exploit an economy's comparative advantages, just as international trade theory teaches.

(Original: Portuguese)

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Periodic reports

Social Panorama of Latin America, 2005, LC/G.2288-P/E), United Nations publication, Sales No. E.05.II.G.161, ECLAC, Santiago, Chile, March 2006, 436 pages.

The 2005 edition of the *Social Panorama of Latin America* analyses recent poverty trends and the increase in migrant remittances, together with their impact on the well-being of the region's population. Short- and long-term trends in social spending, the distribution of such expenditures among the various socio-economic strata and their effects in terms of income deconcentration and increased well-being are also reviewed. The analysis seeks to explore the question as to whether the demographic transition taking place in Latin American countries over the past 15 years has helped to narrow the long-standing gaps between different socio-economic groups' and areas' mortality and birth rates. Attention is also drawn to the magnitude of the HIV/AIDS epidemic in Caribbean countries and to the reversal of its skewed gender distribution, which has had a devastating impact on households and the community at large. Finally, this edition looks at major changes in the health sector, the policies and programmes being used to cope with them, and the various financial and management issues that the countries will have to address in this connection.

The chapter on poverty presents projections of poverty and indigence levels for 2003-2005, together with recent estimates for some countries in the region. This information appears to indicate that poverty is on the decline, although not fast enough to enable the region to meet the first target set in relation to the Millennium Development Goals. In addition to examining the region's progress towards the satisfaction of basic needs, this chapter provides new data on the impact of remittances on the population's living standards. These data indicate that remittances are helping to raise recipient households' living standards substantially and are enabling many of their members to escape from poverty. The impact that such remittances have on overall poverty and indigence rates and on income distribution is very limited, however.

The chapter on social spending provides information on public social expenditure levels in the region, recent and longer-term trends in such expenditure, spending patterns and the impact on income distribution. A close look is taken, in particular, at how the Latin American and Caribbean countries have been allocating these funds among the various social sectors in recent years. This analysis includes a consideration of how the economic recessions experienced by some countries early in the decade have affected social expenditure and seeks to determine whether or not the traditional relationship between social spending levels and the business cycle has changed in any way. Spending patterns in the areas of education and health are reviewed, with attention being devoted to the proportion of

public funds received by the different income strata and how progressive the resulting pattern is. This analysis closes with an examination of the impact of total social expenditure and its various components in terms of income deconcentration and increases in the level of well-being of the region's households.

Microdata from the 1990 and 2000 census rounds were processed in an effort to answer the question as to whether the demographic transition that has occurred in Latin America over the past 15 years has helped to narrow the long-standing gaps between different socio-economic groups' and areas' mortality and birth rates. The analysis of these data points to the existence of differing trends within countries in terms of the link between social inequality and mortality and fertility rates. In most of the countries, infant mortality (especially in urban areas) fell more sharply among lower socio-economic strata, thereby reducing this extreme indicator of social inequality. There are still exceedingly sharp disparities in such rates, however, owing to the high number of preventable premature deaths occurring in the poorer strata, and differentials in fertility rates declined in only a minority of the countries under review. Moreover, in almost all cases, fertility rates rose among adolescents in low and mid-level socio-economic strata. This trend reflects both the intractability of fertility rates among these groups and a considerable increase in social inequality in terms of early reproduction. These findings validate measures targeting the proximate determinants of mortality and fertility – whose effect is felt in all socio-economic groups and even under macroeconomically adverse circumstances – and underscore the need to apply new policies and approaches to address emerging issues such as those posed by the existence of fertility schedule differentials.

The chapter on HIV/AIDS briefly reviews how this epidemic is affecting the Caribbean and looks more closely at trends within the female population. It also analyses how gender relationships influence women's access to their sexual and reproductive rights and why women have become more vulnerable to HIV infection, which is having devastating consequences in terms of female morbidity and mortality rates, women's health, and the well-being of their families and the community in general, as well as the implications in relation to perinatal disease transmission. It also highlights the importance of understanding what sorts of gender-related problems are contributing to this epidemic in the Caribbean in order to devise policies and programmes that will help to stem the advance of the disease.

The chapter on the social agenda provides an overview of the health situation and health-care programmes in Latin American countries. This analysis is based on the responses to an ECLAC survey received from the health ministries of 17 countries. The survey was designed to provide information on how existing health programmes are viewed from the institutional perspective of the countries' ministries of health and how national authorities are assessing the health situation and specific health problems affecting the population. The responses reflect the different sociodemographic situations of the countries and provide a mixed picture in terms of governments' response capacity to public health issues. Most of the countries cite funding and management difficulties that hinder their efforts to cover health needs. Inequality in health care stems not only from shortcoming in access associated with sociocultural and geographical circumstances, but also from

income inequality, which translates into living conditions that are insufficient to prevent health problems or satisfy the health needs of the population.

As is customary, this discussion of the international social agenda also reviews the international meetings at which social issues have been addressed. In this instance, special attention is devoted to various regional meetings held within the United Nations system in order to launch the inter-agency document coordinated by ECLAC entitled *The Millennium Development Goals: A Latin American and Caribbean Perspective*. The main conclusions of this study are also summarized.

Foreign investment in Latin America and the Caribbean, 2005, LC/G.2309-P. United Nations publication, Sales No. E.06.II.G.44, ECLAC, Santiago, Chile, May 2006, 183 pages.

In 2005, foreign direct investment (FDI) inflows to Latin America and the Caribbean (not including financial centres) amounted to over US\$ 68 billion, almost 11% more than in 2004. These inflows greatly exceed the figures recorded between 2001 and 2003, but they still fall short of the volumes observed during the FDI boom of the late 1990s. The region also continues to see its share of world flows decline, which suggests that it has yet to realize its true potential for attracting such investment. This is at least a two-fold problem.

On the one hand, the region has certain policy-related and institutional weaknesses that hinder its efforts to face up to the strong competition for FDI. To gain a better understanding of this situation, the Economic Commission for Latin America and the Caribbean (ECLAC) carried out a study on the role and practices of 15 investment promotion agencies. The findings of that study are presented in chapter II.

On the other hand, success in taking advantage of FDI and the presence of transnational corporations depends, to a large degree, on the extent of local companies' absorptive capacity. The second part of this year's report provides a detailed analysis of the competitive positions and internationalization processes of a large number of emerging Latin American transnational corporations, referred to in the study as "trans-Latins". This information was compiled on the basis of interviews with executives from major trans-Latins in Argentina, Brazil, Chile and Mexico. The conclusions reached on the basis of this analysis are presented in chapters III through VI.

Institutional books

Shaping the Future of Social Protection: Access, Financing and Solidarity, LC/G.2294, United Nations publication, Sales No. E.05.II.G.161, ECLAC, Santiago, Chile, February 2006, 193 pages.

Since the early 1990s, ECLAC has been advocating a new development paradigm that is better suited to a globalized world of open economies. While retaining the Commission's long-standing focus on seeking out positive synergies between economic growth and social equity as part of a productive modernization process, this paradigm also underscores the importance of enhancing competitiveness, preserving macroeconomic balances and strengthening a participatory and inclusive democratic political system. The idea at the core of

this proposal is that the Latin American and Caribbean economies will have to transform their production structures, as well as embarking upon an intensive process of human capital formation, in order to move their development process forward.

From a social perspective, ECLAC has placed special emphasis on promoting greater equality of opportunities through education and the benefits it brings to poor families, addressing and reversing the exclusionary dynamics of structurally heterogeneous labour markets, redistributing assets through social spending and promoting the full exercise of citizenship, with the ultimate aim of strengthening democracy while laying the political foundations for the consolidation of more inclusive societies.

ECLAC now proposes to take this line of thought a step further by focusing on social protection. Today, the issue of social protection has reached a historic turning point at which the region is called upon to take a different approach in coping with the new global order and its implications for national societies. The main reason why solidarity-based social protection mechanisms need to be rethought is that the labour market has not demonstrated a capacity for greater inclusiveness either through the creation of decent job opportunities or the generation of a sufficient level of social protection contributions. It is important, certainly, to promote policies to create more and better jobs, but in the short and medium terms, employment cannot be expected to serve as the sole mechanism for protecting the bulk of the population from the risks associated with inadequate income, health problems and ageing.

The structural changes reflected in the current situation call for a fresh approach to social protection within a framework of integral solidarity that combines contributory and non-contributory mechanisms. A new social covenant must therefore be formed in which social rights are seen as the normative horizon and existing inequalities and budgetary restrictions are the limiting factors to be addressed. In other words, the ethical imperatives that underpin a social rights-based covenant must be reconciled with existing financial constraints. Emphasis must also be placed on efficient resource use with a view to expanding the coverage and raising the quality of services, especially for the lowest-income sectors of the population.

The proposals put forward in this document are designed to build bridges between social rights and policy guidelines aimed at making them more enforceable through improved access, better financing and greater solidarity. To this end, the study devotes particular attention to some of the main issues relating to social protection, such as the reform and design of health and pension systems, taking into consideration both labour market dynamics and the countries' fiscal capacities. Programmes aimed at providing support to society's poorest groups are also examined. The analyses offered here are thus intended to delineate some of the issues that should be encompassed by a new social covenant founded upon the right to social protection.

Other publications

"Pobreza, desertificación y degradación de los recursos naturales," *Libro de la CEPAL*, No. 87, LC/G.2277-P, United Nations publication, Sales No. S.05.II.G.178, ECLAC, Santiago, Chile, December 2005, 267 pages.

This publication reviews the results achieved and lessons learned during the execution of the ECLAC/GTZ project on indicators of the socio-economic impact of desertification and land degradation, conducted by ECLAC in Argentina, Brazil and Chile.

Chapter I, on poverty, desertification and land degradation, considers the causal relationships between these three problems in the countries of the region. It reviews the stages involved in constructing the theoretical and methodological framework for the set of indicators on the socio-economic impact of desertification which were used in the project; analyses the relationship between poverty, desertification and migration by studying the situation in Argentina, Brazil and Chile; undertakes an in-depth survey of the literature on the subject in various parts of the world; and looks at the advances achieved in developing explanatory models and indicators relating to desertification. It also provides an econometric formalization of the proposed desertification model.

Chapter II analyses desertification as a factor in the loss of sustainability, efficiency and equity in resource allocation and the transgenerational transmission of well-being. It looks at inefficiencies in the distribution of well-being in desertified areas, examines a number of public-policy, institutional and market failures, and explores various aspects of the valuation of drylands according to their direct and indirect, consumptive and non-consumptive uses, and their option and quasi-option, non-use and existence or bequest values. In closing, the chapter summarizes methods for the environmental valuation of dryland goods and services which contribute to human well-being and which can be threatened by desertification, such as the production approach, defensive costs, damage avoided, replacement costs, hedonic prices, travel costs and contingent valuation.

Chapter III takes an in-depth look at econometric models and describes the results obtained through their application, using data for the Fourth Region of Chile from the country's latest agricultural census. This chapter shows that:

- Total factor productivity (TFP) is greater in production units located in non-desert areas than in those located in areas subject to desertification. This theory indicates that productive efficiency is greater in non-desert areas than in desertified zones.
- The impact of goat-raising puts heavy pressure on land resources. It limits their productive capacity and thereby fuels processes of degradation and desertification which, in the long term, exacerbate the vicious circle of poverty and desertification.
- The effect of desertification on land's productive capacity is different in desertified and non-desertified areas, which explains the differentials in the production elasticity (in terms of gross value) of these land areas.

Chapter IV, on the economics of desertification, gives a systematic account of various notions concerning the costs of this phenomenon and considers the customary patterns found in Brazil in terms of public policymaking and implementation. Particular attention in this connection is devoted to , environmental policies, which have a high failure rate.

Chapter V describes the system of socio-economic indicators relating to desertification that was constructed during the project, the tools available for their processing, particularly the REDATAM (Retrieval of Data for Small Areas by

Microcomputer) program developed by ECLAC, and ways of accessing this information.

Chapter VI describes one of the core activities of the ECLAC/GTZ project, which is consultation with the population in affected areas. The work done in this area was undertaken in accordance with the United Nations Convention to Combat Desertification, which calls for any actions taken to be planned and implemented with participation by all actors involved, especially the local community. This chapter presents the results of consultations with communities in La Puna, Argentina, in Caicó, Brazil, and in Rfo Hurtado, Chile, as well as the methods used and the contextual analysis carried out in each case.

Chapter VII describes efforts to analyse the socio-economic aspects of desertification by using indicators to measure social impacts of local degradation processes with a view to providing a basis for intervention policies.

The final chapter of this publication uses a case study conducted in an arid area on the southern edge of the Atacama desert in Chile to explain to the reader, in accessible language, how to construct a system of indicators to assess and measure the environmental and human dimensions of land degradation phenomena as a means of providing inputs for decision-making at the national, local and private levels.

Aglomeraciones en torno a los recursos naturales en América Latina y el Caribe: Políticas de articulación y articulación de políticas, *Libro de la CEPAL*, No. 88, LC/G.2285-P, United Nations publication, Sales No: S.05.II.G.157, ECLAC, Santiago, Chile, November 2005, 259 pages.

This book was produced in the framework of the Project on Natural Resource Cluster Development Strategies (GER/99/128) being conducted by ECLAC and the German Agency for Technical Cooperation (GTZ) with the support of the Government of Germany.

The purpose of the study is to contribute to the debate on development policies for Latin America and the Caribbean, a region characterized by its comparative advantages in the area of natural resources and its enormous "gaps" and heterogeneity both in physical and in productive, social and cultural terms. On the basis of a critical reading by specialists from ECLAC and other organizations of case studies on natural resource clusters, the study concludes that the function of public policy, in general, and local organizations, in particular, is to promote interaction among enterprises and institutions and to help them develop the ability to innovate and adapt to constantly changing market conditions, as well as coordinating their own policies and programmes from a long-range perspective.

This analysis is preceded by an examination of the historical context of public policies and lessons learned and of the differences between the conditions present in the region and in the developed countries which inspired its policies. An attempt is also made to define the actual concept of a production cluster as such, and guidelines are offered as to how, where and for what purpose countries should formulate policies and actions to promote linkages, with the ultimate aim of strengthening competitiveness.

The authors answer the question as to whether a form of development based on natural-resource production clusters is desirable with a categorical "yes." The study discusses how difficult it is to ensure that businesses, particularly small and

medium-sized enterprises, are dynamic and flexible, produce the goods that are in demand with the desirable quality, quantity and timeliness, and form virtuous clusters with strong local synergies so that the existing gaps can be narrowed. It goes on to note, however, that there seems to be little choice but to work in that direction by taking advantage of every opportunity for public-private cooperation and drawing upon all the strengths of the private sector and the State apparatus.

Políticas municipales de microcrédito. Un instrumento para la dinamización de los sistemas productivos locales. Estudios de caso en América Latina, *Libro de la CEPAL*, No. 89, LC/G.2286-P, United Nations publication, Sales No. S.06.II.G.16, ECLAC, Santiago, Chile, March 2006, 236 pages.

Over the past decade, public institutions have become more interested in using microcredit as a tool to combat poverty and boost economic circuits based on smaller enterprises. Three case studies are analysed in this book, in Argentina, Brazil and Mexico, where local governments have initiated microcredit programmes which, although their organizational structures, methods of intervention and levels of participation by public institutions differ, all have in common the aim of using microcredit to galvanize the local production structure.

Through these programmes, and specifically by integrating microcredit with other means of assisting businesses, these municipal governments' aim is to contribute to the development of local production systems based on micro- and small enterprises.

A comparative analysis of these cases is also undertaken. This part of the study looks at such enterprises' strengths and weaknesses in an attempt to offer elements for consideration when defining strategies to dynamize the local productive fabric.

This research has shown that the specific characteristics of the production environment and the needs of a given target group are important factors for the definition of both strategic goals and the tools needed in order to achieve them.

The characteristics of the local business sector, financial supply and demand, the existence of very weak socio-economic groups and the political stability of local governments are factors which influence the design and implementation of microfinance projects.

The study also explores a variety of options with regard to intervention methods and organizational forms, ranging from integrated programmes implemented directly by the corresponding municipality to banks in which the public sector is a stakeholder.



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