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A R T I C L E S

Explanatory notes

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., 2006/2007.

(-) Use of a hyphen between years (e.g., 2006-2007) 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.

Overcoming the "empty box syndrome". Determinants of income distribution in Latin America

Ivonne González and Ricardo Martner

ABSTRACT

Latin America's persistent inequality seem to reflect the lack of specific policies to reduce income disparities. The present study uses econometric techniques to estimate the determinants of the income distribution in the region, in a context in which economic growth seems to coexist with the reduction of inequalities — thereby overcoming the "empty box syndrome" that characterized the region in the 1980s and 1990s. Using cross-section studies of a sample of member countries of the Organization for Economic Cooperation and Development (OECD) and Latin America, along with panel estimations for 18 Latin American countries in the period 1990-2010, the article reveals the key role played by educational, institutional and macroeconomic variables in the recent improvements. It also identifies the importance of fiscal action, through variables such as social spending, expenditure on education, capital expenditure and an indicator of the progressiveness of the tax system.

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I

Introduction

Latin America continues to be the most unequal region of the world, although most of its countries are middle-income economies and continue to enjoy relatively sustained economic growth. Projections by the International Monetary Fund (IMF, 2012) show that several Latin American countries will have a per capita income of around US$ 20,000 measured in purchasing power parity (PPP) terms, which is the threshold for classification as a developed country. This status poses even greater income-distribution challenges.

The region's inequality is illustrated by the usual income-distribution indicator, the Gini coefficient. Discussion on this distribution differs from discussion on growth, despite well-known dichotomies and complementarities (ECLAC, 1990). For example, while Burundi has a nominal per capita gross domestic product (GDP) of just US$ 192, its Gini coefficient is 0.33 — indicating a better income distribution than one of Latin America's least unequal countries, Uruguay, which in 2010 had a Gini coefficient of 0.42 but a nominal per capita GDP of US$ 12,000.

In the region, growth combined with a highly unequal income distribution (as in several Latin American countries) coexists with situations of stagnation or poverty combined with either a good or a bad income distribution; but fortunately growth can also go hand in hand with equality.[1] The "empty box syndrome" (Fajnzylber, 1990) shows that Latin American countries did not achieve simultaneous growth and equity goals in the 1980s, nor (more ominously) in the 1990s. Since the publication of the key article that provides the title for this paper, the region's income distribution has not improved much, as the average Gini coefficient fell by just five points from 0.55 in 1990 to 0.50 in 2010. The persistence of inequality seems to reflect the absence of specific policies to reduce income disparities, compounded by predominantly volatile income and employment levels.

The relation between the level of national income and its distribution can be interpreted in two directions: become more equal to grow, or grow to become more equal; and it also displays dichotomies and complementary features (ECLAC 2010). While many studies have tried to estimate how the income distribution affects economic growth, in most cases the results have been somewhat vague. Barro (2000) uses panel regressions for a broad sample of 100 countries to estimate the per capita GDP growth rate, using explanatory variables that include the rate of investment, the fertility rate, years of schooling, and the terms of trade. An additional explanatory variable is the Gini coefficient, which proves to be non-significant for the sample as a whole, but positive for the lower-income countries and negative for wealthier ones. The author uses this finding to infer the existence of a Kuznets curve in which "…inequality first increases and later decreases during the process of economic development."

Since the Barro study, the general evidence has confirmed that this relation is not statistically robust (López and Servén, 2005), so apparently there is no verifiable linear relation between the income distribution and economic growth in cross-section estimations. Nor do there seem to be any studies that analyse this issue exclusively for a sample of Latin American countries.

On the other side of the coin, while discussion of the causes of the unequal income distribution have been intense and polemical, there are few studies (if any focusing specifically on Latin America) that seek to quantify the explanatory factors involved. Martorano and Cornia (2011) and Cornia (2012) have compiled variables related to the income distribution for the region in a publicly accessible database; while Lustig, López-Calva and Ortiz-Juárez (2011) have produced a wide range of research studies analysing selected cases and identifying a variety of causes for the recent improvement in inequality indices, such as educational progress and larger government transfers to the poorest families. ECLAC (2011) also analyses changes in inequality with a labour and non-labour income breakdown.

In a recent econometric estimation for OECD countries, Afonso, Schuknecht and Tanzi (2008) find that government policies have positive effects on the income distribution, both directly through social spending and indirectly through the quality of education and institutions.

The present article aims to replicate these methodologies for Latin American countries, performing

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☐ This article is an update of González and Martner (2010).
[1] In OECD countries, this combination prevailed in particular between 1950 and 1980, when the Gini coefficient dropped from over 0.40 to 0.30, against a backdrop of economic growth (Afonso, Schuknecht and Tanzi, 2008).

econometric estimations to analyse the repercussions of public expenditure and the composition of taxes, among other variables, on the income distribution. This approach is simpler than the usual procedure, in which Gini coefficients are compared before and after taxes and public expenditure (for a compilation see Gómez Sabaini and Martner, 2008); and the aim is to directly estimate the effects of fiscal action on the income distribution for a broad sample of Latin American countries. This may help consolidate the literature that stresses the primacy of fiscal action in variations in the Gini coefficient.

The rest of this article is organized as follows: section II describes recent trends in the income distribution and economic growth; section III reviews a number of older and more recent ECLAC studies on proposals for overcoming the "empty box syndrome" and presents the estimates; and lastly section IV offers concluding remarks.

II
The "empty box syndrome"

Growth in the region over the last few decades has been highly volatile, with four clearly defined phases starting in 1990 (see figure 1): an upswing until 1997, followed by an acute crisis between 1998 and 2002; a third phase of strong recovery between 2003 and 2008, and a fourth phase, starting in late 2008, of slump and recovery in the wake of the international financial crisis.

Without denying the importance of more structural factors, these clearly defined cycles have undoubtedly had a major effect on variations in the indices that measure the income distribution. Table 1 shows that the Gini coefficient has responded to these fluctuations in several countries. Accordingly, the 1990s could be described as a period of "exclusive growth (see figure 2), because, except for Uruguay, Colombia and Honduras, the average Gini coefficient remained constant, despite annual per capita GDP growth of around 2%. As would be expected, the 1998-2002 crisis tended to make that coefficient deteriorate, particularly in Argentina and Costa Rica.

FIGURE 1
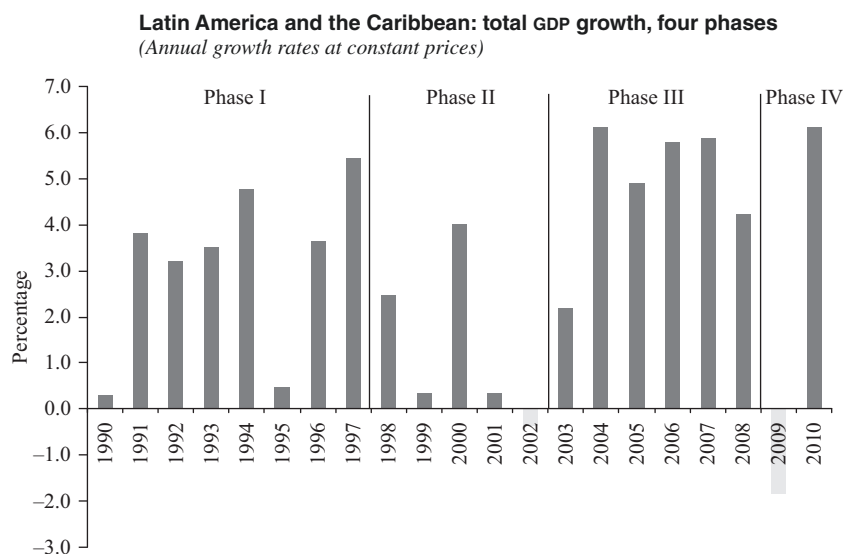
Latin America and the Caribbean: total GDP growth, four phases
(Annual growth rates at constant prices)

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

GDP: Gross domestic product.

TABLE 1

Latin American and Caribbean, selected countries: Gini coefficient
(Values between 0 and 1)

Country/period	1985-1990	1990-1997	1998-2002	2003-2008	2009	2010
Argentina	0.50	0.52	0.55	0.53	0.51	0.51
Bolivia (Plurinational State of)	0.59	0.60	0.60	0.57	-	-
Brazil	0.63	0.62	0.64	0.61	0.58	-
Chile	0.56	0.55	0.56	0.54	0.52	-
Colombia	0.59	0.57	0.58	0.57	0.58	0.58
Costa Rica	0.45	0.45	0.48	0.48	0.50	0.49
Ecuador	0.50	0.52	0.53	0.52	0.50	0.50
El Salvador	0.50	0.51	0.52	0.49	0.48	0.45
Guatemala	0.59	0.57	0.55	0.57	-	-
Honduras	0.62	0.58	0.57	0.59	0.57	0.57
Mexico	0.54	0.53	0.53	0.52	0.48	0.48
Nicaragua	0.57	0.58	0.58	0.54	-	-
Panama	0.52	0.57	0.55	0.54	0.52	0.52
Paraguay	0.59	0.58	0.56	0.54	0.51	0.53
Peru	0.49	0.53	0.54	0.50	0.47	0.46
Dominican Republic	0.50	0.52	0.53	0.56	0.57	0.55
Uruguay	0.50	0.45	0.45	0.45	0.43	0.42
Venezuela (Bolivarian Republic of)	0.50	0.49	0.50	0.45	0.42	0.39
Latin America (simple average)	*0.54*	*0.55*	*0.55*	*0.53*	*0.51*	*0.50*

Source: Prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

FIGURE 2

**Latin America and the Caribbean, selected countries:
per capita GDP growth and changes in inequality, 1990-2000**

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

GDP: Gross domestic product.

In contrast, the first decade of the new millennium can in hindsight be described as a period of "inclusive growth", since the vast majority of Latin American countries enjoyed positive growth and substantial improvements in their Gini coefficients, which fell by an average of four percentage points (figure 3). Although the evidence is very recent, it is worth mentioning the coexistence of growth with rising degrees of equality, as seen in Argentina, Panama, Peru and Uruguay, which grew at above-average rates while also achieving better-than- improvements in their Gini coefficients.

The Bolivarian Republic of Venezuela, Brazil, El Salvador, Mexico, Nicaragua and the Plurinational State of Bolivia all recorded significant progress in terms of the income-distribution measure, although their economies grew more slowly than the regional average. Other countries, such as the Dominican Republic and Ecuador, enjoyed vigorous growth, but with below-average distributional improvements. Lastly, Chile, Colombia, Guatemala, Honduras and Paraguay under-performed the average both in growth and in the absolute variation of the Gini coefficient. Of course, these measures are static and only reflect the signs of a changing economic and social dynamic. What is clear, however, is that the region has staged a rapid recovery from the effects of the financial crisis, but with results in terms of income distribution that vary widely across countries.

FIGURE 3

**Latin America and the Caribbean, selected countries:
per capita GDP growth and changes in inequality, 2003-2010**

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC).

GDP: Gross domestic product.

This diversity can possibly be explained by the region's productive heterogeneity. Cornia (2012) divides the region's countries into three groups: (i) "industrial economies" (Argentina, Brazil, Mexico, Uruguay); (ii) "commodity exporters" (Plurinational State of Bolivia, Chile, Colombia, Costa Rica, Ecuador, Peru and the Bolivarian Republic of Venezuela); and (iii) "remittance receivers" (Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Panama and Paraguay). Although this classification is somewhat artificial and misleading, it has the merit of revealing significant differences in the trend: the "industrial economies" and the "commodity exporters" saw their Gini coefficients fall relatively more than the "remittance receivers" (by 4 and 2 points of the Gini coefficient, respectively, see figure 4).

Although there are likely to be other country-specific situations that explain the progress made (see box 1 for the case of Brazil), it is clearly worth performing statistical inference studies to identify common causes.

BOX 1

Income distribution in Brazil

Having remained stable around 0.60 for several decades until 2000, the Gini coefficient then trended downwards by 0.7 points per year, to reach a level of 0.54 in 2008. The available evidence shows that roughly half of this reduction reflected improvements in the social protection system — particularly the contributions made by the *Bolsa Família* family subsidy programme (PBF) and other social assistance mechanisms. The PBF has substantially increased its number of beneficiaries and today serves 11 million families, or nearly 50 million individuals.

The second fundamental policy for reducing inequalities involved raising the minimum wage, which has grown continuously since 1995. A policy of minimum-wage hikes projected to 2023 has been in force since 2007, mandating adjustments based on inflation and GDP growth over the two previous years. The minimum wage indexes two thirds of social security benefits, both urban and rural. In addition to the social protection network and the recovery of the minimum wage, growing formalization also helps make the labour market increasingly inclusive. Lastly, improvements in the educational profile of the economically active population, although still slow, have helped reduce labour-market inequalities.

The figure below illustrates the pace of the expected continuous fall in the Gini coefficient. By 2015, the index should be below 0.50, according to the targets set in the 2012-2015 multi-year plan (PPA).

Brazil: Gini coefficient, 1995-2015
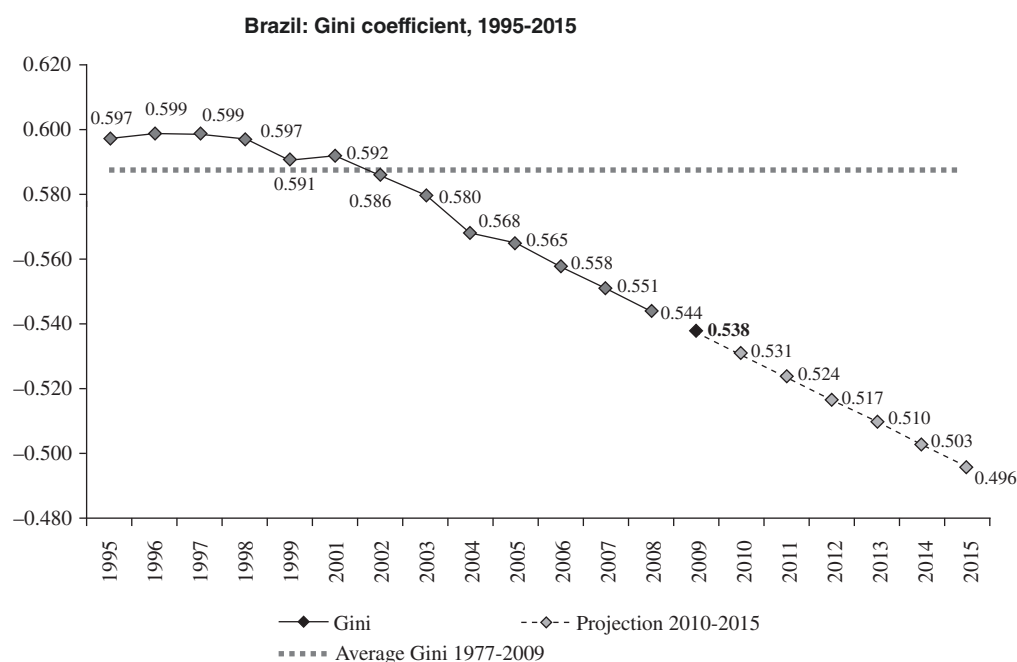
Source: Ministry of Planning, Budget and Management, "Mensagem presidencial. Projeto de Lei Orçamentária – 2009" [Presidential message, Draft Budget Law, 2009], Brasilia [online] http://www.planejamento.gov.br/secretarias/upload/Arquivos/sof/ploa09/080827_ploa_Mensagem09. pdf; and "PPA 2012-2015 – Plano Mais Brasil" [2012-2015 Multi-year plan – 'More Brazil Plan'], Brasilia [online] http://www.planejamento. gov.br/noticia.asp?p=not&cod=7571&cat=155&sec=10.
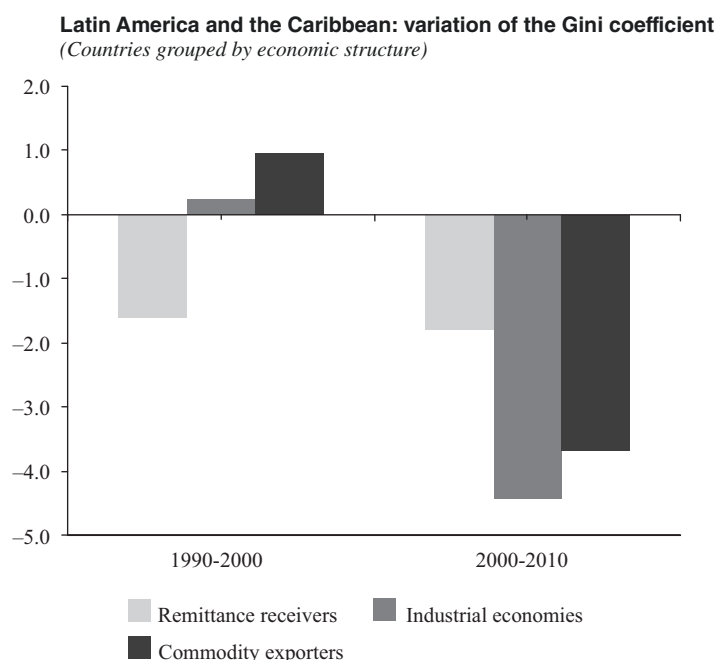
FIGURE 4

Latin America and the Caribbean: variation of the Gini coefficient
(Countries grouped by economic structure)

Remittance receivers   Industrial economies
Commodity exporters

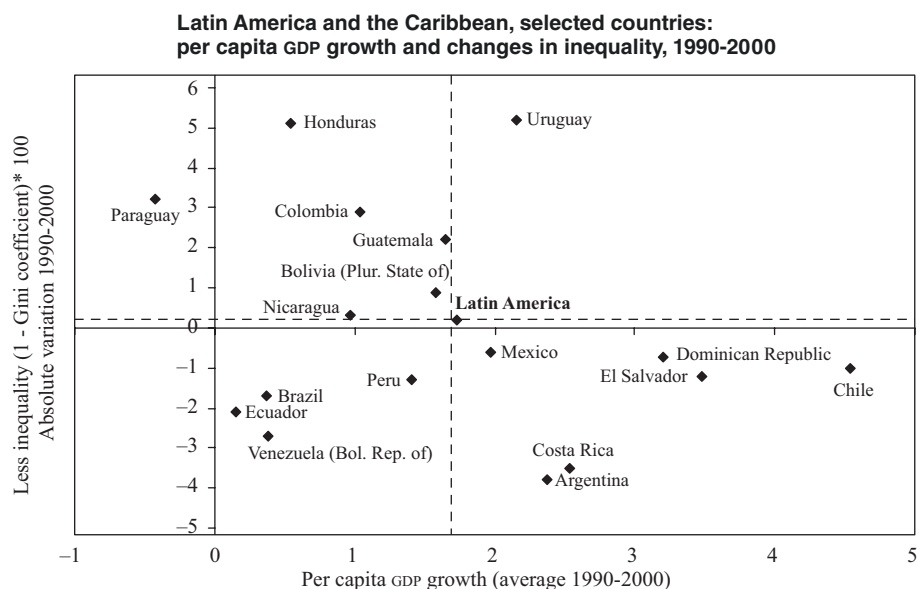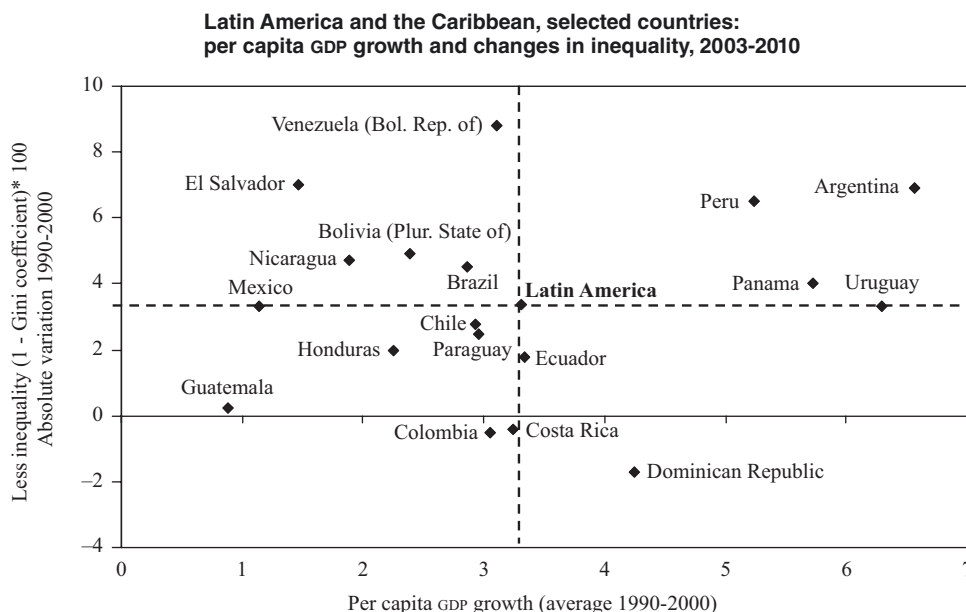*Source*: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC) and G. Cornia (2012), *"Inequality trends and their determinants: Latin America over 1990-2011"*, *Working Papers*, No. WP2012/09, World Institute for Development Economics Research (WIDER), 2012.

III

Determinants of the income distribution

There is an abundant and varied literature on the determinants of the income distribution (Lerda, 2009). In its *2006 World Development Report* the World Bank states that "Equity is defined in terms of two basic principles. The first is equal opportunities: that a person's life achievements should be determined primarily by his or her talents and efforts, rather than by pre-determined circumstances such as race, gender, social or family background. The second principle is the avoidance of deprivation in outcomes, particularly in health, education and consumption levels".

ECLAC has made various contributions to the debate on the meaning of equity. As noted by Infante and Sunkel (2009): "ECLAC (1964) contended that the structural heterogeneity of Latin America manifested itself at that time in the differing productivity levels of workers in the various production strata, a characteristic of the region's economy that also lay at the root of its unequal income distribution". The concept of productive

convergence is therefore crucial for economic growth with equity, as stressed in successive ECLAC publications (2008 and 2010).

Why is the income distribution more equal in some countries than in others? Concepts such as the "empty box syndrome" express the region's decades-long incapacity to open the "black box" of technical progress. Thus, according to Fajnzylber (1990) an internationally competitive industrial system, in a social context that has surpassed a minimum equity threshold (agrarian reform), could help promote equality in the country through the following channels at least: a relatively broader distribution of ownership, associated with the creation of small and medium-sized enterprises; dissemination of labour skills; faster employment growth, associated with a dynamic international market; rising levels of productivity and pay; a broader-based and more socially integrated education system, which is an essential requirement for sustaining international

competitiveness; and, lastly, dissemination of the industrial rationale throughout society, through both formal and informal channels, thereby making society more receptive to absorbing technical progress, which in turn will help raise productivity and distribute the fruits of technical progress more equitably among society at large http://www.eclac.cl/publicaciones/xml/0/27240/lcg2322e.pdf].[2]

Without doubt, this vision of "productive convergence" is crucial for understanding the dynamics of growth with equity in emerging countries (Infante and Sunkel, 2009); but it is also interesting to consider more explicitly the effects of political stability, institutions and fiscal policy.

In "*The Fiscal Covenant. Strengths, Weaknesses, Challenges*" ECLAC (1998), it is argued that "Society usually entrusts the State in particular with a crucial role in the promotion of social equity, and a fiscal covenant would be incomplete and unsatisfactory if that role were not provided for or were ignored or inadequately performed. Important aspects of that role are the promotion of equal opportunity, as expressed, for example, in education, health care and employment, and the task of protecting vulnerable members of society; nor should equity in the Government's collection of the resources it needs to perform these and other tasks be left out of the reckoning."

ECLAC (2000) views equity as the "central pillar around which the region's development patterns need to be reoriented" and as the basic yardstick for measuring the quality of development, defined as "reduction of social inequality in all its various manifestations". This fact that view of the topic is conceptually very broad opens the way for multiple public interventions to ensure better standards of equity, as illustrated by the following passage: "… the sources of inequality are to be found in different areas of social and economic life, and action to further equity has to take this variety into account. For this reason, it is important to broaden the idea of equity by taking into account different aspects connected with equality of opportunities at the beginning and during the course of the educational and employment cycles, equality of access to material wellbeing but also to participation in decision-making and in public life, equality of access to systems of justice, citizen security and healthy lifestyles, and equality of access to numerous sources of knowledge and information and to social and other support networks."

ECLAC (2010) contends that "If the challenge of equality is to be properly addressed, the region must move beyond the 'minimalist' view of the welfare state and social policy that prevailed during the 1990s and move towards the construction of a universal basic social safety net that will become a structural rather than a residual feature of the development model."

Ultimately, the income distribution is only one facet of this broader concept of equality, which encompasses the provision of multiple public goods and services, for which the demand and volume produced will depend, in democratic societies, on majority vote and the building of consensus-based community mechanisms. Musgrave and Buchanan (1999) argue that the issue of public choice is an inherent part of the fiscal process — something that the specialized technocracy tends to ignore.

Afonso, Schuknecht and Tanzi (2008) claim that, at any point in time in a given country, the "primary" income distribution (that is, before government intervention) would be determined by the following factors:

(i) The inheritance of tangible and material wealth.
(ii) The inheritance of human capital, including an infinite number of assets that determine a person's social capital.
(iii) Societal arrangements and norms, such as whether individuals tend to marry individuals with similar wealth or social capital, and including real or de facto caste and tribal systems.
(iv) Past government policies.

The aforementioned authors add "individual talent" to that list, which certainly has made a few individuals rich on an isolated basis. It is more important, however, to highlight the preponderance of hereditary factors, which cannot be changed in the short run and relate basically to the initial social position of individuals in society. If equity is defined in terms of equal opportunities, the prior income distribution is clearly an important explanatory factor of the current value of the Gini coefficient. Past policies will have also changed the initial conditions, although it is hard to isolate such policies from current income distribution policies, or the effect of past government policies on societal change.

The inertia shown by the inequality indicators may reflect the non-existence of policies capable of changing this situation; but it also stems from an unequal distribution of both physical and human assets. For example, Deininger and Olinto (2000) find that the Gini coefficient for the distribution of land ownership was 0.81 in Latin America, compared to 0.60 for the

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[2] Text extracted from Torres (2006, p. 347).

world as a whole. In terms of the distribution of years of schooling, the Gini coefficient is 0.42 in Latin America compared to 0.27 in industrialized countries. These results are corroborated in the study by De Ferranti and others (2004), which finds correlations of 0.75 between the inequality coefficient and years of schooling, and 0.5 with respect to the distribution of land ownership in the region.

Another explanatory factor directly concerns the labour market's capacity to enhance social mobility, which is also linked to labour demand and hence the level of economic activity. The level of unemployment (or the rate of employment) and GDP are thus important factors explaining changes in the income distribution; and this implies a potential link between the level of incomes and their distribution, since the quantity and quality of the supply of public goods and services will depend on tax-revenue capacity (the main determinant of which is the level of income).

Government intervention is known to exert a significant influence on the Gini coefficient — through the level and structure of taxes, expenditure policies and regulations. For example, in the OECD, the Gini coefficient before taxes and transfers is 0.45, but it falls to 0.31 after direct government redistributive actions (which include the progressiveness of the tax system, one third of the effect, and monetary transfers to lower-income groups) (OECD, 2008). In these areas alone, fiscal action has a tremendous capacity to correct the primary income distribution.

In the case of Latin America, and with regard to public spending, mechanisms such as conditional transfers — to improve the inclusion of the more vulnerable sectors — ought to play an important role in explaining changes in the Gini coefficient, but their current volume renders their effect insignificant (ECLAC, 2011).

In addition, the supply of public goods generates indirect and longer-term effects, since government policies to raise the productivity of the poorest groups enhances equity. No one can doubt that public expenditure on justice, citizen security, infrastructure and public transport, health, job training, social inclusion, and so many others, benefits the poorest sectors more than proportionately, by enabling them to participate in the labour force under better conditions.

The level and progressiveness of taxes also has a direct effect on the income distribution. The capacity of the tax system to correct unequal distributions will depend on the amount of revenue obtained and the structure of tax rates in relation income levels — but also on income-tax evasion and the number of exemptions

available. In the medium term, the tax system can also affect job creation (for example if there are many levies on employers), as well as individual effort and family size, all of which affect the trend of the Gini coefficient.

1. Empirical evidence

Although Fajnzylber (1990) uses the ratio between the wealthiest decile (10%) and the four poorest deciles (40%) as a proxy variable for inequality, the most widely used indicator in income-distribution studies is the Gini coefficient. Given the scarcity and heterogeneity of alternative data for Latin American countries, the latter indicator will be used in the estimations performed in this study (see box 2).

The study by Afonso, Schuknecht and Tanzi (2008) for OECD countries[3] provides an interesting analytical framework for replication in Latin American countries. The starting point is a cross-section estimation including both OECD and Latin American and Caribbean countries (details in table 2) for the years 2000 and 2006. In a second stage, the analysis estimates panel data for the sample of Latin American and Caribbean countries, in order to specify the effect of the identified determinants in the region. Fiscal, macroeconomic, social and institutional variables are used, broken down according to the requirements of the analysis. The estimates are made for the period 1990-2010.

As shown in table 3, the variables considered are: *fiscal* (total public expenditure, social public spending, public spending on education, transfers and current subsidies, capital expenditure, tax revenue, direct tax revenues, income taxes, property taxes, indirect tax revenues, general taxes on goods and services, indicator of tax progressiveness); *social* (net secondary school enrolment rate, educational achievement (indicators of the Programme of International Student Assessment (PISA)), initial income distribution; *macroeconomic* (per capita income in PPP terms, initial per capita income, unemployment rate, inflation, GDP growth rate); and *institutional*.

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[3] We are grateful to these authors for having made their databases available for this study.

BOX 2

Definition of the Gini coefficient

The Gini coefficient is defined on the basis of the Lorenz curve, which describes the cumulative percentage of total income received by different percentages of the population.

The coefficient is calculated as the area between the diagonal and the Lorenz curve (area A in the figure) divided by the area under the diagonal (area A+B). In situations of perfect equality, the Lorenz curve would coincide with the diagonal, area A would disappear, and the Gini coefficient would be 0, indicating the total absence of inequality. At the other extreme (a situation in which all income was owned by a single person), the Lorenz curve would coincide with the axes of the graph, area B would disappear, and the Gini coefficient would be 1, indicating total inequality.
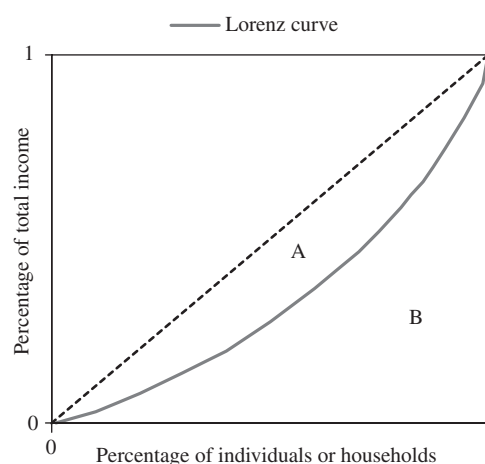
Source: prepared by the authors.

TABLE 2

Selected samples, period 1990-2010

Region	Countries included in each sample
Latin America and the Caribbean (18 countries)	Argentina, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of)
Organization for Economic Cooperation and Development (OECD) (27 countries)	Australia, Austria, Belgium, Canada, Czech Republic Denmark, Finland, France, Germany, Greece, Holland, Hungary, Ireland, Italy, Luxembourg, New Zealand, Norway, Poland, Portugal, Republic of Korea, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, United States, Japan

Source: prepared by the authors.

TABLE 3

Description and sources of the variables used

Variables	Description	Source
Gini coefficient	Inequality index, values between 0 and1	CEPALSTAT (LAC) OECD database World Bank database
Initial income distribution	Gini coefficient, 1970	World Bank database
Fiscal		
Total public expenditure	Total public expenditure as a percentage of GDP	CEPALSTAT (Latin America) World Bank database
Social spending	Public social spending as a percentage of GDP (excluding social spending on education)	CEPALSTAT (LAC) World Bank database
Transfers and subsidies	Current transfers and subsidies as a percentage of GDP	CEPALSTAT (LAC) World Bank database
Public capital expenditure	Public capital expenditure as a percentage of GDP	CEPALSTAT (LAC))
Income taxes	Income tax revenue as a percentage of GDP	CEPALSTAT (LAC) OECD Revenue Statistics
Property taxes	Property tax revenue as a percentage of GDP	CEPALSTAT (LAC) OECD Revenue Statistics
General taxes on goods and services	Revenue from general taxes on goods and services as a percentage of GDP	CEPALSTAT (LAC) OECD Revenue Statistics
Tax progressiveness indicator	Ratio of direct tax revenue/indirect tax revenue	Prepared by the authors on the basis of data from CEPALSTAT (LAC) and OECD Revenue Statistics
Education		
Public expenditure on education	Public spending on education as a percentage of GDP	CEPALSTAT (LAC) World Bank database
Secondary school enrolment rate	Net secondary school enrolment rate (%)	World Bank database
Measurement of quality: indicator Programme of International Student Assessment (PISA)	PISA indicator	OECD PISA database
Human capital index	Adults with tertiary and secondary education compared to adults with primary education (population between 25 and 65 years of age)	Martorano and Cornia (2011)
Years of schooling	Years of formal schooling among the adult population (between 25 and 65 years of age)	Martorano and Cornia (2011)
Institutional		
Public stability index	(1/2)*political stability +(1/2)*rule of law	Worldwide Governance Indicators database
Government effectiveness	Government effectiveness index	Worldwide Governance Indicators database
Voice and accountability	Index of voice and accountability, measuring civil, human and political rights	Worldwide Governance Indicators database
Macroeconomic		
Per capita income (PPP)	Income per capita at purchasing power parity (annual percentage rate of change)	World Bank database
Unemployment rate	Annual average rate (%)	CEPALSTAT World Bank database
Real exchange rate (RER)	RER (index)	CEPALSTAT (LAC)
Price index	Variation in the consumer price index (CPI), annual average	CEPALSTAT (LAC)

Source: prepared by the authors.

PISA: Programme of International Student Assessment.
PPP: Purchasing power parity.

2. Cross-section regressions: results for the OECD and Latin America and Caribbean

Table 4 provides a summary of cross-section regression estimates. The equations estimated by Afonso, Schuknecht and Tanzi (2008) for 22 OECD countries are extended to the Latin American and Caribbean countries that reported

PISA indices in 2000 (equations (1') and (2')). Then, with the new sample, the exercise is repeated for 2006 to detect any breaks in trend; and lastly, equation (3') includes the 18 Latin American and Caribbean countries, with the PISA indices replaced by the net secondary school enrolment rate (a variable that does not indicate quality, as in the previous case, but the coverage of the educational system).

TABLE 4

**OECD and Latin American and Caribbean: determinants
of the income distribution, 2000-2006**

Dependent variable	Gini coefficient						
Sample	OECD [a]		LAC and OECD (logarithms)		LAC and OECD (logarithms)		
Period	2000		2000		2006		
Equations	(1)	(2)	(1')	(2')	(1')	(2')	(3')
Independent variables							
Transfers and subsidies/GDP	-7.13*** (-3.93)		-0.34*** (-3.27)		-0.26** (-2.38)		
Social spending/GDP [b]		-2.51*** (-4.10)		-0.086*** (-3.30)		-0.22*** (-3.08)	**-0.13* (-1.89)**
Personal income-tax/GDP	-1.51 (-1.17)		-0.15*** (-2.47)		-0.066 (-1.04)		
Total PISA index (*Educational attainment*) [c]	-0.86*** (-2.92)		-1.32*** (-3.99)		-1.64*** (-4.30)		
PISA index (*Problem-solving*) [c]		-0.90*** (-6.13)		'-1.25*** (-5.74)		'-0.80** (-2.60)	
Gini coefficient 1970		0.47*** (4.85)		0.50*** (6.19)		0.45*** (3.57)	**0.77*** (13.5)**
Public expenditure on education/ GDP							**-0.08 (-0.12)**
Secondary school enrolment rate							**-0.22 (-0.91)**
No. of observations	22	11	27	16	31	18	**31**
Adjusted R²	**0.56**	**0.92**	**0.86**	**0.98**	**0.73**	**0.93**	**0.93**

Source: prepared by the authors.
Note: Values statistically significant at 1% "***", 5%"**" and 10%"*". t-statistics in brackets.

[a] Results reported in Afonso, Schuknecht and Tanzi (2008).
[b] Social spending does not include expenditure on education.
[c] The PISA index for Latin America includes results only for Argentina, Brazil, Chile, Mexico and Uruguay.
OECD: Organization for Economic Cooperation and Development.
LAC: Latin America and the Caribbean.
GDP: Gross domestic product.
PISA: Programme for International Student Assessment.

In Afonso, Schuknecht and Tanzi (2008), transfers and subsidies and social spending, alternatively, are highly significant variables, as are the coefficient of the initial distribution (1970 Gini coefficient) and educational attainment, measured through the

aggregate PISA indicator — in particular the specific "problem-solving" index. Institutional variables were not significant, nor were control variables such as per capita income and unemployment. Personal income tax was also non-significant.

Extending this sample to a number of Latin American and Caribbean countries — those that use the PISA measurement — produces very similar results. In the first specification, with transfers and subsidies as the explanatory variable (equation (1')), the significant variables were income tax (at least in 2000) and educational attainment. When aggregate social spending is used (equation (2')), this is significant only for 2006, while the effect of the tax variable is diluted, probably owing to problems of multi-collinearity. The regressions tend to be highly dependent on the auto-regressive variable of the initial Gini coefficient. Nonetheless, the greatest effect is obtained from education-related variables.

Figure 5 shows the close fit of observations around the straight-line regression between the Gini coefficient and the PISA measurement; and it also reveals the considerable backwardness of education levels in Latin

American countries. For 15-year-old students who did the PISA tests in the region, this is reflected in an average difference of about two years' schooling compared to the Republic of Korea and Finland (OECD/ECLAC, 2011).

Other relevant partial correlations are illustrated in figures 6 and 7.

A second stage attempted to include the 18 Latin American countries in the sample (see equation (3')), but this impaired the quality of the statistical fit as the new variables considered were not significant. This result can be explained mainly by the lack of an adequate indicator of education quality for the region.

Although the results are revealing, it is important to target the analysis on Latin American countries to explore alternative variables and perform cross-section regressions to confirm whether the variables previously analysed maintain their explanatory power through time.

FIGURE 5
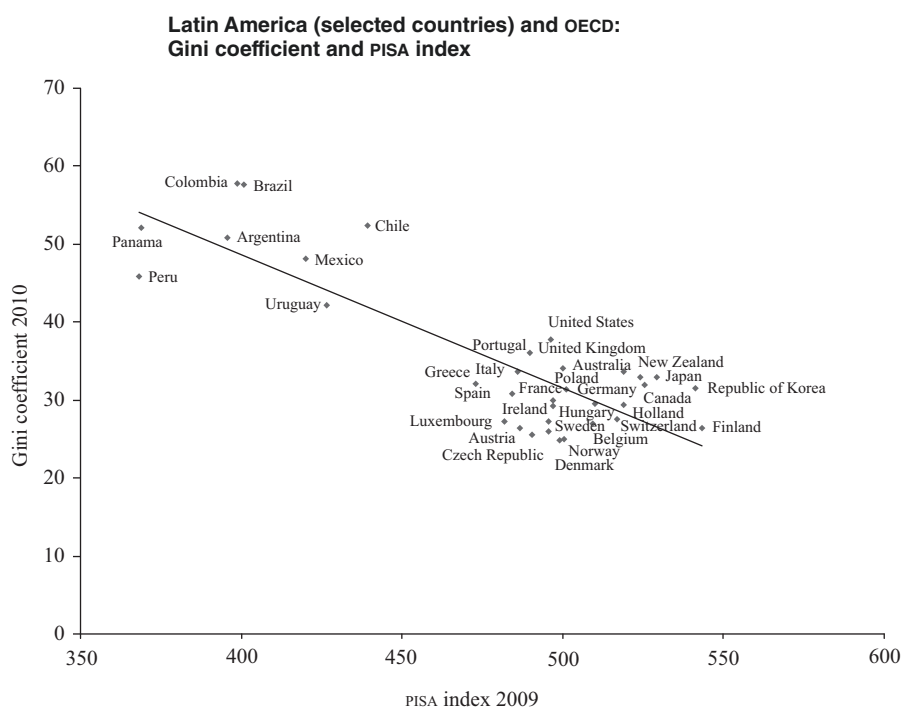
Latin America (selected countries) and OECD: Gini coefficient and PISA index

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Database - PISA 2009" [online] http://pisa2009.acer.edu.au/.

PISA: Programme for International Student Assessment.

FIGURE 6
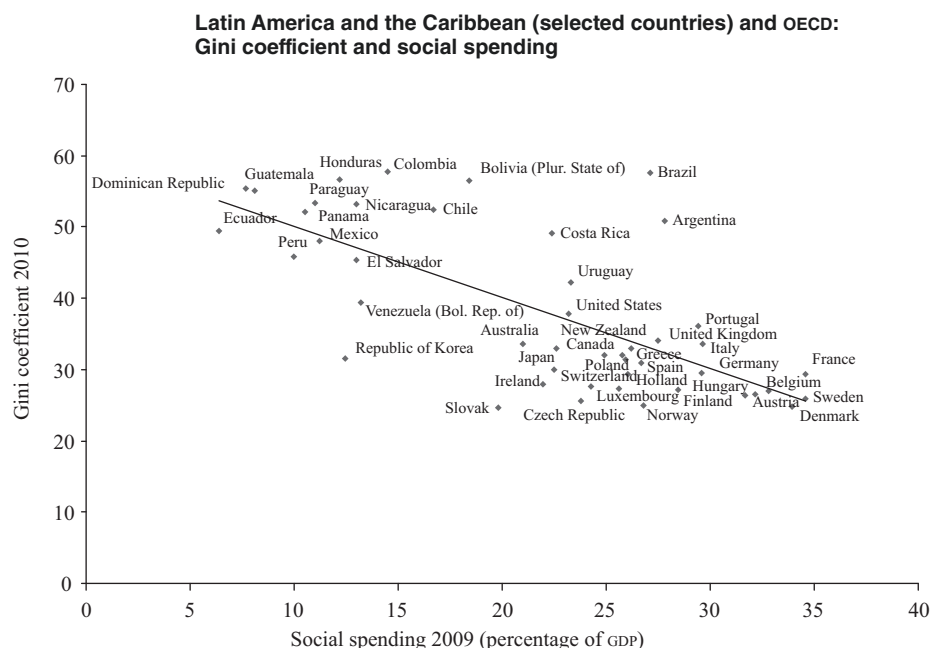
**Latin America and the Caribbean (selected countries) and OECD:
Gini coefficient and social spending**

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC) for Latin American and Caribbean countries and OECD.Stat for OECD countries.
GDP: Gross domestic product.

FIGURE 7
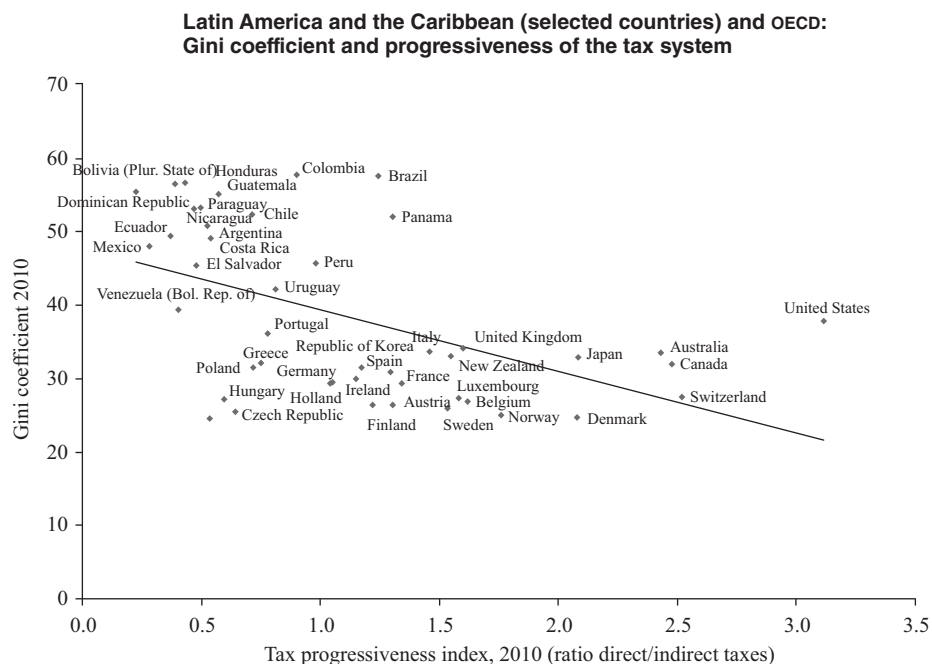
**Latin America and the Caribbean (selected countries) and OECD:
Gini coefficient and progressiveness of the tax system**

Source: prepared by the authors on the basis of official data from the Economic Commission for Latin America and the Caribbean (ECLAC) for Latin American and Caribbean countries and from the Organization for Economic Cooperation and Development (OECD), Revenue Statistics 1965-2010, 2011 for OECD countries.

3. Panel regressions: Latin America

Table 5 shows the panel estimations for the 18 Latin American countries (see table 2) considering the relevant variables previously included in table 4. These estimations differ particularly in terms of the educational-achievement indicators, among which the human capital indicator (the ratio of the number of individuals with secondary and tertiary education compared to those with primary education) is the most important. This variable is also used in the estimations performed by Cornia (2012).

In terms of fiscal variables, the best fit is obtained by separating social spending from public expenditure on education (see equation (4) of table 5). The tax progressiveness index is also significant in the latter equation, although with a smaller coefficient than the expenditure variables. Figures 8 and 9 show that both an increase in social spending and a change in tax composition can explain the improvements in the Gini coefficient in recent years.

TABLE 5

Equations for Latin American and Caribbean, 1990-2010

Sample	Latin America and the Caribbean (*logarithms*)			
Dependent variable	Gini coefficient			
Period	1990-2010			
Independent variables	(1)	(2)	(3)	(4)
Fiscal				
Transfers and subsidies/GDP	-0.26* (-1.69)	-	**-0.26*** **(-1.89)**	**-**
Social spending/GDP [a]	-	-0.35* (-1.64)	**-**	**-0.42*** **(-2.55)**
Public capital expenditure/GDP	-0.19 (-1.27)	-0.18 (-1.28)	**-0.25*** **(-1.78)**	**-0.23*** **(-1.68)**
Tax progressiveness index (*ratio direct/indirect taxes*)	-0.023* (-1.64)	-0.015 (-1.06)	**-0.013**** **(-2.22)**	**-0.014*** **(-2.58)**
Income taxes/GDP	0.01 (0.77)	-0.001 (-0.09)	**-**	**-**
Institutional				
Stability index ((1/2)*political stability +(1/2)*rule of law)	-0.040** (-2.34)	-0.046*** (-2.78)	**-0.037**** **(-2.30)**	**-0.04*** **(-2.56)**
Government effectiveness	-0.003 (-0.44)	-	**-**	**-**
Voice and accountability	-0.004 (-0.005)	0.012 (1.39)	**-**	**-**
Educational attainment				
Public expenditure on education/GDP	-0.008 (-0.23)	-0.023** (-2.33)	**-0.014*** **(-1.73)**	**-0.02*** **(-2.65)**
Human capital indicator (*Individuals with tertiary and secondary education/individuals with primary education*)	-0.085*** (-3.47)	-0.10** (-2.33)	**-0.07*** **(-2.85)**	**-0.10*** **(-3.91)**
Secondary school enrolment rate	-0.023*** (-2.60)	-	**-0.02**** **(-2.62)**	**-**
Years of schooling	-	-0.004 (-0.59)	**-**	**-**

Table 5 (concluded)

Sample	Latin America and the Caribbean (*logarithms*)			
Dependent variable	Gini coefficient			
Period	1990-2010			
Independent variables	(1)	(2)	(3)	(4)
Macroeconomic				
Real exchange rate (RER)	0.021** (2.20)	0.023** (2.25)	**0.025*** (2.77)	**0.026*** (2.71)
Consumer price index (CPI) (*annual variation*)	-0.001* (-1.87)	-0.001 (-1.44)	-	-
Unemployment rate	0.52*** (6.48)	0.44*** (6.10)	**0.51*** (7.68)	**0.44*** (7.23)
Per capita income (PPP) (*annual variation*)	-0.042 (-0.69)	-0.061 (-0.99)	-	-
No. of observations	**357**	**360**	**375**	**378**
Adjusted R²	**0.86**	**0.85**	**0.86**	**0.85**

Source: prepared by the authors.
Notes: Values statistically significant at 1% "***", 5% "**" and 10% "*".
ª   Social spending does not include expenditure on education.
t-statistic in brackets.
GDP: Gross domestic product.
PPP: Purchasing power parity.

FIGURE 8

**Latin American and Caribbean: Gini coefficient
and social spending, various periods**
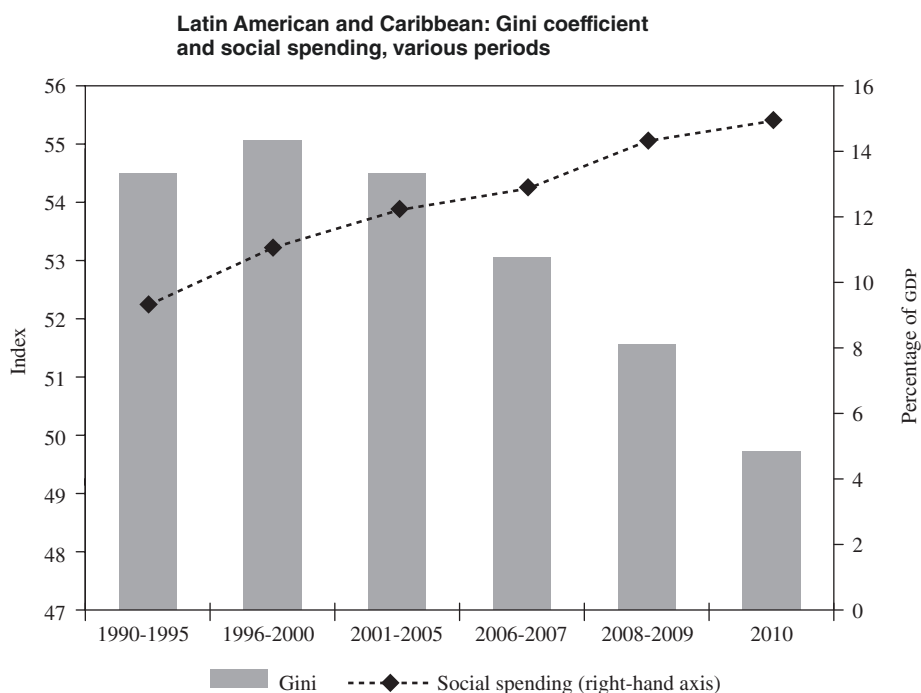
Source: prepared by the authors.

GDP: Gross domestic product.

FIGURE 9

**Latin America and the Caribbean: Gini coefficient
and tax progressiveness index, various periods**

Gini   ---◆--- Tax progressiveness index (right-hand axis)
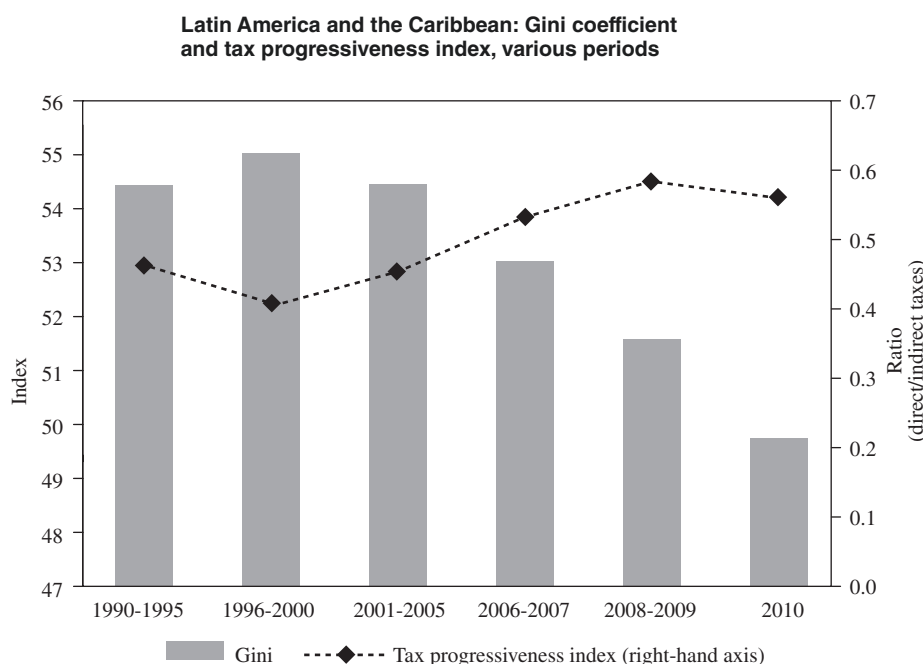
Source: prepared by the authors.

Nonetheless, the unemployment rate is the variable that is most consistently significant and of high impact: for each percentage point reduction in the unemployment rate, the Gini coefficient drops by 0.44 points. Clearly, improvements in formal employment and the consequent increase in labour incomes largely explains recent progress (see figure 10). As noted in ECLAC (2011), a breakdown of variations in inequality shows that income per adult is the main factor driving the distributive improvement. In 10 of the region's countries, the variation of labour income explains 90% or more of the total improvement; in another five countries, the change in non-labour incomes, basically transfers, contributes 40% or more to the total reduction in inequality.

Although the breakdown described above provides an accounting methodology to explain the changes, the econometric estimation makes it possible to highlight the effect of other variables, such as educational attainment as mentioned above, or institutional variables. The stability index calculated by the World Bank also seems

to have an important effect. Unexpectedly, the inflation rate does not appear as a determinant in the period studied, whereas the real exchange rate is significant. An explanation for this is that the recent falls in the real exchange rate are correlated with lower inflation rates in the region. Lastly, per capita income was not significant, because, as discussed in earlier sections, various trends in the level and distribution of income coexisted in the estimation period.

The equations summarized in table 5 thus report significant effects on the Gini coefficient. The empirical evidence corroborates the results reported in other recent studies, showing that public policies have a significant effect on the income distribution — both directly through social spending and tax progressiveness, and indirectly through the quality of education and institutions. The evidence also stresses the primordial role of labour incomes in recent improvements. In these estimations, the initial (or lagged) Gini coefficient is no longer significant.

FIGURE 10

**Latin America and the Caribbean: Gini coefficient
and unemployment rate, various periods**
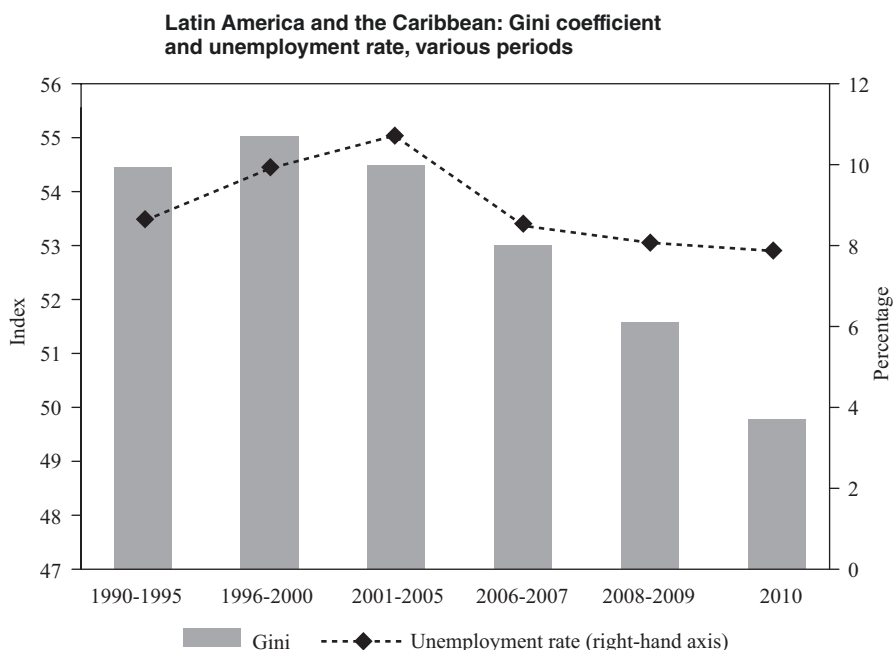
Source: prepared by the authors.

IV

Concluding remarks: options for overcoming the "empty box syndrome"

Although not their main focus, studies relating to poverty reduction and improving the income distribution are often underlain by conflicting views of the role of the state — whether as a catalyst of "productive transformation with equity" or as promoter of the corrective actions needed in the social domain. In the words of Infante and Sunkel (2009), "It seems vital for redistributive policies to be progressively supplemented with distributive ones to narrow productivity divides and thus improve the autonomous incomes of the most disadvantaged sectors. Distributive policies could thus bring about a real reduction in inequality both of incomes and of access to opportunities between the different groups in the social structure…"

This dilemma between productive development and social policies calls to mind the Chinese proverb: "Give and man a fish and you feed him for a day; teach a man to fish and you feed him for the rest of his life." Clearly, there are no categorical solutions to this dilemma between development policies and welfare actions, because experiences of growth with equity are highly varied, and the levels and composition of public expenditure equally so.

It is worth noting that the ever-present dilemmas between growth and equality can be dissipated by prioritizing expenditure that promotes economic growth along with formal employment and access to public goods. The task of enhancing the quality of public expenditure in Latin America and the Caribbean thus involves sustained investment in physical and human capital, and also in innovation and knowledge (ECLAC, 2010).

This article has sought to identify empirical evidence explaining recent improvements in the income distribution in Latin American countries, as measured by the Gini coefficient; and it has shown that increases and improvements in public social spending, education,

public investment and the composition of taxes have had positive effects.

The article also highlights the importance of the macroeconomic cycle, proxied by the unemployment rate, for changes in the Gini coefficient. Nonetheless, while it is important to stress the role of government, and fiscal policy in particular, for achieving inclusive development, the private sector is also important in this process, specifically for its ability to invigorate investment and create jobs.

As Fajnzylber (1990) put it, to achieve the two central objectives of development —authentic competitiveness and equity — many institutions and many policies are needed. But we will have neither competitiveness nor equity unless we address human resources and their education, training and integration into scientific and technological knowledge. Talking the talk in terms of equity or competitiveness, even both at the same time, is mere rhetoric unless a substantive and consistent effort is made to achieve them.

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Free trade agreements in Latin America since 1990: an evaluation of export diversification

Alfonso Dingemans and César Ross

ABSTRACT

This article explores the previously uncontested claim that the free trade agreements (FTAS) signed by Latin American countries —the cornerstone of their international economic integration strategies since 1990— have led to export diversification in terms of variety of goods and number of trading partners. Using data from the United Nations Commodity Trade Statistics Database (COMTRADE), we show that the bulk of export growth in the region has been in the intensive rather than the extensive margin. Concentration indices support the finding that the expansion of exports into new products and new trading partners has been limited. Latin America's bid to diversify its exports using FTAS (based on a static concept of comparative advantages) instead of more comprehensive strategies has had a negligible impact. Governments should therefore adopt a more dynamic approach to comparative advantages and introduce more active policies. Finally, we pose some open questions for future research.

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I

Introduction

Although the Latin American economies[1] were skeptical about the advantages and benefits of (free) trade during the *belle époque* (1940-1975), the devastating debt crisis of the 1980s forced the previously neglected export sector into the limelight. Countries urgently needed foreign currency to pay off their enormous debts, and their economic survival was thus determined primarily by their export capacity (Edwards, 1995; Ffrench-Davis, Muñoz and Palma, 1996; Thorp, 1998; Bulmer-Thomas, 2003).

For many reasons, a nominally pro-market economic reform package of 10 measures proposed and used by various Washington-based institutions —referred to as the Washington Consensus (Williamson, 1990)— was widely adopted in Latin America, although some scholars question to what extent the reforms implemented were actually pro-market (Edwards, 2010). The Consensus promoted the idea of free trade and stressed the need for a sound export sector, with opening up to international competition put forward as the only way to weed out inefficient firms. It was supposed that boosting the export sector would have important trickle-down effects for the rest of the economy (an idea present in Adam Smith's work) because of which it was thought that export growth (maximized under free trade) and economic growth were closely tied. However, research has shown that free trade alone is not enough and can even be detrimental to economic growth (Taylor, 1991; Rodríguez and Rodrik, 1999; Van den Berg and Lewer, 2007; Mejía, 2011). Instead, governments should take a more active stance by "influencing the type and sequencing of exports, as a country strives to produce more advanced products, adding higher value" (Todaro and Smith, 2006, p. 441).

This means that, in order for the causal chain of free trade, export growth, economic growth and economic development[2] to work, an economy must export more value added goods, which can be achieved only through active government policies. Thus, countries should shift the emphasis of their international economic positioning strategy from a traditional, Ricardian (static or passive) approach to comparative advantages —which occur unintentionally— to a more dynamic strategy where active government or industrial policies are implemented to bring about the structural change required to generate intentional comparative advantages, though without disregarding free trade entirely (Agosín, 2006, p. 2; Mejía, 2011, p. 36). The Asian experience has shown that trade policies and free trade are not necessarily incompatible and, indeed, can be complementary (Fishlow and others, 1994). To put it another way, what matters for economic development is the quality of export growth.

The diversification of exports, ideally with a shift towards more value added goods, is a good benchmark against which to assess an economy's export performance and "is all the more urgent in today's economic context" (Leipziger, 2009, p. xi). Diversification is understood here as an increased variety of goods exported to a larger number of foreign markets, with a more even distribution between those markets. This last condition is not normally part of the definition of diversification, but we consider it essential since it would be erroneous, for instance, to claim that a country's exports are more diversified when it manages to gain access to 10 new markets if one single foreign market continues to represent 95% of its total exports.

It may seem surprising to defend the idea of diversification, as opposed to the notion of specialization espoused by standard, classical trade theory; however, three advantages can be identified in favour of diversification (Mejía, 2011): (i) it operates as a hedging strategy, introducing more stability in export earnings; (ii) if other institutional conditions are in place, it can trigger structural change; and (iii) if that structural change succeeds, it can enhance sustained economic growth.

[1]   In this article, we are referring to the 11 largest economies in terms of gross domestic product (GDP): Argentina, Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Plurinational State of Bolivia and Uruguay.

[2]   Economic development is defined here as a "process of structural transformation where countries move from producing 'poor-country goods' to 'rich-country goods'" (Hesse, 2008, p.1) or, in other words, from producing goods with little added value to goods with high added value.

According to Agosín (2006), in the long run, provided that structural change occurs, diversification can lead an economy to reap the benefits of a more diversified specialization. The causal chain we propose therefore is: (free trade,) export growth, export diversification, economic development, economic growth; free trade is a complementary condition, but not a sufficient one.

We must do two things in order to gain an accurate picture of countries' export diversification according to our definition. First, we must differentiate between export growth (Brenton and Newfarmer, 2009, p. 112) in the extensive margin (growth of existing goods to existing markets) and that in the intensive margin (expansion of new goods to existing markets, existing goods to new markets or new products to new markets). Second, in follow-up to the first step, we must compute concentration indices (Samen, 2010).

In spite of the arguments in favour of active government policies, the practice in Latin America has been somewhat different, with governments displaying a marked preference for static comparative advantages. Since the breakdown of the third World Trade Organization Ministerial Conference held in 1999 in Seattle, United States of America, and the standstill of the Doha Round, the countries in Latin America have adopted free trade agreements (FTAs, bilateral or plurilateral trade agreements established under Article XXIV of the General Agreement on Tariffs and Trade (GATT) as exceptions to its most-favoured-nation provisions) as their prime vehicle of international economic integration.

Their worldwide popularity prompted Bhagwati (1995) to speak, perhaps unfairly, of an "infatuation" with such agreements. As to their many positive effects, FTAs are attributed with lowering tariffs and non-tariff barriers, increasing market access, improving the level of competitiveness, fostering the growth of foreign direct investment (FDI), reducing levels of uncertainty and risk, and creating jobs thanks to higher exports (Lynch, 2010, pp. 2-9). Furthermore, numerous academics and policymakers are optimistic about the impact of FTAs on export diversification, which we shall call the FTA–export diversification nexus.

It would seem, therefore, that FTAs are in fact examples of active policies designed to achieve more diversified exports. This is partly true. When negotiating an FTA, governments are actively pursuing the diversification of exports. But there are two caveats. First, what if FTAs only confirm existing economic ties? Can replacing informal practices with formal practices really be considered an active policy? An FTA is merely the infrastructure for trade. By analogy, when

a government builds a bridge, it does not usually use policy to try to influence the type of people who use the bridge. Similarly, many Latin American governments, believing that their job is done once an FTA (the bridge) has been signed, do not pay attention to the kind of goods their countries subsequently export. This approach is in keeping with orthodox policymaking, where the government provides the basic infrastructure and the private sector determines when and how to use it (within legal bounds, obviously). The idea that FTAs can single-handedly bring about export diversification is in line with this philosophy.

In fact, if an FTA–export diversification nexus existed, its impact on prices would be enough to bring about change in the productive structure of an economy and the government's role vis-à-vis economic development would be reduced to supplying an adequate infrastructure and stepping back so as not to interfere in its actual use. In that case, discussions regarding the difference between static and dynamic comparative advantages, and the limits between State and market, would be superfluous. Assessing the impact of FTAs on export diversification is therefore crucial to development, both in theoretical and practical terms. If it were proved that a laissez-faire approach led to economic development, more active industrial policies would not be necessary.

Surprisingly, there are only a handful of investigations addressing this issue, with most research focusing on the nexus between economic growth and export growth (Mejía, 2011; Volpe and Milena, 2009). Hence, the time has come to begin to explore systematically to what extent FTAs have been conducive to export diversification (the quality of export growth) in Latin America in order to determine how governments can or should try to influence export efforts, and subsequently to add to the broader discussion on the limits between the State and the market.

This article therefore aims to contribute to a new research agenda that critically evaluates the economic integration strategies of Latin America in the light of export diversification rather than export growth. Because it is difficult to disentangle and isolate the different causalities at work, the first task is to describe and conduct a preliminary assessment of the impact of FTAs in terms of export diversification given their popularity as a policy tool. We do not intend to oversimplify this issue by reducing it to a single factor; this is merely a first step that will enable us to include other contingent variables, such as terms of trade, at a later stage. Future investigations could examine the (international) politics

of diversification, that is, how the winners and losers of trade liberalization exert influence in the policymaking process to enhance or thwart diversification; to that end, future case studies could follow a model similar to Mejía (2011). Future research could also focus on alternative pathways to achieving export diversification, for example through foreign direct investment.[3] Similarly, other instruments used to position Latin America in the global economy, such as export promotion activities, merit further investigation in terms of their impact on export diversification; however, our preliminary findings published elsewhere on this topic are discouraging.

In this article we will restrict ourselves to an exploratory, quantitative assessment of the relationship between FTAS and export performance in terms of diversification using data from the United Nations Commodity Trade Statistics Database (COMTRADE). Our findings show that FTAS have had little effect on the productive structure of the export sector (particularly with regard to its ability to produce new exportable goods) and on its expansion into new markets. FTAS do not create new patterns and structures, but confirm existing ones. This lack of structural change is further confirmed by fairly stable concentration indices.

First, this means that the current optimism regarding the FTA-export diversification nexus is misplaced —and the argument in favour of industrial policies largely correct— since any diversification would be the result of earlier processes, that is, prior to and independent of the signing of FTAS. This is seen most clearly in the case of Chile, where the diversification process took place in the 1970s and 1980s, not in the last 20 years; FTAS have therefore had virtually no effect on the productive structure of Chilean exports. In addition, the effect of FTAS on the creation of new markets has been limited, as will be shown below, since the countries that have signed FTAS already had firm economic ties (they can be considered "natural markets") and these agreements were merely a formal acknowledgement at the State level of existing informal practices. Nevertheless, we cannot unequivocally rule out a link between FTAS and export diversification (the scope and aim of this article are too limited to be able to do that) since the

effect of each FTA depends on the signatory parties' "fundamentals" (the conditions each country needs for export diversification to take place) (Hausmann, Hwang and Rodrik, 2007). More case-by-case evidence is therefore needed.

Second, our findings support taking a more moderate stance on the envisaged effects of FTAS. FTAS are no guarantee of high-quality export growth and are not a substitute for industrial and social policies (Malvasio, 2006). In other words, although agreements are a vital piece of the international trade architecture, just because they exist does not necessarily mean that their use will automatically promote diversification. Furthermore, even if FTAS did have a diversifying effect on exports, the question remains as to whether the incentives contained in FTAS would outweigh other, opposing incentives, such as high commodity prices (as in the case of China) that favour commodity exports. In that case a more active industrial policy could mitigate the influence of those other incentives. We hold that the market alone cannot achieve economic development and that industrial policies remain an important tool (Rodrik, 2011; Chang, 2012). Future research should help to identify the best policies or instruments for strengthening the link between the export sector and economic development.

This article is organized into four sections. In section II, we show the importance of exports in the development strategies of Latin American countries, and particularly of FTAS in their international economic integration strategies. In section III, we assess the quality of export growth in our sample of countries; to that end, we set out our methodology and highlight the changes observed in the composition of countries' trading partners and their exports. We then reveal the breakdown of export growth in the extensive and intensive margins. To complete our assessment of the diversification of exports, we provide a summary of four concentration indices (for countries and products). We evaluate to what extent FTAS have been inimical to gaining access to new markets and to fostering change in the productive structure (exporting new products). Lastly, section IV contains our conclusions and a call for further research.

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[3] Foreign direct investment is an explicit issue of bilateral trade agreements, but it will not be addressed here because it goes beyond the scope of this article.

II

Latin America's international economic integration through FTAs

The 1980s were difficult for Latin America. The region's economies had been on a downward path since the first oil crisis of the early 1970s (if not before). One of the reasons for this was the inward-looking development strategy known as import-substitution industrialization (ISI) —initially adopted by the region in response to the Great Depression— which had introduced an anti-export bias that led to serious difficulties in financing imports of capital goods, which was an essential part of that very development strategy (Ffrench-Davis, Muñoz and Palma, 1996). Furthermore, the excessive expansion of the State (in terms of both its role and its relative weight within the economy), though undoubtedly necessary for social peace, made fiscal equilibrium virtually impossible. The petrodollars and eurodollars that gushed into Latin America's economies turned out to be a siren song, offering temporary relief to these economies in the short run, but failing, in the absence of structural reforms, to ward off collapse since these loans had to be paid back at some point. Worse still, these capital flows were destined for consumption rather than for investment and, given the highly uncompetitive export sector, any sudden increase in the cost of borrowing would make it extremely difficult to honour payments. Indeed, when the interest rate in the United States shot up in June 1982, causing a diversion of capital flows, the Mexican government defaulted. The ensuing financial panic spread to the whole region, leaving it in effect economically moribund.

The orthodox interpretation of the facts blamed Latin America's malaise on an excessive State presence and measures were proposed to unleash market forces under the slogan of "more market and less State" —measures which Williamson (1990) would dub the Washington Consensus. For a plethora of reasons not discussed here (see, for example, Edwards, 1995 and 2010; Yergin and Stanislaw, 1998; Thorp, 1998; Stokes, 2001), in the early 1990s the Latin American countries, with hardly any exceptions, embraced —at least nominally— the policy prescriptions of the Washington Consensus. To what extent the economic reforms of the 1990s can be considered orthodox is under debate, with some scholars questioning whether they can be considered orthodox at

all (Edwards, 2010). Nevertheless, governments lowered their tariffs on average, though not necessarily across the board, and opened up their economies to international competition, thus joining the wave of globalization based on a model of static comparative advantages, since industrial policy had become —according to Rodrik (2011)— a taboo.

The results, however, were not always positive. In the absence of mobility-enhancing policies (such as re-education plans) and social safety nets, the deindustrialization resulting from increased competition was followed by structural unemployment and underemployment, precarious social and economic conditions and a growing informal sector. Exports were primarily limited to agricultural and mineral commodities with little added value, technological innovation or sophistication.

The failure of the Washington Consensus to solve Latin America's political, economic and social problems —for it would be unjust to suggest that the reforms introduced these problems to Latin America— eventually led to a backlash in the form of a "left turn" (Castañeda, 2006). The more left-leaning governments that came into office improved, changed or outright replaced several of the reforms. Exports, however, remained the cornerstone of their development strategies, regardless of their antipathy, in some cases, towards orthodox economic thinking. Even Hugo Chávez in the Bolivarian Republic of Venezuela —a champion of anti-capitalism— and the Kirchner and Fernández administrations in Argentina —proponents of more traditional populist economic policies, as defined by Dornbusch and Edwards (1991)— acknowledge the importance of exports.

FTAs would seem to be the best way to enhance export growth, especially in the light of failing World Trade Organization rounds of multilateral negotiations. Even Chávez dreams of a Bolivarian free-trade bloc, albeit exclusively for Latin American nations. The signing of FTAs is heralded by presidents and the media as the quintessential vehicle for promoting free trade, boosting exports and gaining access to and prestige on the global economic and political stage. Such agreements are the cornerstone of Latin America's

current international economic insertion strategy and it is therefore understandable that governments and scholars tend to have high expectations of them.

Despite the aforementioned "left turn", governments are optimistic (though not complacent) regarding Latin America's export growth performance and specifically regarding the FTA–export diversification nexus. A quick glance at the public debate confirms this idea. For instance, Barbara Weisel, Assistant United States Trade Representative for South-East Asia and the Pacific, said that the FTA between the United States and Malaysia would create new opportunities and support Malaysia's goal of diversifying its exports and boosting value-added trade (Bernama, 2007). When asked to comment on the future FTA between China and Peru, economist Michael Pettis of Peking University said that the current situation in China's economy, which is shifting towards manufactures imports, would drive Peru to diversify its exports (*La Primera*, 2012). According to a report by a private consultancy firm, over the long term, there is little doubt that the FTA between China and the Association of Southeast Asian Nations (ASEAN) will help improve export diversification (BMI View, 2010). In a joint statement by President Obama and President Piñera on the occasion of President Obama's visit to Chile, they underscored that in the seven years since the United States-Chile FTA had entered into force, not only had the conditions of exchange of goods and services improved, but also new business opportunities had been created, leading to the diversification of products (Ministry of Foreign Affairs of Chile, 2011). In a book published by the General Directorate for International Economic Affairs of Chile[4] to mark 20 years of Chile's experience in trade negotiations, the authors conclude that in the period 1990-2010 there has been considerable diversification in the goods the country exports and its trading partners (DIRECON, 2010, p. 11). Finally, on a more theoretical level, Volpe and Milena (2009, pp. 4-5) talk of an emerging consensus in the specialized literature on the linkage between tariff levels and an economy's ability to export new products, with most countries applying a Ricardian model that predicts that "a reduction in trade barriers leads to an increased range of exported goods".

If half of these perceptions were true, the popularity of FTAS would not be surprising, but the problem

(potentially, at least) is that these claims are not backed by evidence. We should therefore assess whether FTAS are truly conducive to export diversification or whether this is rather a case of "much ado about nothing". In this article we will try to come to a preliminary answer and suggest areas for future research that may be able to deliver a more in-depth analysis.

First, are FTAS indeed so popular? As at January 2012, the WTO[5] had received some 511 notifications of regional trade agreements, 90% of which corresponded to FTAS and partial trade agreements (PTAS). Of these, some 319 agreements were in force. According to the Foreign Trade Information System of the Organization of American States,[6] there are 64 FTAS, 3 framework agreements and 33 PTAS in force among its member States, which are summarized in table 1.[7]

Chile and Mexico have signed the most FTAS, while the Bolivarian Republic of Venezuela and Colombia account for over 50% of all the PTAS signed (see table 1). All of the PTAS signed by the countries in Latin America are with partner countries in South and Central America, whereas some of the FTAS are of an intercontinental nature. Traditional trade partners in Latin America, North America and Europe[8] account for roughly 60% of all the agreements signed and non-traditional partners in Asia and Oceania account for 30%. This suggests that FTAS are used in Latin America to confirm or deepen existing trade ties, rather than to establish new ones.

Colombia, Mexico and above all Chile have signed the most FTAS with countries from other continents. At the other end of the scale, the Bolivarian Republic of Venezuela has signed only PTAS.

Latin American countries have shown an increasing preference for FTAS over PTAS. In fact, the last PTA was signed in the region in 2004. To date, Latin American countries or trading blocs have signed 39 FTAS against 29 PTAS. In comparison, before 1997, less than 25% of all trade agreements signed by Latin American countries were FTAS. This suggests that Latin American countries are seeking ever broader economic integration;

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[4] The responsibilities of the General Directorate for International Economic Affairs (DIRECON), part of the Ministry of Foreign Affairs of Chile, include planning and executing Chile's economic foreign policy and negotiating FTAS.

[5] See [online] http://www.wto.org/english/tratop_e/region_e/region_e.htm.

[6] See [online] http://www.sice.oas.org/agreements_e.asp.

[7] The FTAS and PTAS signed by the members of the Southern Common Market (MERCOSUR) are included for each of the relevant States: thus, the four FTAS signed by MERCOSUR account for a total of 16 FTAS in the table (four for each member) and the one PTA signed by the trading bloc is counted four times (once for each member).

[8] The two FTAS signed by Chile and Mexico with the European Union are counted as two FTAS and not as 27 separate agreements with each 27 European Union member States.

nonetheless, traces of protectionism remain, as can be seen, for example, in the latest measures implemented by President Fernández in Argentina.

In sum, FTAS appear to be an increasingly important instrument for achieving economic integration; however, the geographical distribution of FTA trading partners is less than satisfactory, since such agreements are signed mainly with the region's traditional partners, thus merely formalizing existing ties with natural markets rather than creating new ones. In addition, in line with the philosophy underpinning the Washington Consensus, FTAS are seen as an end in themselves, rather than as an element of a more encompassing, active trade policy that would seek to foster the export of more value added products. Countries are therefore currently employing a strategy built around static comparative advantages. These points will be addressed more thoroughly in the next sections.

TABLE 1

Latin America (selected countries): signed trade agreements in force by number of agreements and number of trading partners

Country	Free trade agreements *(simple count)*	Partial trade agreements *(simple count)*	Total number of treaties	Free trade agreements *(country count)*	Partial trade agreements *(country count)*	Total number of trading partners
Argentina	4	6	10	4	8	12
Bolivia (Plur. State of)	2	1	3	5	1	6
Brazil	4	5	9	4	7	11
Chile	16	4	20	52	4	56
Colombia	5	6	11	10	25	35
Ecuador	0	4	4	0	7	7
Mexico	13	4	17	44	6	50
Paraguay	4	3	7	4	5	9
Peru	10	1	11	14	1	15
Uruguay	5	4	9	5	6	11
Venezuela (Bol. Rep. of)	0	10	10	0	29	29

Source: Foreign Trade Information System, Organization of American States (OAS) [online] http://www.sice.oas.org, January 2012.

III

Latin American export growth: diversification or concentration?

Having discussed the importance and characteristics of the trade agreements (FTAS and PTAS) adopted as part of Latin America's international economic integration strategies, in this section we will analyse the results of that strategy by looking at three areas. First, we will present a detailed analysis of Latin America's export growth in both the extensive and intensive margins. Then we will assess whether Latin American countries have shown a tendency towards diversification or concentration in terms of their trading partners and the products exported. Third, we will investigate whether FTAS have had any significant effect on that process of diversification or concentration. But before answering these questions we shall set out our methodology.

1. Methodology

To examine the questions we have posed, we use data from the United Nations Commodity Trade Statistics Database (COMTRADE),[9] the most comprehensive and detailed database available on trade. Nevertheless, we

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[9] See [online] http://comtrade.un.org/db.

recognize that trade statistics can be susceptible to errors and discrepancies, and that the data available in COMTRADE are no exception.

We use the second revision of the Standard International Trade Classification (SITC Rev. 2), 1976, in order to ensure the homogeneity of data for our sample of countries. This classification groups goods under 10 headings using one-digit codes, and then further breaks them down until it identifies a total of 1,924 different products using five-digit codes (United Nations, 1975, p. vii). The more digits we include, the more different products we identify; however, conducting our quantitative analysis at the most detailed level (five digits) may not actually help us to identify new exports that point to diversification in goods. For example, at the five-digit level meat with bones and meat without bones are considered as two different products, whereas for our purposes, we should group them together. Volpe and Milena (2009) used data at the 10-digit level of the Harmonized Commodity Description and Coding System (an alternative to SITC) and their conclusions regarding the ability of tariff reductions to foster export diversification are accordingly overly optimistic as it is arguable whether they are in effect identifying significantly different products at that level of accuracy. We therefore seek to strike a balance between excessive precision and excessive clustering, both of which would have a negative impact on our results. Evenett and Venables (2002) proposed a simple list containing 71 products defined at the two-digit level, but with a minimum threshold of US$ 50,000 for each product line. In other words, exports of specific goods totalling less than US$ 50,000 were not counted and therefore if exports grew from, say, US$ 30,000 to US$ 500,000 dollars, that growth was considered to be in the extensive margin. For our research, our product list was defined at the two-digit level using SITC Rev. 2 and we applied a threshold of US$ 50,000 per product. To measure change in the region's trading partners, we used a threshold of US$ 500,000 per country and a minimum of 10 goods.[10]

As to the measurement points in time, we chose the years 1990 and 2008. The first because it preceded the current wave of FTAs and the second because it is the most recent year for which data are available, taking into account the need for data smoothing. To control for

one-off exports either in terms of the type of good or the destination market, we average the data from three points in time. Thus, the figures for 1990 and 2008 are actually the averages for the years 1989, 1990 and 1991 and 2007, 2008 and 2009, respectively.

TABLE 2

Standard International Trade Classification 1976 (Rev. 2), one-digit codes

SITC Rev. 2 section headings	Description
0	Food and live animals, chiefly for food
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products not elsewhere specified
6	Manufactured goods classified chiefly by materials
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not elsewhere classified

Source: United Nations Commodity Trade Statistics Database (COMTRADE).

By choosing 2008 for our analysis, we must exclude all the agreements that came into force after that year. The vast majority of FTAs and PTAs were signed before 2006, which leaves us with enough time for their possible effects to be captured by our data.

Interpreting the data from these years poses certain difficulties as the fall of the Iron Curtain led to the creation of several new countries in the early 1990s. The Soviet Union ceased to exist, while new independent States, such as Croatia, were established. In addition, in 1990 there was a decision to separate data on Belgium and Luxembourg in COMTRADE (they had previously been treated as a single entity). As each country has a separate country code, these events artificially led to the gain or loss of trading partners for our selection of Latin American countries, irrespective of their intentions or efforts. Nevertheless, trying to retroactively calculate the GDP of the present-day countries that made up Yugoslavia, Czechoslovakia or the Soviet Union would be a difficult and arbitrary exercise and it would be impossible to trace which products were exported where. Owing to the difficulties caused by the lack of accurate data, we decided to maintain the original country coding. In what

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[10] We, in fact, repeated our analysis at the five-digit level (without a threshold) and, although we are unable to publish these results owing to space limitations, our basic findings were also supported at that level of detail and can therefore be considered robust. The results at a five-digit level can be obtained upon request from the authors.

follows, then, we have to be careful when interpreting the data on changes in trading partners, since both losses and acquisitions are overstated. In our comparative analysis, however, this overvaluation should not affect the essence of our conclusions.

All of the figures we present are in United States dollars at constant 2008 prices in order to control for inflation, which has been considerable in the last 20 years in Latin America, although admittedly less problematic than in prior decades. The 1990 figures are therefore deflated by the official United States price level reported by the World Bank in its World Development Indicators[11].

All the data were processed using the default routines of the standard statistical package IBM SPSS Statistics, version 19.0.

2. The quality of Latin American export growth

In order to quantify export growth we first compare total exports for our sample of Latin American countries in 1990 with 2008 (see table 3). We have three main observations with regard to real export growth. First, all countries, except for the Bolivarian Republic of Venezuela and Uruguay, at least doubled their real export value during the period under consideration. With the exception of the Bolivarian Republic of Venezuela,

Colombia, Paraguay and Uruguay, exports grew at an average annual rate of 7% or more in all countries, with Mexico and Peru achieving double-digit growth. In other words, at first glance the results of the Latin American economies in terms of export growth are encouraging and, indeed, more than satisfactory when compared with their average annual real GDP growth.

However, the difference between the pace of average export growth and average real GDP growth suggests that the impact of the former on the latter is not proportional. A second conclusion is that there is no significant linear correlation between the number of signed treaties and export growth. At this point, we need to perform a more detailed analysis.

3. Changes in export markets

As mentioned above, the quality of growth depends on the ability to export a greater variety of products to more markets (and ideally in a more evenly distributed way). So, in order to break down our figures we need to establish first to what extent the mix of products and countries has changed (if at all). We begin by addressing the latter.

A simple count shows that all the countries in the study, except the Bolivarian Republic of Venezuela, increased the number of their trading partners and are

TABLE 3

Latin America (selected countries): real export growth, 1990 and 2008
(Thousands of United States dollars at constant 2008 prices and percentages)

	Value of exports 1990 *(Thousands of dollars)*	Value of exports 2008 *(Thousands of dollars)*	Absolute export growth *(Thousands of dollars)*	Relative export growth *(Percentages)*	Average annual export growth *(Percentages)*	Average annual real GDP growth *(Percentages)*
Argentina	18 581 526	60 490 183	41 908 657	226	7.2	4.0
Bolivia (Plur. State of)	1 448 436	5 669 593	4 221 157	291	8.4	3.7
Brazil	53 407 971	170 528 685	117 120 714	219	7.1	2.8
Chile	14 075 528	62 408 984	48 333 456	343	9.2	5.2
Colombia	10 840 779	33 490 067	22 649 288	209	6.9	3.5
Ecuador	4 342 018	15 493 913	11 151 895	257	7.8	3.2
Mexico	41 858 114	264 266 121	222 408 006	531	11.4	2.8
Paraguay	1 483 131	3 482 506	1 999 375	135	5.1	2.5
Peru	5 074 031	28 703 686	23 629 654	466	10.1	4.5
Uruguay	2 674 770	5 281 651	2 606 881	97	4.1	2.9
Venezuela (Bol. Rep. of)	25 368 189	46 686 981	21 318 792	84	3.7	2.9

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE) and World Bank Development Indicators (average annual GDP growth).

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[11] See [online] http://data.worldbank.org/indicator.

therefore geographically more diversified than in 1990 (see table 4). We recall that for our purposes a country must receive exports totalling more than the threshold of US$ 500,000 to be considered a destination market. The case of the Bolivarian Republic of Venezuela is pathological: as a result of its overdependence on oil the country lost 37 markets. Other striking cases include Brazil (the most diversified country), the Plurinational State of Bolivia (the least diversified, although it is improving), Mexico (the least successful at entering into new markets) and Argentina (the most successful).

In short, Latin American goods reached comparatively more markets in 2008 than in 1990, and therefore we could initially be inclined to conclude that exports are geographically more diversified, thus giving hope to the supporters of the FTA-export diversification nexus. But before drawing such a conclusion, we shall consider whether the top five destinations for our sample (in terms of export value) have changed much. To this end, we computed the share of each trading partner in the total exports of each of our Latin American countries (see table 5).

TABLE 4

Latin America (selected countries): growth in export destinations, 1990 and 2008

	Destination countries, 1990	Destination countries, 2008		Markets gained		Markets lost	
		Total number	Percentage change	Total number	Percentage change	Total number	Percentage change
Argentina	112	160	43	59	53	11	10
Bolivia (Plur. State of)	32	52	63	25	78	5	16
Brazil	156	188	21	51	33	19	12
Chile	95	134	41	54	57	15	16
Colombia	82	125	52	52	63	9	11
Ecuador	59	89	51	39	66	9	15
Mexico	109	147	35	55	50	17	16
Paraguay	50	77	54	37	74	10	20
Peru	84	115	37	39	46	8	10
Uruguay	74	112	51	49	66	11	15
Venezuela (Bol. Rep. of)	93	67	-28	11	12	37	40

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

TABLE 5

Latin America (selected countries): top five export destinations, 1990 and 2008
(Percentages of total exports)

	1990		2008	
Argentina	United States	12	Brazil	19
	Brazil	12	China	8
	Netherlands	11	United States	7
	Former Union of Soviet Socialist Republics (USSR)	5	Chile	7
	Italy	4	Netherlands	4
Bolivia (Plur. State of)	Argentina	28	Brazil	38
	United States	20	Republic of Korea	9
	United Kingdom	12	Argentina	8
	Belgium-Luxembourg	8	United States	8
	Brazil	6	Japan	5
Brazil	United States	22	United States	13
	Japan	8	China	9
	Netherlands	7	Argentina	9
	Italy	4	Netherlands	5
	Former Federal Republic of Germany	3	Germany	4

Table 5 (concluded)

	1990		2008	
Chile	United States	17	China	17
	Japan	16	United States	12
	Former Federal Republic of Germany	7	Japan	10
	United Kingdom	6	Republic of Korea	6
	Brazil	6	Netherlands	5
Colombia	United States	42	United States	38
	Former Federal Republic of Germany	5	Venezuela (Bol. Rep. of)	15
	Netherlands	5	Ecuador	4
	Panama	4	Netherlands	3
	Venezuela (Bol. Rep. of)	4	Switzerland	3
Ecuador	United States	54	United States	41
	Peru	6	Peru	9
	Republic of Korea	4	Panama	7
	Netherlands Antilles	4	Chile	7
	Panama	4	Colombia	5
Mexico	United States	70	United States	81
	Japan	5	Canada	3
	Spain	5	Germany	2
	France	2	Spain	1
	Canada	1	Colombia	1
Paraguay	Brazil	31	Brazil	17
	Netherlands	16	Argentina	15
	Switzerland	6	Uruguay	15
	Argentina	6	Chile	9
	United States	4	Russian Federation	5
Peru	United States	24	United States	19
	Japan	11	China	13
	Italy	7	Switzerland	11
	Former Federal Republic of Germany	5	Canada	7
	United Kingdom	4	Japan	6
Uruguay	Brazil	27	Brazil	18
	United States	10	Free zones	10
	Argentina	7	Argentina	8
	Former Federal Republic of Germany	5	United States	6
	China	5	Russian Federation	4
Venezuela (Bol. Rep. of)	United States	53	Areas, nes	25
	Areas, nes	8	Latin American Integration Association (LAIA), nes	20
	Netherlands Antilles	4	United States	19
	Netherlands	3	North and Central America, nes	10
	Canada	3	Netherlands Antilles	9

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Abbreviation: nes, not elsewhere specified.

By 2008, the countries of Asia, especially China, had become a crucial trading partner for Latin America, overtaking many European countries. The rise of Brazil within the region is worthy of note. The fastest growing destination countries for Latin American exports were China, Republic of Korea, Brazil and, perhaps surprisingly, the United States. The presence of the United States in this group shows that traditional markets are still some of Latin America's most dynamic trading partners and it would therefore be a mistake to concentrate excessively on new, emerging markets; achieving a balanced mix of destination markets, in order to spread the risk geographically, is more desirable.

This brings us to our second conclusion in this connection: despite the appearance of new markets, the structure of the market shares of each country —and

therefore their risk-spreading capacity— has not changed dramatically. In our view, diversification is not just a matter of having more trading partners: the export shares of each partner matter as well. The concentration of exports does not seem to have changed much, with the top five destinations continuing to represent similar shares in 2008 as they did in 1990 (this will be verified below). To make matters worse for the supporters of the FTA-export diversification nexus, none of the top-performing partners are new according to our definition. The new markets in the top-five lists for Uruguay and the Bolivarian Republic of Venezuela include one former Soviet republic and artificial groupings owing to a lack of more precise data. Current FTAs are therefore either limited to existing trading partners or incapable of opening up considerable access to new markets.

4. Changes in exported products

We now turn to an evaluation of the number of products exported, recalling that for a product to be identified as "new", we apply a threshold of US$ 50,000 per product, with products defined at the two-digit level using SITC Rev. 2. Accordingly, we counted the existing exports for each country in our sample in 1990 and in 2008.

Table 6 shows that, with the exception of Mexico and, curiously enough, Chile, all countries began to export new products during the period under consideration.

The Plurinational State of Bolivia and the Bolivarian Republic of Venezuela stand out in terms of the number of products they stopped exporting between 1990 and 2008 (see the last column of table 6, "products no longer exported"). The net result, however, is that the exports of all countries, except the Bolivarian Republic of Venezuela, are at least equally as diversified in 2008 as in 1990. The situation of the Bolivarian Republic of Venezuela can be explained by its increasing dependence on oil, which currently makes up 95% of its exports.

When we disaggregate these figures (not shown here for lack of space), we can identify some interesting features. For example, the Plurinational State of Bolivia has stopped exporting rubber, but continues to depend heavily on primary exports, with oil accounting for a growing proportion of its exports. An increasing dependence on commodities is in fact seen across the countries of Latin America. Peru has experienced a major rise in its share of exports under heading number 9 (from 1% to 19%); Ecuador saw a fall in its exports under heading 0 and a substantial increase under heading 3; while the share of Paraguay's exports went up under heading 0 and down under heading 2. These seemingly structural changes simply reflect the substitution of one commodity by another. In the case of Ecuador, for example, the petroleum sector simply outperformed other strong sectors, such as vegetables and fish exports. Paraguay's star commodities were cereals and oil-seeds, and the decrease in the relative share of the

TABLE 6

Latin America (selected countries): number of exports, defined at the two-digit level (SITC Rev. 2)

	Number of products exported, 1990	Number of products exported, 2008		New products exported		Products no longer exported	
		Total number	*Percentage change*	*Total number*	*Percentage change*	*Total number*	*Percentage change*
Argentina	66	67	2	1	2	0	0
Bolivia (Plur. State of)	40	49	23	15	38	6	15
Brazil	66	67	2	1	2	0	0
Chile	67	67	0	0	0	0	0
Colombia	63	67	6	4	6	0	0
Ecuador	51	61	20	10	20	0	0
Mexico	68	68	0	0	0	0	0
Paraguay	50	58	16	9	18	1	2
Peru	62	66	7	4	6	0	0
Uruguay	61	64	5	3	5	0	0
Venezuela (Bol. Rep. of)	61	59	-3	2	3	4	7

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).
Abbreviation: SITC, Standard International Trade Classification.

textile sector was caused by negative growth. For Peru the change in distribution is attributable in large part to a spectacular rise in gold exports. However promising this performance might be, it is a traditional sector of the Peruvian economy, dating back to pre-colonial times. In other words, despite the impression that a structural change has taken place, the region's export mix remains limited to commodities.

A possible exception is Mexico whose impressive growth in machinery and transport equipment (from 27% to 53%) and in manufactures (from 4% to 10%) suggest that it exported more value added goods. However, this increase is most likely attributable to the maquila sector (see, for example, Kopinak, 1996). The heavy United States presence in the Mexican economy means that there are probably few spillover effects. The supporters

of the FTA-export diversification nexus can nevertheless claim that this positive effect, however limited, is caused primarily by Mexico signing the North American Free Trade Agreement (NAFTA). While this may be true, our data show that NAFTA has failed to lead to the export of new goods, and its effects on export diversification and structural change are therefore modest at best.

Finally, even the performance of Latin America's export champion, Chile, falls short. According to our data, its top exports are non-ferrous metals (mainly copper), metalliferous ores (copper again) and vegetables and fruit. Thus even Chile still depends heavily on commodities for its exports.

Table 7 paints a clear picture of this trend by presenting the top three exports in terms of value for each country in our sample.

TABLE 7

Latin America (selected countries): top three exports defined at the two-digit level (SITC Rev. 2) in terms of value
(Thousands of United States dollars at constant 2008 prices and percentages of total exports)

	1990			2008		
	Product	Exports *(value)*	Percentages of total exports	Product	Exports *(value)*	Percentages of total exports
Argentina	Feeding stuff for animals	2 086 154	11	Feeding stuff for animals	7 539 836	12
	Cereals	2 007 346	11	Cereals	5 713 809	9
	Fixed vegetable oils and fats	1 757 710	9	Road vehicles	5 710 469	9
Bolivia (Plur. State of)	Metalliferous ores	429 963	30	Gas, natural and manufactured	2 371 695	42
	Gas, natural and manufactured	370 254	26	Metalliferous ores	1 354 171	24
	Non-ferrous metals	204 826	14	Feeding stuff for animals	297 922	5
Brazil	Iron and Steel	6 626 288	12	Metalliferous ores	16 696 622	10
	Metalliferous ores	4 445 904	8	Petroleum	14 829 089	9
	Coffee	3 227 066	6	Meat	12 310 916	7
Chile	Non-ferrous metals	5 349 014	38	Non-ferrous metals	22 282 866	36
	Metalliferous ores	1 898 034	13	Metalliferous ores	15 034 259	24
	Vegetables and fruit	1 430 838	10	Vegetables and fruit	4 247 813	7
Colombia	Petroleum	2 638 905	24	Petroleum	9 781 528	29
	Coffee	2 478 690	23	Coal, cokes and briquettes	4 651 420	14
	Coal, cokes and briquettes	894 728	8	Coffee	2 005 732	6
Ecuador	Petroleum	2 033 015	47	Petroleum	8 987 801	58
	Vegetables and fruit	872 661	20	Vegetables and fruit	1 953 539	13
	Fish, crustacean and mollusks	768 844	18	Fish, crustacean and mollusks	1 561 592	10
Mexico	Petroleum	13 696 251	33	Petroleum	40 598 789	15
	Road vehicles	5 263 925	13	Road vehicles	39 151 725	15
	Power generating machinery and equipment	2 517 816	6	Telecommunications and sound equipment	38 460 315	15

Table 7 (concluded)

		1990			2008	
	Product	Exports *(value)*	Percentages of total exports	Product	Exports *(value)*	Percentages of total exports
Paraguay	Textile fibers	521 564	35	Oil seeds	1 150 657	33
	Oil seeds	452 309	30	Meat	521 811	15
	Meat	156 231	11	Feeding stuff for animals	411 909	12
Peru	Non-ferrous metals	1 275 859	25	Metalliferous ores	8 143 503	28
	Metalliferous ores	963 191	19	Gold	5 496 655	19
	Feeding stuff for animals	666 059	13	Non-ferrous metals	4 215 068	15
Uruguay	Textile fibres	488 295	18	Meat	1 129 686	21
	Meat	411 391	15	Cereals	723 320	14
	Articles of apparel and clothing accessories	269 189	10	Dairy products and birds' eggs	375 115	7
Venezuela (Bol. Rep. of)	Petroleum	19 951 725	79	Petroleum	44 028 286	94
	Non-ferrous metals	1 423 300	6	Iron and Steel	870 092	2
	Iron and Steel	855 551	3	Non-ferrous metals	452 126	1

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Abbreviation: SITC, Standard International Trade Classification.

Based on these data, we conclude, first, that the region has seen little change in its export mix. Second, judging from the shares of the top three exports for each country, the distribution of exports in 2008 is very similar to in 1990. The exports of Latin American economies continue to be heavily concentrated in and dependent on primary commodities.

In sum, our data show that there has been little change in the production mix of these export sectors and the desired increase in value added products has certainly not been seen. Even the two exceptions, Mexico and Argentina, have not been able to create new higher value added goods. Consequently, we do not expect to see any significant growth in the extensive margin, which we will address in the next subsection.

5. Growth in the extensive and intensive margins

Let us now turn our attention to the quality of Latin American export growth during the period 1990-2008. The level of diversification can be assessed by quantifying growth in the extensive and intensive margins and computing the relevant concentration indices. We use the definition of extensive and intensive margins presented in Brenton and Newfarmer (2009, p. 112), according to which export growth can take place in relation to either a country's markets or products, which can be either new or existing, giving us four possible combinations.

The expansion of exports of an existing product to an existing market contributes to growth in the intensive margin. Increased exports of a new product to a new market can be classified as export growth in the extensive margin, which we will refer to as type II. The two remaining combinations contain both a new and an existing element. Type I*a* export growth in the extensive margin involves the export of a new product to an existing market. Lastly, we will refer to an increase in exports of an existing commodity to a new market as type I*b* export growth in the extensive margin (see table 8).

The data in table 8 confirm our suspicions, for they indicate that, in general, export growth in Latin America involves the expansion of existing products to existing markets (intensive margin). Even for Latin America's most active FTA signatory, Chile, the intensive margin accounts for 95.9% of total export growth. The figure for Mexico is even more extreme: 98.9% of its total export growth is in the intensive margin. The virtual absence of type II growth in the extensive margin points to the generalized failure of the current Latin American international economic positioning strategy to create new opportunities. In fact, when we analyse the quality of growth broken down according to the 10 SITC Rev. 2 one-digit section headings, we can confirm that the Latin American economies have hardly achieved any extensive growth in the high-technology or higher value added sectors.

TABLE 8

**Latin America (selected countries): export growth
in the intensive and extensive margins**
(Thousands of United States dollars at constant 2008 prices and percentages)

	Total export growth *(Thousands of dollars)*	Intensive margin		Extensive margin Ia		Extensive margin Ib		Extensive margin II	
		(Thousands of dollars)	*Percentages*	*(Thousands of dollars)*	*Percentages*	*(Thousands of dollars)*	*Percentages*	*(Thousands of dollars)*	*Percentages*
Argentina	41 908 657	37 921 985	90.5	767 685	1.8	3 218 058	7.7	930	0.0
Bolivia (Plur. State of)	4 221 157	3 665 666	86.8	167 837	4.0	385 234	9.1	2 420	0.1
Brazil	117 120 714	103 406 173	88.3	381 132	0.3	13 333 410	11.4	-	0.0
Chile	48 333 456	46 374 130	95.9	-	0.0	1 959 326	4.1	-	0.0
Colombia	22 649 288	20 325 116	89.7	1 347 289	5.9	976 883	4.3	-	0.0
Ecuador	11 151 895	9 762 534	87.5	120 609	1.1	1 228 834	11.0	39 918	0.4
Mexico	222 408 006	219 870 841	98.9	-	0.0	2 537 166	1.1	-	0.0
Paraguay	1 999 375	1 502 079	75.1	10 290	0.5	486 611	24.3	395	0.0
Peru	23 629 593	22 920 015	97.0	7 876	3.0	701 599	0.0	350	0.0
Uruguay	2 606 881	1 461 283	56.1	26 565	1.0	1 119 002	42.9	31	0.0
Venezuela (Bol. Rep. of)	21 318 792	6 133 959	28.8	12 198	0.1	15 172 632	71.2	3	0.0

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Nevertheless, there is a small spark of hope for the supporters of the FTA-export diversification nexus. The Latin American economies have fared relatively better in achieving extensive growth in terms of new markets. To what extent FTAs (and trade agreements in general) are responsible for creating new markets will be analysed below. We will also look at how the changes in the shares of the export markets and goods have contributed to the relative diversification or concentration of exports.

6. Diversification or concentration of exports?

The diversification of exports can be measured in many ways; we have chosen to use four common concentration indices identified by Samen (2010), namely the Herfindahl index, the Hirschman index, the Ogive index and the entropy index. But, in contrast to the standard practice of computing these indices only for goods, we will also calculate them for countries. This way we will have two values for each concentration index for each country: one for growth in relation to products and one in relation to trading partners.

The Herfindahl index for country j is defined as follows:

$$HI1_j = \sum_{i=1}^{N} \left[\frac{x_i}{X_j} \right]^2 \tag{1}$$

Where x_i is defined as the total exports of product i or as the total exports to country i, and X_j is defined as the total exports of country j. N is the total number of goods (or countries). The definition of these symbols will be maintained throughout this article.

The Hirschman index for country j is defined as follows:

$$HI2_j = \sqrt{\sum_{i=1}^{N} \left[\frac{x_i}{X_j} \right]^2} \tag{2}$$

Basically, the Hirschman index is equal to the root of the Herfindahl index. In both cases, they compare the actual concentration with an evenly distributed export mix of goods (or export markets), and a higher index indicates a greater concentration of exports. In the case of absolute concentration, the index would be equal to one and in the most diversified case it would be close to zero.

The Ogive index for country j is defined as follows:

$$0GV_j = N \sum_{i=1}^{N} \left[\frac{x_i}{X_j} - 1/N \right]^2 \tag{3}$$

This index measures the deviation from an equal distribution of export shares (in terms of goods or

countries). $^1/_N$ is considered to be the ideal share of a product (or trading partner) in total exports. When the value approaches zero, it means that the export sector is highly diversified. An index close to one means that it is highly concentrated.

Finally, the entropy index for country j is defined as follows:

$$ENT_j = \sum_{i=1}^{N} \left[\frac{x_i}{X_j} \, x \log_2 \left[\frac{X_j}{x_i} \right] \right] \qquad (4)$$

In contrast to the other measures, the maximum is attained when all products (or countries) are evenly distributed. Thus, lower values indicate a higher concentration of exports.

The results of these four indices are presented in table 9. As the results of the four indices are consistent, we will focus our analysis on the Herfindahl index.

We can draw some interesting conclusions from the indices. First, there tends to be a correlation between the indices for products and trading partners, with the only exceptions being Mexico and the Bolivarian Republic

TABLE 9

Latin America (selected countries): commonly used concentration indices calculated for trading partners and products defined at the two-digit level (SITC Rev. 2).

	Index	Products		Trading partners	
		1990	2008	1990	2008
Argentina	HI1	0.060	0.058	0.055	0.064
	HI2	0.244	0.242	0.235	0.254
	OGV	2.972	2.932	5.274	7.478
	ENT	4.632	4.736	5.001	5.045
Bolivia (Plur. State of)	HI1	0.180	0.242	0.151	0.176
	HI2	0.425	0.492	0.388	0.419
	OGV	6.765	11.140	9.926	8.097
	ENT	3.212	2.925	3.337	3.471
Brazil	HI1	0.046	0.044	0.073	0.047
	HI2	0.215	0.211	0.270	0.217
	OGV	2.076	1.991	8.768	7.076
	ENT	4.970	5.012	5.046	5.372
Chile	HI1	0.184	0.197	0.079	0.072
	HI2	0.429	0.443	0.280	0.268
	OGV	11.333	12.178	6.290	6.464
	ENT	3.477	3.403	4.458	4.559
Colombia	HI1	0.133	0.119	0.192	0.175
	HI2	0.364	0.345	0.438	0.418
	OGV	7.434	6.970	12.828	14.741
	ENT	3.758	4.200	3.873	3.913
Ecuador	HI1	0.300	0.365	0.303	0.193
	HI2	0.548	0.604	0.550	0.440
	OGV	14.628	21.384	14.201	11.981
	ENT	2.243	2.498	3.111	3.581
Mexico	HI1	0.136	0.086	0.496	0.659
	HI2	0.369	0.294	0.704	0.812
	OGV	8.244	4.870	38.355	66.268
	ENT	4.130	4.297	2.317	1.654
Paraguay	HI1	0.233	0.172	0.141	0.093
	HI2	0.482	0.414	0.375	0.305
	OGV	10.856	9.015	8.112	5.780
	ENT	2.817	3.276	3.762	4.288

Table 9 (concluded)

	Index	Products		Trading partners	
		1990	2008	1990	2008
Peru	HI1	0.136	0.154	0.084	0.082
	HI2	0.369	0.392	0.290	0.287
	OGV	7.417	9.179	6.317	6.470
	ENT	3.538	3.422	4.513	4.341
Uruguay	HI1	0.093	0.086	0.104	0.064
	HI2	0.304	0.294	0.323	0.254
	OGV	4.709	4.538	7.306	5.320
	ENT	4.144	4.393	4.308	4.900
Venezuela (Bol. Rep. of)	HI1	0.624	0.890	0.292	0.164
	HI2	0.790	0.943	0.541	0.405
	OGV	37.169	51.654	18.323	8.677
	ENT	1.631	0.523	3.204	3.102

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Abbreviations: SITC, Standard International Trade Classification; HI1, Herfindahl index; HI2, Hirschman index; OGV, Ogive index; ENT, entropy index.

of Venezuela, for reasons already mentioned. Second, only four countries succeeded in diversifying both their markets and their exports (Brazil, Colombia, Paraguay and Uruguay), although in general these changes were only minimal. Third, diversification, however small, was achieved to a greater extent in relation to target markets than goods.

Before drawing hasty conclusions, however, we have to acknowledge the sensitivity (with the exception of the Ogive index) of these indices to the number of products or trading partners. To wit, the index favours countries with a small N (ceteris paribus). Therefore it is common to compare these indices for a fixed N. The results for the top 10 products and export markets are presented in table 10.

TABLE 10

**Latin America (selected countries):Herfindahl index calculated for the
top 10 products (two-digit level, SITC Rev. 2) and trading partners**

	Products		Trading partners	
	1990	2008	1990	2008
Argentina	0.113	0.125	0.138	0.171
Bolivia (Plur. State of)	0.230	0.290	0.181	0.233
Brazil	0.124	0.117	0.194	0.147
Chile	0.245	0.278	0.144	0.142
Colombia	0.191	0.230	0.342	0.322
Ecuador	0.318	0.432	0.431	0.278
Mexico	0.261	0.152	0.643	0.783
Paraguay	0.266	0.211	0.219	0.159
Peru	0.172	0.189	0.178	0.147
Uruguay	0.146	0.163	0.193	0.149
Venezuela (Bol. Rep. of)	0.710	0.910	0.427	0.187

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

Abbreviation: SITC, Standard International Trade Classification.

When controlling for the number of exported goods and trading partners, we find that the only two countries that have diversified in both dimensions are Brazil and Paraguay. The export mix of Colombia and Uruguay is relatively small in comparison with the rest of Latin America as their economies are increasingly concentrated in commodities. The fact that they score better on the Herfindhal index than the Plurinational State of Bolivia, which has an even smaller amount of exported goods, is not a contradiction: the top three exports of the Plurinational State of Bolivia represent a higher share than those of Colombia and Uruguay.

Another difference in the values given by the two indices is that, according to the Herfindhal index, Chile is the most diversified in terms of trading partners, while the Ogive index places Chile third, behind Paraguay and Uruguay. The difference is that the top-10 Herfindahl index excludes commodities, whereas the Ogive index does not. What is consistent between the two indices, however, is that Chile has fared better at diversifying its trading partners than the products it exports.

In sum, these concentration indices did not produce any major surprises. The limited structural changes they revealed showed a greater diversification in terms of trading partners than products. This supports our claim that the productive structure of the export sector in Latin American countries has not changed significantly. The absence of an effect does not necessarily mean that FTAS (and trade agreements in general) are ineffective and perhaps the findings would have been bleaker if no FTAS had been signed. However, we believe that this is highly unlikely and will tackle this question in the next subsection.

7. FTAS and diversification

The coverage of FTAS is significant: as shown in table 11, the exports covered by a PTA or FTA have increased since 1990 for all countries except Uruguay.

The expanding coverage of FTAS is hardly surprising, considering that most of these agreements were signed after 1990. Nevertheless, their impact has been astonishing in the cases of Mexico and Chile, with 94% and 80%, respectively, of their trade with other countries covered by FTAS. At the other extreme, less than 10% of the total exports of the Bolivarian Republic of Venezuela, Colombia and Ecuador are covered by FTAS.

Table 12 shows whether these FTAS created new markets or merely confirmed existing ties.

TABLE 11

**Latin America (selected countries): exports covered
and not covered by trade agreements**
(Thousands of United States dollars at constant 2008 prices and percentages)

	Total exports, 1990				Total exports, 2008			
	Without agreement		With agreement		Without agreement		With agreement	
	Thousands of dollars	*Percentages*	*Thousands of dollars*	*Percentages*	*Thousands of dollars*	*Percentages*	*Thousands of dollars*	*Percentages*
Argentina	18 582	100	0	0	36 717 272	61	23 772 911	39
Bolivia (Plur. State of)	1 448 436	100	0	0	3 032 614	53	2 636 979	47
Brazil	53 407 971	100	0	0	137 078 944	80	33 449 741	20
Chile	14 075 528	100	0	0	11 772 471	19	50 636 513	81
Colombia	10 294 937	95	545 841	5	30 498 885	91	2 991 182	9
Ecuador	4 342 018	100	0	0	14 334 362	93	1 159 551	7
Mexico	41 229 536	98	628 579	2	16 331 152	6	247 934 969	94
Paraguay	1 483 131	100	0	0	2 294 703	66	1 187 803	34
Peru	4 930 197	98	91 303	2	18 980 869	66	9 722 816	34
Uruguay	1 944 685	73	730 086	27	4 231 930	80	1 049 721	20
Venezuela (Bol. Rep. of)	24 680 937	97	687 252	3	44 806 718	96	1 880 264	4

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

TABLE 12

**Latin America (selected countries): exports to trading partners
before and after signing free trade agreements, 1990 and 2008**
(Thousands of United States dollars at constant 2008 prices and percentages of total exports)

	Exports in 1990 to future FTA partners		Exports in 2008 to FTA partners		Annual average growth
	Thousands of dollars	*Percentage of total*	*Thousands of dollars*	*Percentage of total*	
Argentina	4 870 976	26.20	23 772 911	39.30	9.8
Bolivia (Plur. State of)	495 557	34.20	2 636 979	46.50	10.3
Brazil	5 586 579	10.50	33 449 741	19.60	11.1
Chile	9 758 851	69.30	50 636 513	81.10	10.2
Colombia	607 489	5.60	2 991 182	8.90	9.8
Ecuador	178 728	4.10	1 159 551	7.50	11.6
Mexico	37 302 311	89.10	247 934 969	93.80	11.8
Paraguay	161 372	10.90	1 187 803	34.10	12.5
Peru	1 513 771	30.10	9 722 816	33.90	11.6
Uruguay	344 525	12.90	1 049 721	19.90	6.8
Venezuela (Bol. Rep. of)	1 943 532	7.70	1 880 264	4.00	-0.2

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

The data show that trade with future FTA partners was already relatively substantial in 1990 and their share in total exports rose significantly between 1990 and 2008 for all countries except for the Bolivarian Republic of Venezuela. Average annual growth in exports to FTA partners was higher than the growth seen in exports to all countries (see table 3). Given the existing significance of these export destinations for the economies in question, it is difficult to conclude that the trade agreements opened up new markets.

In terms of access to new markets, our data indicate that only six countries began exporting to new countries (according to our threshold) under a trade agreement. Disregarding the Eastern European countries established following the dissolution of the Soviet Union and other artificial changes (such as the separation of data on Belgium and Luxembourg in COMTRADE), Chile gained access to the markets of Bulgaria, Iceland, and Malta; Colombia to Antigua and Barbuda, Belize, Guyana and Saint Kitts and Nevis; Ecuador to Paraguay and Uruguay (which fell short of the threshold in 1990); Mexico to Bulgaria, Iceland and Romania; Paraguay to Ecuador (which fell short of the threshold in 1990); and the Bolivarian Republic of Venezuela to Belize. This list is hardly impressive: the access gained represents less than 1% of the total exports of these countries in 2008 (hence, these results are economically insignificant). Bulgaria and Romania were new actors in the market economy and it is therefore not clear that an FTA with the

European Union was necessary to gain access to their markets. Ecuador, Paraguay and Uruguay are natural trading partners and trade between them would most probably have expanded even without trade agreements.

All of this suggests that, on the whole, FTAs (and trade agreements in general) have been rather ineffective with regard to fostering access to markets, particularly new markets. Of course, an optimistic interpretation would be that, given this difference in growth rates, there remain dynamic markets available with which the Latin American countries could sign an FTA in order to further boost their performance. While this is possible, in the case of Chile, for example, there are few countries left with which it does not already have an agreement. Furthermore, the most growth was seen in exports to the United States and China —both countries with which Chile already had strong economic ties. From the standpoint of geographical diversification, signing an FTA with either of those two countries would not make much sense.

Another hypothesis is that if FTAs were signed with new trading partners, then type I*b* export growth in the intensive margin would occur naturally. Hence, the true potential of FTAs is not really being measured. This is true, in theory, but the list of existing trade partners leaves little room for further expansion. It is questionable whether the reward would be worth the diplomatic effort involved in negotiating agreements with the mainly small countries that remain. In truth, given the existing, endogenously created economic ties, the idea behind signing an FTA

is not to gain access to new markets, but to diversify an economy's export mix. Of course countries want to see growth in the intensive margin, but this is a short-term gain. The long-term gain is obtained through diversification and FTAS are ineffective to that end.

The data in table 13 show that trade agreements have not been instrumental in fostering the export of new products, except in the cases of Brazil and the Bolivarian Republic of Venezuela. And indeed, no trade agreement has achieved the "purest" form of diversification (new countries and new products).

This ends our preliminary assessment of the relationship between trade agreements, particularly FTAS, and export diversification in terms of both trading partners and products. An analysis of the data has confirmed our main hypothesis: FTAS are a useful and perhaps necessary element of a country's international economic positioning strategy, but if diversification is the objective (as it should be), these agreements must be complemented with other industrial policies. As Osvaldo Rosales, former chief negotiator of Chile, said, an FTA is no guarantee of economic success (Malvasio, 2006).

TABLE 13

**Latin America (selected countries): export growth
by type of growth and existence of a trade agreement**
(Thousands of United States dollars at constant 2008 prices and percentages)

	Extensive margin Ia				Extensive margin II			
	Without agreement		With agreement		Without agreement		With agreement	
	Thousands of US dollars	*%*	*Thousands of US dollars*	*%*	*Thousands of US dollars*	*%*	*Thousands of US dollars*	*%*
Argentina	767 560	100	125	0	930	100	...	0
Bolivia (Plur. State of)	160 608	96	7 229	4	2 420	100	...	0
Brazil	...	...	381 132	100	...	...	...	...
Chile	...	...	...	...	...	...	...	...
Colombia	1 333 290	99	13 999	1	...	...	...	...
Ecuador	100 883	84	19 726	16	39 285	98	633	2
Mexico	...	...	...	...	...	...	...	...
Paraguay	6 803	66	3 488	34	370	94	25	6
Peru	4 954	63	2 922	37	350	100	...	0
Uruguay	954	4	25 611	96	31	100	...	0
Venezuela (Bol. Rep. of)	55	0	12 143	100	3	100	...	0

Source: authors' calculations based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

IV

Conclusions

Where does this leave us? Let us sum up the facts. Latin America's international economic integration strategies have focused on the signing of FTAS and PTAS. At first glance, export growth performance has been encouraging, but when we disaggregate the data on growth, several question marks arise. First, although the increase in the number of trading partners has been considerable, and there has undoubtedly been a shift towards Asian countries, the distribution of the shares of the top five

export markets has remained almost unchanged. Countries have therefore achieved little overall in terms of spreading their risk. Second, diversification into new exports has been disappointing. In the few cases where countries began to export new products, these were generally commodities that substituted other commodities exports. The export mix of the top three products for each country remained largely unchanged and, therefore, countries did not succeed in bringing about a structural change in

their economies. Export growth is mainly attributable to growth in the intensive margin. A closer look at the concentration indices shows modest improvements in terms of the number of trading partners, but not in relation to the number of products. Finally, these findings are corroborated by cross-referencing the data on export growth and the existence of FTAs: these agreements have been largely ineffective in fostering export diversification.

FTAS, unsupported by other more comprehensive policies, are indicative of laissez-faire policy approach. These agreements cannot be considered an element of active policy as they simply confirm existing informal practices and do not influence or guide new processes. There has been a disregard for country "fundamentals" (Hausmann, Hwang and Rodrik, 2007) since it is believed that FTAs foster export diversification regardless.

Is Latin America's continuing dependence on primary exports solely explained by FTAs? Certainly not. Often, contingent economic incentives can be counterproductive to export diversification, as is seen most clearly by China's overpowering demand for natural resources and the resulting appreciation of national currencies in Latin America. FTAs would be powerless in the face of such economic forces, even if they did foster export diversification. While this article does not attempt to unravel the causes of export diversification, a broad, active industrial policy would likely have a better chance of mitigating these perverse incentives than the narrower scope of FTAs.

Does this mean that FTAs are superfluous? On the contrary, we acknowledge that FTAs have numerous benefits, just not this one in particular, at least not without the backing of a comprehensive export strategy. An FTA alone will not change the productive structure of an economy. Unlike the former economic advisor to President George H.W. Bush Michael Boskin, who famously said that it did not matter whether an economy made computer chips or potato chips, we hold that the quality of export growth does matter, and that FTAs are not the ideal means to achieving such quality growth. FTAS have proven useful for boosting exports of existing products to existing markets, but do not help countries to branch into new products or markets.

The task ahead, in the realm of policymaking, is therefore to investigate how to promote exports of more value added products and how to achieve a more even distribution (within reason) in terms of the export mix and the shares of trading partners. Policymakers must not fixate on the signing of new FTAs as if the job ended there. This does not mean that they should abandon the notion of free trade, but rather they should focus on how to improve existing strategies by complementing existing and future FTAs with other measures. These agreements will most probably continue to be the main instrument used to promote free trade while the Doha Round remains at an impasse.

This article is but a first foray into this issue. Future research could involve a more thorough, case-by-case analysis of the relationship between FTAs and export diversification and could include other variables. Attention could be focused on the politics of export diversification and look at why the long-term benefits of export diversification have been passed up in favour of short-term gains. Another question is to what extent Latin American businesses and governments really support free trade and, more importantly, why governments and academics alike have defended the FTA-export diversification nexus.

For the time being, it is clear that industrial policy should no longer be a taboo (Rodrik, 2011). If Latin American countries hope to reap the benefits of increased free trade through FTAs, then they must recognize that those benefits are not automatic and that exports also need the guidance of a goal-oriented strategy. Only time will tell whether the Latin American State is an ideal partner to that end.

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Ecuador: defining and measuring multidimensional poverty, 2006-2010

Andrés Mideros M.

ABSTRACT

This paper provides new insights into the scope, measurement and analysis of multidimensional poverty in Ecuador and generates empirical evidence for the period 2006-2010. Multidimensional poverty is defined using a rights-based approach, on the basis of the provisions of the 2008 Constitution, but the analysis is limited to information gleaned from the Survey of Employment, Unemployment and Underemployment (ENEMDU) The findings show that multidimensional poverty decreased between 2006 and 2010; however, the level of inequality remained unchanged, with higher levels of poverty for rural inhabitants and women and among indigenous and Afro-Ecuadorian populations. Enhanced social protection and the promotion of better working conditions and public services are the priorities for abolishing poverty in Ecuador, but this requires political will and social commitment.

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I

Introduction

Poverty alleviation is at the top of the development agenda. But why is poverty alleviation important? And what does poverty mean? These are questions which as yet have no definitive answer. The first of them can be resolved with reference to Adam Smith's assertion that "no society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable" (Smith, 1776, cited in Easterly, 2007, p. 756). This being so, any coherent development policy must offer a solution to poverty. But the second question is a more complex one. There is a broad range of literature that tries to define and measure poverty, and there are a great range of anti-poverty policies, which depend on the approach used to analyse the issue and the way poverty is defined.

This paper suggests some elements for use in defining poverty. First, there is the ideological discussion of who cares about poverty, and how to approach it; second, the choice between an absolute and a relative approach; and third, the choice of methodology. These three issues cannot be isolated from prevailing economic, social, cultural and political structures. Furthermore, the definition of poverty and the design of poverty alleviation policies are conducted through an interactive and iterative process involving a number of actors in any given society. In this paper, poverty governance is presented as comprising (i) the values, norms, processes and institutions needed to define poverty; (ii) the goals of anti-poverty policies; (iii) the willingness to pay for the required actions; and (iv) the choice of poverty alleviation policies. Regarding the methodological approach, although there is agreement on the need for a multidimensional understanding of poverty, it is still often measured one-dimensionally in most parts of the world. This means that further research and empirical analysis are needed to capture the multidimensional nature of poverty, in the relevant context.

This paper attempts to provide new insights into the scope, measurement and analysis of multidimensional poverty in Ecuador and to generate empirical evidence for the period 2006-2010. This period coincides with the inauguration of a left-leaning government (in 2007) and with the approval of a new political constitution by referendum. The new constitution (2008) introduced the concept of "good living" as the information basis for national development. However, a framework must now be built in order to analyse well-being and poverty under this new, people-centred development agenda.

The main research questions are, first, how poverty should be measured in Ecuador under the new constitution and, second, how poverty changed between 2006 and 2010. The rest of this paper is organized as follows. Section II introduces the context of Ecuador. Section III discusses what constitutes an understanding of poverty in the framework of good living. Section IV presents the methodology and data used for the measurement of multidimensional poverty. Section V presents the findings together with an exploration of poverty in Ecuador between 2006 and 2010. Section VI concludes with some final remarks to guide anti-poverty policy and future research.

II

Ecuador: the development framework and good living

Ecuador is a middle-income country with per capita gross national income (GNI) of US$ 3,970 at purchasing power parity (PPP) in 2009 (World Bank, n.d.). The total population is 14.3 million. In December 2010, unemployment was 6.1% and underemployment 47.1% (INEC, 2010a). A new constitution, the Montecristi Constitution[1] of 2008, was approved by referendum on 28 September 2008 with a 64% vote in favour across

[1] Named after the city where it was adopted.

the country. It introduces the concept of *buen vivir* or *sumak kawsay* (good living) as the information basis for social justice. The constitution treats development as the dynamic interrelationship between the economic, political, socio-cultural and environmental systems (Constitución de la República del Ecuador, 2008, article 275). This development framework is based on human rights (political, civil, economic, social and cultural) and on the rights of nature (Larrea, 2010; Acosta, 2009 and 2010). A key defining feature of the new constitution is the role of the State in providing public goods and services and protecting rights. The constitution establishes the following rights as the basis for the concept of good living (Constitución de la República del Ecuador, 2008, articles 12 to 34):

1.   permanent access to safe, adequate and nutritious food and water, preferably locally produced;
2.   a healthy living environment;
3.   unrestricted access to information and communication technology;
4.   the right to construct and maintain a cultural identity, enjoy leisure time and benefit from scientific progress;
5.   universal access to free education up to and including the third level of higher education;
6.   safe, decent and appropriate housing and access to public spaces;
7.   a healthy life and permanent access to medical care; and,
8.   work and social protection.

Moreover, specific rights are established transversally for priority groups: the elderly, the young, migrants,[2] pregnant women, children and adolescents, disabled persons, the seriously ill, imprisoned persons and "consumers" (Constitución de la República del Ecuador, 2008, articles 35 to 55). These rights are complemented by the rights of communities, peoples and nationalities, rights of participation, rights of freedom, rights of nature, rights of protection and responsibilities of citizenship (Constitución de la República del Ecuador, 2008, articles 56 to 83).

The constitution establishes the National Development Plan as the basis for public policies, public budgeting and the spheres of competence of different levels of government (Constitución de la República del Ecuador, 2008, article 280). Public policies must be oriented towards good living and must guarantee rights (Constitución de la República del Ecuador, 2008, article 85). The National Development

Plan 2009-2013, known as the National Plan for Good Living, completes the development framework in Ecuador (SENPLADES, 2009). This framework identifies public policy as a tool for generating and reproducing the conditions for good living on the basis of the National Development Plan and as part of a dynamic and interrelated process of development.

Social expenditure and economic growth

Central government social expenditure increased from 4.7% to 8.1% of gross domestic product (GDP) between 2006 and 2010 (see figure 1). Including social security transfers, social expenditure represented 12.6% of GDP in 2010. However, Ecuador remains below the 2007-2008 weighted average for Latin America (18%) (ECLAC, 2011b). The sectors accounting for the highest public expenditure as a percentage of GDP in 2010 were education (3.8%), health (2.0%) and social inclusion (1.9%).

In the case of Ecuador, the level of social expenditure does not correlate with economic growth, instead, there is a negative correlation between social expenditure and debt servicing (see figure 2), making it clear that each Government sets the social budget in accordance with its priorities in this regard. There are clear differences between periods: 1997-1999 (economic crisis with low social expenditure); 2001-2006 (economic recovery with constant social expenditure) and 2007 and after (economic stability with rising social expenditure).

In real terms (2000 dollars), the level of social expenditure per capita increased from US$ 78 in 2006 to US$ 143 in 2010. Of this amount, US$ 67 (46.7%) went to education. However, in 2008 Ecuador had the second-lowest rates of public education expenditure per student at primary and secondary level in Latin America (ECLAC, 2011b).

On the other side of the budget, oil revenues rose from 7.8% of GDP in 2006 to 13.8% in 2010, partly owing to higher international oil prices during the period, but also because the Government changed the terms of contracts with private companies to provide more revenue for the State (BCE, 2011c). Tax revenues as a share of GDP increased from 11.7% to 13.7% between 2006 and 2010. Tax pressure (tax revenues as a percentage of GDP) in Ecuador is close to the Latin American average, but lower than in countries such as Brazil and Chile (ECLAC, 2011a). Moreover, the average tax pressure in Latin America is lower than in the Organisation for Economic Cooperation and Development (OECD) countries, where it was 34.8% in 2008 (OECD, 2011).

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[2]   Includes migrants (emigrants and immigrants), returnees, refugees and internal migrants.

FIGURE 1
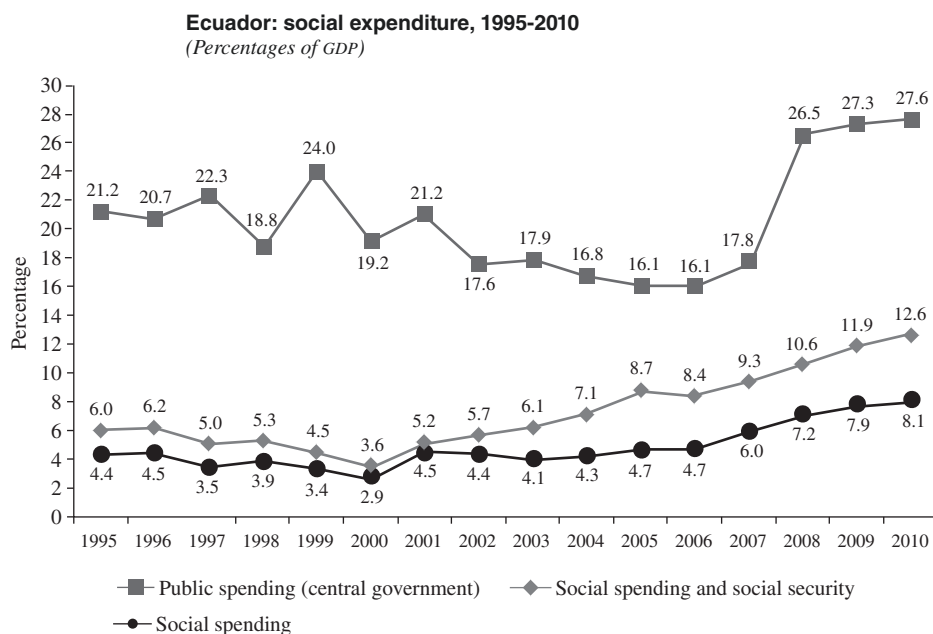
Ecuador: social expenditure, 1995-2010
(Percentages of GDP)

Source: prepared by the author on the basis of Central Bank of Ecuador, *Información estadística mensual*, No. 1786, Quito, 2000; *Boletín Anuario*, No. 32, Quito, 2010; *Información estadística mensual*, No. 1909, Quito, 2011; *Información estadística mensual*, No. 1911, Quito, 2011; and Ministry of Finance of Ecuador, "Budget Statistics" [online] http://finanzas.gob.ec/portal/page?_pageid=1965,1&_dad=portal&_schema=PORTAL.

FIGURE 2
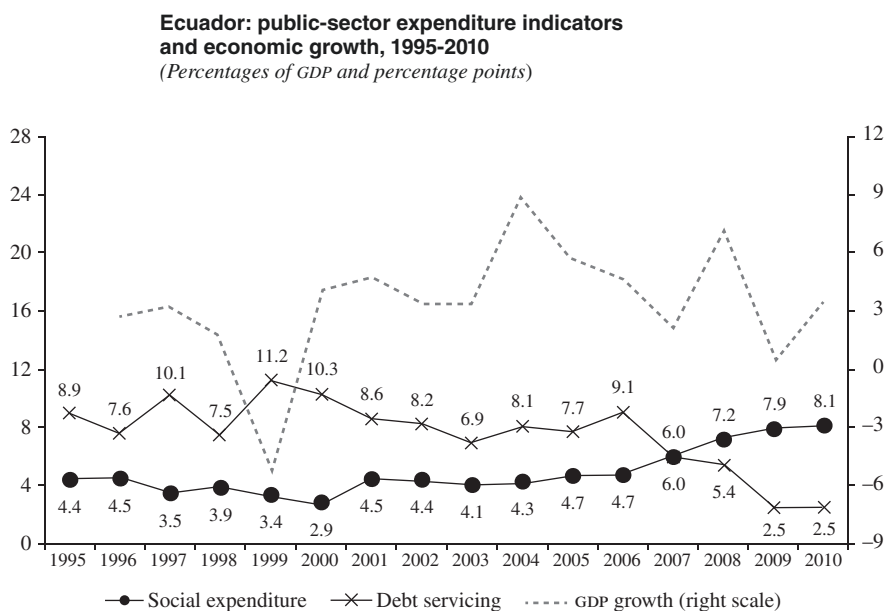
**Ecuador: public-sector expenditure indicators
and economic growth, 1995-2010**
(Percentages of GDP and percentage points)

Source: prepared by the author on the basis of Central Bank of Ecuador, *Información estadística mensual*, No. 1786, Quito, 2000; *Boletín Anuario*, No. 32, Quito, 2010; *Información estadística mensual*, No. 1909, Quito, 2011; *Información estadística mensual*, No. 1911, Quito, 2011; and Ministry of Finance of Ecuador, "Budget Statistics" [online] http://finanzas.gob.ec/portal/page?_pageid=1965,1&_dad=portal&_schema=PORTAL.

However, rising public expenditure in Ecuador between 2006 and 2010 led to primary fiscal deficits of 4.2% and 2.0% of GDP in 2009 and 2010, respectively. After the international crisis of 2009, the economy grew by 3.6% in 2010 and by 8.6% in the first quarter of 2011 (BCE, 2011b). For public expenditure to be sustainable, in any case, new financing options need to be identified so that the financial position of the public sector can be kept healthy.

III

Poverty: a multidimensional approach for Ecuador based on the right to good living

Poverty can be seen as a lack of well-being, and its alleviation is the prime objective of any meaningful development strategy. In the words of Andre Béteille: "It becomes more and more apparent that development and growth are not the same thing. Where growth leads to an increase of poverty and inequality, it could hardly be called development in any meaningful sense of the term" (Béteille, 2003, p. 4458). Poverty as a lack of well-being has an intrinsically political connotation (i.e. the definition of well-being). Poverty definitions are bound up with political power and ideological perspectives, which generate different policies for poverty reduction (Alcock, 1997). A definition of poverty has to accommodate the relationship between poverty and inequality. An absolute approach to poverty will immediately delink these concepts, while a relative approach will establish an indubitable and direct relationship (Béteille, 2003), treating poverty as an unacceptable level of inequality and viewing it as a structural social consequence. Peter Townsend is considered one of the most prominent advocates of a relative approach, and in his seminal work of 1979 he argues that "if poverty is relative cross-nationally…, then it is also relative historically. It is relative to time as well as to place" (Townsend, 1979, p. 52). He also discusses the role of institutions, norms, legislation and cultural conventions in the sense of relative deprivation.

Besides the ideological and absolute/relative discussions, different approaches are used to define and analyse poverty (the monetary, social exclusion, participatory, basic needs and capability approaches, among others). In this paper, a rights-based approach is proposed to link poverty analysis with the development framework in Ecuador. In this approach, the definition and measurement of poverty are based on the exercise of legally (socially) defined rights. This approach can be related to the capabilities approach in that both promote freedom/capabilities/conditions for individuals to achieve a life they value. A rights-based approach is proposed for the definition and measurement of poverty in Ecuador because the development framework, as laid down in the constitution and the National Development Plan, establishes good living as the main development objective, and this is defined by the set of rights presented in section II.

A rights-based approach requires a multidimensional analysis because rights cannot be understood either by an aggregate measure alone or by a one-dimensional approximation. Other arguments in favour of a multidimensional approach are that "(i) people value things besides material well-being; (ii) material well-being is only imperfectly correlated with other aspects of well-being; (iii) policy choices depend on which dimensions are prioritized; and (iv) the different dimensions of poverty reinforce one another" (White, Levy and Masters, 2002, p. 3).

It is important to include in this list the fact that markets do not exist for all valuable goods and services and that some markets are mostly imperfect (Bourguignon and Chakravarty, 2003; Ferro Luzzy, Flückiger and Weber, 2008). However, a multidimensional approach can be criticized on the grounds that a final aggregate measure loses relevant information. To meet this criticism, a multidimensional analysis of poverty must include an analysis of each dimension separately; indeed, this is one of the main virtues of this method. Accordingly, a multidimensional approach is meant not for international comparisons, but to create a better understanding of poverty in a specific context and then generate relevant information for policymakers. Furthermore, the selection of dimensions has to be context-specific and based on socially accepted development objectives (e.g., the good living rights approved by referendum in Ecuador).

IV

Methodology

The multidimensional poverty literature accepts as a basic measurement criterion that deprivation must be defined "as a shortfall from a threshold on each dimension of an individual's well-being" (Bourguignon and Chakravarty, 2003, p. 27). But there are different approaches to identifying a person as poor. A first option is to consider a person as poor if he or she falls below the poverty line in at least one dimension (Bourguignon and Chakravarty, 2003). This approach is called the union approach, but it has been criticized on the grounds that it may identify as poor some persons who are not truly poor. An alternative to the union approach is the intersection approach, whereby a person is defined as poor if he or she falls below the poverty threshold in all dimensions, but this may fail to identify individuals suffering from extensive deprivation in certain dimensions. Alkire and Foster (2009) propose a "dual cut-off" methodology, whereby a person is identified as poor when he or she falls below the poverty line in at least a predefined number of dimensions. But the number of dimensions stills remains an arbitrary decision.

A union approach is used in this paper from a rights-based perspective, as rights are not substitutable and so deprivation in respect of one right is enough for a person to qualify as poor. Besides, it is important to note that the criticism of the union approach applies only to a headcount ratio. In this paper, however, the aim is to identify the level of deprivation, meaning that the poverty gap (that is the difference between the current situation and the threshold) must be used instead of a headcount ratio. To study distribution among the poor, finally, a transformation of the poverty gap making it sensitive to distribution (i.e. severity) is used so that a better measure of the poverty level is obtained.

There is a broad range of literature about poverty measures, most following the approach of Amartya Sen, who established that to measure poverty the poor should be identified and an index constructed from information about them. From a one-dimensional perspective on poverty (e.g., monetary deprivation), Sen developed an index which is the weighted sum of poverty gaps (Sen, 1976). Following Sen's proposal, Anthony Shorrocks modified the index, adjusting the normalization condition in order to satisfy the transfer axiom and to provide continuity (Shorrocks, 1995). However, the most common

measures of poverty (i.e. the poverty headcount and the poverty gap) are calculated following the Foster, Greer and Thorbecke (1984) parametric family of indices. These authors proposed an additively decomposable index based on Sen's index, but in the Foster, Greer and Thorbecke (FGT) indices poverty is aggregated using household shortfalls as weights (relative deprivation) instead of a rank order (Foster, Greer and Thorbecke, 1984). However, it is important to note that the most common poverty index (the poverty headcount index) fails to satisfy the monotonicity and transfer axioms, while the poverty gap index does not satisfy the transfer axiom (Sen, 1976).[3] These axioms are important because poverty is a matter of degree or intensity and not a simplified poor/non-poor dichotomy, meaning that a true measure of poverty must take account of distribution among the poor or the severity of poverty.

Data and dimensions

There is agreement among scholars that some of the structural determinants of poverty in Ecuador are: high levels of inequality, low human capital, low institutionalization, political unrest, the low productivity of the economy and irresponsible rent-seeking behaviour (Henstchel and Waters, 2002; Larrea, 2004; World Bank, 2005; Farrow and others, 2005). The crisis of 1999 has been extensively analysed for its effects on poverty and inequality (Larrea, 2004; World Bank, 2005).

The headcount of consumption deprivation increased from 39.3% in 1995 to 52.2% in 1999 before decreasing to 38.3% in 2006, while the headcount of people with basic needs deprivation fell over the same years from 53.6% to 50.6% and then to 45.8%. In the case of income deprivation, the headcount ratio decreased from 37.6% in 2006 to 32.8% in 2010. Over the same period, poverty in urban areas decreased from 25.9% to 22.5%, while in rural areas it decreased from 60.6% to 52.9%

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[3] Amartya Sen explains the monotonicity and transfer axioms as follows: "Monotonicity Axiom: Given other things, a reduction in income of a person below the poverty line must increase the poverty measure. Transfer Axiom: Given other things, a pure transfer of income from a person below the poverty line to anyone who is richer must increase the poverty measure" (Sen, 1976, p. 219).

(INEC, 2010b). These figures show that one third of the population has income below the official poverty line (US$ 57.29 per capita per month in 2006) and half the population in rural areas suffers from monetary deprivation. In the case of basic needs deprivation, the headcount ratio decreased from 46.9% in 2008 to 41.8% in 2010 (INEC, 2010c).

As an alternative to one-dimensional measures, two partial approaches to multidimensional poverty have been applied in Ecuador. The first is an analysis applying a totally fuzzy and relative approach (Cuesta, 2008). However, that study does not analyse each dimension, and the dimensions are not clearly related to the development framework of Ecuador. The second is a poverty index based on unsatisfied basic needs, usually presented as a measure of multidimensional poverty. But the index is defined as a set of conditions rather than by measurements of deprivation in different dimensions, meaning it is a multivariate index but not a multidimensional approach.

In order to analyse poverty from a rights-based multidimensional approach, the good living rights are used to define dimensions of well-being. This option is proposed in order to link poverty analysis with the development framework established in the constitution and National Development Plan of Ecuador. From this perspective, each dimension is both cause and effect in a dynamic process of development, and deprivation in one or more dimensions is seen as a cause or consequence of poverty. However, different dimensions may be selected when other contexts are analysed. Thus, the methodology recognizes the specificities of Ecuador under the new constitution. The study focuses on certain "good living" rights as dimensions of well-being, on the basis of the information available. For a more comprehensive rights-based approach, political and civil rights and the rights of nature must be analysed. It is because of a lack of individual information that this study concentrates on just some of the rights of good living, which can be understood as economic, social and cultural rights. Other dimensions are left for future research.

The data are taken from the database of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR) conducted by the National Statistics and Census Institute (INEC), the figures being those for the December round between 2006 and 2010. Table 1 shows the variables and indicators $X_{i,k}^l$ constructed for $i=\{1,2,\ldots,n\}$ individuals, $j=\{1,2,\ldots,h\}$ households and $k=\{1,2,\ldots,m\}$ dimensions. Different indicators could arguably be used, but the list is limited by the data available and the choice of indicators is opportunistic rather than ideal. As the dimensions are conceptually interrelated, some indicators may be used in more than one dimension, but the proposed list tries to capture each dimension with at least one indicator. Furthermore, the selected indicators are based on regular questions included in the ENEMDUR, which allows for future replication and monitoring. Accordingly, the proposed methodology can be used on an ongoing basis for a more comprehensive analysis of poverty with improvements in policy design, monitoring and evaluation.

TABLE 1

Dimensions and indicators

Dimension	Variable	Indicator
Food and water	Access to public water supply system in the home	$X_{i,1}^1 = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
	Food expenditure capacity	$X_{i,1}^2 = min\left\{1, \dfrac{\text{per capita income } j; i° \ J}{\text{consumption poverty line}}\right\}$
Communication and information	Radio at home	$X_{i,2}^1 = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
	Telephone at home	$X_{i,2}^2 = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
	Television at home	$X_{i,2}^3 = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$

Table 1 (continued)

Dimension	Variable	Indicator
Communication and information	Computer at home	$X_{i,2}^{4} = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
	Internet at home	$X_{i,2}^{5} = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
Education	Educational attainment	$X_{i,3} = \min\left\{1, \dfrac{\text{education}_i}{\text{Es}_i}\right\}$; if age: > 4 $Es_i = \begin{cases} \max\{0; \text{ ages up to } 6\}; \text{ or} \\ 17; \text{ if age} > 22, \text{ or} \\ \text{education}_i; \text{ if all} \begin{cases} \text{education}_i > 9; \\ \text{education}_i \,\tilde{}\, 17; \text{ and} \\ \text{do not want to study} \end{cases} \end{cases}$
Housing	Own home	$X_{i,4}^{1} = \begin{cases} 1; \text{ if owned home} \\ 0,5; \text{ if courtesy or employer-provided housing} \\ 0; \text{ if rented or other} \end{cases}$
	Flooring quality of home	$X_{i,4}^{2} = \begin{cases} 1; \text{ if adequate} \\ 0; \text{ if inadequate} \end{cases}$
	People per room in home	$X_{i,4}^{3} = \begin{cases} 1; \text{ if } P_{room} \,\tilde{}\, 2 \\ 3\text{-}P_{room}; \text{ if } 2 < P_{room} < 3 \\ 0; \text{ if } P_{room} \,°\, 3 \end{cases}$ $P_{room} = \dfrac{\text{people in the home}_{j;i°\,J}}{\text{bedrooms in the home}_{j;i°\,J}}$
	Electricity in home	$X_{i,4}^{4} = \begin{cases} 1; \text{ if public service} \\ 0,5; \text{ if private source} \\ 0; \text{ if none} \end{cases}$
	Access to sewerage system in home	$X_{i,4}^{5} = \begin{cases} 1; \text{ if sewerage} \\ 0,5; \text{ if other system} \\ 0; \text{ if none} \end{cases}$
	Access to rubbish disposal at home	$X_{i,4}^{6} = \begin{cases} 1; \text{ if public service} \\ 0,5; \text{ if private service} \\ 0; \text{ if none} \end{cases}$
Health	Health insurance	$X_{i,5}^{1} = \begin{cases} 1, \text{ if yes} \\ 0, \text{ if no} \end{cases}$
	Self-coverage capacity	$X_{i,5}^{2} = \min\left\{1, \dfrac{\text{per capita income}_{j;i°\,J}}{\text{minimum standard budget}}\right\}$

Table 1 (concluded)

Dimension	Variable	Indicator
Work and social security	Work and satisfaction with work	$X_{i,6}^{11} = \begin{cases} 1,\ \text{si} \begin{cases} \text{if working and satisfied, or} \\ \text{do not want to work} \end{cases} \\ \frac{5}{6},\ \text{if working and somewhat satisfied} \\ \frac{2}{3},\ \text{if working but not satisfied} \\ \frac{1}{2},\ \text{if working but dissatisfied} \\ 0,\ \text{if not working} \\ 0,\ \text{if both} \begin{cases} \text{working, and} \\ \text{age} <15 \end{cases} \end{cases}$
	Wanting more work	$X_{i,6}^{12} = \begin{cases} 1,\ \text{if yes} \\ 0,\ \text{if no} \end{cases}$
	Social security	$X_{i,6}^{2} = \begin{cases} 1,\ \text{if yes} \\ 0,\ \text{if no} \end{cases}$

Source: prepared by the author.

All the indicators have a maximum value of 1 (threshold attained) and a minimum of 0 (total deprivation). The indicators are defined between 0 and 1 to reduce discontinuity problems, but are limited by the information available. For categorical data, different levels are set as equidistant (i.e. the indicators are ordinal). Aggregation at the level of dimensions follows the next general function: $X_{i,k} = g_k\left(X_{i,k}^1, \ldots, X_{i,k}^p\right)$ for the variables 1={1,…, p}, where the function $g_k(\cdot)$ is specific to each dimension k.

To identify the level of deprivation for each dimension, reformulation of the indices is carried out using the formula $\hat{X}_{i,k} = 1 - X_{i,k}$, where the deprivation level $\hat{X}_{i,k}$ is interpreted as the relative gap between the individual level of X_k and the deprivation threshold $z_k = 1$, with a maximum value of 1 (total deprivation) and a minimum of 0 (no deprivation).

V

Findings

This section presents deprivation in each dimension. For the sake of completeness, headcount ratios are presented at the indicator level as well as at the dimension level. Deprivation gaps (levels of deprivation) are also presented at the dimension level for different regions and demographic groups. To gauge inequality (i.e. for a relative perspective), the change in the ratio with respect to the national level is presented as well. Lastly, multidimensional poverty is analysed by region and demographic group.

1. Food and water

This dimension is defined by two variables. The first is measured at the household level and is defined as deprivation in the public water supply to the home. The threshold is defined on the basis of the responsibility of the State (municipal governments) to provide a water supply (Constitución de la República del Ecuador, 2008, article 264). The second variable measures monetary (i.e. income) deprivation as a proxy for food deprivation

(the threshold approximates to food deprivation, as it is the official extreme poverty line). Table 2 shows the national headcount of deprived persons. The percentage of the population deprived of a public supply of water to the home decreased from 32.1% in 2006 to 27.9% in 2010, while the percentage of the population with monetary deprivation fell from 16.9% to 13.5% over the same period. At the dimension level, one third of the population suffers from food and water deprivation; however it is important to note that, on average, 1% of the population overcomes this deprivation each year.

Table 3 presents the deprivation gap at the dimension level. The figures show the average gap for different regions and demographic groups. The table makes it clear that deprivation in this dimension is particularly an issue in rural areas (especially in rural coastal and rural Amazon areas), while a smaller deprivation gap is found in the cities of Cuenca, Quito and Machala.

The deprivation gap for food and water decreased between 2006 and 2010 in all regions and for all demographic groups, with the exception of the indigenous population, for which the deprivation gap remained unchanged. Because the two variables are measured at the household level, it is not possible to disaggregate the deprivation gap by gender or age. Where relative deprivation is concerned (that is, the ratio of the deprivation gap of a given group to the national level), the deprivation gap for the indigenous demographic group rose from 2.1 times to 2.5 times the overall national gap between 2006 and 2010. Additionally, there were increases (that is higher relative deprivation) in rural coastal areas, the urban Sierra and the Amazon. The reduction in food and water deprivation between 2006 and 2010 was primarily driven by the cities of Cuenca and Machala and urban coastal areas. Additionally, the monetary deprivation gap increased for indigenous people and the urban Sierra (including Quito) and Amazon regions during this period.

TABLE 2

Ecuador: deprivation headcounts, 2006-2010

(Percentages of the population)

Variable/dimension	2006	2007	2008	2009	2010
Water in the home	32.1	28.7	28.8	29.0	27.9
Monetary	16.9	16.5	16.2	15.8	13.5
Food and water	**38.4**	**35.7**	**36.0**	**36.5**	**34.2**
Radio	27.2	28.9	28.0	31.8	32.4
Telephone [a]	68.9	66.0	64.4	65.4	63.0
Television	19.7	17.5	15.5	15.5	13.0
Computer	80.4	79.6	76.8	75.9	71.8
Internet	...	...	93.2	92.4	88.2
Communication [b]	**73.2**	**70.9**	**69.2**	**71.3**	**69.8**
Education	**66.1**	**64.6**	**64.8**	**66.0**	**65.4**
Home	27.6	32.6	30.9	32.6	31.3
Flooring	30.1	28.9	28.1	25.7	23.4
Bedrooms	50.1	50.2	48.5	46.7	43.6
Electricity	4.9	4.6	4.4	6.0	4.6
Sewerage	51.1	48.0	45.3	45.1	43.5
Rubbish disposal	31.3	29.8	28.7	29.1	25.4
Housing	**81.2**	**81.8**	**80.5**	**79.7**	**77.8**
Health insurance	79.7	79.7	78.1	77.2	69.2
Monetary	66.0	65.3	64.8	66.9	63.3
Health	**88.5**	**88.2**	**87.6**	**87.5**	**84.9**
Satisfaction with work	23.0	28.6	27.7	27.9	24.7
Wanting more work	42.0	31.9	26.6	26.8	21.4
Work [c]	36.8	35.3	32.5	33.1	28.8
Social security	84.5	83.2	82.2	80.7	79.4
Work and social security	**90.3**	**88.7**	**87.2**	**86.0**	**84.0**

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR), December rounds.

[a] Does not include mobile phone.

[b] Does not include computer or Internet.

[c] Aggregates "satisfaction with work" and "wanting more work".

TABLE 3

Ecuador: deprivation gap by dimension, 2006 and 2010
(Percentages)

Region/group	Food and water		Communication [a]		Education		Housing		Health		Work and social security	
	2006	2010	2006	2010	2006	2010	2006	2010	2006	2010	2006	2010
National	19.2	16.4	38.6	36.1	34.8	34.0	26.6	22.8	57.1	50.2	53.1	47.4
Quito	1.7	1.0	17.1	12.7	24.4	23.3	15.0	10.9	39.8	36.2	47.4	37.0
Guayaquil	7.3	6.6	31.7	30.7	29.3	26.8	17.4	16.3	49.4	43.8	53.1	47.4
Cuenca	3.2	0.5	15.5	13.0	24.6	24.9	12.7	10.3	43.2	40.4	48.6	37.9
Machala	8.8	3.6	38.1	36.2	31.7	28.6	17.2	13.5	57.8	47.1	56.4	48.7
Urban Sierra	6.6	6.0	24.7	22.9	29.3	30.3	15.2	13.3	52.2	50.6	51.6	46.2
Urban coast	10.7	9.0	40.2	39.3	33.4	32.4	20.4	19.0	61.6	51.0	55.4	52.2
Urban Amazon	4.5	7.7	25.2	30.3	26.9	28.2	16.2	18.2	49.6	52.8	49.7	46.2
Rural Sierra	39.4	33.0	50.4	47.5	45.1	45.0	41.3	33.6	66.3	64.6	56.2	49.9
Rural coast	48.9	42.4	62.7	58.6	48.8	47.5	49.6	43.0	69.7	48.4	54.3	50.3
Rural Amazon	46.2	40.9	66.7	55.6	37.3	36.0	50.7	40.4	66.4	66.3	50.9	45.7
Male	…	…	…	…	33.9	33.1	…	…	56.5	50.0	53.7	45.7
Female	…	…	…	…	35.7	34.9	…	…	57.7	50.5	52.5	49.0
Children	…	…	…	…	4.8	3.1	…	…	66.8	59.7	51.0	48.0
Adolescents	…	…	…	…	9.9	7.1	…	…	63.8	59.3	55.7	50.9
Youth	…	…	…	…	34.1	28.9	…	…	55.4	49.8	56.5	49.5
Adults	…	…	…	…	49.6	47.8	…	…	49.5	44.3	51.8	45.4
Elderly	…	…	…	…	74.3	71.4	…	…	52.9	40.5	50.0	45.5
Indigenous	40.9	40.9	59.0	59.2	47.3	46.5	45.5	41.5	72.0	71.5	60.2	51.1
White	16.7	10.1	33.3	26.9	31.6	27.8	23.4	15.7	50.6	43.3	51.3	44.5
Mestizo	17.4	13.1	36.8	32.6	33.7	32.1	24.8	20.2	55.9	48.6	52.6	46.6
Afro-Ecuadorian	21.6	16.4	46.2	42.4	39.8	35.6	34.1	25.1	63.8	55.0	53.9	50.2

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR), December rounds.

[a] Does not include computer or Internet.

2. Communication and information

Deprivation in the dimension of communication and information is measured by five variables at the household level: ownership of a radio, telephone, television and computer, and Internet access. However, the possession of these means of communication does not reflect true access to and use of them, nor does it indicate access to information or tell us about the quality of any information accessed. A comprehensive analysis of these criteria is indeed necessary, but exceeds the scope of this study. Table 2 shows the deprivation headcount for each variable and for the dimension. Deprivation declined between 2006 and 2010 for all the variables expect radio. In 2010, the highest percentages of deprivation were for the Internet (88.2%), computers (71.8%) and the telephone (63.0%), while the lowest deprivation ratios were for radio (32.4%) and television (13.0%).

Table 3 shows the deprivation gap at the dimension level by region. The deprivation gap decreased in all domains between 2006 and 2010. Deprivation is highest in the rural Amazon and on the coast, especially in rural areas. However, the relative deprivation gap between the rural Amazon and the national level decreased from 1.7 to 1.5 between 2006 and 2010. At the country level, the deprivation gap was 36.1% in 2010, meaning that on average each household had one out of three means of communication (mainly television, followed by radio). Differences in the deprivation gap by demographic group are similar to those for the previous dimension.

Indigenous persons have a higher deprivation gap. The relative deprivation gap for indigenous people increased from 1.5 to 1.6 times the national level between 2006 and 2010. The ratio is similar for Afro-Ecuadorians (1.2) but lower for mestizos (for whom it declined from 1.0 to 0.9 over the period) and whites (down from 0.9 to 0.7).

3. Education

An educational attainment index is used to identify educational deprivation. This index compares a person's years of education with the desired number of years (the threshold) for his or her age. Desirable or expected years of education are defined as a function of age. The desired number of years of education is 0 for those aged under 7, while the maximum number is set at 17 (complete primary, secondary and tertiary education). However, a person is defined as not deprived if he or she has more than nine years of education (complete primary education) and does not wish to study more.

Average years of education for the population aged over 5 increased from 7.4 in 2006 to 7.9 in 2010. Table 4 shows average years of education and average expected years of education by age group. Average years of education increased between 2006 and 2010 for all age groups. The group with the largest improvements in its level of educational attainment between 2006 and 2010 were the young, with the proportion attaining the expected years of education rising from 65.9% in 2006 to 71.1% in 2010.

TABLE 4

Ecuador: average education and average expected education by age group, 2006 and 2010
(Years)

Age group	2006		2010	
	Education	Expected education	Education	Expected education
Children	2.8	2.2	3.1	2.4
Adolescents	8.0	8.4	8.4	8.5
Youth	10.0	15.4	10.8	15.4
Adults	8.5	16.9	8.7	16.8
Elderly	4.4	17.0	4.8	17.0

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR), December rounds.

Despite the large improvements mentioned, the percentage of the population showing some level of educational deprivation was still over 65.4% in 2010 (66.1% in 2006). Rural areas show the largest deprivation gaps (see table 3). There is a difference in gaps between females and males, with the educational deprivation gap being 1.1 times as great on average for the former as for the latter. This ratio remained unchanged between 2006 and 2010, as did the ratios between the deprivation gaps of indigenous people and rural areas and the national level.

4. Housing

To measure housing deprivation, six variables are considered. The first concerns home ownership, with an individual being considered as not deprived if his or her household owns the home they live in and deprived if the home is rented.[4] The second variable identifies the quality of the flooring, following the ENEMDUR criterion.[5] The third variable measures the number of people per bedroom in the home. An individual is considered non-deprived if there are two people or fewer per room and deprived if there are three or more people per room. An intermediate level of more than two but less than three people per room on average is also established.[6] Lastly, access to electricity, a sewage system and rubbish disposal are measured at the household level.[7]

Table 2 shows the percentage of the population with deprivations in the housing dimension. One third of the population do not own a home. There is no clear trend for this indicator during the period. In the case of flooring quality, the deprivation headcount decreased from 30.1% in 2006 to 23.4% in 2010. Almost half the population live in a home with more than two people per bedroom. However, this indicator decreased from 50.1% to 43.6% during the period. Electricity provided via the public grid covers almost all the population. Meanwhile, public sewerage and public rubbish disposal services covered 56.5% and 74.6%, respectively, of the population in 2010. Lastly, at the dimension level, the

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[4] The threshold is defined as a household owning its home in accordance with article 30 of the constitution, which provides for a right to housing irrespective of a person's financial and social situation (Constitución de la República del Ecuador, 2008, article 30). Renting a home affects disposable income, so that the ability to do so depends on a household's financial situation.

[5] Flooring is considered adequate if it has been treated for this use.

[6] The threshold is set at the same level as in the official index of unsatisfied basic needs.

[7] The threshold is set in consideration of the obligation of the State to provide these services (Constitución de la República del Ecuador, 2008, articles 264 and 314).

proportion of deprived people decreased from 81.2% in 2006 to 77.8% in 2010.

In 2010, the deprivation gap at the national level was 22.8%, meaning that on average each individual was deprived on more than one variable. Rural areas have a larger deprivation gap in housing. However, relative deprivation decreased from 1.6 to 1.5 times the national level in the rural Sierra between 2006 and 2010. In the case of the rural Amazon, the ratio decreased from 1.9 to 1.8, while it remained unchanged for the rural coast (1.9). The urban Amazon is the only region that showed higher deprivation in 2010 than in 2006. This can be explained by rising demand for housing that cannot be satisfied.

Indigenous and Afro-Ecuadorian populations have larger deprivation gaps than other ethnic groups. In the case of indigenous people, the relative deprivation gap increased from 1.7 to 1.8 times the national level between 2006 and 2010, while the ratio for the Afro-Ecuadorian population decreased from 1.3 to 1.1 over the same period.

5. Health protection

Two variables are used to analyse health protection. The first identifies whether individuals have health insurance (public or private), and they are defined as deprived if they have none. The second variable is a measure of financial self-protection, going by the official basic goods and services basket. Individuals are considered not deprived if the income of their household is equal to or higher than the cost of the relevant basic basket,[8] so that they can afford to cover unpredictable expenses. It is important to mention that public health care is available to the whole population in Ecuador. However, waiting times and other uncovered expenses limit access and quality. Health status and health care need specific analysis to identify a more comprehensive level of health deprivation and inequality.

The percentage of the population without health insurance was 69.2% in 2010. This share decreased by more than 10 percentage points between 2006 and 2010. In the case of financial self-protection, 63.3% of the population could not afford the basic basket of goods and services in 2010. At the dimension level, 84.9% of the population lacks some element of health protection. The main driver of these deprivation figures

is the low coverage of the social security system. The deprivation gap is below 50% only in the main cities (Quito, Cuenca, Guayaquil and Machala). The level of deprivation decreased in all regions between 2006 and 2010 except the urban Amazon, where it increased from 49.6% to 52.8%. The largest reductions were in the coastal region, especially the rural coast, where the deprivation gap decreased from 69.7% to 48.4%. This is connected with access to public health insurance from the Ministry of Public Health.

Indigenous and Afro-Ecuadorian populations have larger deprivation gaps, a result of both more limited access to health insurance and lower incomes. Children show higher levels of deprivation, though mothers and infants are provided with free care by the Ministry of Public Health. It is important to note that people requiring priority protection receive special public health care to meet their specific needs. The largest reduction in deprivation between 2006 and 2010 was in the elderly group, where it declined by more than 10 percentage points during the period. This effect can be explained partly by the extension of public health insurance coverage, but also by higher incomes thanks to old age benefits.

6. Work and social security

Work deprivation is measured by two variables. The first, satisfaction with work, measures access to work and the level of satisfaction it provides,[9] identifying as deprived anyone who wants to work but who is jobless, and anyone younger than 15 years old who is working.[10] Social security deprivation is measured by a variable identifying as deprived anyone who is not a member of any social security scheme.[11]

Table 2 shows the deprivation headcount for each variable. One quarter of the population are deprived in terms of work satisfaction, meaning that they want to work but are not working or that they are dissatisfied with their work. This indicator increased overall between 2006 (23.0%) and 2010 (24.7%), but was actually lower

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[8] The cost of the basic basket for a household of four people with 1.6 earners was US$ 555.27 as of April 2011 (INEC, 2011), and it is adjusted by the consumer price index (CPI).

[9] Satisfaction is determined by the individual's own perception on a scale from satisfied to dissatisfied (see table 1). In 2010, 31% of the employed population were dissatisfied because of their income, 26% because of poor career opportunities and 20% because of job instability.

[10] The legal minimum working age is 15 (Código de la Niñez y Adolescencia, 2003, article 82).

[11] Ecuador has social security schemes under three different institutes: the Ecuadorian Social Security Institute (IESS), the Armed Forces Social Security Institute (ISSFA) and the National Police Social Security Institute (ISSPOL). The IESS has three different regimes: a general regime, a voluntary regime and a rural regime.

in 2010 than in 2007 (28.6%). The main reason for the lower deprivation headcount in 2006 was a higher level of self-reported satisfaction. The proportion of satisfied workers decreased from 71.3% in 2006 to 63.9% in 2007 before rising back to 68.9% in 2010. However, the work satisfaction deprivation gap (level of deprivation) decreased from 15.8% to 13.9% over the same period. The percentage of workers wanting more work decreased from 42.0% in 2006 to 21.4% in 2010, and the aggregate work deprivation headcount decreased from 36.8% to 28.8% over the same period. In the case of social security, the deprivation headcount (percentage of the population without social security) decreased from 84.5% in 2006 to 79.4% in 2010. The total deprivation headcount is higher for this dimension than for the previous one. The percentage of the population with some level of deprivation in work and social security was 84% in 2010, showing that this dimension requires special government attention and an increase in the coverage of the social security system.

The deprivation gap is similar in all regions and decreased by 5.7 percentage points between 2006 and 2010. The indigenous population has the largest deprivation gap (see table 3). Deprivation among indigenous people held steady at 1.1 times the national level between

2006 and 2010, but increased from 1.0 to 1.1 for Afro-Ecuadorians over the same period. Lastly, the work deprivation gap for indigenous people decreased from 32.7% in 2006 to 15.6% in 2010.

7. Multidimensional poverty

Multidimensional poverty in Ecuador (see figure 3) decreased from 17.9% in 2006 to 15.6% in 2010. This reduction cannot be interpreted in the same way as a headcount ratio (i.e. a reduction in the number of poor people), but the important thing is that it shows that the level (severity) of multidimensional poverty in the country has fallen. Between 2006 and 2010, the level of multidimensional poverty decreased at an average rate of 3.2% per year. Figure 3 presents the pattern of multidimensional poverty between 2006 and 2010. Although the trend shown is similar to that for poverty as measured by income, multidimensional poverty is less strongly affected by economic shocks (such as the 2009 international crisis). Besides being a measure of the severity of poverty, this indicator captures a reduction not just in the number of poor people but in the level of poverty, especially among the poorest.

FIGURE 3
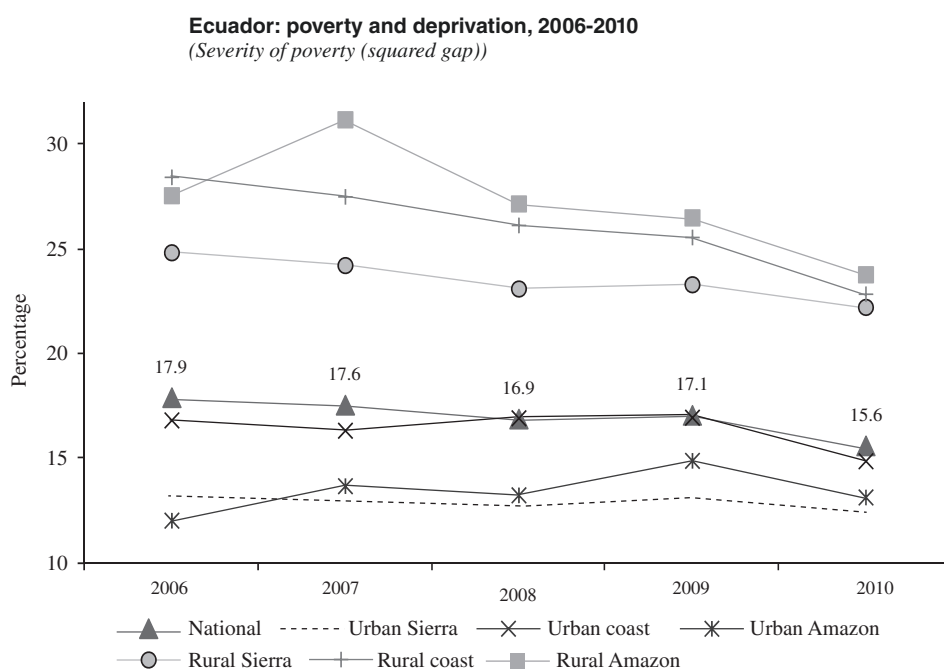
Ecuador: poverty and deprivation, 2006-2010
(Severity of poverty (squared gap))

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR) and National Statistics and Census Institute (INEC), *Evolución del mercado laboral*, Quito, 2010.

Table 5 presents figures for multidimensional poverty between 2006 and 2010 by region and demographic group. The regions with the highest levels of multidimensional poverty are rural areas. Despite the fact that multidimensional poverty decreased by 2.3 points (12.8%) in rural areas between 2006 and 2010, relative poverty was still 1.4 times the national level in the rural Sierra, 1.5 times in rural coastal areas and 1.5 times in the rural Amazon. Where urban areas are concerned, the coastal region shows the highest levels of multidimensional poverty, while Quito and Cuenca have the lowest levels. It is important to note that multidimensional poverty remained unchanged[12] in the urban Amazon between 2006 and 2010, which ties in with the increasing deprivation levels (gaps) in all dimensions other than work and social security.

[12] The difference between 2006 and 2010 is not significant (t-value = 0.4594).

TABLE 5

Ecuador: multidimensional poverty by region and group, 2006-2010
(Percentages)

	Multidimensional poverty					Absolute share					Relative share				
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010
National	17.9	17.6	16.9	17.1	15.6	17.9	17.6	16.9	17.1	15.6	100.0	100.0	100.0	100.0	100.0
Quito	10.0	9.5	9.1	9.3	8.3	1.2	1.1	1.0	1.1	0.9	6.5	6.2	6.1	6.2	6.1
Guayaquil	13.3	12.6	11.8	12.7	11.7	2.2	2.0	1.9	2.0	1.9	12.0	11.6	11.3	12.0	12.1
Cuenca	10.2	9.3	8.3	9.1	8.5	0.3	0.2	0.2	0.3	0.2	1.5	1.4	1.3	1.5	1.5
Machala	15.5	15.0	14.0	13.5	12.5	0.3	0.3	0.2	0.2	0.2	1.5	1.5	1.5	1.4	1.4
Urban Sierra	13.2	13.0	12.8	13.1	12.5	1.8	1.8	1.8	1.8	1.7	10.1	10.2	10.4	10.6	11.0
Urban coast	16.8	16.3	16.9	17.0	14.9	3.2	3.1	3.2	3.2	2.8	18.0	17.8	19.2	19.0	18.2
Urban Amazon	12.0	13.7	13.3	14.9	13.2	0.2	0.2	0.2	0.3	0.2	1.0	1.2	1.3	1.5	1.4
Rural Sierra	24.9	24.2	23.1	23.3	22.2	4.2	4.2	4.0	4.0	3.8	23.5	23.7	23.4	23.3	24.3
Rural coast	28.5	27.5	26.2	25.6	22.9	3.7	3.6	3.4	3.3	3.0	20.7	20.4	20.2	19.5	19.0
Rural Amazon	27.6	31.2	27.2	26.5	23.8	0.9	1.0	0.9	0.9	0.8	5.1	5.9	5.4	5.0	5.2
Male	18.0	17.3	16.6	16.7	15.4	8.9	8.6	8.2	8.2	7.6	49.8	48.8	48.3	48.3	48.7
Female	17.9	17.8	17.2	17.4	15.8	9.0	9.0	8.7	8.8	8.0	50.2	51.2	51.7	51.7	51.3
Children	17.4	17.1	16.2	16.4	14.8	4.3	4.3	3.8	3.6	3.2	23.7	24.4	22.7	21.1	20.2
Adolescents	17.0	16.5	15.8	16.1	14.7	2.3	2.2	2.1	2.1	1.9	12.8	12.4	12.5	12.6	12.3
Youth	17.0	16.9	16.1	16.1	14.5	3.3	3.2	3.1	3.1	2.7	18.7	18.2	18.3	18.3	17.6
Adults	18.0	17.7	17.1	17.3	15.9	6.2	6.3	6.1	6.3	5.9	34.8	35.7	36.2	36.6	37.7
Elderly	23.4	22.4	21.9	21.8	19.9	1.8	1.6	1.7	1.9	1.9	9.9	9.3	10.3	11.4	12.3
Indigenous	28.5	28.1	27.4	27.4	27.0	2.1	2.0	2.0	1.9	1.8	11.6	11.4	11.7	10.9	11.7
White	15.9	16.2	15.4	14.4	12.3	0.9	1.2	1.1	1.0	0.4	4.8	6.6	6.5	5.7	2.4
Mestizo	17.0	16.6	15.9	16.4	14.2	14.2	13.5	12.8	13.4	11.3	79.2	77.0	75.7	78.5	72.4
Afro-Ecuadorian	20.8	20.3	19.8	18.3	17.2	0.8	0.8	1.0	0.8	0.8	4.3	4.5	6.0	4.4	5.1
Montubio	…	…	…	…	22.4	…	…	…	…	1.3	…	…	…	…	8.4
Other	15.0	21.4	21.6	25.1	17.4	0.0	0.1	0.0	0.1	0.0	0.1	0.6	0.1	0.4	0.1

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR), December rounds.

The highest levels of multidimensional poverty are found among the indigenous population and Afro-Ecuadorians. While relative poverty among Afro-Ecuadorians decreased from 1.2 times the national level in 2006 to 1.1 in 2010, the relative level for indigenous people increased from 1.6 times the national level in 2006 to 1.7 in 2010, meaning that despite the absolute reduction in the level of multidimensional poverty, the indigenous population was worse off in 2010 than in 2006 in terms of equity.

In terms of relative shares of multidimensional poverty at the national level (table 5), the coast accounted for 50.6% of the national multidimensional poverty level in 2010, both by number of poor people and poverty level. Rural areas, and especially the rural Amazon, have the highest levels of poverty but a lower absolute number of poor. If the figures are broken down by age group, children and adults together accounted for 57.9% of multidimensional poverty in 2010 (20.2% and 37.7%, respectively), both by number of poor people and by poverty level, while the elderly are the group with the highest level of multidimensional poverty. Lastly, decomposition by ethnic group shows that the indigenous population accounted for 11.7% of all multidimensional poverty nationwide in 2010 by poverty level, while the mestizo population represented 72.4% of all multidimensional poverty owing to the absolute number of poor.

An ordinary least squares (OLS) regression (see table 6) shows that multidimensional poverty in Ecuador is strongly associated with ethnicity and rural residence. Controlling by household characteristics, region and year, indigenous persons show levels of multidimensional poverty 7.6 points higher than persons who self-identify as white or mestizo, while Afro-Ecuadorians have a level of multidimensional poverty 1.9 points higher. With regard to gender, the level of multidimensional poverty among women is 0.5 points higher than among men. This shows the existence of ethnic and gender inequalities, but on a different level. It is important to note that the coefficients remain unchanged when the regression is not controlled for time effects, which means that despite the reduction in the level of multidimensional poverty, the level of inequality did not change between 2006 and 2010.

The household characteristics that show the strongest relationships with the level of multidimensional poverty are the household dependency ratio[13] and single-parent households. One additional point on the household dependency ratio is associated with a multidimensional poverty level that is 0.6 points higher. A single-parent household has, on average, a level of multidimensional poverty 0.7 points higher than that of a household with two parents. These relationships show the importance of social protection policies for households with vulnerable populations. Lastly, regional inequalities are the main drivers of multidimensional poverty, as living in a rural area is associated with a multidimensional poverty level between 9.1 and 13.7 points higher than that in Guayaquil.

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[13] The household dependency ratio is defined as the number of children, adolescents and elderly people divided by the number of young people and adults.

TABLE 6

Ecuador: multidimensional poverty, regression using ordinary least squares (OLS)

Multidimensional poverty	I	II	III	IV
Indigenous	0.11663 *	0.11205 *	0.07583 *	0.07575 *
Afro-Ecuadorian	0.03333 *	0.03182 *	0.01849 *	0.01922 *
Child	-0.00616	-0.01185 **	-0.02303 *	-0.02346 *
Adolescent	-0.00872 ***	-0.01489 *	-0.02450 *	-0.02470 *
Youth	-0.00836 *	-0.00666 *	-0.00779 *	-0.00800 *
Elderly	0.04601 *	0.00818 **	0.01732 *	0.01764 *
Female	0.00378 *	0.00365 *	0.00532 *	0.00526 *
Married	0.00708 *	0.00717 *	0.00293 *	0.00282 *
Household dependency ratio		0.00863 *	0.00611 *	0.00604 *
Female head of household		-0.01038 *	0.00266 **	0.00356 *
Age of head of household		0.00001	-0.00034 *	-0.00032 *
Single-parent household		0.00901 *	0.00713 *	0.00669 *

Table 6 (concluded)

Multidimensional poverty	I	II	III	IV
Quito			-0.03553 *	-0.03555 *
Cuenca			-0.03346 *	-0.03327 *
Machala			0.01646 *	0.01646 *
Urban Sierra			0.00083	0.00087
Urban coast			0.03889 *	0.03884 *
Urban Amazon			0.00489	0.00506
Rural Sierra			0.00489	0.09135 *
Rural coast			0.13571 *	0.13570 *
Rural Amazon			0.11904 *	0.11935 *
2007				-0.00409 *
2008				-0.01110 *
2009				-0.00896 *
2010				-0.02392 *
Constant	0.15623 *	0.14910 *	0.13473 *	0.14334 *
Observations	395 280	395 280	395 280	395 280
R^2	0.09140	0.11070	0.34640	0.35170

Source: prepared by the author on the basis of the National Survey of Employment, Unemployment and Underemployment in Urban and Rural Areas (ENEMDUR), December rounds.

* 1% significance; ** 5% significance; *** 10% significance.

VI

Concluding remarks

The dimensions with the highest levels of deprivation in Ecuador are work, social security and health protection. Accordingly, a priority for poverty alleviation in Ecuador is to reform the social protection system, increasing its level of coverage and the risks covered. Deprivation in relation to housing and education still affects a large number of Ecuadorians. Housing deprivation problems mainly concern quality, meaning that policies must be implemented to increase access to basic services (in particular drinking water and sewerage) and that fair private-sector mechanisms need to be created to improve housing conditions.

Despite the reduction in multidimensional poverty between 2006 and 2010, the level of inequality has not changed. Rural areas are still the poorest and the ratio between poverty there and at the national level has not improved. Persistent inequalities continue to affect indigenous people and Afro-Ecuadorians, and the level of poverty is still higher among women than men, especially when it comes to education and work.

Households with high dependency ratios show higher levels of multidimensional poverty. This is a sign that it is important to promote and increase family support as a social protection mechanism. Besides this, poverty is severest in rural areas where more resources are needed owing to heterogeneity, dispersion and lack of basic infrastructure. Significant resources are required to alleviate multidimensional poverty, and better redistribution is needed. However, structural social and economic inequalities also need to be addressed in order to foster more equitable economic growth. Political will and social commitment are likewise necessary.

Finally, further research is needed to fathom the relationships between social protection, economic growth and multidimensional poverty alleviation. In the same way, additional dimensions and a comprehensive contextual analysis are important for analysing civil and political rights, as well as the rights of nature. New information therefore needs to be collected continually in order to improve the indicators used to measure each dimension.

ANNEX 1

A measure of multidimensional poverty in Ecuador

A multidimensional approach defines poverty by a vector of individual characteristics (Tsui, 2002). In general terms, a multidimensional poverty index can be presented as a function $P(X,z): Mxz \rightarrow R_+^1$, where $X \in M$ is the (n x m) attributes' matrix for $i=\{1,2,\ldots,m\}$ individuals and $k=\{1,2,\ldots,m\}$ dimensions and $z \in Z$ is the vector of thresholds (Bourguignon and Chakravarty, 2003). An index can be constructed following at least three different methodological approaches: the axiomatic approach, fuzzy sets theory and information theory (Maasoumi and Lugo, 2008). Following Bourguignon and Chakravarty (2003), a general decomposable multidimensional index that satisfies the necessary axioms can be defined as:

$$P(X,z) = \frac{1}{n}\sum_{i=1}^{n} f \begin{bmatrix} max\left\{0^{\circ}_{,}\left[1-\frac{x_{i,1}}{z_1}\right]\right\} \\ ,\ldots, max\left\{0^{\circ}_{,}\left[1-\frac{x_{i,k}}{z_k}\right]\right\} \end{bmatrix} \quad (1)$$

or in a general form as:

$$P(X,z) = \frac{1}{n}\sum_{i=1}^{n} f\left(X_{i,1}^{\wedge},\ldots,X_{i,m}^{\wedge}\right) \quad (1.1)$$

Using a union approach to define $f(\cdot)$ and then a variation on the Foster, Greer and Thorbecke (1984) index to capture the severity of poverty, multidimensional poverty can be measured as follows:

$$P(X,z) = \left[\frac{1}{n}\sum_{i=1}^{n} \frac{1}{m}\sum_{k=1}^{m} X_{i,k}^{\wedge\ 2}\right] \quad (2)$$

In (2), the dimensions are assumed to be non-substitutable but interrelated for the aggregate level of poverty, which is consistent with a rights-based perspective. At the individual level, more weight is given to dimensions with a higher deprivation gap, and subsequently more weight is assigned to those persons with higher levels of deprivation. This makes the index sensitive to poverty distribution. Poverty at the individual level is defined by $P_i \left(1/m\right)\sum_{k=1}^{n} X_{i,k}^{\wedge\ 2}$, with

a maximum value of 1 (complete poverty) and a minimum of 0 (not poor).

In order to analyse each dimension, headcount ratios and deprivation gaps (deprivation levels) can also be estimated for different regions and demographic groups, where applicable. For the headcount ratio, anyone falling below the threshold on at least one variable is considered deprived (union approach) on the basis of the following rule:

$$deprived_i = \begin{cases} Yes; \ if \ X_{i,k}^{\wedge} > 0^{\sim} \\ No; \ if \ X_{i,k}^{\wedge} = 0 \end{cases} \quad (3)$$

The deprivation gap for each individual on each indicator is directly measured by $X_{i,k}^{\hat{l}}$, while the individual deprivation gap in each dimension is determined by the aggregation function $g_k(\cdot)$ as follows:

$$X_{i,k} = \circ \frac{1}{p}\sum_{l=1}^{p} X_{i,k}^{l} \quad (4)$$

The deprivation level $\left(X_{i,k}^{\wedge}\right)$ is measured using (4) in each dimension and is defined as the average deprivation level among the variables. Finally, the decomposable aggregate deprivation gap for each dimension is:

$$X_k^{\wedge} = \frac{1}{n}\sum_{i=1}^{n} X_{i,k}^{\wedge} \quad (5)$$

Using (5), it is possible to decompose the deprivation gap by region and by demographic group, as follows:

$$X_k^{\wedge} = \sum_{s=1}^{q} \frac{n_s}{n} X_k^{\wedge(s)} \quad (6)$$

where S is the set of groups $\{1,\ldots,q\}$, and .

$$\{1,\ldots,q\}, \ y \ X_k^{\wedge(s)} = \left(1/n_s\right)\sum_{i_s=1}^{n_s} X_{i_s,k}^{\wedge}$$

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The biodiesel market and public policy: a comparative analysis of Argentina and Brazil

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ABSTRACT

This article presents a comparative case study of the institutional aspects of policymaking and the impacts that this has had on the development of the biodiesel market in Argentina and Brazil. The study draws upon an analysis of the policymaking process and, based on the available statistical evidence, discusses how this has influenced the market's development. Its findings underscore the differences between the two countries' policy objectives. In Argentina, issues relating to the supply of petrodiesel have been a crucial factor, whereas, in Brazil, the promotion of family farming has been a major objective. In Brazil, Petrobras has played a significant role, but some of the country's policy objectives in this area have not been fully met. In Argentina, the external market continues to be the driving force behind this industry.

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I

Introduction

Although biodiesel was first produced in the late nineteenth century, its production has been rapidly gaining ground in recent decades, and the debate about the issue has heated up in the last few years as a result of a number of different factors.

This article will discuss the biodiesel development policies of Argentina and Brazil. Both of these countries have been pursuing policies aimed at promoting biodiesel production and are positioning themselves as world-class producers and consumers. It is the authors' hope that this study will shed light on how a country's institutional structure influences the development of biofuel promotion policies and their outcomes. The conclusions reached in this regard can serve as a valuable diagnostic tool for use in the design of energy policies in countries dealing with similar sets of circumstances. They may also contribute to an understanding of how these two countries are positioned within the global energy system as it transitions towards more renewable sources of energy.

The methodology used in this analysis is based on comparisons of the motivations that originally drove these policies, the policymaking processes themselves and the results achieved in terms of the promotion of biodiesel in Argentina and Brazil.[1] The study is composed of this introduction and four other sections. Section II outlines the underlying structure of the comparative analysis of biodiesel promotion policies in the two countries. Section III provides a description of the initial sets of circumstances and the importance of the driving factors in each case. This discussion points up the existence of two main policy drivers: the incentives provided by external markets, which have played a very important role in the case of Argentina, and the political agendas of the executive branch in Brazil. The focus then shifts to the policymaking process as such in each of these countries and to the driving forces and the various stakeholders that have been actively involved in promoting their interests within the institutional structure. Section IV covers the basic provisions of the laws and policy tools used to promote biodiesel production. The description of the policymaking process and the policy tools adopted in each country serves to underscore the important part played by institutions and stakeholders in the design of policies on biodiesel fuels. Within this context, emphasis is placed on the endogenous factors involved in policy design. The various repercussions of the introduction of promotional laws are analysed, along with their objectives in each case. This section also explores the consequences of these policies in terms of production and distribution. Section V offers some concluding observations within a comparative framework.

II

Component factors in an analysis of the development of the biodiesel market

The results produced by different countries' public policies for the promotion of biodiesel fuels are determined, in large part, by their policy objectives and their particular circumstances, but the political and institutional factors at work at the time that such policies are designed are the most influential elements of all. It is therefore of critical importance to determine what factors have been taken into account in assessing the different biodiesel development

exports, family farms' share in the production of biodiesel inputs and the concentration of land ownership. The information sources used included the databases of the Energy-Economic Information System (SIEE)/Latin American Energy Organization (OLADE), the National Petroleum, Natural Gas and Biofuels Agency (ANP), the Ministry of Agricultural Development and the World Bank, as well as information from the Ministry of Mines and Energy of Brazil and the Secretariat of Energy of Argentina.

paths. An understanding of these considerations is essential to the discussion presented here.

Figure 1 provides a schematic outline of the different clusters of factors that have to be taken into account when analysing the development of biofuel promotion policies and their performance. As shown, the direction taken by the design of biofuel policies is directly influenced by a set of exogenous factors. At the same time, there is a two-way impact between a country's institutional structure and these policies, since the former determines the types of instruments used to promote biofuels, and, later on, once these policies are in place, they also exert an influence on the institutional structure. Finally, the cluster of factors relating to policy outcomes relate to the impacts that the policies have had on the various factors that they were designed to target directly, as well as on other sets of circumstances that they have influenced indirectly. Since the policymaking process is a dynamic one, this last cluster will also influence subsequent policymaking through a feedback loop.

FIGURE 1

Analytical clusters
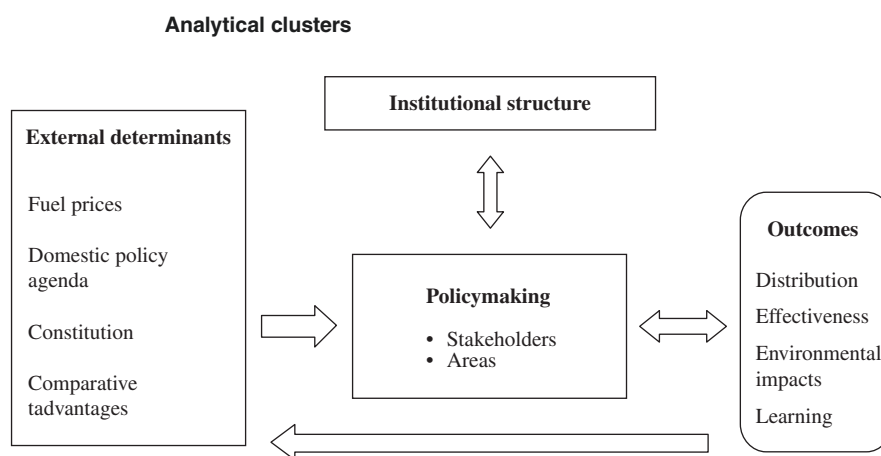
Source: Prepared by the authors.

The main reasons why countries have decided to promote biodiesel have varied from case to case. Some of the principal ones have to do with energy-related concerns, such as energy security, geopolitical independence and the impact of oil price volatility (Khanna, Scheffran and Zilberman, 2006). Environmental considerations involved in the effort to reduce greenhouse gas emissions is another driver of biofuel development. Biodiesel promotion policies in the European Union, for example, were in part triggered by public interest in reducing greenhouse gas emissions (Bureau and others, 2006; Timilsina and Shrestha, 2011). The opportunities that biodiesel production opens up for the agricultural sector (job creation, the use of state-of-the-art technology, and the marketing of biodiesel inputs and products) have also been a fundamental consideration (Pistonesi and others, 2008). In addition, for developing countries having a comparative advantage in the production of natural-resource-intensive goods, biofuels offer a strategic niche in the international economy (Msangi, Ewing and Rosegrant, 2006).

The interaction of these motivating factors gives rise to what might be characterized as the external determinants of biofuel promotion policies. This also endows the analysis with a multidimensional focus that encompasses political/institutional, agricultural, energy-sector, social and other impacts. This is why policies designed to boost biofuel development generally combine a number of different energy, agricultural, trade and environmental policy tools (Galperín and Pérez Llana, 2009).

Today, given the volatility of energy and raw materials markets, these considerations are prompting countries to step up their implementation of public policies designed to pave the way for the development of this energy source. The results of each of these policies largely depends on what the policy objectives are and on the different sets of circumstances existing in the countries concerned, but some of the most influential factors of all are the political and institutional structures and systems that are in place at the time that the policy is being formulated. The hypothesis advanced in this study is that institutional

features are just as influential as external factors are in determining the sectoral trajectories or development paths of the biofuel industry. In other words, we maintain that the politics of policies[2] has to be integrated into the analysis of biofuel promotion initiatives.

The differing development paths of the biodiesel industry in different countries, which are an outcome of the energy policies they implement, will give rise to differing results in terms of production and distribution. The institutional structure underlying biofuel promotion generates incentives and constraints that will influence investment decisions and, hence, production levels. The role played by the institutional structure is especially important when there are no established markets and when there is uncertainty about the future of energy markets and about what kinds of economically viable opportunities

may open up. But the analysis must also take policies' undesired effects into account. In particular, because of the interaction between biofuel and agricultural produce markets, biodiesel promotion policies have an impact on food prices and on oilseed (biodiesel feedstock) production chains. The distributional effects are another core consideration in policy analysis, since examining the effects of a given policy entails determining who gets what. In other words, the institutional structure has differing effects on the costs and benefits of the persons and groups involved, since it affords rights or benefits to some economic agents that may represent additional (or increased) costs for others. The creation of different incentives will give rise to a group of "winners" and a group of "losers" that will derive different policy-generated benefits or be subject to different policy-generated costs.

III

External determinants of biodiesel development

While, globally, a variety of reasons underlie governments' decisions to introduce biodiesel promotion policies, at a more local level, the cases of Argentina and Brazil exhibit a number of similarities and differences.

In Argentina, the development of the biodiesel market has been driven mainly by external demand, and the chief factors prompting the introduction of policy incentives have originated in the energy sector, agricultural sector and agribusiness. In Brazil, the main driving force for the development of the biodiesel industry has been more directly related to the social policy agenda of President Luiz Inácio ("Lula") da Silva[3] and only tangentially to energy-related considerations.

1. The role of energy markets

Since mid-2004, Argentina has been grappling with energy shortages which have recently been further exacerbated

by other factors. First of all, its primary energy matrix is heavily skewed towards hydrocarbons (87% of domestic supply in 2009), and 58% of its electricity matrix is composed of thermal energy. Second, its production levels are steadily declining, with year-on-year decreases, according to the Argentine Energy Institute (IAE), of 18% for petroleum and 6% for natural gas. Third, its reserves are shrinking, as attested to by a steady reduction in production horizons and limited refining capacity (Recalde, 2011a). The decline in reserves is graphed out in figure 2, which illustrates the trend in natural gas and petroleum reserves (NGRES and PRES, respectively) and in the reserves horizon —calculated on the basis of existing reserves and production levels— of natural gas (HNG) and petroleum (HP), which is a measurement of the number of years that existing reserves will last at the current level of output. This shortened horizon is the result of the depletion of oil and natural gas wells,[4] along with decreasing investment in exploration, which began in the early 1990s following the deregulation and privatization of oil and gas fields. This situation has been

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[2] Interest in the "politics of policies" has been growing over the last decade. With the development of today's new institutional economy and new political economy, the literature on the policymaking process has highlighted the importance of the role played by institutions in comparative policy performance. For an exploration of how this applies to the situation in Latin America, see IDB (2006).
[3] Luis Inácio ("Lula") da Silva, of the Workers Party, was President of Brazil from 1 January 2003 to 1 January 2011. He was succeeded by Dilma Rouseff, also of the Workers Party.

[4] This may change in the wake of the discovery of large petroleum and natural gas fields in unconventional geological formations in 2010 and 2011. The scale of those deposits and the economic viability of tapping into them have not yet been assessed, however.

FIGURE 2

Argentina: Hydrocarbon reserves and horizons, 1970-2008
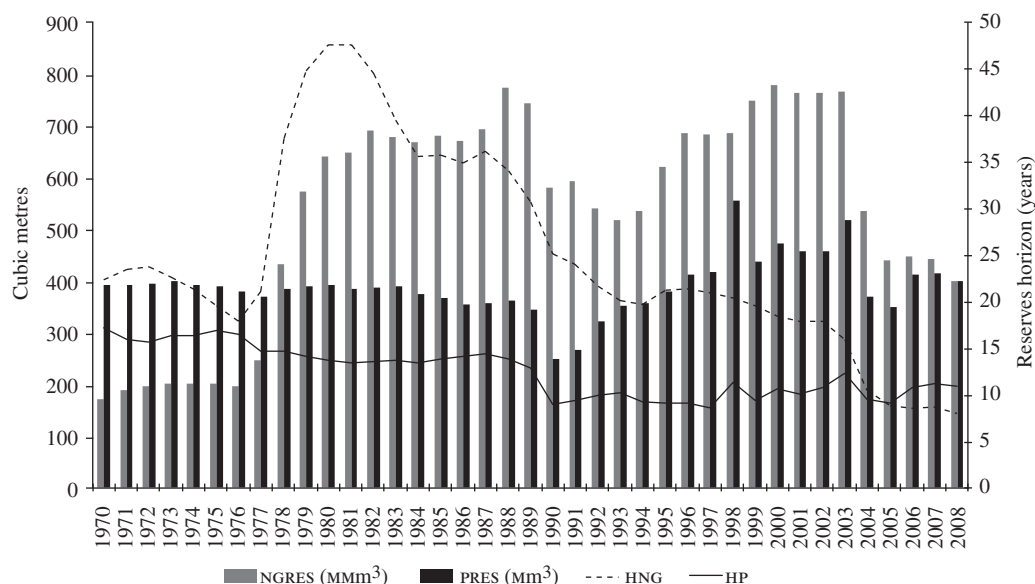
Source: M. Recalde, *Sistemas energéticos, mercado y Estado. El rol de los recursos naturales energéticos y la política energética en el caso argentino*, Madrid, Editorial Académica Española, 2011.

aggravated in recent years by the reaction to the price distortions created by the introduction of Decrees Nos. 310/2002 and 809/2002 and Decision No. 337/2004 of the Ministry of Economic Affairs and Production (Recalde, 2012).[5]

The promotion of biodiesel in Argentina is linked to the importance of petrodiesel, which accounts for nearly 50% of derivative fuel consumption and is the main fuel used in the transport and agricultural sectors (40% and 96%, respectively, of fuel consumption in 2009).[6] According to Chidiak and Stanley (2009) and Recalde (2010), the supply of this fuel is limited because, in addition to the depletion of existing wells, as mentioned earlier, the country has no more idle refining capacity. Although, since 2010-2011, there has been a comparable deterioration in the situation with regard to both petrodiesel and gasoline, so far the situation in terms of imports has been more serious in the case of

petrodiesel[7] than it has been for gasoline, partly because of the increasing use of diesel as a fuel for motor vehicles.

In Brazil, unlike in Argentina, energy-related issues, while certainly a factor, are not the most important consideration. Brazil has been producing and using biofuels since the 1970s, when it began to produce bioethanol from sugar cane as a means of promoting renewable fuels. Furthermore, the discovery of large oil fields off the Brazilian coast (known as the "pre-salt" reserves) has altered the energy supply paradigm. These reserves are estimated at between 70 million and 100 million barrels of oil equivalent and have put Brazil on the geopolitical petroleum-production map while at the same time sharply reducing the risk of oil shortages.

Brazil's energy sector is not driven by general supply problems. The country has a clean energy mix

[5]   For an in-depth discussion of trends in production, reserves and investment in exploration and their determinants, see Recalde (2011b and 2011c).

[6]   Calculated on the basis of statistics obtained from the energy database of the Secretariat of Energy, available at: http:energía.mecon.gov.ar

[7]   According to information from the Energy Secretariat, imports of petrodiesel, measured in United States dollars, have been climbing since 2002 (although they dipped in 2009 as a direct result of the slump in fuel demand triggered by the economic crisis that began in mid-2007), while the output of local refineries has exhibited a year-on-year decrease (the growth rates for petrodiesel output have been 7.62% in 2005/2006; 2.64% in 2006/2007; –3.43% in 2007/2008; and –3.96% in 2008/2009).

that includes a large proportion of biofuels. Its energy inventory indicates that, as of 2009, 47.3% of domestic supply came from renewable sources (15.2% ethanol and sugar-cane derivatives, 15.2% hydroelectricity, 10% firewood and 3.8% other renewable energy sources, including biodiesel). Another consideration is that, for Brazil, continuing to have a clean energy mix is a strategic tool in its bid to consolidate its diplomatic ambitions. The promotion of biofuels is a means of signalling Brazil's commitment to the global energy agenda and to environmental issues, which could also be linked to the fact that Brazil's transport sector has higher carbon dioxide (CO_2) emissions levels than its Argentine counterpart (see figure 3).

Figure 4 illustrates the fact that petrodiesel is used more in Argentina while the use of gasoline is more prevalent in Brazil. This fact, coupled with the downswing in local petrodiesel production, demonstrates why the energy sector has been one of the main drivers behind the promotion of biodiesel in Argentina.

2. The agricultural sector as a driving force

The agricultural sector has played a central role in driving the promotion of biodiesel in Argentina, but it has been a much less influential factor in Brazil. In Argentina, more than 95% of the raw material used to produce biodiesel comes from soybeans. Soybeans are the largest single oilseed crop that Argentina produces, and the land area devoted to it has been soaring in the past few years. Most of the harvest —whether in the form of soybeans or soy oil— is exported. In 2006-2009, over half these exports went to China, the world's largest market for soybean oil. Since 2009, however, when China took a strategic decision to set up plants in its own territory and to begin processing soybeans there, Argentine exports of soybean oil have fallen.[8] Given this downturn in external demand, the creation of a local biodiesel market represents a new business opportunity for oilseed producers and refineries. Nonetheless, one of the unexpected results of biodiesel production in Argentina is that the external market,[9] rather than the domestic market, quickly became one of the major driving forces behind its development (CADER, 2010).

In Brazil, on the other hand, the agricultural considerations that spurred the introduction of policies to promote the development of biodiesel are more varied and less directly related to soybean production. The aim of helping small-scale farmers and their families to play a more active role in society has been a major motivation for the promotion of biodiesel in Brazil since Luiz Inácio "Lula" da Silva was elected president in late 2002. And this was also one of the main reasons for the institutionalization of the National Biodiesel Programme in 2005.[10] It was also hoped that the programme would boost the production of castor oil, which is sited primarily in north-eastern Brazil, a poor and arid region, although the importance of soybean oil as an input for the production of biodiesel is not disputed, since soybeans are the only oilseed that is being produced on a big enough scale to make it a cost-competitive and reliable source of supply for the market. The emergence of the biodiesel market opened up an attractive business opportunity by paving the way for the creation of a domestic market that can boost domestic demand for oilseeds, which in turn can provide greater stability and security for the producers of the country's hefty supply of soybean oil.

3. Promotional instruments and their design

Argentina first began to take active steps to promote biodiesel in 2001, when Decree No. 1396/2001 was issued. That decree sets out a plan for making biodiesel production competitive, states that its production is in the national interest and introduces a number of economic tools for promoting its use. The effort to promote biodiesel really started to come into its own, however, in 2004, when energy supply problems began to become apparent. That was the year in which the Secretariat of Agriculture, Livestock, Fisheries and Foodstuffs launched the National Biofuels Programme (Decision No. 1156/2004), one of whose main objectives was to backstop rural sectors and provide them with advisory assistance in setting up biodiesel and bioethanol plants as an alternative to local soybean and soybean oil production. In May 2006, Argentina passed Act No. 26.093, entitled "Regulation

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[8] For the first quarter of 2011, Argentina recorded a 39.7% year-on-year drop in its exports of soybean oil.
[9] Argentina has gone from being the seventh-largest producer of biodiesel in 2007 to being the world's second-largest producer (with 13.1% of the market), after the United States (with 14.3%) (ECLAC, 2011).

[10] According to studies conducted by the Ministry of Agricultural Development, Ministry of Agriculture, Livestock and Supply, the Ministry of National Integration and the Ministry of Urban Affairs, for every 1% of diesel oil that is replaced with biodiesel produced using raw materials provided by family farms, 45,000 jobs can be created in the rural sector that would provide wages averaging US$ 3,000 to each worker. Family farms create 1 job for every 10 hectares of farmland, whereas agribusinesses create 1 job for every 100 hectares (Lima, 2005).

FIGURE 3

Argentina and Brazil: CO$_2$ emissions of the transport sector
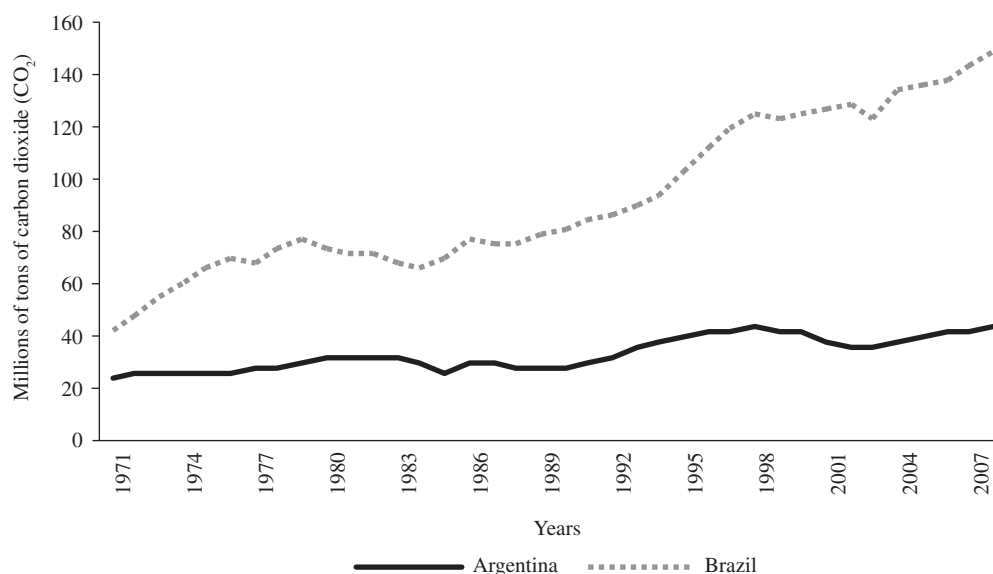
Source: Prepared by the authors on the basis of the official United Nations database.

FIGURE 4

Argentina and Brazil: Shares of different fuels in the transport sector, 2008
(*Percentages*)
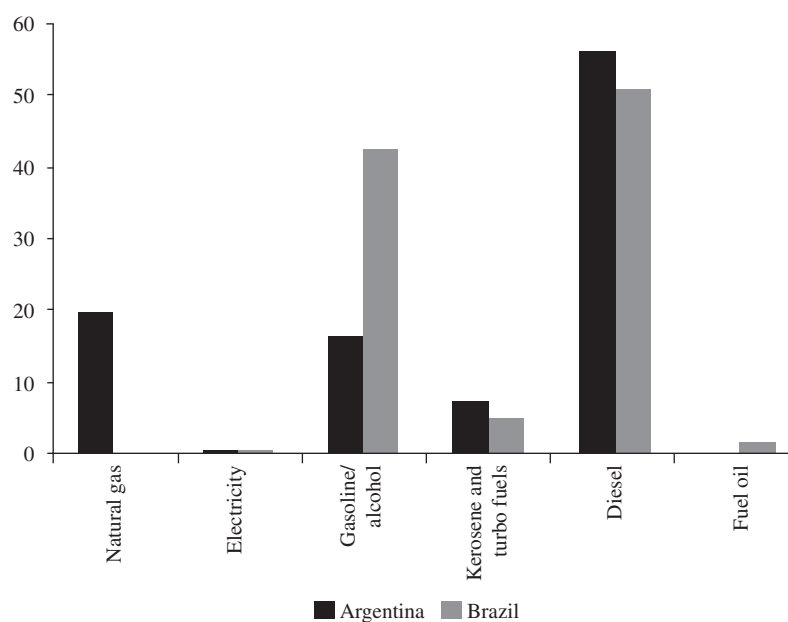
Source: Prepared by the authors on the basis of figures from the database of the Latin American Energy Organization (OLADE)/Energy-Economic Information System.

and Promotion of the Sustainable Production and Use of Biofuels" (along with implementing regulations set forth in Decree No. 109/2007), which establishes the legal framework for biofuels production.[11]

With respect to design issues, Chidiak and Stanley (2009) point out flaws in the regulatory instruments in this area, especially as regards coordination between public and private stakeholders and even within various subdivisions of the public sector owing to the divergent interests of the parties concerned. Within the public sector, this was reflected in the differing views of the Ministry of Economic Affairs and Public Finance, the National Institute for Industrial Technology (INTI) and the National Institute for Agricultural Technology (INTA) or the Ministry of Agriculture, Livestock and Fisheries. In the private sector, pressure groups associated with the first two links in the biodiesel production chain include the Argentine Biofuels and Hydrogen Association (AAHB), the Argentine Agrarian Federation (FAA) and the Argentine Biofuels Chamber (CARBIO) and various groups of the public.

One of the controversial issues that arose had to do with the types of economic incentives being offered and their potential impact on national accounts. The stakeholders most at odds with each other were groups in the agricultural sector and in the Ministry of Economic Affairs.[12] The Ministry was focusing on tax revenues: as of 2004, fuel taxes were accounting for 5.5% of total tax receipts, taxes on soya exports for 12% and the value-added tax (VAT) for 30%.

Another amendment made to the bill provided for the inclusion of federal provincial bodies and private agencies in the National Biofuels Sustainable Production and Use Advisory Committee and gave the Committee the authority to set benchmark prices. The authority to implement these provisions has been delegated to the Secretariat of Energy of the Ministry of Federal Planning, Public Investment and Service, which is to be assisted in this task by the National Advisory Committee (created

by virtue of article 3 of Act No. 26.093).[13] Specifications of the quality standards to be met by the B100[14] that is then mixed with diesel were established in 2010 by Decision No. 6/2010 and were later modified by Decision No. 828/2010. In July 2010, Decision No. 554/2010 raised the compulsory diesel blending rate from 5% to 7%, and the government appears to be working its way towards a further increase in the mandatory cut to 10%, which would help to curb the country's rising imports of petrodiesel and diesel oil. Biodiesel plants are bound to provide producers in the domestic supply chain (who can avail themselves of the incentives provided for in the new law) with sufficient quantities of biodiesel to comply with the 5% cut and to make supplies available to blending plants.

Unlike Argentina, Brazil has a great deal of experience in the promotion of renewable energy, especially biofuels. In the 1970s, in response to the international oil crisis and a severe local foreign-exchange shortage and as a means of reducing its reliance on petroleum, Brazil launched a renewable energy incentive policy. As part of that policy, it established Pró-Álcool, a national programme designed to boost the production of ethanol from sugar cane. Biodiesel, however, did not begin to figure on the energy policy agenda until the late 1990s or early 2000s.

As a first step, the federal government set up inter-agency committees that included representatives of government ministries, universities and research centres.[15] During this stage, energy and environmental issues, together with agricultural interests in the business community, were the main driving forces behind the effort.[16] When President da Silva took office in late 2002,

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[11] The bill was submitted to the Senate on 6 July 2004. One of its provisions, which was subsequently deleted, stated that any company, including oil companies, could qualify for the benefits provided for therein. The law that was ultimately passed, however, states that the incentives are primarily intended for small and medium-sized enterprises (SMEs).

[12] The bill originally provided for an exemption from the tax on petrodiesel (20.2%) and the infrastructure tax ($ 0.05 per litre of petrol). The Ministry came back with a counter-offer of a tax rebate on biofuel sales, accelerated amortization of production plants' profits and exemptions from the duty on imported inputs and from the minimum presumed income tax.

[13] This Committee includes representatives of the Secretariat of Energy, the Secretariat of Agriculture, Livestock, Fisheries and Foodstuffs, the Secretariat for the Environment and Sustainable Development, the Ministry of Finance, the Secretariat of Industry, Trade and Small and Medium-Sized Enterprises, the Ministry of Science, Technology and Productive Innovation and the Federal Public Revenue Administration.

[14] The term "biodiesel" is used to refer to the pure form of this fuel (B100), which has been designated as an alternative fuel by the Department of Energy and the Department of Transportation of the United States. B100 can be used in its pure form but it is more often used as an additive to conventional diesel fuel.

[15] One of the initiatives that provided a framework for this process was the National Biodiesel Production Programme (ProBiodiesel), which was launched in 2002 and coordinated by the Ministry of Science and Technology. More than 200 specialists and organizations belonging to the Brazilian Biodiesel Technology Network were involved in its design.

[16] The programme's objectives were: (i) to reduce the country's reliance on petroleum products; (ii) to create new markets for oilseeds, particularly soybeans; (iii) to boost overall demand for alternative fuels; and (iv) to cut carbon dioxide emissions.

however, the National Biodiesel Production Programme (ProBiodiesel) was completely revamped, and social goals in line with the new Administration's founding principles became an important element.

In 2003 an inter-ministerial working group was set up, and responsibility for administering the country's biodiesel policy was transferred from the Ministry of Science and Technology to the Executive Office.[17] Following the publication of the working group's report, biodiesel was introduced into the country's energy mix with the launch of the National Biodiesel Programme in December 2004.

The three pillars of the National Biodiesel Programme are social inclusion (with family farming being used as a vehicle for its promotion), environmental sustainability and economic viability. Under this programme, biodiesel use became compulsory, with a mandatory cut for diesel being set at 2% between 2008 and 2012 and rising to 5% thereafter. The implementation of the biodiesel policy called for a number of institutional changes, one of which was a name change for the National Petroleum Agency, which became the National Petroleum, Natural Gas and Biofuels Agency (ANP).

The biodiesel market is being consolidated with the help of ANP-administered public tenders, in which firms that have what is known as a social fuel stamp (SCS) enjoy preferential conditions, and a system for certifying industries that use inputs produced by family farms. The tenders are a way of ensuring that the benchmarks set by the National Biodiesel Programme are achieved. Petrobras has played a central role in this programme, since it is the sole buyer and is chiefly responsible —along with the Alberto Pasqualini Refinery (REFAP), which is also controlled by Petrobras— for ensuring that legally mandated blending ratios are complied with.

The National Biodiesel Programme uses a variety of promotional devices, including the institutionalization of tenders (price guarantees), a differentiated tax regime (designed to foster social inclusion) and mandatory blending ratios (in order to make sure that there is a market for biodiesel).

— *Policy tools*

As mentioned earlier, many countries around the world are developing policies to promote biofuels production. There are a variety of policy tools that can be used for this purpose, either singly or in combination with one another, depending on the policy objectives

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[17] The Executive Office is headed by the President's Chief of Staff.

being pursued and circumstances in the country concerned. The choice of tools will depend on a number of factors that need to be evaluated. Some of the main financial incentives are tax cuts (for investment, credits, differential capital amortization schemes) and lending instruments (the establishment of clear-cut lending mechanisms, reductions in implicit investment risk, guarantees designed to improve access to bank financing, low-interest loans). Argentina and Brazil have used different combinations of these policy tools to create their individual promotional policy packages. Tables 1 and 2 outline the different promotional schemes in use in these two countries.

Both Argentina and Brazil use a combination of quantitative and price-based policy tools. The former include a compulsory blending ratio, which ensures that producers will have a domestic market for their output. The latter comprise a mix of tax and financial benefits.

In Argentina, article 13 of Act No. 26.096 delineates the eligibility requirements for the promotional benefits set forth in that law, which can be met by industrial ventures located in the country that produce biofuels for the domestic market as their sole business activity —i.e., firms in which the State has a majority interest or agricultural producers (which have to prove that at least 50% of their assets are located in Argentina). In addition to the price-based and quantitative policy criteria established in the law and its accompanying regulatory decrees, there are also quality standards for biofuels in general and for biodiesel in particular. The law also clearly states that companies must have the necessary equipment in their plants to take the measurements needed to determine compliance with those quality standards.

These promotional tools aside, many authors have asserted that one of the factors driving biodiesel production recently has been the differentiated tax rates applying to exports of soybeans, oil and biodiesel. The export tax is levied at a rate of approximately 35% for soybeans, 32% for oil and just 20% for biodiesel. As a result, it has been one of the main drivers for production.

Finally, an alternative use for biodiesel is being explored by the Secretariat of Energy, which in 2009 launched the Renewable Energy Generation Programme (GENREN). Under this programme, blocks of 150 MW are put out to tender for electricity generating projects that use biofuels. Official information provided by Energía Argentina S.A. (ENARSA) indicates that the prices assigned to the selected biofuel-fired thermal generation projects range from US$ 258 to US$ 297 per MWh.

TABLE 1

Argentina: biodiesel promotional pricing tools

	Type of tool					
	Quantitative requirements	Financial incentives				
Legal instruments	Quotas	VAT	Profits tax	Liquid fuels tax	Infrastructure tax	Tax on transfers or imports of petrodiesel
Act No. 26.096	5%	Rebate of the percentage corresponding to capital goods and/or infrastructure works	Accelerated amortization	Exemption for the percentage of biofuel in the mix	Exemption for the percentage of biofuel in the mix	Exemption for the percentage of biofuel in the mix
Decision No. 554/2010	7%					
	Qualitative requirements					
Decision No. 6/2010 and Decision No. 828/2010	Quality specifications for biofuels to be blended with X percentage of petrodiesel.					
GENREN	Public tender to cover 150 MW of biofuel-fired thermal generation for energy for sale on the wholesale electrical power market. Guaranteed 15-year purchase contracts at pre-set price.					

Source: Prepared by the authors on the basis of Act No. 26.096 and the corresponding implementing regulations.

GENREN: Renewable Energy Generation Programme.

TABLE 2

Brazil: biodiesel promotional pricing tools

Federal taxes	Family farming, north, north-east and semi-arid	Family farming in general	General rule (other types of agriculture)	Diesel oil
IPI[a]	—	—	—	—
CIDE[b]	None	None	None	R$ 0.07
PIS/PASEP and COFINS [c]	Reduction of up to 100%	Reduction of up to 68%	R$ 0.22 (equal to or less than rate applying to diesel oil in all cases)	R$ 0.148
Total (per litre)	*R$ 0.00*	*R$ 0.07*	*R$ 0.218*	*R$ 0.218*

Source: Prepared by the authors on the basis of Decree No. 5.297 (6/12/2004), Decree No. 5.298 (6/12/2004) and Directive No. 1 of the Ministry of Agricultural Development, 19 February 2009.

[a] Tax on manufactures.
[b] Economic domain tax.
[c] Social integration tax and social security contributions.

As noted earlier, the most innovative feature of Brazil's programme is its use of tenders in which the acceptable price levels differ according to whether the bidding projects are promoting family farming or not. Thus, social inclusion has been promoted by designing a tax scheme that benefits business activities that patronize family farming and the semi-arid and northern regions, whose human development indices have traditionally been lower than those of the rest of the country. In order to do this, a system was designed based on a "social fuels stamp" in order to distinguish among different categories of farmers, regions and raw materials; ratings are then issued on the basis of a combination of these factors. The social fuels stamp is a certificate issued by the

Ministry of Agrarian Development to producers that buy their inputs from family farms.[18] Some of the benefits available to producers that hold this certificate are access to special credit lines from the National Economic and Social Development Bank (BNDES)[19] and preferential access to some of the lines of credit provided under the

National Family Agriculture Programme (PRONAF) for farmers who plant oilseed crops.

The percentage set for the blending ratio is one of the main tools for the promotion of biodiesel. The controversy here is between groups hoping to see rapid market growth (the agricultural and industrial segments of the market) and those advocating a moderate growth rate that will allow for the inclusion of small farmers. The initial cut was set at 2%, but it was raised to 3% in July 2008, to 4% in January 2009 and to 5% in April 2010.[20]

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[18] The social fuels stamp system was overhauled in February 2009 following a debate between representatives of the family-based agricultural sector and representatives of the oil processing industry and biodiesel producers. As a result, the percentages set for the purchase of raw materials from family farms was set at 15% for the northern and central-western regions and at 30% for the south, south-east, north-east and semi-arid regions.

[19] In 2010, its name was changed to the Development Bank of Brazil (BNDES).

[20] Since 2010, ANP has also been looking at the possibility of making the use of biodiesel compulsory in maritime transport. Advocates of the idea of increasing the cut are proposing that the compulsory blending level be set at 10%.

IV

Promotion policies: current status and potential effects

Table 3 provides a comparative overview of external factors, policymaking features and some of the main outcomes of this process. In the following sections we will analyse the current situation and the potential implications for each of the sectors affected by these policies. It is important to make it clear that, given the very short time horizon involved in evaluating these policies, some of the observed results may not be a direct effect of the implementation of these policies but may instead be attributable to external factors. This is especially the case in Argentina, where external demand has been the main factor driving biofuel production.

1. The current situation in the energy sector

As noted earlier, Argentina's fuel imports went from accounting for 4.84% of its total imports in 2004 to 7.78% in 2010. As shown in figure 5, since 2005, the production of petrodiesel and diesel oil have been separated from local production, and imports have obviously had to rise since then. Because these policies have been in place for so short a time, official statistics on their results are not yet available. The Ministry of Planning estimates, however, that the compulsory 7% cut in petrodiesel will boost annual consumption of biodiesel in the domestic market from 750,000 tons/year to 1.05 million tons/year, which is roughly equal to the level of Argentina's

current annual imports of petrodiesel. If this turns out to be the case, these policies may well prove to have been successful in reaching their energy objectives.

By the same token, in Brazil diesel imports account for a significant percentage of total imports, although here, unlike in Argentina, domestic production of diesel is also on the rise. In 2010, Brazil imported nearly 9 billion litres of fuel, with the main driving force being the growth of domestic consumption. As figure 6 shows, with the expansion of diesel production and the introduction of the compulsory blending ratio, imports have levelled off. Senatore and others (2010) assert that Brazil managed to save US$ 2.84 billion worth of diesel imports between 2005 and 2010 by increasing domestic diesel production and substituting biodiesel for petrodiesel.

2. The current situation in the agricultural sector and the biodiesel production chain

Argentina's biodiesel production capacity soared from 130,000 to 2.5 million tons between 2006 and 2010. Unlike the situation in Brazil, however, this increase in installed capacity was not solely a result of regulatory initiatives, since, while 51% of output is going to exports, 43% is being taken up on the domestic market. The sector has a formidable production capacity, with an average of 110,000 tons per plant, and there are at least five

TABLE 3

Argentina and Brazil: a comparison

	External factors (drivers)	Policymaking (stakeholders, rules, scenarios)	Outcomes (distribution, allocation)
Argentina	• Growing energy deficit: increasing imports of diesel oil owing to limited supply capacity. • Drop in demand from China. • Pressure from the main supply-chain stakeholders. • External market for biodiesel driving the industry more than the local market.	• Main pressure groups involved: the State, via the Secretariat for Energy and Public Finance; Ministry of Economic Affairs; National Institute for Agricultural Technology (INTA); Argentine Biofuels and Hydrogen Association (AAHB); Argentine Agrarian Federation (FAA) and Argentine Biofuels Chamber (CARBIO). • Special policy tools: compulsory blending ratio of 7%; various tax exemptions; GENREN tenders.	• Very large production capacity. • Appropriation of profits by main agents in the soya production chain: large soybean oil producers. • Integration of the soya production chain. • Concentration of production capacity. • Effects on the concentration of land used for soybean crops.
Brazil	• Agenda of President Lula (social inclusion) and presidential environmental agenda (National Biodiesel Programme). • Petroleum and diesel prices (imported by Brazil). • Past successes with biofuels policies (*path dependence*).	• Main pressure groups involved: the State via Petrobras; biodiesel producers' association; automotive industry; fuel industry; family farming institutions (ministry, trade unions, social movements). • Special policy tools: social fuel stamp, ANP public tenders, compulsory blending ratio of 5% (2012), cuts in the PIS/PASEP and COFINS taxes.[a] • Distribution of decision-making power (Ministry of Mines and Energy, ANP).	• Large production capacity, although smaller than Argentina's. • Appropriation of profits by soya production chain. • Benefits for soya-producing regions (south and central-west). • Active role for Petrobras in meeting social goals.

Source: Prepared by the authors.

GENREN: Renewable Energy Generation Programme.
[a] Social taxes.

FIGURE 5

Argentina: consumption, production and imports of diesel oil and petrodiesel, 2000-2009
(Thousands of cubic metres)
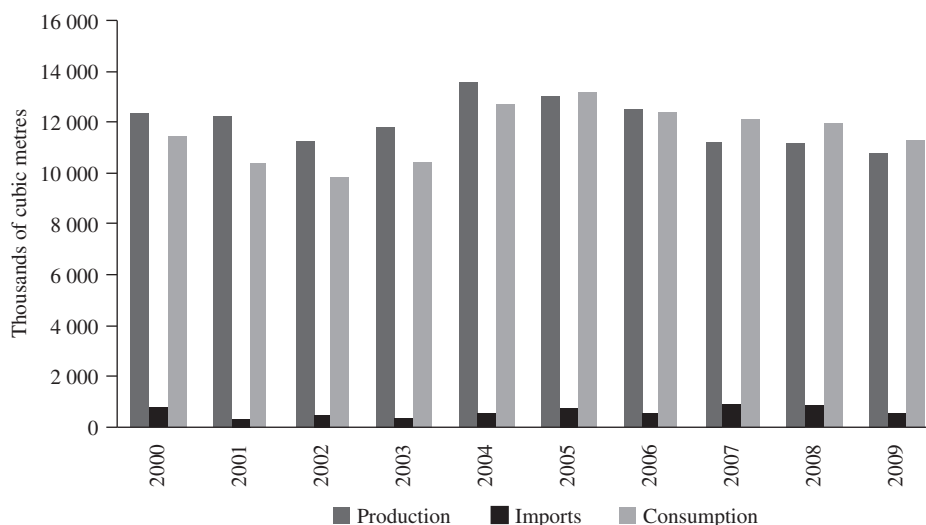
Source: Prepared by the authors on the basis of figures from the Secretariat of Energy and Public Finance.

FIGURE 6

Brazil: consumption, production and imports of diesel, 2004-2009
(Thousands of cubic metres)

Legend: ■ Consumption ■ Production ■ Imports
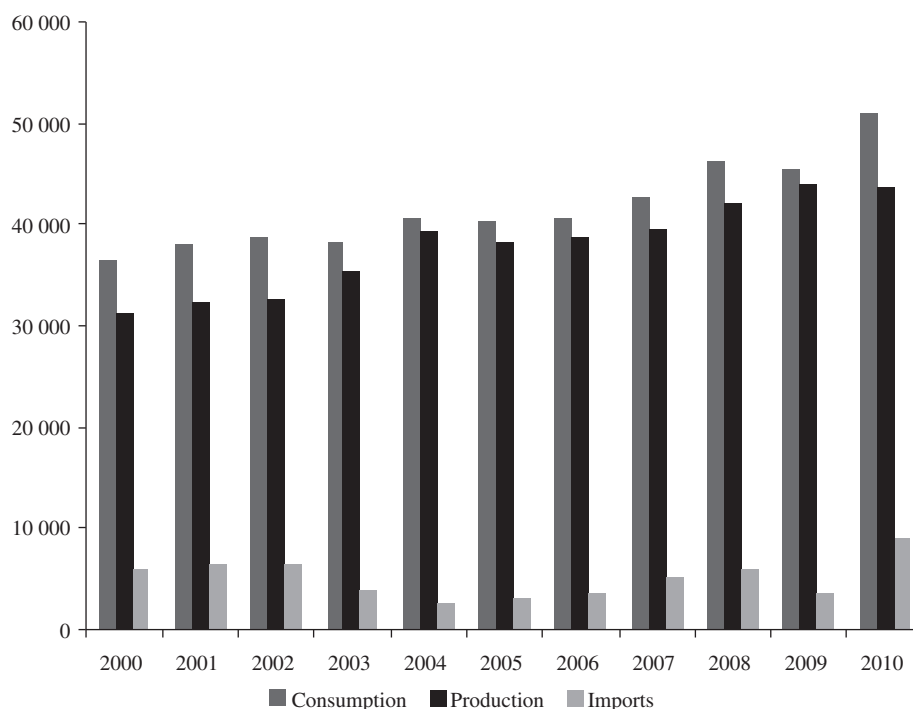
Source: Ministry of Mines and Energy, *Balanço energético nacional 2010*, Brasilia, 2010.

large plants with a production capacity of over 250,000 tons that export more than 75% of their output. These producers are not eligible for the incentives provided by these new laws, which target production for the domestic market. These laws have therefore not had any significant effect on the development of the market other than in terms of small-scale producers, which account for 6% of installed capacity and sell 100% of their output on the domestic market.

Biodiesel production gives soy producers a chance to expand their marketing channels as well as their earning opportunities all along the chain, which is why many of them are involved in manufacturing it as well. The impact that the increase in biodiesel production has had on soybean production can be gauged by looking at the increase in the output of this oilseed, which represented 88% of the harvested land area in 2008-2009, as shown in figure 7. However, trends in soybean production have been linked to trends in the external market, and the largest share of that market is accounted for by the export of soy meal. According to the National Institute

of Statistics and Censuses (INDEC),[21] between 2007 and 2009 the exports of the soya production complex amounted to nearly US$ 15 billion and accounted for 24% of total exports.

In Brazil, on the other hand, the launch of the National Biodiesel Programme jump-started local biodiesel production almost as soon as it was introduced. In just five years, the programme spurred the creation of an industrial complex capable of producing over 5 billion litres of biodiesel per year. With the compulsory 5% fuel blend generating a demand for an estimated 2.5 billion litres, there appears to be no threat of a supply shortage in the near future, and plants have idle capacity. Unlike the situation in Argentina, nearly all the country's biodiesel output is sold on the domestic market; firms rarely export a portion of what they produce.[22]

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[21] Available at: www.indec.gov.ar
[22] The biodiesel industry in Argentina exhibits a relatively high degree of concentration. Nearly 60% of production capacity is accounted for by just 10 firms.

FIGURE 7

Argentina: land under cultivation and soybean output, 1970-2010
(Millions of hectares)

■ Amount of land, nationwide, planted with soybeans (in hectares), by year
— Nationwide soybean output (in tons), by year
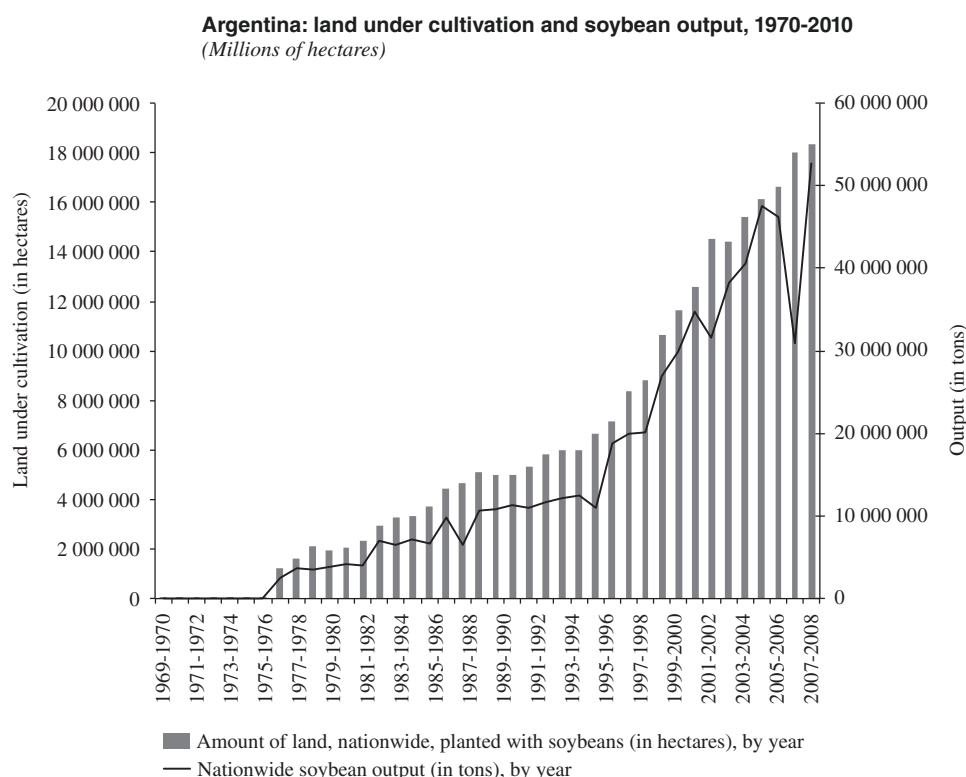
Source: Prepared by the authors on the basis of figures from the Ministry of Agriculture, Livestock and Fisheries.

With the growth of the biodiesel market, producers are looking for a way to integrate the industry and gain greater control over the chain by becoming the leading players in the production of the main feedstock —soybeans— and, in some cases, beef tallow as well. Transnationals such as the Archer Daniels Midland Company and Cargill are entering the market, and the average size of processing plants is on the rise, with capacity climbing from 64,000 litres per year in 2008 to 75,000 litres per year as of May 2010. On average, plants are smaller in Brazil than they are in Argentina, however. Nonetheless, Brazilian plants, too, have increased in number and production capacity during this period, with the number of plants having a capacity of over 150,000 litres rising from six to nine and those with a capacity of over 300,000 litres increasing from one to three.

3. Social considerations and the impact on distribution

The distributional effects of the expansion of biodiesel production in Argentina can be analysed by looking at its impact on the agricultural sector. One of the first distributional effects of this industry's growth has been the crowding out of small-scale producers, who, with the entry of large-scale investors and rising land prices, have decided to rent out their land and have ceased to operate as producers. This has, in turn, had an impact on rural employment (Giarraca and Teubal, 2005; Honty and Gudynas, 2007; *Biodiversidad*, 2007). According to the estimates made by a number of authors, mechanization and the introduction of genetically modified soybeans led to the displacement of at least 200,000 small-scale producers between 1990 and 2001 as producers strove to lower biodiesel production costs so that biodiesel would be more competitive. Data provided by ECLAC (2011) and Botta and Selis (2003) indicate that mechanization and the direct planting method used in Argentina have cut person/hour requirements so much that four out of every five jobs have been lost.

In Brazil, despite the government's efforts to promote family farming, most of the soybeans used in biodiesel production are supplied by large-scale producers. This clearly has strong implications in terms

of the government's social and environmental goals. More than 90% of biodiesel is produced from soybeans or beef tallow. It may be that as little as 20% of the country's biodiesel output is produced by family-based agricultural enterprises, and the feedstock for 90% of that is small-scale farmers' soybean crops, chiefly in the southern and central-western regions of the country. Unfortunately, these farmers are not among the poorest segments of the farm population, which are the target groups for the National Biodiesel Programme.

The number of agricultural producers in the biodiesel chain is growing, however, largely because of the entry of the three Petrobras plants and the creation of Petrobras Biocombustível (PBio), which is the largest buyer of oilseeds from family farms in the semi-arid regions of north-eastern Brazil.

One especially important factor, however, is that the hope of attaining the social and environmental goals underpinning the National Biodiesel Programme hinges, to a great extent, on how well PBio runs its operations

and manages their financial and logistical aspects. PBio has enough political clout and enough financial and human resources at its command to enable it to shoulder part of the corresponding supply-chain costs, to promote family farming and to make headway towards the achievement of the social and environmental goals of Brazil's biodiesel policy.

Groups with links to family-based agriculture have voiced concern about the effectiveness of these new policy tools, however. In their view, the inclusion of family farming in this production sector is far from assured, and there is a high risk that this policy will operate along the lines of the traditional model of integration for family farming and agro-industry. These groups advocate a more decentralized production model in which family farmers are given more support by business enterprises and the State so that, in the long run, they can transition towards the production of vegetable oils instead of oilseeds (see figure 8).

FIGURE 8

Brazil: number of family-based feedstock suppliers, 2005-2010

Number of family-based feedstock suppliers
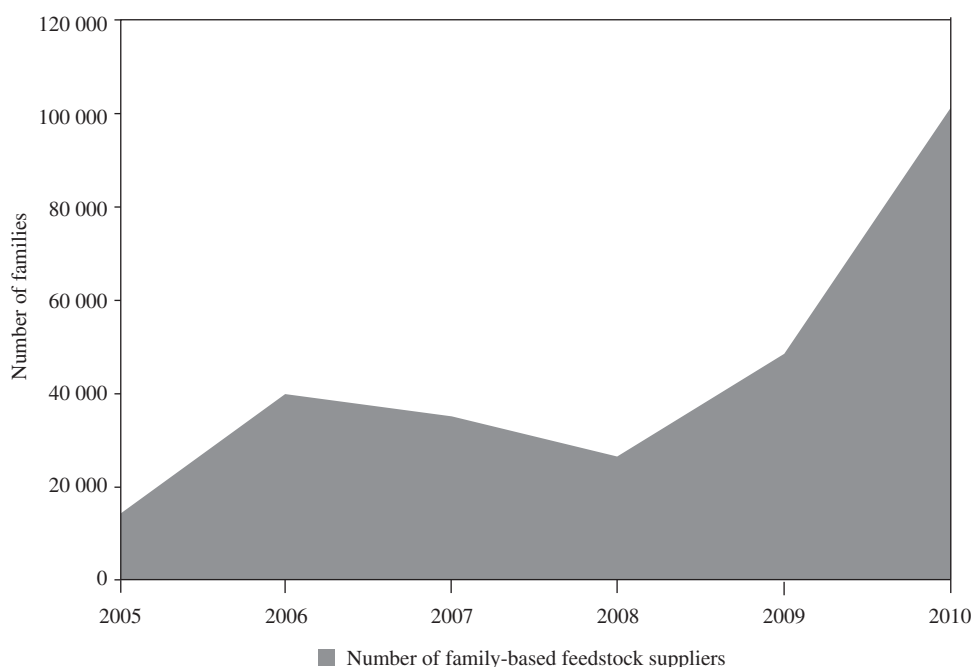
Source: Prepared by the authors on the basis of Ministry of Agricultural Development and G.M. Senatore and others, "O biodiesel e sua contribuição ao desenvolvimento brasileiro", Fundación Getulio Vargas and União Brasileira do Biodiesel, October 2010 [online] http://www.ubrabio.com.br/sites/1700/1729/00000201.pdf

V

Conclusions

Any comparative case study of Argentina and Brazil must be based on a recognition of the two countries' different political and economic circumstances and the different driving forces behind the move to regulate their biodiesel industries. In both cases, production incentive policies were introduced in the early 2000s, but since then the development paths of their biodiesel markets have diverged in a number of ways.

In Argentina, the main motivation has been the need to find a way for the energy sector to supply more of the country's energy requirements. Since 2004 the energy sector has been in crisis, and the situation has been exacerbated in recent years as hydrocarbon reserves and refining capacity shrink. The need to curb the country's growing imports of petrodiesel has been one of the factors behind the increase in the compulsory blending ratio from 5% to 7%, which seemed very likely to be raised to 10% by the end of 2012 and even to 20% for some sectors, such as passenger transportation or the agricultural sector. Petrodiesel imports have been boosted in recent years by growing demand from the electricity sector, which has no idle capacity left and is encountering serious problems in securing a sufficient supply of natural gas, its main fuel. Biodiesel can help this sector by making it possible to build biofuel-fired generating plants, especially now that the GENREN programme and other electrical power supply programmes are under way.[23]

Agricultural interests underlie these energy-related drivers. In the 2009/2010 harvest, the country produced nearly 54.5 million tons of soybeans. The interests of this sector are shown up quite clearly by an analysis of its role in the design of energy policy, the creation of more attractive tax incentives and the entry of some of the major soybean producers into biodiesel production.

In Brazil, on the other hand, the policy on biodiesel production has gained momentum since 2000, and the country's previous experiences played a decisive role when the plan for promoting this industry was being drawn up. The Pró-Álcool Programme has been a major success from an energy standpoint, but a failure in social policy terms, and that is why social objectives were explicitly incorporated into Brazil's policy on biodiesel. This policy has also opened up an opportunity for civil society organizations to take part in the debate surrounding energy policy, which had previously focused entirely on technical issues.

Since so little time has passed since these policies were introduced, their results cannot yet be fully evaluated. Nonetheless, certain differences can already be identified on an a priori basis. Data from official sources appear to indicate that Argentina's energy matrix is transitioning towards an increased substitution of biofuels for diesel oil and petrodiesel, and to some extent its biodiesel incentive policy can therefore be considered a success. However, biofuel production in Argentina is overwhelmingly geared to the external market, and the export sector —composed of large business groups— is not the policy's target group, which is not benefiting from the incentives. Thus, the expansion of the country's biodiesel production capacity is more directly a result of the growth of the world soy market and Argentina's tax scheme for exports of soy products, which has made biodiesel more attractive than soybeans or soybean oil. The Argentine biodiesel market can therefore be divided into two groups: large-scale soybean oil producers catering to the international market, which have turned Argentina into the world's largest biodiesel exporter, and small-scale producers whose output is sold on the domestic market as a means of meeting compulsory blending targets.

Accordingly, the stated policy objective of promoting small-scale ventures does not appear to have been achieved. One of the possible reasons for the presence of large industrial enterprises and the emphasis on exports could be that the legislated economic incentives fall short of what is needed. With distorted fuel prices in effect and fairly low export taxes on biofuels, the

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[23] One such programme is the Energy Plus Programme launched in 2006 pursuant to Decision No. 1281/2006. Various analysts of the Argentine energy industry contend that this programme forces large-scale users to negotiate the purchase of the supply needed to cover the increase in their electrical power demand relative to a benchmark level (set at their 2005 consumption levels) while at the same time creating an additional business opportunity for potential producers. As provided for in the corresponding decision, the supply for the Energy Plus Service is provided by the added generating capacity of generators, co-generators and self-generators that is not traded on the wholesale electrical power market, does not come from existing generating plants or is not linked into the wholesale electrical power market. Thus, the new investments in the Energy Plus Service have to be negotiated by large-scale users and suppliers, which can enter into contracts whose terms, conditions and prices are determined by the private parties concerned.

production of biodiesel for export is the most profitable option for producers.

In Brazil, on the other hand, the driving force behind the biodiesel market's growth has been the domestic market, with the pace of growth being determined by the State via the National Energy Policy Council (CNPE). The creation of domestic market guarantees and tax incentives has prompted large-scale biodiesel and soybean producers to take part in government-sponsored tenders and to turn towards the domestic market. Thus, the policy tools used have been successful in ensuring supply and averting shortages in the domestic market. Brazil has also apparently managed to reduce petrodiesel imports, thereby fulfilling one of the programme's other objectives.

Family farms are involved to a very limited extent in the National Biodiesel Programme, however, and soybeans are the main feedstock used for the production of biodiesel. Recent experience shows that structural shortcomings in the country's family-based agricultural sector[24] that hinder access to resources, technology and capital are limiting the programme's effectiveness.

In Brazil, PBio is one of the two main forces behind the effort to attain the social and environmental goals of the National Biodiesel Programme. This company's status as a joint public/private venture allows it to pursue social goals in line with Brazil's energy policy and the federal government's priorities, in addition to its purely private business objectives.

The clear-cut differences between Argentina's and Brazil's success in achieving their programmes' goals have to do with the maturity of their energy policies, their experience and, above all, the existence in Brazil of a firm like Petrobras, which the State can use to implement and guide the steps taken to pursue its energy policy objectives. This has not been the case in Argentina. However, in early 2012 the Argentine government decided to resume control over the country's largest energy company, YPF S.A.,[25] which had been privatized some 20 years earlier. Its use of this corporation as a vehicle for the implementation of its energy policy could do away with the differences between the two countries' policy development paths and the scope of their policy objectives.

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[24] Especially in north-eastern Brazil.

[25] In accordance with Act No. 26.741, which was published in the Boletín Oficial of 7 May 2012, and the implementing regulations set out in Decree No. 660/2012, the ownership structure of YPF S.A. is such that 26% belongs to the State and 25% to the corresponding states, with the rest being divided up between national and international investors that buy shares in the company on the stock market. See: www.infoleg.gov.ar

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Production structure of the services sector in countries at different development levels

Kênia Barreiro de Souza, Suzana Quinet de Andrade Bastos and Fernando Salgueiro Perobelli

ABSTRACT

Although the services sector accounts for nearly 70% of employment and income in developed and developing countries alike, it is well known that the economic performance of the tertiary sector does not depend exclusively on its capacity to add value. This article will evaluate the productive structure of the sector, by considering intra- and inter-sectoral relations in three countries with different development levels: Brazil, the United Kingdom and the United States. The article uses data from the 1995, 2000 and 2005 OECD input-output tables, to calculate the field of influence of sectoral links in the purchase and sale of inputs. The results show that the services sector in Brazil is poorly integrated with the rest of the economy; but in the other two countries, the most important links are spread across the economy as a whole.

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I

Introduction

Today, in the early twenty-first century, nearly all industrialized economies have become "service economies" (Maroto-Sánchez, 2010). Although the services sector accounts for nearly 70% of employment and income in developed and developing countries alike, most of the economics literature focuses on agriculture and manufacturing, while neglecting the role of tertiary activities.

According to data published by the Organization for Economic Cooperation and Development (OECD, 2010a), in 2005 the tertiary sector generated 82.94% of gross domestic product (GDP) in Luxembourg, and 77.25% in United States (see table 1).

The economic performance of the tertiary sector does not depend exclusively on its capacity to add value relative to the other sectors. Other indicators, such as

the balance of trade in services, reveal sharp differences between developed economies and Brazil (see table 2). According to Hoekman and Matoo (2008), international trade in services is a good indicator of the maturity of the tertiary sector, since its growth in the more developed countries mainly reflects exports of productive services and services provided to businesses.

Against this backdrop, this article aims to evaluate the productive structure of services through intra- and inter-sectoral relations in countries of different development levels. For the empirical analysis, three benchmark economies were chosen: Brazil, as the largest economy in Latin America; and the United Kingdom and the United States, as the countries reporting the largest services-trade surpluses in the years 1995, 2000 and 2005.

TABLE 1

OECD countries: share of value added by sector, 1995 and 2005
(*Percentages*)

Countries	Agriculture			Manufacturing			Services		
	1995	2000	2005	1995	2000	2005	1995	2000	2005
Austria	2.71	1.97	0.88	30.58	30.70	30.25	66.71	67.33	70.16
Germany	1.27	1.26	1.62	31.99	30.25	30.70	66.74	68.48	68.90
Brazil	**8.36**	**7.60**	**5.71**	**33.90**	**35.60**	**35.60**	**57.74**	**56.80**	**65.02**
Canada	2.86	2.21	1.81	30.39	32.91	32.91	66.75	64.88	65.62
Denmark	3.47	2.61	1.43	25.08	26.81	26.81	71.45	70.58	73.06
Slovakia	5.93	4.48	3.65	38.07	35.84	35.84	56.01	59.68	59.88
Spain	4.39	4.38	3.20	29.49	29.23	29.23	66.12	66.39	67.11
United States	**1.46**	**1.00**	**1.07**	**28.20**	**23.32**	**23.32**	**70.34**	**75.68**	**77.25**
Finland	4.53	3.78	2.77	32.59	33.38	33.38	62.89	62.84	64.75
France	3.23	2.71	2.29	26.19	24.68	24.68	70.58	72.61	74.83
Indonesia	16.85	16.08	13.06	38.98	45.82	45.82	44.17	38.10	40.14
Italy	3.31	2.80	2.20	30.28	28.43	28.43	66.42	68.78	70.93
Japan	1.76	1.81	1.38	32.65	25.79	25.79	65.59	72.39	70.56
Luxembourg	1.03	0.68	0.43	21.74	18.35	18.35	77.23	80.96	82.94
Norway	3.02	2.13	1.53	34.03	41.71	41.71	62.95	56.16	55.60
Netherlands	3.52	2.76	2.09	27.76	25.80	25.80	68.72	71.44	73.74
Poland	7.46	3.52	4.53	39.86	33.83	33.83	52.68	62.65	64.76
Portugal	5.12	3.78	2.84	29.77	27.58	27.58	65.11	68.65	72.63
United Kingdom	**1.77**	**1.02**	**0.67**	**30.84**	**27.34**	**27.34**	**67.39**	**71.64**	**75.85**
Sweden	2.71	1.88	1.10	30.32	28.58	28.58	66.97	69.54	71.23

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Input-output tables" [online] http://www.oecd.org/document/3/0,3343, en_2649_34445_38071427_1_1_1_1,00.html [viewed in April 2010].

a   Countries were selected for which data for 1995 and 2005 were published by the OECD.

TABLE 2

OECD countries: balance of trade in services, 1995, 2000 and 2005
(*US$ billion*)

Countries [a]	1995			2000			2005		
	Exports	Imports	Balance	Exports	Imports	Balance	Exports	Imports	Balance
Austria	79.90	133.40	-53.50	83.20	138.20	-55.00	163.50	210.20	-46.70
Germany	24.30	19.30	5.00	23.10	16.50	6.60	42.40	30.60	11.80
Brazil	**6.10**	**13.60**	**-7.50**	**9.50**	**16.70**	**-7.20**	**16.00**	**24.40**	**-8.40**
Canada	26.10	33.50	-7.40	40.20	44.10	-3.90	55.80	65.70	-9.90
Denmark	13.90	13.20	0.70	24.50	22.10	2.40	43.50	37.30	6.20
Slovakia	2.50	1.80	0.70	2.20	1.80	0.40	4.40	4.10	0.30
Spain	40.30	22.90	17.40	52.60	33.20	19.40	94.80	67.10	27.70
United States of America	**219.20**	**141.40**	**77.80**	**298.60**	**223.70**	**74.90**	**389.10**	**313.50**	**75.60**
Finland	7.40	9.60	-2.20	7.70	9.10	-1.40	17.00	17.70	-0.70
France	78.90	64.50	14.40	80.60	60.80	19.80	122.30	105.70	16.60
Indonesia	5.50	13.50	-8.00	5.20	15.60	-10.40	12.90	22.00	-9.10
Italy	57.50	51.10	6.40	56.70	55.60	1.10	89.40	90.00	-0.60
Japan	65.50	122.80	-57.30	69.20	116.80	-47.60	106.10	134.00	-27.90
Luxembourg	10.70	7.50	3.20	20.00	13.20	6.80	40.90	24.60	16.30
Norway	13.70	13.10	0.60	17.80	15.00	2.80	29.90	29.20	0.70
Netherlands	45.90	44.80	1.10	49.30	51.40	-2.10	80.10	73.30	6.80
Poland	10.70	7.10	3.60	10.40	9.00	1.40	16.30	15.50	0.80
Portugal	..	..	..	9.00	7.10	1.90	15.20	10.40	4.80
United Kingdom of Great Britain and Northern Ireland	**84.50**	**66.90**	**17.60**	**124.00**	**101.10**	**22.90**	**216.70**	**169.70**	**47.00**
Sweden	16.40	16.80	0.40	22.70	24.60	-1.90	43.10	35.30	7.80

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Input-output tables" [online] http://www.oecd.org/document/3/0,3343,en_2649_34445_38071427_1_1_1_1,00.html [viewed in April 2010].

[a] Countries were selected for which data were available for the entire period.

Productive structures were compared using data from the OECD's 1995, 2000 and 2005 input-output tables (OECD, 2010b) in the light of the growth of the services sector.

This article is divided into five sections, including the introduction. While section II reviews the literature on the services sector and the "tertiarization" process, section III provides details of the methodology employed and describes the data used in the empirical analysis. The fourth section offers a formal analysis of the results obtained, and section V sets out the main conclusions.

II

The services sector and tertiarization[1]

Despite attempts to characterize services, the growing technological dynamic of the productive process makes it hard to distinguish between economic sectors (Arriagada,

2007). According to this author, there is no consensus over the classification of service activities, which remains a complex issue requiring a multidisciplinary approach:

> *The rapid pace of change in the introduction of new technologies, which generate products with different characteristics but fulfil functions similar to those of traditional modes of production, distribution and*

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[1] The term "tertiarization" refers to the tertiary-sector expansion process.

consumption, introduce additional complexities that have rendered classification systems obsolete (Arriagada, 2007, p. 31).

Intra- and inter-sectoral boundaries are becoming more tenuous (Bernardes, Bessa and Kalup, 2005); and the distinction between manufacturing activities and those of the services sector is becoming less clear-cut (Pilat and Wölfl, 2005; Wölfl, 2005; Arriagada, 2007; Lima and Rocha, 2009; Siddiqui and Saleem, 2010). An inter-sectoral convergence process is unfolding, such that the manufacturing sector is increasingly service-oriented, and the services sector is gradually becoming more industrialized (Gallouj, 2002). As Boden and Miles (2000), cited in Freire (2006a, p. 35) note, the economic system can be viewed as a network of interconnected functions; for historical reasons some of these are classified as services and others as manufacturing.

Although it is hard to characterize the heterogeneous group of activities encompassed by the tertiary sector, the debate over the economic role of services has not yet been fully integrated into core economic theory, and the term "tertiary" continues to be used to refer to all activities not belonging to the agriculture or manufacturing sectors (Delgado, 2005).

Based on that definition, the trend of tertiary-sector expansion is known as tertiarization and is explained by various factors, including: (i) an increase in final demand by households, stemming from the high income-elasticity of demand for services and rising incomes; (ii) growth of the intermediate consumption of services, as production processes become more flexible; and (iii) productivity differences between sectors, which raise the production costs of tertiary activities.

To understand the tertiarization process, the composition and degree of heterogeneity of tertiary activities need to be established, because the multiple trends affecting this process manifest themselves in different ways at different economic development levels. Each country's degree of maturity and socioeconomic development is reflected in its productive structure and, hence, in the composition and dynamism of the tertiary sector.

Those characteristics reflect the set of historical and socioeconomic factors that have permeated the expansion of the tertiary sector, combining the effects of variations in final and intermediate demand and activity differences between sectors in various ways. Wölfl (2005) argues that countries are distinguished by the role and performance of the services sector; and the differences can explain how pro-services structural change affects economic growth.

The historical and socioeconomic determinants of tertiarization

As noted above, Wölfl (2005) argues that each country differs in terms of the role and economic performance of its services sector. While the growth of the modern branch of services may reflect the trend of the production structure and society itself, which requires more flexible production and a wider range of services, other branches of the tertiary sector can be characterized by low-productivity and low-skilled labour, owing to supply-side pressures in the labour market (Weller, 2004).

Thus, the effects on growth differ considerably between one activity and another, because they depend on structural and market characteristics (Pilat, 2005). This author finds that a well-functioning services sector is crucial for understanding not only the economic performance of individual countries, but also the welfare of their citizens. A diverse and productive services sector can enhance the performance of other economic sectors (particularly manufacturing), raising quality and boosting competitiveness throughout the economy.

Various explanations can be found for tertiarization. Bell (1973) describes the expansion of the tertiary sector in developed countries since the advent of the post-industrial society, marked by income growth that fuels greater consumption of services such as health, entertainment, education and culture. In that society, technological development would be expected to reduce the proportion of manual and unskilled workers, and most of the population would be engaged in producing intangible goods.

Knowledge would be the key factor for economic growth, while education and vocational training would be targeted on increasing welfare and social advancement. The tertiary sector would contribute to that process in two ways: producing social development and welfare, and playing a strategic role by enhancing the competitiveness of enterprises and the economy as a whole (Weller, 2004).

At the same time, since the 1950s developed countries have been undergoing a process of demographic growth and migration of the rural population to urban areas (Paiva, 1986). According to Pandit and Casetti (1989), those developments increased the labour supply beyond the ability of those countries' industries to fully absorb it, leading to excessive growth of the services sector, with low-productivity jobs in traditional or even informal tertiary activities.

Nonetheless, not all tertiarization processes are entirely spurious (or associated with low-quality jobs) in developing countries, or entirely genuine (or linked

to skilled functions with great capacity to add value) in industrialized economies (Weller, 2004). There are multiple trends involved in tertiarization, and all economies display spurious and genuine processes simultaneously, in proportions that vary according to their development level (Weller, 2004).

The historical background that characterizes the "multiple trends" of tertiarization in industrialized and developing countries as described by Weller (2004) is reviewed below.

1. Tertiarization in developed economies

Until the early 1970s, the predominant accumulation pattern in developed capitalist economies was Fordism,[2] characterized by mass production, economies of scale, technical and internal division of labour and vertical integration (Coffey and Bailly, 1991). In the mid-1960s, as war-ravaged economies recovered and the import-substitution movement gained ground in "third world" countries (particularly in Latin America), international competition intensified. Against this backdrop, firms saw signs of faltering revenues, until the first oil crisis in 1973 pushed up production costs and caused the collapse of the Fordist model.

The 1970s and 1980s were a turbulent period of economic reconstruction and social and political readjustment (Harvey, 1992, p. 140). In economic terms, a new pattern of accumulation emerged, known as "flexible production", which was characterized by a process of enterprise horizontalization, prioritizing core competencies; and co-operation became a strategic tool for maintaining competitiveness (Vargas and Zawislak, 2006). According to Coffey and Bailly (1991), activities in the flexible production system had to be outsourced to keep pace with technical changes.

The growth of advanced services is directly related to the emergence of the new information and communications technologies (ICT) paradigm, which allows for greater integration between economic sectors and, consequently, greater information and knowledge exchange between manufacturing and services, promoting the innovation process (Castellacci, 2008). The technological revolution thus gave rise to the "knowledge-based economy" (Jesus, 2005), the characteristics of which include a strengthening of knowledge-intensive services provided to firms (Muller

and Zenker, 2001), which act as "innovation promotion agents" (Bernardes, Bessa and Kalup, 2005).

According to Castells (1999), advanced services, such as finance, insurance, real estate, consulting, legal advisory services, advertising, projects, marketing, public relations, security, data compilation and information systems management, as well as research and development (R&D) and innovation, are responsible for knowledge production and the flow of information. Barras (1986) contends that the ICT revolution actually represents an "industrial revolution" for the services sector.

Consequently, in cities at the end of the twentieth century, the flow of intangible goods outweighed the flow of tangible goods (Phelps and Ozama, 2003). As a result, cities which in the Fordism period constituted material production hubs became centres of production for communication, ideas, knowledge and information (Storper and Venables, 2004). Cities are the crucial locations for the advanced services and telecommunications needed to implement and manage global economic operations (Sassen, 1999, p. 35). As this author emphasizes, burgeoning demand for services that are increasingly complex, diversified and specialized, makes them economically viable and allows the corresponding activities to expand mainly in the large urban centres.

According to Bailly, Maillat and Coffey (1987), small urban centres accommodate service activities with potential to contribute to local economic growth, by directly influencing production and supplying specialized services, not only locally but also to neighboring regions and the large centres nearby. These authors argue that the existence of strategic services such as maintenance, transport, accounting and legal services, is necessary both for existing firms and for the creation of new enterprises, and also for the relocation of those with little capacity to internalize services (particularly small and medium-sized firms).

The flexibility requirements of the post-Fordist, post-industrial, or knowledge economy, fuelled the spread of specialized services used mainly as intermediate productive inputs. This was very different from what occurred in the early 1950s, when final demand growth and the low productivity of services compared to the other sectors could fully explain tertiarization.

In this context, the expansion of the tertiary sector in industrialized countries can generally be seen as a sign of the evolution of the production structure —through the growth of intermediate demand— and of society itself, through the consumption of specialized services (Weller, 2004). Thus, when the expansion of services

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[2] The term "Fordism" refers to the production-line model implemented by Henry Ford, the United States automobile manufacturer.

is linked to a genuine tertiarization process (in other words growth in services linked to production and social welfare and advancement) it represents an expression of the post-industrial society (Bonet, 2007).

2. Tertiarization in developing economies

The expansion of the tertiary sector in developing economies is based on concomitant processes of worker inclusion and exclusion (Weller, 2004). First, activities linked to systemic productivity and social production grows, thereby generating high-productivity and high-quality jobs. Nonetheless, a portion of the jobs created reflect labour-supply pressures and use labour of low quality and low productive capacity. Thus:

> When talking of tertiarization in Latin America and the Caribbean, it is always important to remember the simultaneous presence of spurious and genuine processes, and thus avoid inappropriate simplifications such as identifying tertiarization with informality or interpreting it exclusively as an expression of post-industrial modernization (Weller, 2004, p. 174).

Unlike what happened in the industrialized countries, where technical progress increased efficiency and productivity, thereby raising wages and fuelling an expansion of demand for both goods and services, in late-industrializing countries technical progress affected only a few sectors, particularly those linked to food and raw materials produced at low cost and serving the large industrial centres (Pinto, 1984).

This happened because when the developing countries, particularly Latin American ones, embarked on their industrialization process, most European countries, along with the United States and Japan, had already achieved a higher technological level that was capital-intensive and required less labour each period. These characteristics were transferred to the nascent Latin American manufacturing through large transnational firms and imported means of production (machinery and raw materials), causing structural unemployment (López and Cobos, 2008). As the resultant labour surplus was not needed for agricultural production, according to Roggero (1976) and Kaztman (1984), the dynamic shortfall fuelled disproportionate growth in services.[3]

Manufacturing expansion could not absorb all workers leaving the countryside for the cities, causing severe imbalances in the labour market and excessive expansion of the tertiary sector, as a reflection of hidden unemployment (Roggero, 1976; Carneiro, 1994; Mazumdar, 2010; Mitra, 2010).

In the secondary sector, particularly in the least developed countries, investment constraints reduced the capacity to absorb labour and increase production capacity. This reflects the small size of domestic and external markets for the consumption of manufactured goods, compounded by rigid technical coefficients of production and scant domestic saving (Kon, 2004 and 2007).

Spurious tertiarization, involving few entry barriers and providing a refuge for low-productivity, low-skilled and low-paid labour, produces an expansion of services in response to supply pressures on the labour market (Carneiro, 1994; Melo and others, 1998; Amadeo and Pero, 2000; Bonet, 2007; Mitra, 2010).

For Kaztman (1984), this was merely the first wave of tertiarization in Latin America, and also the primary effect of the rural-urban migration of agricultural labour. Although workers originating in the agriculture sector are low-skilled, they boost demand for goods and services, thereby increasing integration between the secondary and tertiary sectors and creating new branches of services of a different type, closely linked to the inputs needed for industrial development.

In the 1990s, trade liberalization promoted changes in the production structure and gave renewed momentum to the tertiarization process. In the case of Brazil, the manufacturing sector was directly affected by the policies adopted, which exposed domestic manufacturing to international competition and forced industries to raise productivity and reduce employment. The result was an increasingly excessive growth of the tertiary sector, which absorbed the excess labour (Hilgemberg, Campos and Hilgemberg, 2009).

Having reviewed the differences in the formation of the tertiary sector, the next step is to identify the effects of the different contexts on the behaviour of services in developed and developing countries.

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[3] The concept of dynamic shortfall was formulated by Prebisch in the early 1970s and can be understood as the inability of the productive system to generate sufficient jobs to absorb the growth

of the economically active population and unemployment caused by technical progress (Roggero, 1976; Kaztman, 1984; Escaith, 2006).

III

Methodology

The emphasis on inter-sectoral relations and the concern for the growth dynamic of service activities have meant that input-output tables have often been used in the analysis of the sector. According to Schettkat and Yocarini (2003), this is an appropriate methodology for studying the gross output of services, since it allows inter-sectoral production relations to be analysed with some degree of intra-sectoral breakdown.

The input-output model consists of a system of linear equations that describe how the output of a given

sector is distributed through the rest of the economy. The basic information used in the model thus corresponds to inter-sectoral product flows, and also requires data on production destined for final consumption and that used as other productive inputs, such as labour, capital and imports, among others (Miller and Blair, 2009).

In the case of an economy with three sectors (primary, secondary and tertiary, for example), the input-output table data would be organized as shown in table 3.

TABLE 3

Structure of the input-output table

			Destination of production				
			Sectors			Final demand (C+I+G+X)	Gross production value
			Primary	Secondary	Tertiary		
Composition of output from the purchase standpoint	Sectors	Primary	z_{11}	z_{12}	z_{13}	f_1	x_1
		Secondary	z_{21}	z_{22}	z_{23}	f_2	x_2
		Tertiary	z_{31}	z_{32}	z_{33}	f_3	x_3
	Gross value added		v_1	v_2	v_3		
	Other payments		p_1	p_2	p_3		
	Gross production value		x_1	x_2	x_3		

Source: prepared by the authors on the basis of R.E. Miller and P.D. Blair, *Input-Output Analysis: Foundations and Extensions*, New York, Cambridge University Press, 2009.

The total output of the primary sector can be defined as the sum of sector production flows for use as intermediate inputs (z_{11}, z_{12}, z_{13}) and flows to meet final demand (f_1), consisting of consumption by households (C), investment (I), government expenditure (G) and exports (X):

$$x_1 = z_{11} + z_{12} + z_{13} + f_1 \qquad (1)$$

In addition, from the standpoint of purchases by the primary sector, its production corresponds to the intermediate flows of input purchases (z_{11}, z_{21}, z_{31}), plus the value added by the sector (v_1) and other payments (p_1). In general terms, the sum of the lines of the matrix represents each sector's total sales, and the sum of the columns represents its total purchases.

Thus, considering all sectors of the economy from the sales perspective, the economy's total output can be represented by the following system of equations:[4]

$$x_1 = z_{11} + z_{12} + z_{13} + f_1$$
$$x_2 = z_{21} + z_{22} + z_{23} + f_2 \qquad (2)$$
$$x_3 = z_{31} + z_{32} + z_{33} + f_3$$

The ratio between each sector's input use and its total production comprises the technical coefficients (a_{ij}), or input-output coefficients of the Leontief production function used in input-output models. The basic premise

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[4] If there were n service sectors, for example, the element x_3 would be an n x I vector, the element z_{33} would be a n x n matrix, and so on.

of this production function is that inter-industry flows from sector i to sector j depend only on the gross output of sector j in the period in question. Consequently, the ratio between the inputs purchased from sector i to be used in the production of j is given by:

$$a_{ij} = \frac{z_{ij}}{x_j} \quad (3)$$

Rewriting equation (3), intermediate consumption between sectors i and j can be defined as $z_{ij} = a_{ij}x_j$. Thus, substituting this relation into (2) gives:

$$\begin{aligned} x_1 - a_{11}x_1 - a_{12}x_1 - a_{13}x_1 &= f \\ x_2 - a_{21}x_2 - a_{22}x_2 - a_{23}x_2 &= f_2 \\ x_3 - a_{31}x_3 - a_{32}x_1 - a_{33}x_3 &= f_3 \end{aligned} \quad (4)$$

Simplifying (4):

$$\begin{aligned} (1 - a_{11})x_1 - a_{12}x_1 - a_{13}x_1 &= f_1 \\ -a_{21}x_2 - (1 - a_{22})x_2 - a_{23}x_2 &= f_2 \\ -a_{31}x_3 - a_{32}x_1 - (1 - a_{33})x_3 &= f_3 \end{aligned} \quad (5)$$

The system (5) can be represented in matrix form as:

$$(I - A)x = f \quad (6)$$

where:

$$I \begin{vmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{vmatrix} =; A = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}; x = \begin{vmatrix} x_1 \\ x_2 \\ x_3 \end{vmatrix}; f = \begin{vmatrix} f_1 \\ f_2 \\ f_3 \end{vmatrix}$$

Solving (6) for x gives:

$$x = (I - A)^{-1} f = Bf \quad (7)$$

where:

$$B = \begin{vmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{vmatrix}$$

B is known as the Leontief inverse matrix, or total requirements matrix.

1. Field of influence

A field-of-influence analysis was performed to evaluate the importance of each of the links between economic sectors, thereby making it possible to identify the most important inter-sectoral relations. A coefficient is considered relevant if its variations have pronounced effects on the final results of the economy as a whole (Guilhoto and others, 1994).

To formulate the methodology of the field-of-influence analysis, Sonis and Hewings (1989) —cited in Miller and Blair (2009)— used the ratio between variations in the direct production coefficients (matrix A) and variations in the total requirements matrix (matrix B, which is equivalent to $(I - A)^{-1}$).

Thus, in the case of a variation of ΔA in the coefficients of matrix A, which generates a new technical coefficients matrix $A^* = A + \Delta A$, the total requirements matrix can be rewritten as: $B^* = (I - A - \Delta A)^{-1}$.

To evaluate the effects of variations in each of the elements of matrix A, there needs to be a small variation ε in each a_{ij} individually, in other words, ΔA is a matrix $E = \begin{vmatrix} \circ_{ij} \end{vmatrix}$, such that:

$$\varepsilon_{ij} = \begin{cases} \varepsilon \ se \ i = i_1 \ ej = j_1 \\ 0 \ se \ i \neq i_1 \ ej \neq j_1 \end{cases} \quad (8)$$

The field of influence of each coefficient is approximately equal to:

$$F(\varepsilon_{ij}) = \frac{B^* - B}{\varepsilon_{ij}} \quad (9)$$

Thus the total influence of each technical coefficient, or each link in the input-output table, is given by:

$$s_{ij} = \sum_{k=1}^{n} \sum_{l=1}^{n} \left[f_{kl}(\varepsilon_{ij})^2 \right] \quad (10)$$

Consequently, the larger is s_{ij}, the greater will be the field of influence of coefficient a_{ij}.

2. Description of the data

The OECD matrices for Brazil, the United States and the United Kingdom for 1995, 2000 and 2005, include 48 sectors, 18 of which relate to services. Nonetheless, not all of those sectors have data available for the first two countries, so the matrices had to be reconciled, resulting in a total of 26 sectors, 10 of which correspond

to services (see annex 1). The OECD data are expressed in the currency of each country, in other words in reais, dollars and pounds, at current basic prices.

The data of the input-output tables are presented using the basic structure shown in table 3. From the sales standpoint (see table 4), sector production is represented by the rows of the matrix. These outputs are destined for the rest of the domestic market (columns corresponding to intermediate consumption and domestic consumption) and to the external market (column corresponding to exports).

TABLE 4

Brazil, United States, United Kingdom: distribution of gross production value from the sales perspective, 1995-2005
(Percentages)

Origin:	Destination:		Intermediate consumption				Domestic consumption	Exports	Gross production value
			Agriculture	Manufacturing	Services	Total			
Agriculture	BRA	1995	14.64	45.26	3.88	63.77	34.59	1.64	100.00
		2000	14.91	43.94	3.55	62.39	33.99	3.62	100.00
		2005	14.91	43.95	3.54	62.39	33.99	3.62	100.00
	USA	1995	23.86	46.99	12.15	83.00	7.21	9.79	100.00
		2000	19.87	50.63	7.56	78.06	13.78	8.16	100.00
		2005	19.82	50.63	6.44	76.89	15.01	8.10	100.00
	GBR	1995	10.09	46.06	8.55	64.70	28.28	7.02	100.00
		2000	7.20	34.45	8.42	50.07	43.19	6.74	100.00
		2005	6.21	31.43	8.00	45.65	46.06	8.29	100.00
Manufacturing	BRA	1995	2.74	38.35	16.10	57.18	33.98	8.83	100.00
		2000	2.95	38.08	18.91	59.95	30.30	9.75	100.00
		2005	2.48	36.84	12.48	51.80	40.01	8.19	100.00
	USA	1995	1.06	33.70	22.82	57.58	31.56	10.86	100.00
		2000	0.92	28.78	21.70	51.41	36.44	12.15	100.00
		2005	0.75	26.61	18.16	45.52	44.91	9.57	100.00
	GBR	1995	1.11	28.59	15.72	45.42	24.49	30.09	100.00
		2000	0.57	24.84	17.00	42.41	28.04	29.55	100.00
		2005	0.51	28.17	12.67	41.34	37.11	21.55	100.00
Services	BRA	1995	1.43	8.64	19.05	29.12	69.39	1.50	100.00
		2000	1.38	9.18	17.65	28.21	69.34	2.45	100.00
		2005	1.62	12.27	17.64	31.52	65.61	2.86	100.00
	USA	1995	0.52	7.98	26.14	34.64	62.99	2.37	100.00
		2000	0.36	7.96	28.88	37.20	60.44	2.36	100.00
		2005	0.32	9.36	28.90	38.59	58.79	2.62	100.00
	GBR	1995	0.55	8.30	30.72	39.57	54.75	5.68	100.00
		2000	0.41	7.69	35.01	43.10	49.69	7.21	100.00
		2005	0.31	7.75	30.57	38.63	52.26	9.11	100.00
Total	BRA	1995	2.92	22.91	16.77	42.61	53.04	4.36	100.00
		2000	2.98	23.42	17.16	43.56	50.93	5.51	100.00
		2005	2.98	26.46	14.13	43.56	50.93	5.51	100.00
	USA	1995	1.15	16.73	24.83	42.72	52.13	5.15	100.00
		2000	0.78	14.20	26.64	41.62	53.29	5.09	100.00
		2005	0.72	15.11	25.37	41.20	54.02	4.78	100.00
	GBR	1995	0.92	15.81	25.28	42.00	44.12	13.87	100.00
		2000	0.53	12.77	29.68	42.99	43.58	13.43	100.00
		2005	0.43	14.34	24.77	39.54	47.47	12.99	100.00

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Statistics" [online] http://stats.oecd.org/Index.aspx?DataSetCode=CSP2010 [viewed in April 2010].

In output-destination terms, while services production is concentrated on domestic consumption in all three countries, the highest percentage is in Brazil. The proportion of services produced for intermediate consumption in the Brazilian economy was just 29.12% in 1995, 28.21% in 2000 and 31.52% in 2005 — compared to 34.64%, 37.20% and 38.59% in the United States, and 39.57%, 43.10% and 38.63% in the United Kingdom, respectively, in those years.

Gross production value (GPV) measured in terms of purchases consists of the inputs used in each sector's production, plus taxes, profit margins and transport, imported inputs and gross value added. Thus, the sectors identified in the columns are the suppliers of inputs used in the production of the sectors indicated in the rows (see table 5).

The share of intermediate consumption in total services sector GPV is greater in the United States and the United Kingdom than in Brazil. The same is true of the intensity of intra-sectoral relations in the services sector: whereas in Brazil intermediate trade accounted for 19.05% of services production in 1995, 17.65% in 2000 and 17.64% in 2005, the equivalent percentages in the United States were 26.27%, 29.04% and 28.90%, and, in United Kingdom, 30.72%, 35.01% and 30.57%, respectively in the same years.

The proximity ratio between manufacturing and services can also be defined in terms of the use of services as inputs for manufacturing production. Whereas that ratio was 21.39% in 2005 in the United States, in the case of Brazil it was 11.94% in 1995 and 11.19% in 2005.

The differences in the composition of services in terms of the distribution of GPV in Brazil, compared to the United Kingdom and the United States, reveal the first signs of a less integrated sector (stronger intra-sectoral relations and little integration with other sectors) oriented towards domestic final consumption rather than intermediate consumption.

TABLE 5

Brazil, United States, United Kingdom: distribution of gross production value from the purchases perspective, 1995-2005
(*Percentages*)

Destination:	Origin:		Agriculture	Manufacturing	Services	Total
	BRA	1995	14.64	8.72	0.54	4.77
		2000	14.91	7.65	0.48	4.42
		2005	14.91	6.41	0.57	4.42
Agriculture	USA	1995	23.87	3.01	0.36	1.65
		2000	19.88	2.63	0.15	1.10
		2005	19.82	2.32	0.13	1.06
	GBR	1995	10.09	2.62	0.25	1.23
		2000	7.20	1.42	0.14	0.58
		2005	6.21	0.90	0.11	0.41
	BRA	1995	14.21	38.35	11.64	22.21
		2000	16.97	38.08	14.77	24.42
		2005	16.98	36.84	13.68	25.17
Manufacturing	USA	1995	16.57	33.88	10.63	17.96
		2000	17.90	28.93	8.26	13.99
		2005	16.30	26.61	7.95	13.67
	GBR	1995	19.51	28.56	8.14	15.19
		2000	13.92	24.84	6.67	11.81
		2005	17.73	28.17	5.83	12.92

Table 5 (concluded)

Destination:		Origin:	Agriculture	Manufacturing	Services	Total
Services	BRA	1995	10.23	11.94	19.05	15.63
		2000	10.15	11.76	17.65	14.72
		2005	10.14	11.19	17.64	13.97
	USA	1995	17.77	17.32	26.27	23.32
		2000	18.33	21.16	29.04	26.76
		2005	16.19	21.39	28.90	26.47
	GBR	1995	18.55	16.01	30.72	25.56
		2000	25.08	19.59	35.01	30.60
		2005	23.88	16.83	30.57	26.22
Total intermediate consumption	BRA	1995	39.07	59.01	31.24	42.61
		2000	42.03	57.49	32.90	43.56
		2005	42.03	54.44	31.88	43.56
	USA	1995	58.21	54.21	37.25	42.93
		2000	56.11	52.72	37.45	41.84
		2005	52.31	50.32	36.98	41.20
	GBR	1995	48.15	47.19	39.11	41.99
		2000	46.20	45.85	41.81	42.99
		2005	47.82	45.90	36.51	39.54
Total taxes and imports	BRA	1995	3.54	7.48	5.33	6.03
		2000	5.35	10.02	5.53	7.34
		2005	5.35	9.59	5.20	7.34
	USA	1995	2.05	6.76	1.42	3.09
		2000	5.33	9.43	1.76	3.89
		2005	5.71	10.87	2.46	5.03
	GBR	1995	7.61	16.07	7.61	10.44
		2000	12.24	16.95	7.51	10.20
		2005	14.78	16.95	8.21	11.00
Gross value added	BRA	1995	57.39	33.51	63.43	51.36
		2000	52.62	32.49	61.57	49.09
		2005	52.62	35.96	62.92	49.09
	USA	1995	39.74	39.03	61.33	53.98
		2000	38.56	37.85	60.79	54.27
		2005	41.99	38.81	60.55	53.77
	GBR	1995	44.24	36.74	53.28	47.57
		2000	41.56	37.20	50.68	46.82
		2005	37.39	37.15	55.28	49.46
Gross production value	BRA	1995	100.00	100.00	100.00	100.00
		2000	100.00	100.00	100.00	100.00
		2005	100.00	100.00	100.00	100.00
	USA	1995	100.00	100.00	100.00	100.00
		2000	100.00	100.00	100.00	100.00
		2005	100.00	100.00	100.00	100.00
	GBR	1995	100.00	100.00	100.00	100.00
		2000	100.00	100.00	100.00	100.00
		2005	100.00	100.00	100.00	100.00

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Statistics" [online] http://stats.oecd.org/Index.aspx?DataSetCode=CSP2010 [viewed in April 2010].

IV

Analysis of the results

The field of influence is used to quantify the importance of each of the inter-sectoral links, providing a view of the degree of synergy and integration between economic activities, in terms of the purchase and sale of productive inputs.

That analysis is justified because the interaction between manufacturing and services can be explained by two trends: (i) growth in services that are complementary to manufacturing activities; or (ii) the outsourcing of activities (Wölfl, 2005). This integration is probably the main difference between developed and developing economies in terms of the behavior of the services sector (Greenhalgh and Gregory, 2001; Braibant, 2002: Siddiqui and Saleem, 2010). Although it is impossible to separate the two trends, the results of the field-of-influence analysis revealed the most important production links between the two major sectors.

Figures 1 to 9 show the fields of influence in the three countries analysed for 1995, 2000 and 2005. The results for each production link were distinguished by shading ranging from black through scales of grey to indicate above-average fields of influence — in other words – the links of greatest importance for the economy as a whole. Following the input-output structure, the rows represent sectors supplying production inputs, while the columns represent the destination of those inputs.

A horizontal row and a vertical row separate the service sectors (from 17 to 26) from the other sectors and divide the figure into four quadrants, displaying the importance of the intra-and inter-sectoral relations in terms of: (i) the purchase and sale of inputs between goods-producing sectors (purchasers and sellers both from 1 to 16); (ii) the use of service inputs by goods-producing sectors (purchasers from 1 to 16 and sellers from 17 to 26); (iii) the use of goods as inputs in the tertiary sector (purchasers from 17 to 26); and (iv) the purchase and sale of inputs between service-producing sectors.

Figure 1 shows the field of influence by activity sector for Brazil in 1995. In that year, the main links were concentrated in the goods-producing sectors (from 1 to 16), particularly the "textiles, textile products and leather and footwear" sector (5) and the "basic metals and metal products" sector (12). The links between manufacturing and services were not very significant, except for the "finance and insurance" sector (20) which reports several above-average indicators among

tertiary activities. Relations between services sectors did not report any link with an above-average field of influence; in other words until 1995 the strongest links in the production chain in Brazil were centred on relations between different manufacturing sectors or between manufacturing and services. This shows the lack of importance of intra-sectoral relations between services for the economy at large; and, compounded with the lack of integration with manufacturing, it shows that the tertiary sector has weak linkages with the rest of the economy.
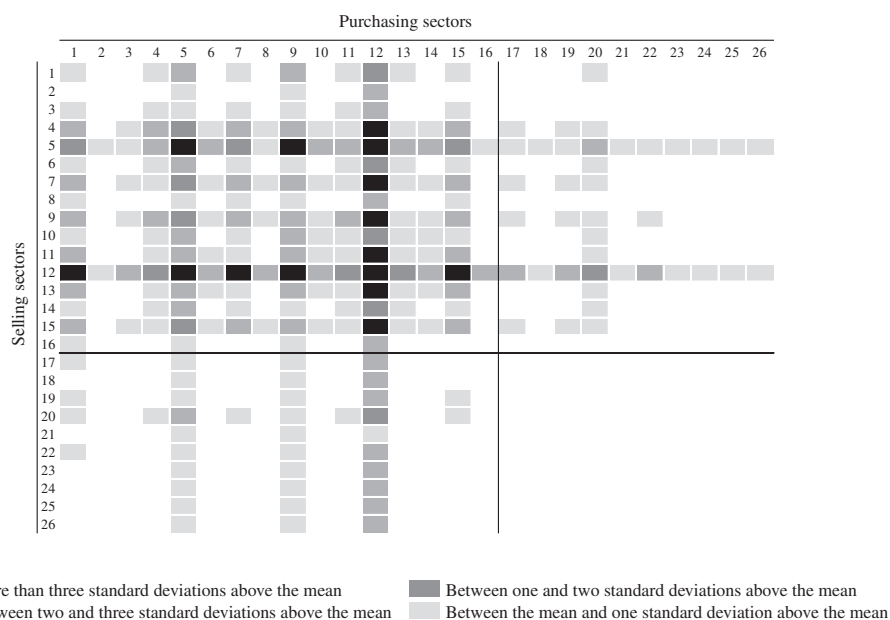
The structure of the field of influence in 2000 (see figure 2) is little changed from 1995, such that: (i) the important links were concentrated in relations between goods-producing sectors, in particular "agriculture, hunting, forestry and fishing" (1); "textiles, textile products, leather and footwear" (5); "pulp, paper, paper products, printing and publishing" (7); "chemical products" (9); "basic metals and metal products" (12); and "electricity, gas, steam, water and hot water" (15); (ii) relations between services sectors were not significant; and (iii) there was little interaction between goods- and services-producing sectors, either in the purchase or in the sale of inputs.

The importance of each link had changed little in 2005 (see figure 3). Relations between goods-producing activities became more homogeneous; and the "transport, storage, and communication services" sector (19) was most integrated with the other sectors, mainly goods-producers.

Other tertiary activities became more important as purchasing sectors (columns) and selling sectors (rows), including "commerce; repairs" (17), "finance and insurance" (20) and "business services" (22). During the period analysed, only in 2005 were there any intra-sectoral links in the tertiary sector that were important for the rest of the economy; all of these related to "transport, storage and communication services" (19).

Unlike the situation in Brazil, the most important links in the United Kingdom economy are distributed between goods-producing and service sectors (see figure 4). The 1995 results highlight the importance of the following activities: "electricity, gas, steam, water and hot water" (15), "construction" (16), "business services" (22), "health and social work" (25) and "other collective, social and personal services" (26).

Brazil: Field of influence by activity sector, 1995

Key
■ More than three standard deviations above the mean
■ Between two and three standard deviations above the mean
■ Between one and two standard deviations above the mean
■ Between the mean and one standard deviation above the mean

Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

Brazil: Field of influence by activity sector, 2000

Key
■ More than three standard deviations above the mean
■ Between two and three standard deviations above the mean
■ Between one and two standard deviations above the mean
■ Between the mean and one standard deviation above the mean
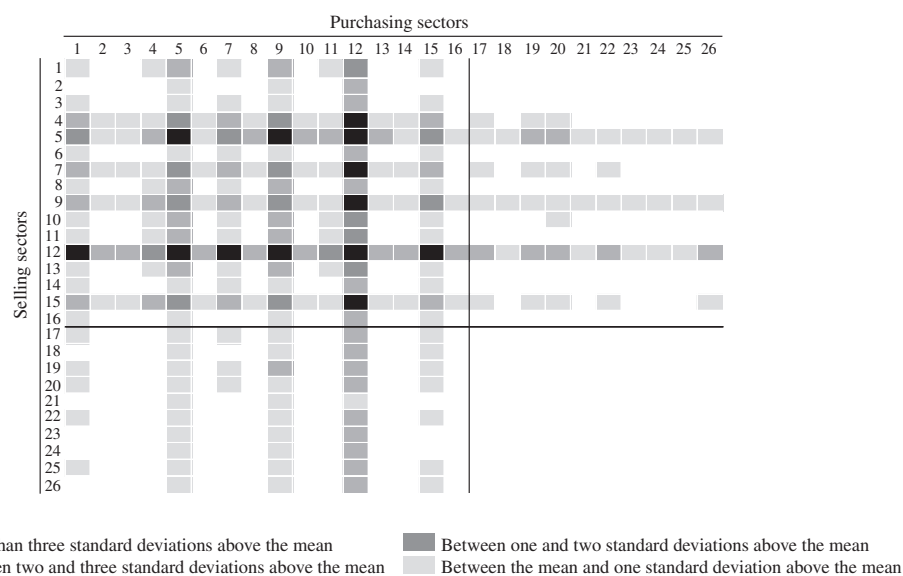
Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

FIGURE 3

Brazil: Field of influence by activity sector, 2005

Purchasing sectors

Key
■ More than three standard deviations above the mean
■ Between two and three standard deviations above the mean
■ Between one and two standard deviations above the mean
■ Between the mean and one standard deviation above the mean
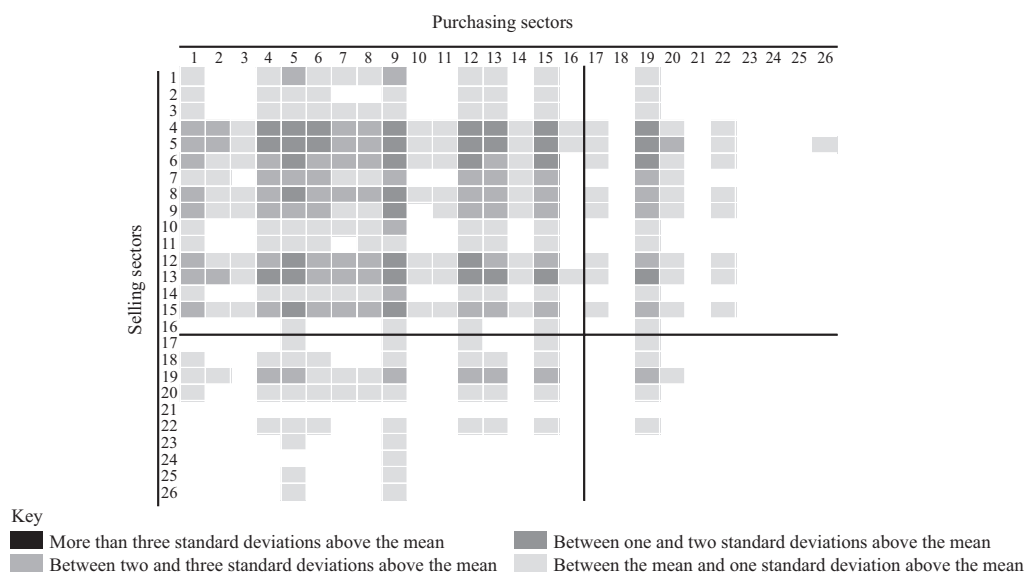
Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

FIGURE 4

United Kingdom: field of influence by activity sector, 1995

Purchasing sectors

Key
■ More than three standard deviations above the mean
■ Between two and three standard deviations above the mean
■ Between one and two standard deviations above the mean
■ Between the mean and one standard deviation above the mean
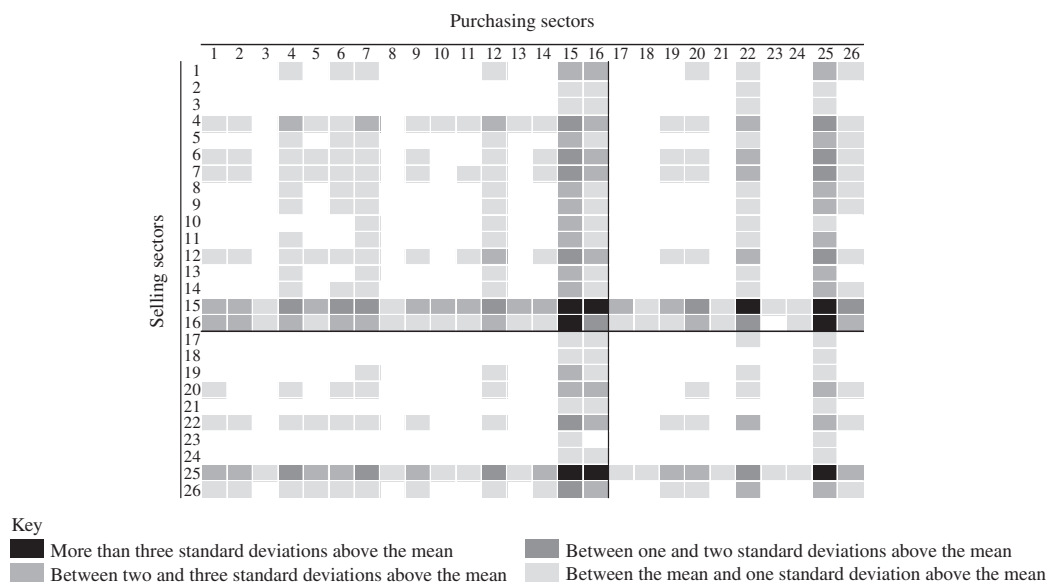
Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

In these sectors, both the purchasing and selling links were more than averagely important for the economy as a whole, in particular intra-sectoral links which displayed fields of influence of more than three standard deviations above the mean.

In 2000 (see figure 5) the links of the "health and social work" sector (25) weakened, while those of "business services" (22) and "other collective, social and personal services" (26) gained importance as both input suppliers (rows) and input purchasers (columns).

The number of links highlighted between goods-producing sectors also decreased, particularly in the case of "food products, beverages and tobacco" (4), "wood and wood products and cork" (6), "pulp, paper, paper products, printing and publishing" (7) and "basic metals and metal products" (12). Intra-sectoral links remain the most important, with a field of influence of more than three standard deviations above the mean. In 2005 (see figure 6), the situation was similar to that recorded in 2000: intra-sectoral links distributed throughout the economy and few outstanding activities (both goods-producers and services).
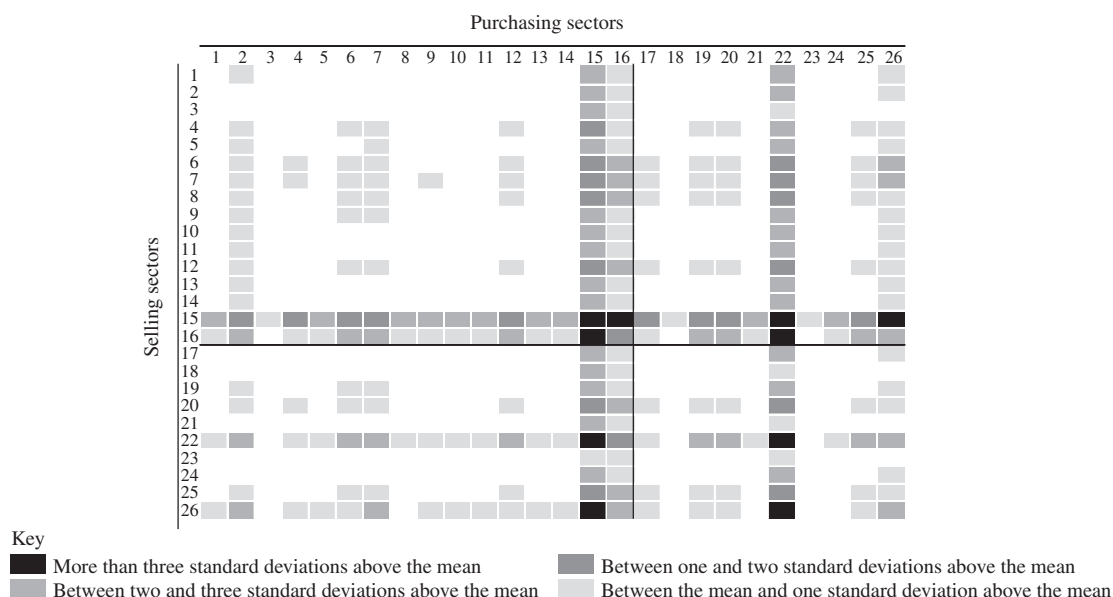
As in the case of Brazil, the results for the United States in 1995 (see figure 7) show few important links between the service sectors, while the main relations are concentrated in goods-producing sectors, particularly "agriculture, hunting, forestry and fishing" (1), "textiles, textile products, leather and footwear" (5) and "basic metals and metal products" (12).

In the case of relations between the tertiary and other sectors, the activities of "finance and insurance" (20) were the most important, in terms of both the purchase and the sale of inputs from other sectors, followed by "transport, storage and communication services" (19) and "business services" (22).

In 2000 (see figure 8), the purchasing and selling links of the tertiary sector were very important for the United States economy. In that year, the "finance and insurance" sector (20) reported the largest field of influence of the entire economy, with purchasing and selling relations above the mean of all other sectors. In terms of productive-input purchases, there were also significant links in the tertiary sectors of "business services" (22) and transport, storage and communication services" (19).

FIGURE 5

United Kingdom: field of influence by activity sector, 2000

Key

■ More than three standard deviations above the mean

▨ Between two and three standard deviations above the mean

▨ Between one and two standard deviations above the mean

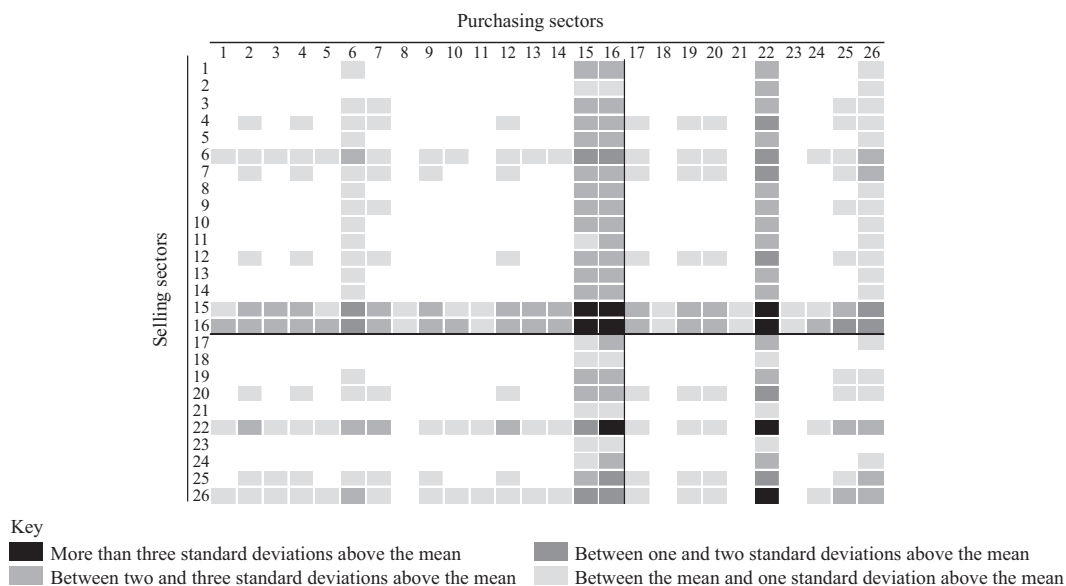▨ Between the mean and one standard deviation above the mean

Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

FIGURE 6

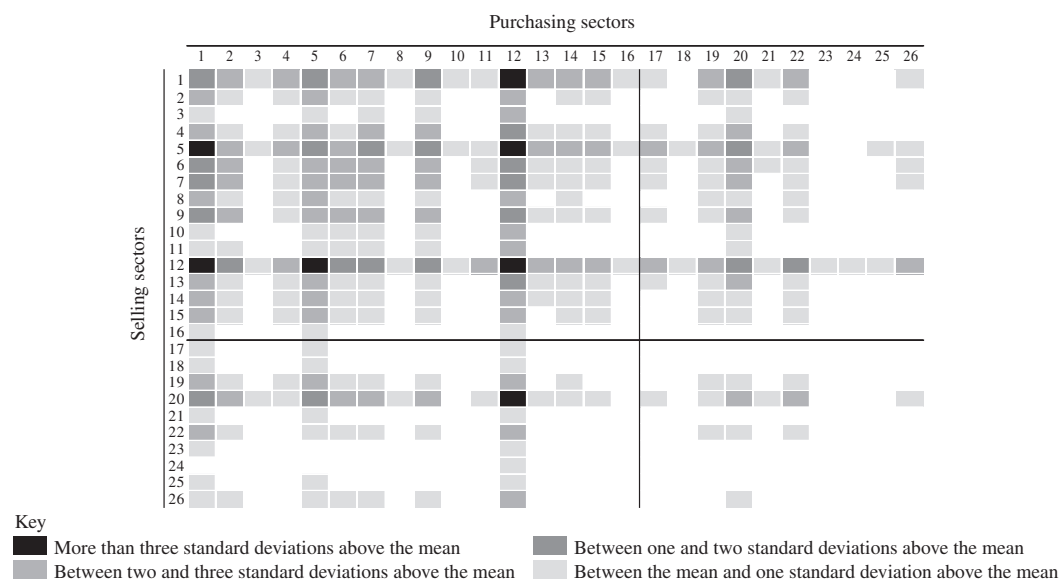**United Kingdom: field of influence by activity sector, 2005**

Key

■ More than three standard deviations above the mean   ■ Between one and two standard deviations above the mean
■ Between two and three standard deviations above the mean ■ Between the mean and one standard deviation above the mean

Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

FIGURE 7

United States: Field of influence by activity sector, 1995

Key

■ More than three standard deviations above the mean   ■ Between one and two standard deviations above the mean
■ Between two and three standard deviations above the mean ■ Between the mean and one standard deviation above the mean
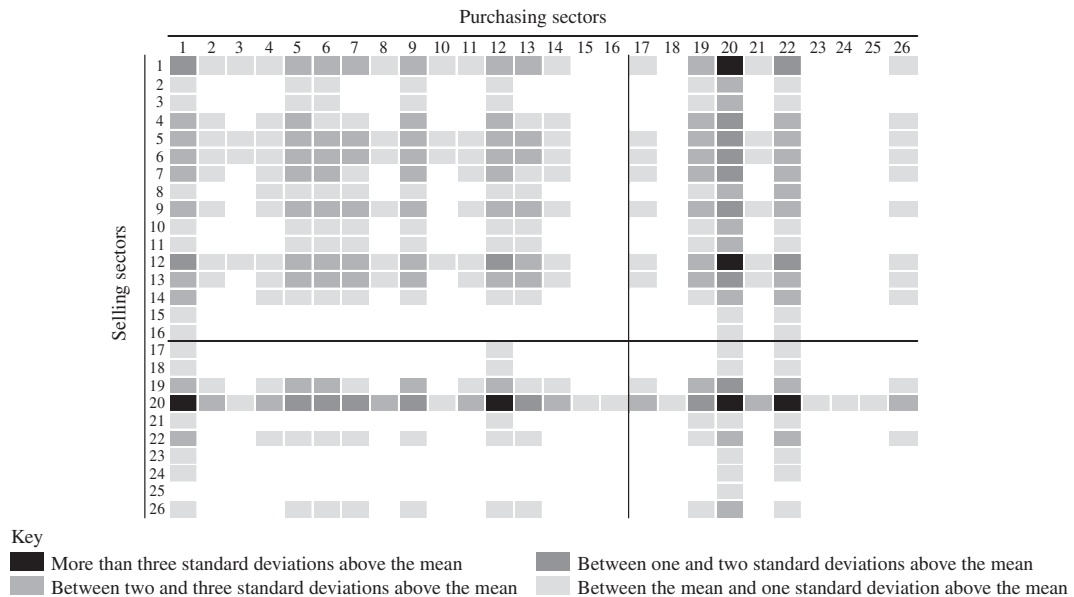
Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

FIGURE 8

United States: field of influence by activity sector, 2000

Purchasing sectors

Key
■ More than three standard deviations above the mean
■ Between two and three standard deviations above the mean
■ Between one and two standard deviations above the mean
■ Between the mean and one standard deviation above the mean

Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

It is worth noting that, even with the intensification of input purchase and sale relations in the services sector, the manufacturing sector maintains its importance mainly in the activities of "agriculture, hunting, forestry and fishing" (1) and "basic metals and metal products" (12).

Lastly, the results of the field-of-influence analysis in the United States for 2005 are similar to those of 2000 (see figure 9). In both years, the most important links were distributed throughout the different sectors, with both goods-producing and service sectors displaying important linkages, including "agriculture, hunting, forestry and fishing" (1), "chemical products" (9), " basic metals and metal products" (12), "transport, storage and communications services (19)", "finance and insurance" (20) and "business services" (22).

In short, field-of-influence analysis reveals significant differences between the production structures of Brazil and the benchmark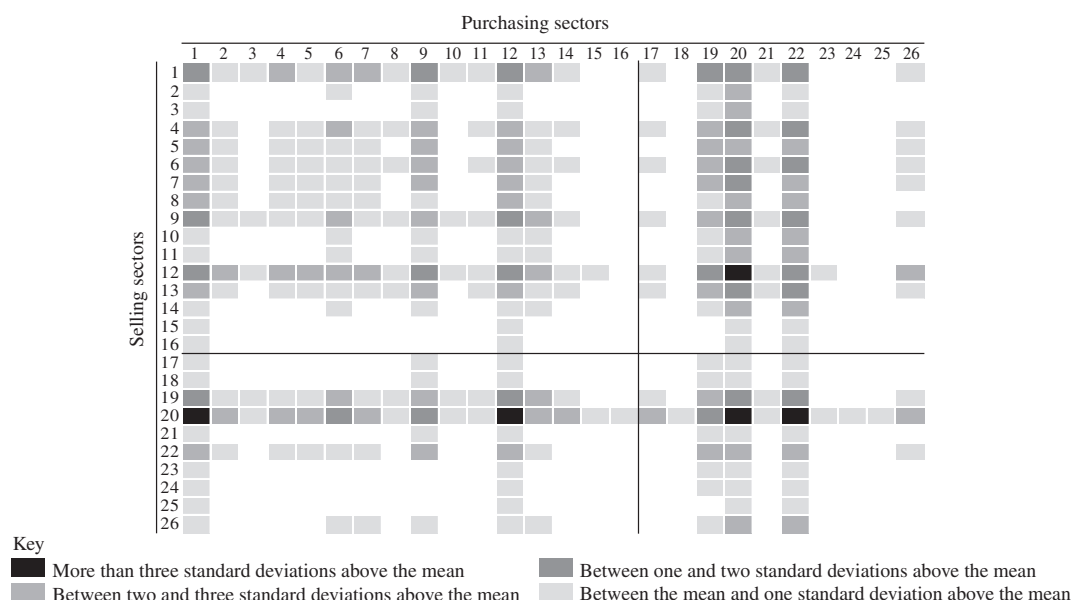 economies of the United States and the United Kingdom. While in the latter two countries the most important links are distributed throughout the economy and intensify each year in the services sector, in Brazil the main relations remain concentrated in the goods-producing sectors, although the first signs of a trend towards greater integration of the tertiary sector with the rest of the economy could be discerned in 2005.

According to Greenhalgh and Gregory (2001), Braibant (2002) and Siddiqui and Saleem (2010), these results support the idea that interactions between manufacturing sectors can partly explain the differences in the behaviour of the services sector between developed and developing economies.

Moreover, as Camacho and Rodríguez (2008) point out, services account for an increasing share of intermediate consumption in developed countries, whereas integration between sectors in developing countries remains fragile.

FIGURE 9

United States: field of influence by activity sector, 2005

Purchasing sectors

Key

■ More than three standard deviations above the mean   ▨ Between one and two standard deviations above the mean

▨ Between two and three standard deviations above the mean   ▨ Between the mean and one standard deviation above the mean

Source: prepared by the authors.

Note: Sector numbers identified in annex 1.

V

Conclusions

This article has aimed to evaluate the tertiarization movement in countries of different development levels, from the viewpoint of intra-and inter-sectoral linkages. Although aggregate tertiary-sector shares are similar in developed and developing countries, there are a number of factors that distinguish them, which makes it crucial to understand how tertiarization is related to economic development. Historical differences mark the expansion of the tertiary sector and result in different production structures, depending on each economy's development level. On this basis, it was decided to analyse the production relations of the tertiary sector in Brazil, the United Kingdom and the United States.

The results of the field-of-influence study show that the services sector in Brazil is still poorly integrated with the rest of the economy, unlike in the other two countries, where the production chain's major links are distributed across all sectors. This may be interpreted

as reflecting the degree of maturity of the production structure because, as noted by Siddiqui and Saleem (2010), the division of labour between firms means that synergy between goods production and services improves the economy's competitiveness and leads to consolidated employment and income growth.

In Brazil, agriculture, basic industry (metallurgy and iron and steel, among others) and the food industry account for a larger proportion of the production structure and have a small capacity to generate value-added compared to the same activities in the United States and the United Kingdom. Moreover, the service sectors in the two latter countries have a larger share and greater capacity to add value to each monetary unit used in production (see annex 2).

Production differences can also be explained by the structure of consumption in each country, the characteristics of which differ according to income

levels. Although 64.71% of consumption by Brazilian households involves the purchase of services, the fraction of consumption targeted on sectors such as agriculture and the food industry is still high (3.38% and 11.51%, respectively) compared to 5.38% and 7.60% in the United States and the United Kingdom respectively, according to 2005 data.

This may be interpreted in terms of Engel's law, which postulates that as income rises the proportion spent on food falls (Maroto-Sánchez, 2010). According to Fuchs (1968), the increase in final demand invokes the relation between the composition of expenditures and income levels, because, when incomes rise, the demand for products tends to grow less quickly than the demand for services, thereby increasing the importance of services in the economy. In this case, the demand for entertainment, health, education and transport services, among others, grows (Wölfl, 2005).

The comparative analysis thus shows that to improve the performance of services in Brazil means strengthening both the tertiary sector and manufacturing. As noted by Siddiqui and Saleem (2010), while manufacturing-led growth can produce high growth rates in terms of value-added in the economy at large, together with significant indirect technological effects owing to higher capital-intensity, it does not create enough jobs or improve social indicators. In contrast, services-led growth raises employment levels and improves socioeconomic indicators (through health services, education, social assistance, research and development). Nonetheless, when growth is fuelled by services, but the manufacturing sector is uncompetitive, the economy will be fragile and volatile. Consequently, the competitiveness and diversification of the economy depend on synergy effects between the two sectors. In the Brazilian case, some activities, including "business services" and "transport, storage and communication services" deserve special attention because they are an essential part of the specialization requirements of the flexible production system. Given their high productivity compared to other sectors, those activities represent growth opportunities for the country. On the other hand, the lower- productivity branches (such as "commerce" and "household services") are essential for job creation.

Productivity is also related to firm size through various factors, such as economies of scale, logistics and the use of advanced technologies in production processes. In 2001, while 97.6% of firms in Brazil's tertiary sector were microenterprises and small businesses, they accounted for about 60.8% of jobs, but only 22.3% of value-added (IBGE, 2003).[5]

Lastly, it is worth noting that these results are compatible with the ideas put forward by Freire (2006b): it is not a matter of confirming the existence of a post-industrial society but of assuming the development of a new type of industrial society in which relations between the tertiary and secondary sectors are even stronger. This requires strengthening production links with the rest of the economy and, as suggested by Domingues and others (2006), integrating technology and regional development policies, creating articulations in specific manufacturing segments, namely in high-technology sectors and those that need specialized services.

The findings reported in this article offer issues for debate on the role that agents can play in the development of the tertiary sector. The Brazilian government could participate in the production integration process either through specific sectoral policies or through an initiative to promote income growth, which would also allow for the consumption of more complex services. In the long term, the consumption of such services would foster greater integration with the industrial sector and convergence towards the structure displayed by developed economies such as the United States and the United Kingdom.

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[5] The Brazilian Geography and Statistical Institute (IBGE) defines "microenterprises" as firms with gross annual revenue of up to R$ 240, 000, and "small firms" as those with annual gross income of between R$ 240,000 and R$ 1.2 million.

Aggregation of data provided by the Organization for Economic
Cooperation and Development (OECD)

	26 sectors	OECD Division
1	Agriculture, hunting, forestry and fishing	1
2	Extractive industry (energy)	2
3	Extractive industry (non-energy)	3
4	Food, beverages and tobacco	4
5	Textiles, textile products, leather and footwear	5
6	Wood and products of wood and cork	6
7	Pulp, paper, paper products, printing and publishing	7
8	Coke, refined petroleum products and nuclear fuel	8
9	Chemical products	9+10
10	Rubber and plastic products	11
11	Other nonmetallic mineral products	12
12	Basic metals and metal products	13+14+15
13	Transport equipment	21+22+23+24
14	Other industries	16+17+18+19+20+25
15	Electricity, gas, steam, water and hot water supply	26+27+28+29
16	Construction	30
17	Commerce; repairs	31
18	Hotels and restaurants	32
19	Transport, storage and communication services	33+34+35+37
20	Finance and insurance	38
21	Real estate activities	39
22	Business services	40+41+42+43
23	Public administration and defence; compulsory social security	44
24	Education	45
25	Health and social work	46
26	Other community, social and personal services	36+47+48

Source: prepared by the authors.

ANNEX 2

Brazil, United States, United Kingdom: share in gross value added
and value added by sector, 1995, 2000 and 2005
(Percentages)

	Brazil			United States			United Kingdom		
Year	1995	2000	2005	1995	2000	2005	1995	2000	2005
Sectors	Gross production value								
Agriculture	7.48	7.09	5.14	1.98	1.40	1.37	1.91	1.15	0.89
Extractive industry	0.91	1.85	2.82	1.20	1.19	1.72	1.92	1.93	1.75
Food products	8.35	7.75	7.05	3.55	3.06	2.87	4.57	3.36	2.91
Durable consumer goods	3.23	3.08	2.77	2.40	1.35	0.95	1.81	1.19	0.80
Basic industry	15.13	17.28	15.77	11.56	10.26	10.25	12.20	9.69	8.47
Capital goods	8.83	7.79	9.13	9.63	9.45	7.31	9.85	8.94	6.70
Non-durable consumer goods	10.58	10.86	7.93	9.39	6.49	6.94	9.53	9.27	10.62
Commerce and repair services	7.87	7.77	8.45	11.76	10.33	10.10	10.32	11.44	10.86
Services to families	13.32	13.61	15.73	25.01	23.31	24.73	22.68	24.43	26.81
Business services	11.69	11.57	17.43	17.85	22.72	22.59	20.01	24.00	24.71
Public administration	12.61	11.37	7.79	5.67	10.44	11.18	5.20	4.60	5.47
	Gross value added								
Agriculture	8.36	7.60	5.71	1.46	1.00	1.07	1.77	1.02	0.67
Extractive industry	0.80	2.45	2.46	1.08	1.24	1.80	2.47	2.89	2.46
Food products	3.79	3.40	2.87	2.18	1.58	1.28	2.75	2.32	1.97
Durable consumer goods	2.00	1.81	2.10	1.61	0.84	0.63	1.46	1.04	0.63
Basic industry	9.94	10.38	8.76	8.16	7.00	6.54	9.62	7.68	6.05
Capital goods	6.47	5.80	4.36	6.93	6.30	4.62	7.22	6.36	4.61
Non-durable consumer goods	10.91	11.76	8.72	8.24	6.37	6.80	7.32	7.04	7.75
Commerce and repair services	8.57	7.10	12.14	14.27	12.78	12.45	11.24	11.85	11.62
Services to families	18.55	20.62	22.32	31.39	27.30	28.85	28.81	30.90	32.08
Business services	14.30	12.78	20.58	18.25	23.36	23.32	21.33	23.68	26.77
Public administration	16.33	16.29	9.97	6.42	12.25	12.63	6.00	5.22	5.38
	Ratio between gross value added and gross production value								
Agriculture	57.39	52.62	54.07	39.71	38.55	41.99	44.24	41.56	37.39
Extractive industry	45.01	65.15	42.42	48.21	56.21	56.39	61.01	69.92	69.46
Food products	23.29	21.52	19.83	33.06	27.79	24.04	28.63	32.35	33.46
Durable consumer goods	36.84	32.76	45.35	70.79	54.98	72.52	49.38	56.68	64.13
Basic industry	32.77	28.87	26.17	34.41	35.06	32.77	36.32	35.90	34.06
Capital goods	37.62	36.58	23.24	38.63	35.96	33.98	34.89	33.31	34.07
Non-durable consumer goods	68.27	73.50	95.77	66.08	72.57	71.59	54.21	50.55	48.10
Commerce and repair services	55.91	44.87	69.94	65.22	66.77	66.33	51.83	48.49	52.95
Services to families	71.52	74.39	69.04	67.43	63.20	62.72	60.45	59.22	59.18
Business services	62.86	54.25	57.44	54.91	55.50	55.51	50.73	46.19	53.57
Public administration	66.52	70.35	62.31	60.83	63.34	60.74	54.93	53.09	48.61

Source: prepared by the authors on the basis of Organization for Economic Cooperation and Development (OECD), "Statistics" [online] http://stats.oecd.org/Index.aspx?DataSetCode=CSP2010 [viewed in April 2010].

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Keynesian economic policies: reflections on the Brazilian economy, 1995-2009

Fábio Henrique Bittes Terra and Fernando Ferrari Filho

ABSTRACT

As is well known, Keynes proposed deliberate government action, particularly the implementation of economic policies, to coordinate and stabilize the dynamic of monetary economies. In that context, this article aims to retrieve and describe the Keynes' economic-policy prescriptions, specifically monetary, fiscal and exchange-rate policies, and to analyse the Brazilian economy's performance in terms of the operating rationale of Keynesian economic policy in the period 1995-2009. The study's findings show that the economic policies implemented following the Real Plan did not keep the Brazilian economy on a sustained and stable growth path in the face of the endogenous and exogenous economic crises that occurred throughout the period. Moreover, its conclusions question the Keynesian credentials of the countercyclical policies implemented by the Brazilian economic authorities since the 2007-2008 international crisis.

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I

Introduction

The economic theory set forth by John Maynard Keynes recommends deliberate government intervention in the economy to avert the crises of effective demand that are inherent to the dynamic of monetary economies.

Since the 1970s, several authors have endeavoured to retrieve the economic policy prescriptions contained in Keynes' works, including Davidson (1972 and 1982); Minsky (1982 and 1986); Kregel (1985 and 1994-1995), and Carvalho (1992). In addition to correcting the mistaken interpretation of Keynesian economic-policy proposals, which mainstream thought has inadvertently confused with easy-money policies and budget deficits, the present article emphasizes the relevance of his proposals today.

Against that backdrop, this article first describes Keynes' policy proposals, particularly regarding monetary, fiscal and exchange-rate policies. It then briefly reviews the economic policies implemented in Brazil since the introduction of the Real Plan in July 1994 and, more specifically, in the period following the international financial crisis of 2007-2008. The aim here is to analyse the Brazilian economy during that period in terms of the operating rationale of Keynesian macroeconomic policy.

The article is organized in four sections, including this introduction. Section II describes monetary, fiscal and exchange-rate policies from the Keynesian perspective. Based on the theoretical framework described, section III establishes whether the macroeconomic policies implemented between 1995 and 2009, including those applied during the international financial crisis, constitute Keynesian economic policies. Section IV concludes.

II

The monetary, fiscal and exchange-rate policies proposed by Keynes

In general, the cyclical instability of output and employment levels was always one of Keynes' basic concerns (Ferrari Filho, 2006a), and he believed that the problem of fluctuations ultimately stems from the fact that "a monetary economy [...] is essentially one in which changing views about the future are capable of influencing the quantity of employment…" (Keynes, 1964, p. 4).

Keynes defined capitalist economies as "entrepreneurial economies or monetary production economies". The defining characteristic of a monetary economy is that money serves not only as a means of exchange but as an asset with capacity to provide protection from changes in economic agents' expectations, or "changing views about the future", since it represents an inter-temporal claim on social wealth and possesses maximum liquidity to finance both spot transactions and contracts requiring payments in the future. Depending on how entrepreneurs' liquidity preference (in other words the demand for money) is constrained by their expectations about the future, they will make substitutions between different forms of wealth holding, either increasing or decreasing the demand for reproducible assets and, thus,

increasing or decreasing the income generated by new production (Carvalho, 1994, p. 47).

With the aim of restraining such "changing views about the future" held by those capable of controlling economic activity, namely entrepreneurs, Keynes set forth a new social philosophy to resolve "the outstanding faults of the economic society in which we live [...] [in other words,] its failure to provide for full employment and its arbitrary and inequitable distribution of wealth and incomes" (Keynes, 1964, p. 372). In that regard, while describing the implications of his theory as "moderately conservative", Keynes claimed that:

> *"The state will have to exercise a guiding influence on the propensity to consume partly through its scheme of taxation, partly by fixing the rate of interest, and partly, perhaps, in other ways. […] I conceive, therefore, that a somewhat comprehensive socialization of investment will prove the only means of securing an approximation of full employment; though this need not exclude all manner of compromises and of devices by which public authority will co-operate with private initiative"* (Keynes, 1964, p. 378).

The guiding influence needed from the State, as proposed by Keynes, was expressed through what ultimately defines the economic goal of any social system: politics. Keynes (cited in Minsky, 1986, p. 8) defines the political problem as follows:

"The political problem of mankind is to combine three things: economic efficiency, social justice and individual liberty. The first needs criticism, precaution and technical knowledge; the second, an unselfish and enthusiastic spirit which loves the ordinary man; the third, tolerance, breadth, appreciation of the excellencies of variety and independence, which prefers to give unhindered opportunities to the exceptional and to the aspiring".

Carvalho (2008) argues that Keynesian economic policy is characterized by a principle not of allocation, but of mobilization. Its objective is first and foremost to mobilize resources that are not expanding effective demand and are therefore disappointing the expectations of entrepreneurs — agents who are responsible for creating employment and wealth in society.

According to Keynes, the policy of mobilizing resources to generate effective demand involves nothing more than the set of conventional macroeconomic policies —monetary and fiscal and, in an open economy context, exchange-rate policies— since microeconomic policies can give rise to distortions, privileges and inefficiencies. Acting in the more generalized domain of macroeconomics would allow the widest possible scope for private initiative, thereby avoiding the concentration of opportunities and incomes. It would also be possible to socialize the risks of frustrated expectations, and thus protect workers from large-scale layoffs. Keynes highlights the roles of monetary, fiscal and exchange-rate policies for this purpose.

Monetary policy would be used to align the relative prices of investment assets in the economic system, by managing the interest rate in the economy. Keynes (1964, pp. 225-226) argues that all assets have an intrinsic rate of interest, which is equivalent to their yield. When comparing the various yields on the assets available for choice, economic agents may judge it preferable —in terms of liquidity, carrying cost and quasi-rent— to channel their resources into assets that do not generate an expansion of economic activity—particularly when the productive investments made in the past have resulted in excessive inventories and frustrated expectations.

The basic interest rate set by the monetary authority should be widely publicized and held at a level considered normal, in accordance with the habits and customs of the public, because, as Carvalho (1999, p. 275) points

out, people have expectations as to the normal rate of interest and expect current rates to tend towards this. Accordingly, when the future is unknown, economic agents will always attempt to foresee the rate of interest and monitor it closely to avoid incurring high investment opportunity costs.

Carvalho (1994, pp. 43-44) provides an example of how monetary policy affects the way economic agents manage their portfolio composition. According to the author,

[it is] in this sense that the inverted pyramid that characterizes the Keynesian vision of the relation between money and other financial assets is constructed [...] at the vertex is legal tender, and the other assets are supported on that vertex in successive layers, each one defined by the institutional arrangements that establish rules of convertibility between the groups [...] and by the relation between the yields obtained on each collection of assets.

The relation between the different assets and money itself means that monetary policy plays an important role in the economic dynamic. Its influence on effective demand is indirect, initially affecting liquidity conditions in the money market, and subsequently motivating economic agents' decisions. Thus, if the government authorities wish to expand the volume of capital in society, they should lower the rate of interest to stimulate productive investments. In addition, keeping the interest rate at levels compatible with eliminating capital scarcity would result in "euthanasia of the rentier", a class that is not remunerated for its "risk and the exercise of skill and judgment", but by "exploiting the scarcity value of capital " (Keynes, 1964, pp. 375-376).

Nonetheless, there are times when monetary policy does little to stabilize the dynamic cycles of monetary economies, since its capacity to stimulate effective demand diminishes when uncertainty about the future leads both consumers and investors to hoard money instead of spending it, regardless of the interest rate set by the monetary authority. In that situation, which is common at times of economic crisis, the "liquidity trap" phenomenon operates and money's store-of-value function is what agents desire. As the interest rate acts indirectly on the economic system and sometimes has only minor effects on agents' liquidity preference and effective demand, Keynes (1980a) writes:

"... It's not quite correct that I attach primary importance to the rate of interest. What I attach primary importance to is the scale of investment and am interested in the low interest rate as one of the elements furthering this." (Keynes, 1980a, p. 350).

In those circumstances, government intervention essentially takes the form of fiscal policy, based on public expenditure management —which is wholly different from the public deficit— and on tax policy.

The primary objective of tax policy is to make it possible to redistribute income that is shared unequally, by taxing either income or inheritance. Second, by expanding the State's spending capacity, tax policy makes it possible to boost aggregate demand in the economic system. Lastly, as Keynes (1972) points out, it can also increase disposable income, by promoting an expansion of effective demand.

In Keynes' original view, public expenditure management involves formulating two budgets: the ordinary (current) budget and the capital budget.[1] The ordinary budget encompasses the resources needed to maintain the basic public services supplied by the government, such as public health, education, urban infrastructure, national defence and social security. Although, as Kregel (1985) notes, Keynes believed in the importance of those current expenditures, particularly social security transfers, as automatic stabilizers of business cycles, the ordinary budget should always be in surplus or, at least, balanced.

As an example of his concern for a balanced budget, in the debates held in the United Kingdom on the social security system to be constructed after World War II, Keynes (1980a, pp. 204-205) argued that the system being envisaged would impose "a severe burden to meet simultaneously pensions against which no funds have been accumulated and to accumulate funds for future pensions".[2]

The need to avoid public deficits in the ordinary budget stems from their repercussions in a monetary economy, including:

(i)   the creation of "dead-weight" debts, for which no funding source has been set up to finance their future payment;

(ii) pressure on the rate of interest in the economy, caused by the public sector's demand for private savings to finance its deficits;

(iii) the risk that the State would be forced to contract new debt to pay off its previous obligations, depending on the pace of growth and profile of the debt in relation to economic growth and the increase in public revenues.

In that context, Keynes writes, "it is probable that the amount of such surplus would fluctuate from year to year for the usual cases. But I should not aim at attempting to compensate cyclical fluctuations by means of the ordinary budget. I should leave this duty to the capital budget." (Keynes 1980a, p. 278).

The capital budget defines public expenditure in terms of the productive investments made by the government to keep the economic system stable. Such investments should be undertaken by public or semi-public bodies, with the clear aim of regulating the economic cycle.[3]

The capital budget could be in deficit; but the deficit would be financed with the surpluses necessarily obtained in the ordinary budget. Thus, any debt generated by the capital budget deficit would stem not from government borrowing on financial markets, but from productive or semi-productive activities that would gradually replace the dead-weight debt (Keynes, 1980a, p. 277).

It would be unwary to think of public expenditure under true Keynesian fiscal policy as a tool of last resort: it is not. The concept of "automatic stabilizer" is defined in Keynes' own writings, as "a long-term programme of a stable character should be capable of reducing the potential range of fluctuation to much narrower limits" (Keynes, 1980a, p. 322).

Pursuing Keynes' line of argument, the main task of the automatic stabilizer would thus be to prevent wide fluctuations by implementing a stable and continuous programme of long-term investments. In other words, its function would not be to *rescue* the economy from the peaks and troughs of the business cycle, but to *prevent* them from occurring. Moreover, once a long-term productive investment programme had been established, any short-term fluctuations could be more easily managed in the framework of that programme, either by bringing forward future measures in response to the first signs of insufficient effective demand, or by delaying investment projects in the capital budget when there are signs of excess aggregate demand.

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[1]   Keynes' descriptions of budgetary policy can be found in chapter 5 of volume XXVII of the *Collected Writings of John Maynard Keynes*, entitled "*Employment Policy*". These were debated with various interlocutors in relation to the problems that United Kingdom of Great Britain and Northern Ireland would face after World War II, including the aim of full employment. For more on the subject, see Keynes (1980a, chapter. 5).

[2]   The debates were held in the Interdepartmental Committee on Social Insurance and Allied Services of the United Kingdom of Great Britain and Northern Ireland, established in June 1941, and took place mainly between Keynes and commission president William Beveridge. For more on the subject see Keynes (1980a, chapter. 4).

[3]   According to Keynes (cited in Kregel, 1985, p. 37), semi-public bodies pursue the public good and "approximate more to the status of a public corporations than that of individualistic private enterprise". Examples of such bodies would include "the universities, the Bank of England, the London Port Authority and joint-stock institutions".

Thus, measures to contain short-term fluctuations should not be restricted to promoting expansionary phases, but should also be adopted to head off episodes of excess aggregate demand. As Keynes (1972, p. 377-8) notes:

> "… *It follows that the increased quantity of money available to be spent in the pockets of consumers will meet a quantity of goods which is not increased [...] with the result that there is nothing left to buy and the consumer goes home with the money burning his pocket [...] Some means must be found for withdrawing purchasing power from the market; or prices must rise until the available goods are selling at figures which absorb the increased quantity of expenditure — in other words the method of inflation.*"

By promoting productive institutions, the capital budget generates its own surplus through time. To keep public finances in overall balance, it suffices to avoid incurring current deficits, because any short-term imbalances in the capital budget would be financed with surpluses from the ordinary budget, and the returns obtained from the public investments made will tend to balance the capital budget in the long run. As Keynes (1980a, p. 320) put it, the "capital expenditure would, at least partially, if not wholly, pay for itself".

The possibility of equilibrium in the long-term capital budget makes the public-sector budget as a whole much more rational and viable, by fostering the generation of surpluses through time and thus promoting public saving in both halves of the Keynesian budget. This reduces the possibility of incurring budget deficits which, as Keynes confirms, would occur if the volume of planned investment fails to produce equilibrium. In such conditions, and only then, the "lack of balance would be met by unbalancing one way or the other the current budget." Nonetheless, "this would be a last resort, only to come into play if the machinery of capital budgeting had broken down" (Keynes, 1980a, p. 352).

To dispel any doubts as to his true intention in prescribing operating modes for fiscal policy, Keynes also argues that one should not confuse the fundamental idea of the capital budget with the particular —and rather desperate— expedient of deficit financing (Keynes, 1980a, pp. 353-354).

The fundamental role assigned to investment spending in terms of the dynamic of aggregate demand in the Keynesian perspective, focuses on three aspects in particular. First, the stock of wealth accumulated in society depends essentially on investment decisions, which mobilize idle resources such as machinery, equipment, and particularly human labour. Second, as noted by Carvalho (2008), the initial increase in wealth, which results from resources being transferred from one individual to others in the act of investment, can generate a circuit of spending and, consequently, increase income further through the multiplier effect. And, lastly, Keynes (1980a, p. 350) explains why he would prefer a "heavy scale of investment to increasing consumption", the main reason being that he thought we had yet to even approach the point of capital saturation.

The public investments funded from the capital budget should not rival private-sector investments, but complement them (Carvalho, 1999).[4] The former should function as inducers par excellence of the latter, and thus stabilize the cyclical fluctuations of the economic system. Moreover, as agents' expectations are the system's destabilizing factor, fiscal policy in the form of investment expenditure should act on those expectations. To make this absolutely clear, Keynes develops the notion of the capital budget so that the productive investor can rely on the commitment of government action.

In short, in an uncertain world, where economic agents put their potential command over social wealth at risk for the purpose of obtaining greater command in the future, fiscal policy should be robust, to underpin a path of increasing wealth, and thus promote investors' expectations. In that regard, Minsky (1986, p. 6) argues that "if the market mechanism is to function well, we must arrange to constrain the uncertainty due to business cycles so that the expectations that guide investment can reflect a vision of tranquil progress."

In the case of exchange-rate policy, Keynes' proposals envisage the operation of a managed exchange-rate system, to ensure both external balance and price stability. Keynes makes that idea clear in his International Clearing Union proposal for reorganizing the world economic order at the end of World War II. In that proposal, which included a system of exchange rates that were fixed but alterable according to circumstances, he defines one of the objectives as reducing uncertainty about the future prices of assets and tradable goods when economic agents have to make decisions involving foreign-exchange contracts (Ferrari Filho, 2006b, chapter 3).

Keynes also stressed that the external dynamic of monetary economies could not do without tools that would promote symmetrical adjustment in countries' trading and financial relations. On this point, Keynes

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[4] It should also be noted that capital-budget decisions should be related to what, technically speaking, are "social investments"—decisions which, if not taken by the government, will not be taken by anyone else (Kregel, 1985, p. 37).

proposed creating an "international market maker" which would: (i) issue a universally accepted currency; (ii) provide conditions under which trade balances would be automatically adjusted, so that deficit countries would not be forced to attract capital to finance their balance of payments; (iii) define foreign-exchange management rules; and (iv) institute capital-control mechanisms.[5]

Three of the four objectives of the "international market maker" (automatic adjustment of trade imbalances, implementation of a managed exchange rate, and the adoption of capital-control mechanisms) play two fundamental roles for Keynes: (i) they reduce the uncertainty of business expectations; and (ii) they provide greater freedom to implement monetary policy, by obstructing pass-through effects from the exchange rate to domestic prices, and preventing the interest rate being used constantly to attract speculative capital from abroad, which could inhibit productive investments. In

short, through exchange-rate policy, Keynes aimed to establish inter-temporal equilibrium in external accounts and allow monetary policy the greatest possible autonomy.

As noted by Marcuzzo (2005, p. 2), Keynes' theory constantly recommends what should be done to underpin the level of investment, in the sense of "stabilizing business confidence", rather than as a debt-financed public-works plan. This reflects the fact that Keynes' trust in the "socialization of investments", rather than in a fiscal policy aimed at smoothing consumption levels over the business cycle, reveals his concern for the size of the deficit and the importance of providing market incentives to achieve the desired level of employment (Marcuzzo, 2005, p. 2).

Lastly, it shows that, in both conception and implementation, Keynesian economic policy aims to maintain levels of effective demand, to mitigate involuntary unemployment by stabilizing business expectations. Ultimately, the outcome pursued with Keynesian economic policies is the construction of a society that enjoys economic efficiency, social justice and individual freedom. Keeping that idea in mind, section III of this article analyses the conduct of macroeconomic policies in Brazil during the period following the Real Plan.

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[5] In the words of Keynes (1980b, p. 270) "to provide that money earned by selling goods to one country can be spent on purchasing the products of any other country. […] we cannot hope to balance our trading account if the surpluses we earn in one country cannot be applied to meet our requirements in another country."

III

Review of economic policy in the period 1995-2009 from a Keynesian perspective

1. The rationale of the Real Plan and implementation of monetary, fiscal and exchange-rate policies

As is well-known, the Real Plan was based on the same rationale as the early-1990s economic stabilization programmes implemented in developing, and particularly Latin American, economies: an exchange-rate anchor combined with trade and financial liberalization.

Experience shows that economic stabilization programmes based on that rationale nearly always unfold in the same sequence:
(i)   First, there is a sharp drop in the inflation rate, accompanied by substantial exchange-rate appreciation.
(ii) When the real exchange rate appreciates, as a result of the difference between domestic and international inflation with the nominal exchange

rate remaining relatively stable, trade balances deteriorate, thereby fuelling balance-of-payments current account deficits.
(iii) These deficits are financed through foreign-capital inflows, particularly speculative flows and purchases of government bonds.
(iv) The public debt grows, and the cost of rolling over payment puts pressure on the public deficit.
(v)   The twin deficits, external and fiscal, reveal the inconsistency of "macroeconomic fundamentals" in the eyes of the market; and
(vi) Currency crises break out.

The Real Plan was no exception to this pattern. Despite its relative success in controlling the inflationary process, import incentives fuelled by trade liberalization and exchange-rate appreciation, together with sluggish export growth, caused the trade balance to deteriorate

rapidly and generated current account deficits. These were financed through inflows of foreign venture capital or, in particular, portfolio investments; and this in turn added to public-sector liabilities.[6]

The inter-temporal inconsistency of that strategy fuelled numerous speculative attacks on the real during the second half of the 1990s, nearly all of which stemmed from a combination of "contagion crisis" and evidence of the macroeconomic imbalances in the Brazilian economy, particularly in its external accounts, which further aggravated the country's external vulnerability and fragility. By early 1999 the strategy for financing the Brazilian economy's chronic external deficit had became exhausted, and economic agents no longer trusted the country's economic policy. There was then no alternative but to change the monetary and foreign-exchange regime by replacing the currency band with a flexible-exchange-rate mechanism and implementing a system of inflation targeting. This signalled the end of the monetary-stabilization model in place until then.

Since the application of the Real Plan, monetary policy has played an active role, both directly and indirectly, in stabilizing the inflationary process: between 1994 and 1999, it was used to attract external capital flows and thus bring the country's overall external accounts into balance (essential for maintaining exchange-rate stability); then, following the adoption of inflation targeting, it was used to lower the inflation rate to the centre of the target range and prevent exchange-rate movements being passed through to domestic prices (Arestis, De Paula and Ferrari Filho, 2009). In brief, throughout the price-stability years, monetary policy was conservative, and this generated high interest rates.[7]

Figure 1 shows the trend of the basic interest rate in the Brazilian economy in the period following the Real Plan, as an illustration of the argument made in the foregoing paragraph. Despite trending downwards throughout the period, basic interest rates remained very high under both monetary regimes — the exchange-rate anchor between July 1994 and January 1999 and inflation targeting since June 1999.

FIGURE 1

Brazil: basic nominal interest rate,1995-2009
(Annual average, percentages)
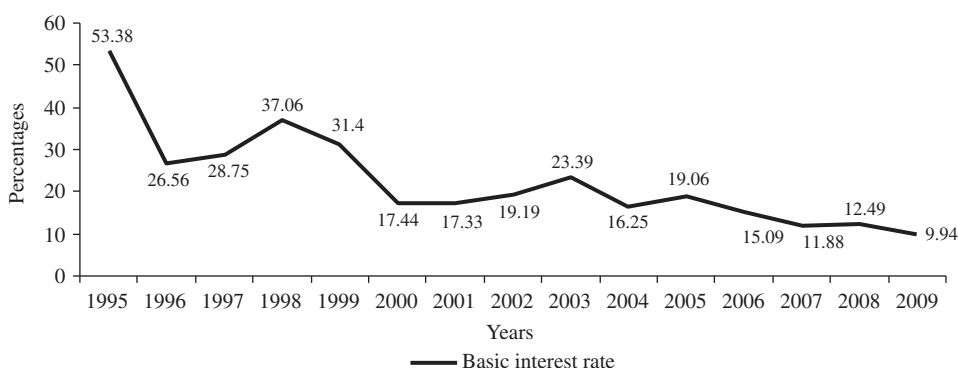
Source: prepared by the authors on the basis of Institute of Applied Economic Research (Ipeadata) - Macroeconomic data, 2010 [online] http://www.ipeadata.gov.br.
Note: Between January 1995 and March 1999, average annual interest rates were calculated on the basis of the TBan, which was the basic interest rate of the Brazilian economy in force at that time. The other calculations used the Over-SELIC (Special Settlement and Custody System) rate.

[6] Although Brazil's public deficit was largely financed with external capital, this did not increase its external liabilities. The capital inflow targeted securities denominated in local currency, broadly indexed to the interest-rate and exchange-rate variation. While this strategy reduced Brazil's external-liability exposure to exchange-rate volatility, it did not help protect the country's foreign-exchange reserves from speculative foreign capital movements.

[7] The aim of using the interest rate depends on the monetary regime in force at the time. As noted by Arestis, De Paula and Ferrari Filho (2009), in the Brazilian exchange-rate-anchor regime, the interest rate was used to keep the external sector in balance. Under inflation targeting, basic interest rates were the instrument par excellence to attain the targets set by the monetary authority. For further information on the implementation of the different monetary regimes see Arestis, De Paula and Ferrari Filho (2009).

The average basic interest rate in the Brazilian economy between 1995 and 2009 was 22.6% per year. In the exchange-rate-anchor period, between 1985 and January 1999, the rate rose to an annual average of 33.6%, whereas between June 1999 and December 2009, under inflation targeting with a floating exchange rate, the average was 16.4% per year. Figure 1 shows that the interest rate eased steadily downwards from 2006 on, such that between 2006 and 2009 average rates were at their lowest level since the Real Plan. There was also a substantial fall between 2008 and 2009, as a result of the countercyclical monetary policy implemented to protect the Brazilian economy from contagion from the subprime mortgage crisis. In that context, the basic interest rate fell from an annual rate of 13.75% in January 2009 to 8.75% in the following December, the lowest ever recorded in the post-Real Plan period.

As noted above, Keynes (1964) viewed the earning of interest as an investment alternative used by economic agents to increase their wealth; and for that reason monetary-policy interest rates are used to influence agents' spending decisions. On this point, Keynes (1980b, p. 276) argued that one could not hope to control domestic interest rates unless capital outflows from the country were restricted, since the interest rate would need to be used to attract foreign capital to finance the balance of payments. In other words, an interest rate cut could help promote productive investments during recession, whereas in upswings the interest rate could be used to dampen effective demand by economic agents and control inflation.

Between 1995 and 1999, the period of the exchange-rate anchor with broad capital mobility and a current account deficit, the monetary policy interest rate became a hostage to speculative pressure from international investors seeking a "premium" for investing their wealth in Brazil, thereby sustaining the conditions for continued management of the exchange rate. In that period, the need to keep the exchange rate at levels that would prevent potential exchange-rate devaluations from being passed through to domestic prices, and to provide an anchor for economic agents' future price expectations, meant that the domestic interest rate maintained a substantial spread with respect to average international rates.

This spread attracted massive capital flows into the country, and the real exchange rate rose in response. One of the consequences of this for the Brazilian economy was a turnaround in its trade balance, given the need —as noted by Bresser-Pereira and Nakano (2003)— to attract "external saving" to balance the current account. This aggravated external vulnerability, because Brazil's current account deficit was financed largely with speculative

short-term capital. Moreover, given that monetary flows into and out of the country are one of the determinants of the monetary base, government bonds were issued to prevent capital inflows (typically speculative) being converted into reais in the Brazilian economy and threatening the recently-won monetary stability. As those bonds were mostly indexed to the base rate of interest and, from late 1990 onwards, also remunerated by the variation in the exchange rate, the exchange-rate appreciation also had repercussions on public finances via the expansion of financial expenses and public debt.

Following the adoption of inflation targeting in July 1999, the logic of the monetary authorities' interest-rate policy changed in form, but not necessarily in substance. In other words, monetary policy ceased to focus exclusively on attracting international capital to increase external saving and thus keeping the balance of payments in balance, but was now also aimed at controlling aggregate demand with a view to keeping the inflation rate within the range previously set by the inflation-targeting regime. On this point, Bresser-Pereira and Nakano (2002) draw attention to the excessive number of variables for which the interest rate became responsible. These include the exchange rate, which required high interest rates both to attract external saving and to appreciate the real, thus averting any chance of pass-through. Corroborating the idea that, under inflation targeting, the interest rate and exchange rate continue to work in harness to keep inflation under control, Modenesi, Modenesi and Martins (2011) apply a Taylor-rule to the Brazilian economy and highlight the importance of the exchange rate for defining the interest rate in Brazil during the inflation-targeting regime. Meanwhile, Terra (2011) stresses the contraction of aggregate demand through the issuance of government bonds, as an important element in defining monetary-policy interest rates.

To implement its tight-money policy, the central bank had to make sure investors ratified the monetary constraint by demanding public bonds which, once purchased, diverted money into financial circulation and thus made it possible to control the monetary base. Thus, monetary policy also had to take account of the behaviour of the exchange rate, which generated a functional overload for the interest-rate and kept it high. As figure 1 shows, the price paid by the central bank to achieve that goal averaged 16.4% per year. Despite the relative trend towards continued appreciation of the real exchange rate illustrated in figure 2, the modus operandi of the inflation-targeting regime (high interest rates), together with exchange-rate float and a backdrop of capital- and financial-account liberalization, proved unable to maintain nominal exchange-rate stability (see figure 3).

FIGURE 2

Brazil: real effective and nominal exchange rate, 1995-2009
(Index: May 2005=100)
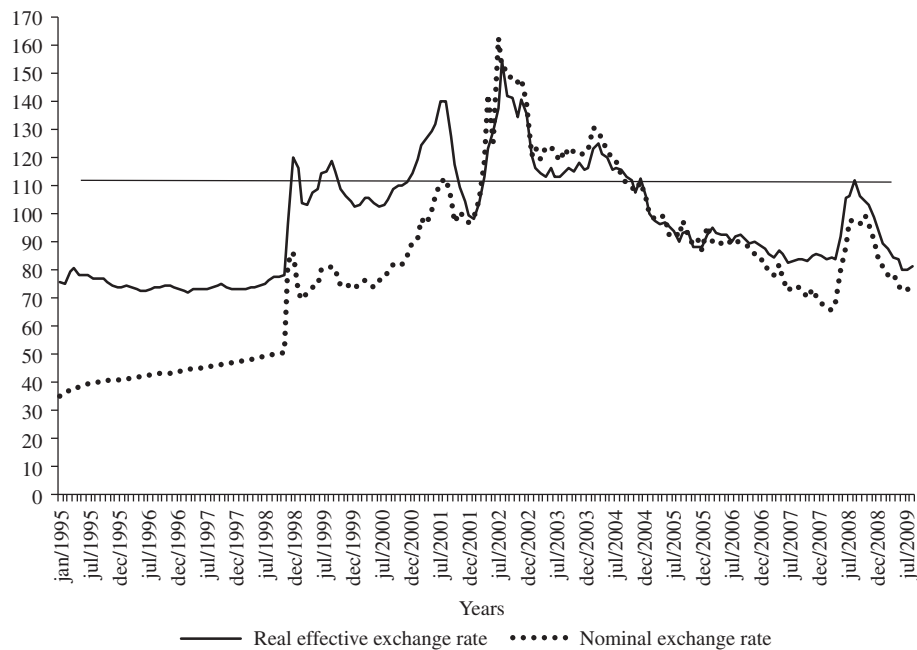
——— Real effective exchange rate   • • • • • Nominal exchange rate

Source: prepared by the authors on the basis of Institute of Applied Economic Research (Ipeadata) - Macroeconomic data, 2010 [online] http://www.ipeadata.gov.br.

FIGURE 3

Brazil: volatility (standard deviation) of the exchange rate, 1995-2009
(Percentages)
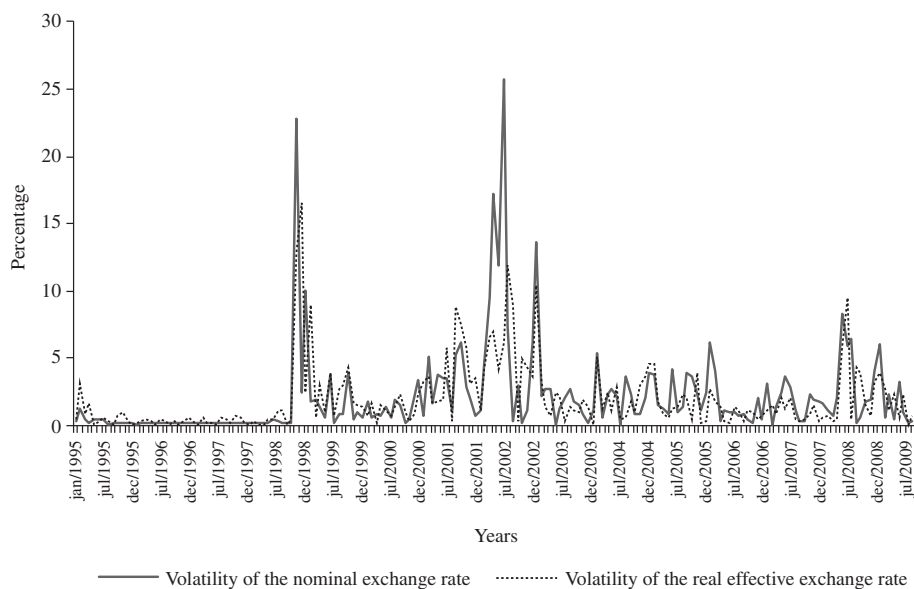
——— Volatility of the nominal exchange rate   ········· Volatility of the real effective exchange rate

Source: prepared by the authors on the basis of Institute of Applied Economic Research (Ipeadata) - Macroeconomic data, 2010 [online] http://www.ipeadata.gov.br.

The periods of steepest exchange-rate devaluation in the post-1999 period occurred in that same year, when the exchange-rate regime was altered; in 2002 in the lead-up to the presidential elections, in which expected victory by Luiz Inácio Lula da Silva would likely usher in changes in macroeconomic policy; and in 2008, as a result of the subprime mortgage crisis. Those periods aside, the exchange rate tended to appreciate, such that in late 2009 the nominal rate was very close to the levels prevailing during the exchange-rate-anchor period. Figures 2 and 3 show the trend of the real effective and nominal exchange rates and the volatility of the exchange rate, respectively.

Reliance on external saving to control the balance-of-payments current account was a constant in the post-Real Plan period, except in 2003-2007, when burgeoning agricultural and mineral commodity exports fuelled a current account surplus. The replacement of manufactured exports by agricultural and mineral commodities caused a further exchange-rate appreciation and created a vicious circle in the export process, by

hastening the retreat of manufactured and technology-intensive exports.[8]

The aforementioned modus operandi of the inflation-targeting regime, together with its repercussions on the exchange-rate appreciation and need for external saving, had the effect of fuelling the public debt and compromising the public-sector fiscal outturn. This reflected the high cost of refinancing that debt, for which the parameter is the basic interest rate on government bonds used in monetary-policy open-market operations. Whereas the central bank's activities are financed out of income received by the National Treasury, the cost of monetary policy, noted above, imposes a heavy load on public finances. In such circumstances, the public sector had no alternative but to finance itself by raising the tax burden in relation to gross domestic product (GDP). Figure 4 shows the trend of GDP growth and the relation between the tax burden and GDP, between 1995 and 2009.

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[8] Bresser-Pereira (2009) provides a detailed explanation of this phenomenon which is known as "Dutch disease".

FIGURE 4
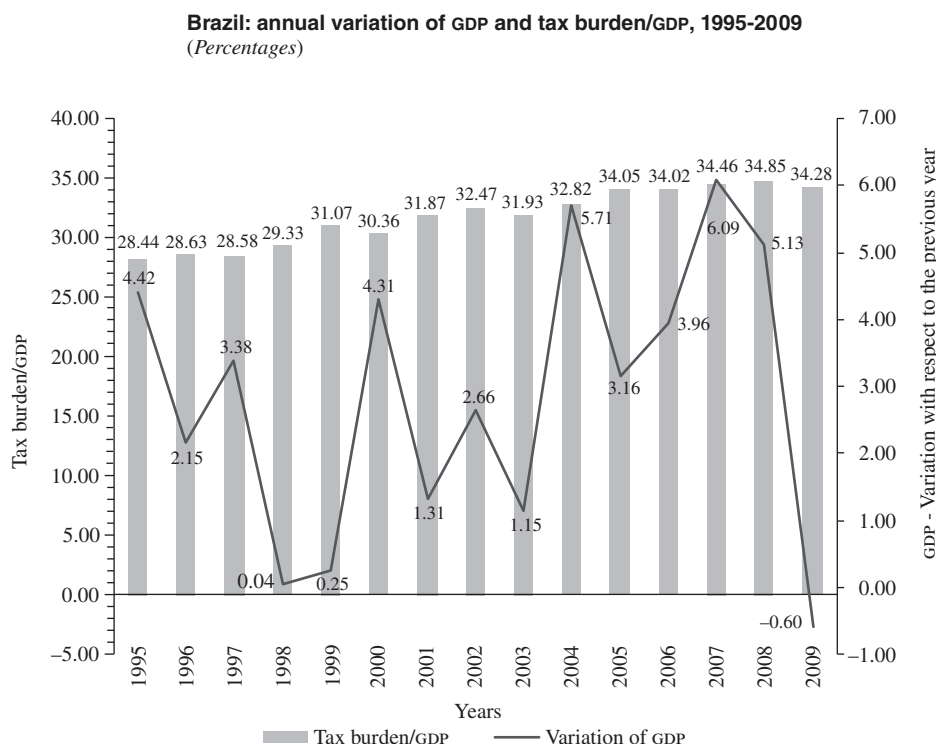
Brazil: annual variation of GDP and tax burden/GDP, 1995-2009
(*Percentages*)

Source: Prepared by the authors on the basis of Institute of Applied Economic Research (Ipeadata) - Macroeconomic data, 2010 [online] http://www.ipeadata.gov.br.
Note: End period figures at base values expressed in 2008 prices.

As shown in figure 4, the annual growth rate of Brazil's GDP was not only low (averaging around 2.9%) but displayed intermittent volatility throughout the period 1995-2009.[9] Moreover, the tax burden rose continuously in relation to GDP in those years, except for minor reductions in 1997, 2000, 2003 and 2009.

According to Keynesian theory, one possible cause of the behaviour of Brazil's GDP could have been that contractionary monetary policy and exchange-rate appreciation discouraged investment, consumption and exports. More specifically, the high borrowing costs affect productive investment decisions, through: (i) the buildup of involuntary stocks as consumption is squeezed; (ii) investor expectations faced by a monetary policy which, by exclusively pursuing price stability, has the effect of restricting aggregate demand; and (iii) the opportunity cost of productive investment and consumption.

The trend towards constant exchange-rate appreciation discourages investments in products with greater technological content and reduces the cost of importing such products from countries with lower production costs, such as Germany, China, the Republic of Korea and India. By making it more profitable to import technology than to produce it domestically, the appreciated exchange rate becomes an obstacle to research and development (R&D) activities in the country by making it harder for Brazilian industry to develop in segments producing high value added goods and services. Consequently, domestic products of high and medium technology become less and less competitive on the international market, rendering the country increasingly reliant on agribusiness exports, which, while important as generators of foreign-exchange earnings, contain little value added.

With respect to public finances in the post-Real Plan period, the negligible average growth rate of GDP and its volatility made it impossible for the government to increase its share in social wealth without raising the tax burden. Yet, if the goal of economic policy, as expressed in Keynesian theory, had been to stimulate wealth creation, the share to be transferred to the State would have grown automatically, without the need to impose a heavier tax burden on society.

Despite the increased tax burden and the accumulation of primary savings virtually throughout 1995-2009 (except for 1997), the Brazilian government required nominal financing throughout the post-Real Plan period. In other words, the policy of limiting non-financial expenses in the form of public spending and investment (which represent primary expenses in the primary public accounts) was unable to absorb the large financial expenses incurred by the government, and nominal deficits resulted. It is worth noting that the existence of constant primary surpluses means that the stubbornly high level of interest payments cannot be blamed on primary fiscal imbalances. The nominal deficits were therefore due to the financial expenses of the public sector, which, if not caused by fiscal-policy deficits (since there were recurrent primary surpluses) could only have been caused by the policy of issuing government bonds to resolve the monetary-policy problem, as shown in figure 1. Data on the flows of public-sector financing needs in the period 1995-2009 are shown in figure 5.

As shown in the figure, only in 1997 was there a larger primary deficit, while in 1996 and 1998, the fiscal outturn was in balance. In 1995, and from 1999 onwards, pursuant to a requirement of the 1998 agreement for financial assistance to be provided by the International Monetary Fund (IMF), the primary surpluses became substantial and grew still further after the government of Luiz Inácio Lula da Silva took office in 2003. Nonetheless, the nominal deficit and nominal interest payments remained very high throughout the period, and only started to fall back after 2006. In 2009, in response to the international economic crisis, the government increased public spending on income-transfer policies, such as the *Bolsa Família* family support programme, and instituted subsidy mechanisms such as the *Minha casa, minha vida* ("My home, my life") programme. Those policies to increase public spending reduced the primary surplus.

Tax revenues did not fall significantly in 2009 (when they represented 34.28% of GDP compared to 34.85% in 2008), even taking account of the tax exemptions afforded to industrialized products. Gobetti and Orair (2010) explain this by the increase in revenue obtained by the states and municipalities from the Vehicle Ownership Tax (IPVA) and the Urban Property and Land Tax (IPTU).

In that context, the effect on the public accounts of the imbalance caused by financial flows (in view of public expenditure on nominal interest payments in relation to GDP, as shown in figure 5) was a massive increase in the net public sector debt, which surged from 29.0% of GDP in 1995 to 52.1% in 2002 (the highest level of the 1995-2009 period). From then on, Brazil's net public sector debt-to-GDP ratio started to decline, particularly between 2007 and 2008. This was largely due to the higher annual average rate of GDP growth achieved after 2006, and the lower interest rates prevailing from then on. Figure 6 shows the behaviour of the Brazilian public sector's net debt.

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[9] As an illustration of that volatility, GDP grew at consecutively increasing rates in just three years, 2005, 2006 and 2007 — 3.2%, 4.0% and 6.1% per year, respectively. In the other years of the 1995-2009 period, GDP growth was negative or occurred at both rising and falling rates.

FIGURE 5

**Brazil: primary and nominal financing needs of the public sector
and nominal interest rates, 1995-2009**
(*Percentages of GDP*)
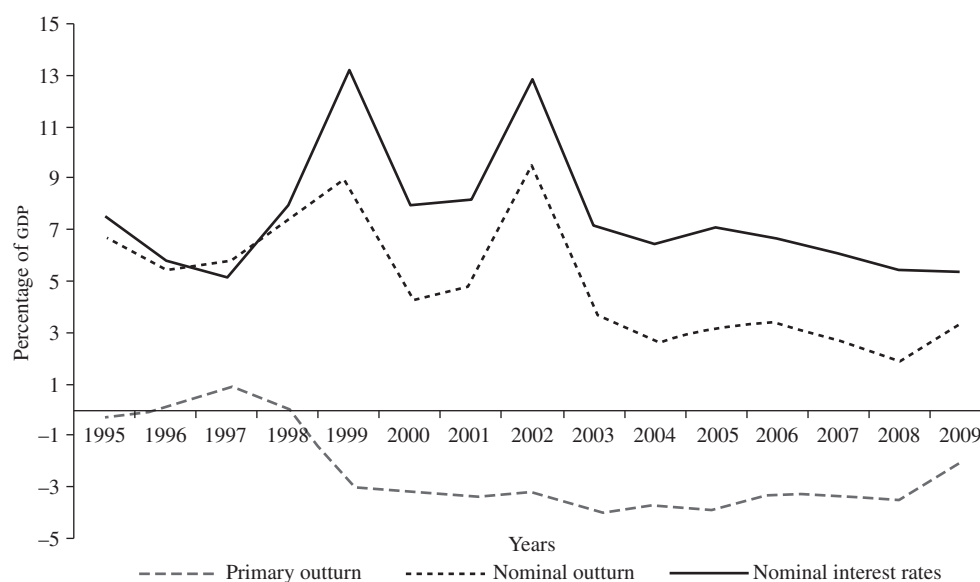
Source: prepared by the authors on the basis of Central Bank of Brazil, "Séries temporais de economia e finanças", 2010 [Economic and financial time series] [online] http://www.bcb.gov.br.
Note: End of period values. Negative values represent a surplus and positive values signify a deficit.

FIGURE 6

Brazil: net public-sector debt, 1995-2009
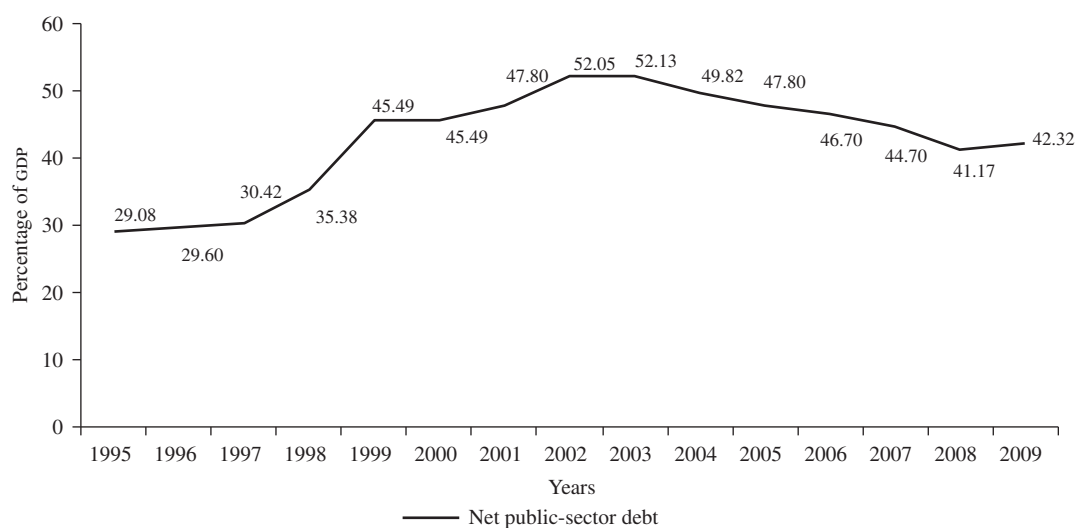(*Percentage of GDP*)

Source: prepared by the authors on the basis of Central Bank of Brazil, "Séries temporais de economia e finanças", 2010 [Economic and financial time series] [online] http://www.bcb.gov.br .
Note: End of period values.

The peak attained by net public sector debt in 2002 largely reflects the speculative attack that occurred around the time of the presidential elections, which were won by Luiz Inácio Lula da Silva. With free capital movement, the exchange rate depreciated as foreign investments withdrew from the country, and the interest rate rose to curb the turbulence. In September 2002, the nominal exchange rate reached R$ 3.89 per dollar, its highest level since the Real Plan. To contain capital flight, interest rates were raised and this affected the net public sector debt, which was already inflated by the exchange-rate adjustment. Consequently, the debt level recorded in 2002 lasted into the following year, with significant repercussions on the public sector's financial expenses in interest payments (see figure 5). After 2004 —as was the case throughout the 1995-2009 period— the interest rate spread caused by the still high interest rates, at a time of international liquidity, pushed up the exchange rate despite persistent nominal volatility (see figures 2 and 3).

Based on the data presented above and following Keynes' bipartite budgetary format, it can be said that in Brazil there is no notion of a capital budget, but something akin to a "financial budget". Its counterpart, which would be the "ordinary budget", does not offset the expenses of the financial budget. Despite the surpluses recorded constantly throughout most of the period reviewed, cumulative primary saving was unable to keep the public sector's net debt from rising. The deficits incurred by the public sector were characterized by their financial component, which made them difficult to pay in the long term, since no funding sources had been put in place when the debts were contracted. Accordingly, no structural fiscal adjustment was set up in Brazil.

The requirement to generate primary surpluses means financial payments detract from public expenditure of the sort that stimulates aggregate demand (public consumption and investment). On average, between 1995 and 2007, interest paid by the public sector represented 7.8% of GDP per year in real terms; the primary surplus absorbed an annual average of 2.4% of GDP and the public-sector tax burden was 30% of GDP per year. Against that backdrop, nominal interest payments and the primary surplus absorbed 23.3% and 8% of total public revenue, respectively, which means that 31.3% of all public sector income was immobilized and had little or no effect on aggregate demand in the Brazilian economy, depending on how interest payments were distributed. As a result, effective demand was reduced on average by the equivalent of 9% of GDP per year between 1995 and 2007 (BCB, 2010; Ipeadata, 2010).

Lastly, unlike the Keynesian proposal regarding the capital budget deficit —maintenance of entrepreneur confidence— the Brazilian government's (nominal) financial deficits do not help sustain employment rates or enhance social justice in terms of income distribution. The financial deficits originated in interest payments, and those payments remunerated rentiers. To the extent that the primary surplus represents a resource saving to be used to balance the effect of the nominal deficit on public finances, albeit only partially, in reality, the outcome is a transfer of resources from the population at large to government bond-holders, which also makes it impossible to improve the country's income distribution. Keynes viewed inequality in the income distribution as one of the most serious problems of the capitalist system; and improving it was one of the main goals of his social philosophy, as set forth in the *General Theory of Employment, Interest and Money.*

2. Were Brazil's countercyclical policies Keynesian?

In response to the international economic crisis that broke out in the United States subprime mortgage market in late 2007, the Brazilian government implemented various measures from the first quarter of 2009 onwards (somewhat tardily it could be said), particularly fiscal and monetary measures. Fiscal policies included rate cuts in personal income tax (IRPF), the financial transactions tax (IOF) or purchases on credit, and the industrialized products tax (IPI) for automobiles, electrical appliances and construction materials; an increase in benefits paid by the *Bolsa Família* programme; institution of the *Minha casa, minha vida* housing programme; and the creation and increase of funding through special and subsidized credit lines for agricultural production, the purchase of construction materials and infrastructure building, among others.

In the case of countercyclical monetary measures, the Central Bank of Brazil (BCB): (i) made its rules on use and collection of compulsory deposits more flexible, to inject liquidity into the domestic money and financial market and to finance loans from the Brazilian Development Bank (BNDES); (ii) streamlined the takeover of financial institutions at risk of insolvency by public banks, particularly Caixa Econômica Federal and Banco do Brasil, and (iii) launched a series of cuts in the basic interest rate from January to July 2009, from 13.75% to 8.75% (BCB, 2010).

As noted by Ferrari Filho (2009), between late 2008 and early 2009 the thesis that Brazilian economy's was in some way immune from the global economic crisis was

refuted, because it began to feel the effects observed in developed countries despite the countercyclical measures implemented. In the wake of the crisis, economic activity slowed sharply, with a 0.6% contraction in GDP in 2009, following 5.1% growth in 2008. In that period, the main indicators of aggregate demand in the Brazilian economy —investment, consumption and exports— fell drastically: the investment rate plummeted by 20.3%, private consumption dropped by 1.1%, and exports slumped by 22.1% in the first half of 2009 (Ferrari Filho, 2009).

Despite the authorities' slow reaction to the crisis, the fiscal and monetary policies implemented to stimulate aggregate demand in the first quarter of 2009 had some effect, particularly in terms of reducing unemployment, which, having surged from 6.8% in December 2008 to 9.0% in March 2009, dropped back to 6.8% in December of that year. Moreover, no major fault lines appeared in the national financial system, as happened in the central countries

Nonetheless, the countercyclical policies implemented cannot be described as strictly Keynesian. Although the outcome, both desired and attained, by the economic authorities through these policies displays a Keynesian stamp (boosting effective demand countercyclically),[10]

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[10] It might be noted that the countercyclical measures adopted by Brazil's economic authorities are not, in principle, orthodox.

Keynes visualized a situation of ongoing normality in the economic system which, by preventing cycles, would enable investors to form better expectations about the future and encourage them to forego liquidity. In that sense, Keynesian economic policies prescribe continuous government action to avoid recessionary trends and not, as happened in the case of Brazil, government intervention after a crisis has broken out. Lastly, government action should not be to remedy but to prevent the economic problems inherent to the dynamic of monetary economies. In brief, albeit with extreme delay and using relatively timid measures, such as the modest cut in the basic interest rate, the economic authorities had some success in combating the crisis. If the Keynesian notion of the State applying "permanent automatic stabilizers" to effective demand had been conventionally adopted, the dynamic of the Brazilian economy would clearly have been less cyclical; moreover, the crisis of effective demand suffered by the global and Brazilian economies between 2008 and 2009, would unlikely have been so deep, and it would definitely have been shorter. By recognizing business expectations as both a causal factor of the crisis and, at the same time, the source of the prosperity of the economic system, Keynes proposed automatic-stabilizer policies to lay firm foundations for entrepreneurial action. Laying such foundations should be a constant commitment and not a last resort as happened in Brazil.

IV

Conclusions

One of Keynes' main concerns was to how to promote the greatest possible social wealth and ensure its distribution among the largest number of individuals. The key elements of wealth production are entrepreneurs (and their impulses or "animal spirits"), who are continuously dealing with the inherent uncertainty of the future. To resolve that dilemma, and in keeping with his concern, Keynes proposed government intervention to underpin entrepreneurial expectations.

In Keynes' early writings, government intervention focused on three areas: monetary, fiscal and exchange-rate policy. On the first, he argued that implementing monetary policy through the interest rate should avoid crowding out productive investment, and thereby avert negative effects on the level of investments, which are a source of job creation, wealth and income distribution. According

to Keynes, fiscal policy is the most important sphere of government action and is structured around: (i) tax policy and (ii) the notion of a bipartite budget, divided into an ordinary (current) budget and a capital budget. The purpose of the first is to finance basic government services, and it should always be in surplus. The second aims to strengthen expectations by automatically stabilizing the cycles of monetary economies. This budget could be in deficit, because it is financed in the short run from the surpluses generated in the ordinary budget, and, in the long run, from the returns on investments made as part of its automatic stabilization functions. As can be seen, Keynes viewed budgetary balance as a crucial element in the rationale of fiscal policy. Lastly, the monetary authority should use the exchange rate under a managed floating mechanism, not only to curb speculation, but also

to keep the real effective exchange rate stable through time, which is essential for boosting export activity and preventing exchange-rate fluctuations from being passed through to domestic prices.

When this logic is applied to the conduct of economic policy in Brazil after the Real Plan, it can be seen that both fiscal and exchange-rate policy were subordinated to monetary policy, and the monetary regime predominated throughout. To keep inflation substantially low throughout the 1995-2009 period, monetary policy imposed very high interest rates, which firstly were inconsistent with sustained economic growth and, secondly, imposed a burden on the country's public finances that was incompatible with primary surpluses, thereby generating a surge in net public sector debt.

The high basic interest rates also fuelled exchange-rate appreciation, a trend that has prevailed throughout the post-Real Plan period. In the absence of wide-ranging controls on international capital inflows into the country, the exchange rate was left to the mercy of external speculators' decisions on how and where to invest their savings. Influenced by external motives, such as the crisis unleashed by the subprime mortgage market in the United States, or by endogenous factors (such as the 2002 presidential campaign), economic agents engaged in foreign-exchange transactions that caused the sharp exchange-rate volatility observed throughout the floating-rate period after 1999. The attempt to control that volatility during the managed-exchange-rate period triggered the Brazilian currency crisis of late 1998 and early 1999, when the monetary authority lost control of the domestic interest rate.

The economic policies implemented to combat the international economic crisis of 2007-2008 cannot be classified as Keynesian, either; at most, they involved government presence in the equilibrium of the economic dynamic, something unimaginable from a conventional theoretical viewpoint. The countercyclical measures had an ex-post assistance profile, since the aim was to rescue the country from the bottom of the pit once the belief that the Brazilian economy was ring-fenced from economic developments elsewhere in the world had been laid to rest. Keynes believed stabilization policy should be permanent, because the entrepreneurial investments responsible for economic prosperity needed to be constant. The term "automatic stabilization" should evoke an economic policy action that keeps the economic system on a normal course without affecting business expectations. As with any volatility in the economy's basic prices —such as the exchange rate, interest-rate, and wages— "stop-go" growth of the type seen in Brazil undermines business confidence. To promote productive investment in a climate of uncertainty, the entrepreneur requires constancy, and that is what Keynes proposed with automatic stabilization. The economic policies used in Brazil to deal with the crisis were last-resort measures, since their objective was not to stabilize business expectations, but to rescue them. It is no coincidence that Brazil's GDP shrank by 0.6% in 2009 compared to the 2008 level.

Lastly, this brief analysis of the economic policy implemented in Brazil in the post-Real Plan period shows that it lacked the credentials of Keynesian economic policies, as described in the second section of this article. Why did the economic policies implemented after the Real Plan diverge from those recommended by Keynes? Here, Minsky (1986, p. 8) aptly notes:

"... economic policy must reflect an ideological vision; it must be inspired by the ideals of a good society. And it is evident that we are faced with a failure of vision, with a crisis in the aims and objectives that economic policy should serve" (Minsky, 1986, p. 8).

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Enterprise creation and economic recovery: the case of Rio Grande do Sul

Mario Duarte Canever and André Carraro

ABSTRACT

This article analyses the dynamic of new enterprise creation in Rio Grande do Sul, measured by the business start-up rate in relation to the number of pre-existing firms and also relative to the labour force. The analysis shows that business start-up rates are not homogeneous regionally or across sectors. It also identifies a relation between regional economic growth and the business start-up rate, which depends on the rate of renewal of the enterprise base and fundamentally on the entrepreneurial drive of local workers, which affects the degree to which enterprise creation rates converge between regions. The results also show that an increase in the business start-up rate improves regional economic performance after a period of time.

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I

Introduction

For over 20 years, the business start-up rate has been considered an important factor when formulating regional development policies. The birth of a new business is a valuable expression of entrepreneurship, which is a basic element in economic growth (Johnson, 2004). Spatial variations in the business start-up rate within and between countries pose recurrent challenges to policymakers. Studies published by the Global Entrepreneurship Monitor (GEM) constantly show variations between countries. For example, the 2002 GEM study covering 37 countries, found that total entrepreneurship, defined as a percentage of the labour force involved in the opening or initial steps of a new business, varied from 18.7% in Thailand to just 1.8% in Japan (Reynolds, Bygrave and Autio, 2004, p.4). The same study revealed large disparities between the different regions of the world, with the highest business start-up rates recorded in Latin America and in the countries of developing Asia.

Spatial variation within each country is also considerable: for example, Reynolds, Storey and Westhead (1994) found that the highest business start-up rate the regions of the United States was 4.1 times the lowest rate. Johnson (2004) calculated business start-up rates in the different regions of the United Kingdom from 1994 to 2001, reporting the highest rate in the London region and the lowest in Northern Ireland. Using the United Kingdom municipal database, Ashcroft, Plotnikova and Ritchie (2007) concluded that business start-up rates vary across time and space. According to these authors, the cyclical nature of the business start-up rate reflects the country's macroeconomic fluctuations. Start-up rates also tend to vary between municipalities year by year, and the variations seem to be pro-cyclical. In other words, when the national economy improves generally, municipalities with high business start-up rates tend to outshine the rest of the country in terms of economic performance.

It is therefore unsurprising that empirical studies showing variations in business start-up rates and their repercussions on regional economic performance are given such attention. Many studies also report relations between business start-up and job creation (Hart and Oulton, 2001), innovation (Audretsch, 1999), economic growth (Schmitz, 1989) and the reduction of unemployment (Thurik, 1999). Public-policy makers wishing to improve a region's economic performance should look for effective ways to boost business start-up rates.

Although there are many studies internationally that relate business start-up with spatial issues and regional development (Reynolds, Storey and Westhead, 1994; Johnson, 2004; Van Stel, Carree and Thurik, 2005; Ashcroft, Plotnikova and Ritchie, 2007), a deeper analysis of this topic is still needed in the case of Brazil. The studies by Campos and Iootty (2005); Barros and Pereira (2008), and Canever and others (2010) are recent exceptions. The first of these uses the database of the Brazilian Geography and Statistical Institute (IBGE) to analyse factors that explain the birth and expiry of firms in Brazil. Among other findings, the authors provide empirical evidence of the relation between sector growth and net enterprise creation. Barros and Pereira (2008) analysed the influence of entrepreneurship on gross domestic product (GDP) and unemployment in the municipalities of Minas Gerais and found that a stronger entrepreneurial spirit leads to a reduction in unemployment, but does not necessarily improve economic performance in terms of local GDP growth. In contrast, Canever and others (2010) studied issues that underlie the business start-up rate in Rio Grande do Sul (RS) and the consequences this has on municipal performance, reporting positive relations between entrepreneurship and per capita GDP in subsequent years. A common feature of those three studies is their use of a measure of entrepreneurship. Campos and Iootty (2005) use the difference in the absolute number of firms in consecutive years as a measure of the entrepreneurial spirit. Barros and Pereira (2008) measure the entrepreneurial spirit through the proportion of own-account workers, while Canever and others (2010) use the difference in the number of firms per capita relative to the adult population of a municipality in consecutive years, as an indicator of business activity. Although these measures may be related to business start-up, strictly speaking they are indicators of the proportion of entrepreneurs in the total population and the growth of the business structure, rather than the creation of new enterprises as such.

The present study reformulates the entrepreneurship indicator, providing a conceptual and operational definition of the business start-up rate obtained from data published by the Ministry of Work and Employment in the Annual Social Information Report (RAIS), for the municipalities of the State of Rio Grande do Sul.

Given the importance of new enterprise creation for regional development, and the lack of studies examining this

relation in Brazil, the present article aims to: (i) determine whether business start-up rates in Rio Grande do Sul are homogeneous; (ii) determine whether business start-up rates in regions considered less dynamic are different than state-wide rates; and (iii) show how the business start-up rate affects development of the regions.
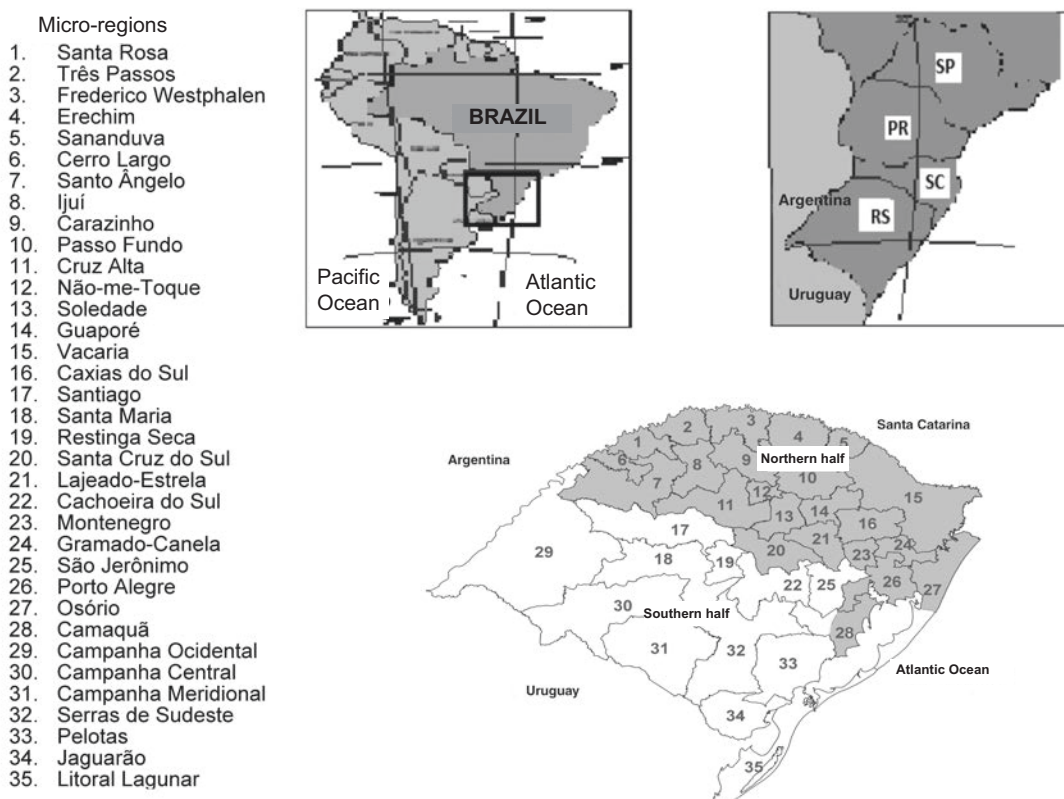
In development terms, the State of Rio Grande do Sul is divided into two distinct regions (see figure 1). The northern part, which encompasses about 80% of the state's municipalities and 50% of its land area, is considered more developed and more dynamic; and its average per capita GDP in 2008 was roughly R$20,000. In contrast, the southern portion, located on the border with Uruguay, is less dynamic and had a per capita GDP of R$15,000 in that year. These data describe a dual income-distribution dynamic in the state. Although many plausible reasons have been offered to explain this disparity, no study has analysed the business start-up rate and entrepreneurial spirit as potential causes. In this context, Rio Grande do Sul seems to be a special case for illustrating the relation between enterprise creation and economic growth — a topic that has been little explored in a developing-country context.

This article is divided into five sections, including this introduction. Section II considers the importance of the entrepreneurial spirit and new business creation for local development, and section III presents the data and describes the methodological procedures used. Section IV describes and analyses the results, and section V sets forth the conclusions.

FIGURE 1

Regions of Rio Grande do Sul

Micro-regions
1. Santa Rosa
2. Três Passos
3. Frederico Westphalen
4. Erechim
5. Sananduva
6. Cerro Largo
7. Santo Ângelo
8. Ijuí
9. Carazinho
10. Passo Fundo
11. Cruz Alta
12. Não-me-Toque
13. Soledade
14. Guaporé
15. Vacaria
16. Caxias do Sul
17. Santiago
18. Santa Maria
19. Restinga Seca
20. Santa Cruz do Sul
21. Lajeado-Estrela
22. Cachoeira do Sul
23. Montenegro
24. Gramado-Canela
25. São Jerônimo
26. Porto Alegre
27. Osório
28. Camaquã
29. Campanha Ocidental
30. Campanha Central
31. Campanha Meridional
32. Serras de Sudeste
33. Pelotas
34. Jaguarão
35. Litoral Lagunar

Source: prepared by the authors on the basis of http://pt.wikipedia.org/wiki/Rio Grande do Sul.

II

Development, entrepreneurial spirit and the business start-up rate

There is currently great interest in the inter-relationships that exist between entrepreneurship and economic development, and between entrepreneurship and social-human development — both at the academic level and among corporate leaders in the private sector and public-policy makers. Nonetheless, owing to conceptual and methodological shortcomings, few studies have researched the relations between these variables (exceptions include Wennekers and Thurik, 1999; Van Stel, Carree and Thurik, 2005). The entrepreneurial spirit and development are complex phenomena that are hard to measure; and their concepts can take on various meanings depending on the theoretical currents that sustain them. This means that constructing theories and tests is also a complex and difficult task.[1]

The relation between the entrepreneurial spirit and development was discovered many years ago, when the Austrian economist Joseph A. Schumpeter (1883-1950) formulated the theory of circular flows and explained the factors that constrain the economic development process. Development, in the sense proposed by the author, stems from innovative creation promoted by entrepreneurs.

Following Schumpeter's pioneering work (see Schumpeter, 1982), economic growth models evolved on the basis of the neoclassical production function, in which the factor of production was the key variable for solving the economic-growth problem. The forerunner of this line of work was Solow (1956), which proposed an economic growth model containing capital and labour as factors of production. Despite the advances proposed by Solow (1956), the Romer critique (1986) directed the attention of researchers in this area towards what he considered a shortcoming of the Solow model, namely knowledge. The contribution made by Romer (1986) elicited a vast range of studies that highlighted the role of investment in human capital, education and research and development (R&D) within so-called "endogenous growth theory".[2]

Despite the theoretical and empirical evolution of the new endogenous growth models, a new set of studies has recently emerged, including Garther and Carter (2003) and Audretsch (2007), which suggest a new variable omitted from Solow's pioneering model: the Schumpeterian entrepreneur. For those authors, the entrepreneurial spirit, understood as the capacity of economic agents to generate new enterprises, should be included in economic growth models, thereby explicitly recognizing a new form of capital: entrepreneurial capital.

Unlike the typical notion of the entrepreneurial spirit as an action, process or vocational activity, this line of research sees it as a reserve of capital (Hofsteder and others, 2002). The proposal does not deny the progress made in Solow's model, but enhances it by subdividing his "capital" variable into physical capital, human capital, and entrepreneurial capital. At the same time, this makes it possible to reconcile two major currents of economic-growth research, by contending that entrepreneurial capital allows for convergence between the romantic and naive entrepreneur of the Schumpeterian model and the scientific and rigid R&D model proposed by Romer (1990) and Grossman and Helpman (1991).

The production function, composed of its main determining factors, can be expressed through a typical Cobb-Douglas function:

$$Y_i = {}^\circ \; K_i^\beta \; L_i^\delta \; R_i^\phi \; E_i^\gamma \; e_i^\varepsilon$$

where K represents physical capital, L is the labour force, R stands for knowledge capital, E represents entrepreneurial capital, and i identifies different regions.

Here, the physical-capital variable characterizes a region's capacity to invest in creating a reserve of physical capital. The variable L corresponds to the labour force needed for the production function; and R represents the set of ideas that result from the research process, which are available to any interested person. Lastly, the entrepreneurial capital variable E captures the effect of the entrepreneurial agent who is capable of perceiving opportunities arising from a change in demand or supply. The exponents represent the marginal productivities of the respective variables, which in this study are assumed to be decreasing.

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[1] For an analysis of the debate over the entrepreneurial-spirit concept, see Herbert and Link (1989); Thorton and Flynne (2003), and OECD (1998).

[2] On endogenous growth models, see Romer (1990); Grossman and Helpman (1991) and Aghion and Howitt (1998).

By highlighting entrepreneurial capital, this approach makes up for a common shortcoming in this type of study, by assigning entrepreneurship an explicit role in the economic growth process. In other words, *ceteris paribus*, the existence of agents who are relatively more inclined to assume the risks inherent to new businesses allows for better utilization of existing physical capital, labour and knowledge; and this leads to more efficient resource allocation and promotes economic growth.

Consequently, the birth of new firms (entrepreneurial capital) is formally related to economic growth through at least three different channels (Audretsch, 2007). The first is the role of entrepreneurial capital as a mechanism for disseminating the knowledge generated by R&D models. Although Romer (1990), Lucas (1988) and Grossman and Helpman (1991) stress the importance of knowledge spillovers as a key variable in endogenous growth models, they have little to say about the mechanism through which knowledge is disseminated throughout society. While it is true that an innovation system consists of R&D, it also seems that dissemination of the knowledge generated by investment in research requires entrepreneurial capital to form the bridge between invention and innovation. In other words, while in Schumpeter's 1912 model (Schumpeter, 1982) the innovating entrepreneur is responsible for breaking the circular flow of income, in the endogenous growth model it is entrepreneurial capital that is responsible for disseminating information.[3]

The second channel linking entrepreneurial capital to economic growth corresponds to the competition effect. The creation of a larger number of firms increases a region's entrepreneurial capital and, at the same time,

boosts competition. In microeconomic models (Varian, 1992), and also in the Porter (1991) model, knowledge is more widely disseminated in competitive market structures than in monopolies. This theory is supported by empirical evidence published in studies by Feldmann and Audretsch (1999) and Glaeser and others (1992), which found a positive relation between economic growth and an increase in competition, measured by the number of firms in a city.

The third and last channel is based on the classification effect. The presence of greater entrepreneurial capital affects economic growth not only through the larger number of firms, but also through a wider diversification of enterprises in a given region. The pioneering analysis of the economy of cities by Jacobs (1969) found that the complementarity of knowledge and information held by different firms within a geographic region generates a positive externality and increases the return on investments, innovative activity and economic growth.

In the Brazilian case, studies of the relation between development and the entrepreneurial spirit are mainly descriptive analyses of productive clusters or technological hubs existing in the different regions.[4] Although those studies outline the economic and social profile of various regions that have specific industrial productive clusters with local development potential, they do not analyse entrepreneurial capital *per se*, but the innovative actions needed for the region to develop. In the case of Rio Grande do Sul, the debate on the spatial dynamics of the income distribution allows for a more detailed analysis of the distribution of the business start-up rate (entrepreneurial capital) and its relation to economic growth.[5]

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[3]   Under this approach, important research with great market potential in the biotechnology area will remain no more than a research report until a firm emerges that is willing to disseminate the new knowledge.

[4]   See, for example, the studies by Haddad (1999); Castilhos (2002); Lastres, Cassiolato and Maciel (2003); Cassiolato and Szapiro (2000); Cassiolato, Lastres and Szapiro (2000), among others.
[5]   See Porsse, Rosa and Porto (2008).

III

Data and methodological procedures

1.   Data

To estimate enterprise creation rates, this study uses the number of local units (firms) according to the activity classification sections proposed in the RAIS, published by the Ministry of Work and Employment for each city (municipality) and micro-region of the state of Rio Grande do Sul. The data cover all of the state's 496 municipalities for the period 1995-2008. To be

able to use the database to calculate the new enterprise creation rate, new firms (parent companies) were first separated from already existing ones (subsidiaries). The birth (opening) of a new firm is identified by its presence for the first time in the RAIS database. Thus a firm that did not appear in the RAIS in year *t-1* but does appear in year *t* is considered to have been born in *t*, since that was the year of its first appearance in the database.

Only firms appearing in the database in consecutive years were counted, which means that firms that appeared in the database in a given year, but disappeared the following year only to reappear in the next year, were not considered. Enterprises that were born in a given year, disappeared for a longer period ($t+2$, for example) and reappeared in later periods were also filtered out. This procedure meant that the rates relating to the last year of the series (2008) were not estimated, because it was impossible to use the filter as described. This procedure was also adopted by Souza and others (2007) to purge the database for calculating business start-up rates, which otherwise would be biased. In fact, these firms are believed to remain active although they do not contribute data. Although the enterprise population was reduced by about 1% per year by the aforementioned exclusions, this does not compromise the validity of the results since the sample includes over 100,000 enterprises each year.

To facilitate the analysis, data were compiled from the 21 economic sectors defined by the RAIS in three traditional economic sectors, namely:

(i)   Agriculture – includes firms operating in the crop-farming, livestock, forestry production, fishing and aquaculture sectors.

(ii)   Industry – encompasses firms from the extractive industry, manufacturing industry and civil construction.

(iii)   Commerce and services – covers electricity and gas companies; water, sewerage, waste management and pollution abatement activities; commerce, automobile and motorcycle repair; transport, storage and postal services; accommodation and food; information and communication; financial activities, insurance and related services; real-estate activities; professional, scientific and technical activities; administrative activities and complementary services; public administration, defence and social security; education, human health and social services; arts, culture, sport and recreation; other service activities; domestic services, international organizations and other institutions outside the country.

2. Methodological procedures

The business start-up rate can be measured in various ways. Considering economic sector i in region r, the business start-up rate in that sector can be defined as follows:

$$Fir = \frac{NEtir - NEtir - 1}{NEtir - 1}$$

where: NE = number of firms from sector i in region r; and t represents the year in question.

The denominator of the business start-up rate as defined above is the number of companies existing in the year prior to that being estimated. This procedure is particularly important for analysing the renewal of the enterprise base, since the resultant rate measures the proportion of enterprises that represents the new business fabric. In general, this business start-up indicator is expressed in relation to 100 pre-existing firms; and, according to Johnson (2004), this method is known as the "ecological approach". An alternative measure — defined as the enterprise creation rate in relation to the labour force, or the "labour-market" approach, proposed by Armington and Acs (2002) — uses the population (or labour force) as denominator. The business start-up rate in relation to the labour force is more appropriate for gauging the entrepreneurial spirit of the local population, in other words finding the proportion of inhabitants who are involved in creating a new business. This alternative specification for the business start-up rate in region r aggregated across all sectors, and denoted here as Fir^*, can be therefore be defined as:

$$\frac{\sum_{i=1}^{n} NEtir - \sum_{i=1}^{n} NEtir - 1}{\sum_{i=1}^{n} Pr}$$

where Pr is a measure of the population or labour force in region r. Obviously the calculation of the business start-up rate for a given sector only uses the labour force employed in that sector. This indicator is expressed per 1,000 employees in the region, such that an $Fir^* = 10$ means that 10 new firms were formed for every 1,000 workers in the region.

Lastly, the empirical test of the business start-up rate in relation to economic growth was estimated from the following model:

$$\tilde{PI}\ B = c + PIB_{i,t} + PIBPC_{i,t} + TM_{i,t} + TX_{i,t} + \varepsilon_{i,t}$$

where i identifies the municipality and ΔPIB represents the variation in municipal GDP. The fact that municipal GDP data were not available for all years of the series made it impossible to use panel data; so it was decided to test the aforementioned model with cross-section data relating to certain years. The model therefore indicates whether the business start-up rate $TX_{i,t}$ between 2002 and 2005 has repercussions on average municipal GDP growth between 2005 and 2007. The control variables $PIB_{i,t}$ and $PIBPC_{i,t}$ represent GDP and per capita GDP in 2001; and $TM_{i,t}$ is the average firm size in each municipality from 2002 to 2005.

IV

Results and discussion

Table 1 shows the two business start-up rates for each of the micro-regions of Rio Grande do Sul. The two measures produce different regional rankings and are poorly correlated (r = 0.08). This result does not agree with those reported for the United States (Armington and Acs, 2002) or the United Kingdom (Johnson, 2004). Surprisingly, both measures show a high business start-up rates in certain micro-regions that are not among the most developed in the state, including Soledade, Frederico Westphalen, Osorio and Cerro Largo. In contrast, other micro-regions, such as Caxias do Sul, Porto Alegre and Santa Cruz do Sul, display low business start-up rates despite being among the most developed in the state. Clearly, the two measures have different policy repercussions. For example, if the goal of the Caxias do Sul micro-region in 2007 had been to attain the state-wide business start-up rate, 225 new firms would need to have been created according to the ecological approach *(Fir)*, but 505 according to the alternative labour-market *(Fir*)* measure.

TABLE 1

Rio Grande do Sul: business start-up rates, alternative specifications, 1996-2007

| Micro-region	*Fir* (percentages)	*Fir** (percentages)	Average No. of firms (units)	Per capita GDP 2005 (R$ thousand)
Cachoeira do Sul	13.4	13.4	2 159.8	7.9
Camaqua	14.3	12.8	1 441.7	8.8
Campanha Central	12.8	15.6	3 134.2	6.7
Campanha Meridional	12.8	13.9	2 710.7	8.5
Campanha Ocidental	13.5	13.4	5 280.0	9.1
Carazinho	14.2	13.0	2 560.1	9.4
Caxias do Sul	14.1	8.7	15 003.0	19.5
Cerro Largo	16.0	20.5	913.0	8.5
Cruz Alta	14.0	16.2	2 436.5	9.9
Erechim	14.3	10.3	3 222.6	11.3
Frederico Westphalen	17.1	20.7	1 992.8	7.4
Gramado-Canela	16.7	8.7	5 379.2	11.3
Guapore	15.9	12.0	2 214.4	16.5
Ijui	14.6	12.8	2 954.2	11.3
Jaguarao	13.7	16.5	947.7	7.0
Lajeado-Estrela	15.7	9.6	5 234.5	14.4
Litoral Lagunar	15.6	10.1	2 956.5	12.0
Montenegro	15.6	8.6	2 951.2	14.3
Nao-me-Toque	13.5	14.4	882.7	13.4
Osorio	19.0	17.5	5 112.7	8.1
Passo Fundo	15.6	12.5	5 584.4	13.4
Pelotas	14.2	10.4	6 083.0	7.5
Porto Alegre	15.4	7.2	53 237.9	16.1
Restinga Seca	13.6	16.4	896.6	8.5
Sananduva	14.8	18.8	757.2	8.4
Santa Cruz do Sul	15.1	8.4	4 143.1	16.7
Santa Maria	15.1	13.4	5 517.2	8.5
Santa Rosa	14.8	14.0	2 438.2	10.2
Santiago	14.3	16.9	1 018.0	8.0
Santo Angelo	14.4	15.7	2 874.1	7.8
Sao Jeronimo	16.3	9.7	1 429.2	45.2
Serras de Sudeste	14.9	13.6	1 441.6	8.3
Soledade	17.2	19.5	791.5	6.6
Tres Passos	16.2	15.1	1 935.6	11.0
Vacaria	15.4	9.1	2 719.1	9.7
Average	15.1	9.5	160 995.7	13.3

Source: prepared by the authors on the basis of the Annual Social Information Report (RAIS).

Graphically, it can be seen that the state is concentrated in Porto Alegre and Caxias do Sul. Nonetheless, this concentration is tending to decline, in particular because these micro-regions have relatively lower business start-up rates. Moreover, rapid growth in previously undynamic regions means these are starting to gain importance in the state, thereby consolidating a convergence process in the Rio Grande do Sul business structure.

The data show that business start-up rates vary considerably between sectors. Table 2 presents the *Fir* and *Fir** rates for the 16 sectors analysed. Here again, the figures vary according to the measures used, but there is a closer correlation between the two indices at the sector level than at the micro-regional level (r = 0.45). Both indices report the lowest business start-up rates in the public administration, defence and social security sector, followed by the electricity and gas sector. The highest rates are found in the sectors of commerce and vehicle repair, international organizations and other institutions outside the country, and food and accommodation.

FIGURE 2
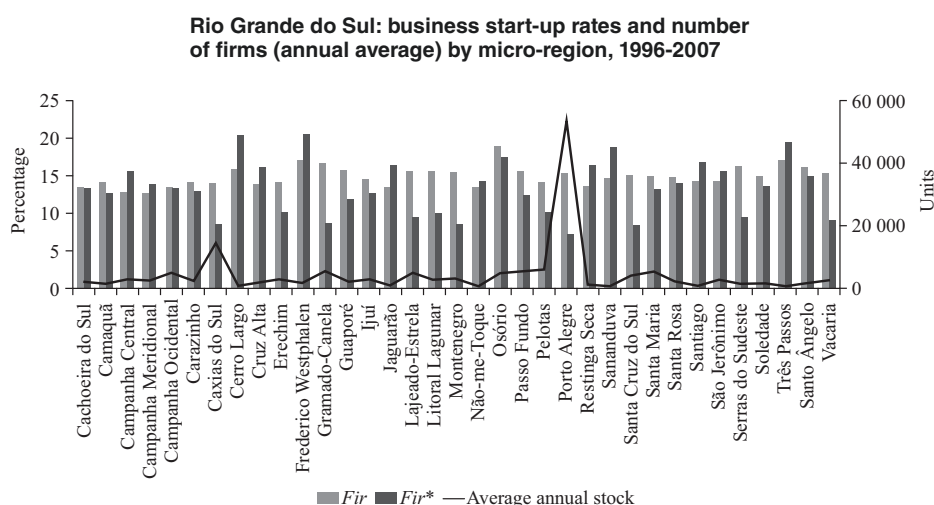
Rio Grande do Sul: business start-up rates and number of firms (annual average) by micro-region, 1996-2007

Source: prepared by the authors on the basis of the Annual Social Information Report (RAIS).

TABLE 2

Rio Grande do Sul: business start-up rates by sector, 1996-2007
(Percentages)

Sectors	*Fir*	*Fir**
Crop farming livestock breeding forestry production, fishing and aquaculture	11.1	16.0
Manufacturing industry	13.3	4.0
Electricity and gas	8.0	2.3
Water, sewerage, waste management and pollution abatement activities	12.0	5.4
Commerce; automobile and motorcycle repair services	47.0	25.3
Transport, storage and postal services	14.2	18.2
Food and accommodation	18.3	18.5
Information and communication	13.9	8.6
Financial activities, insurance and related services	10.2	5.2
Professional, scientific and technical activities	12.4	10.7
Administrative activities and confirmatory services	21.4	5.8
Public administration, defence and social security	4.3	0.1
Education	10.0	17.3
Human health and social services	18.6	2.7
Arts, culture, sport and recreation	9.9	9.4
International organizations and other institutions outside the country	18.0	42.6
Total	*15.1*	*9.5*

Source: prepared by the authors on the basis of the Annual Social Information Report (RAIS).
Note: Extractive industries, civil construction, real estate activities, other service activities and domestic services are not included as separate categories because they only appear in the RAIS from 2006 onwards.

As noted above, business start-up rates are not homogeneous across micro-regions or between sectors; and they are potentially higher (lower) in areas with a larger (smaller) proportion of sectors with high business start-up rates, respectively. The regional variation in the location of sectors with different business start-up rates might reflect differences in regional competitive advantages; but, as noted by Johnson (2005), alternative explanations are possible, such as path dependency, the availability of opportunities and how opportunities are perceived, and the supply of potential entrepreneurs.

Comparing business start-up rates in regions considered less dynamic with those for the state as a whole reveals considerable heterogeneity (see table 3). Nonetheless, the relation between economic dynamism and the business start-up rate can be discerned. For example, in the case of micro-regions located in what is conventionally referred to as the "southern half" of the state, the business start-up rate in relation to total enterprises (*Fir*) is just 94% of that recorded for the state as a whole. On the other hand, the business start-up rate in relation to the labour force (*Fir**) is 32% above the state average, which suggests that workers in the southern half of the state are more entrepreneurially minded than their peers in the northern half. Consequently, while there is greater renewal of the entrepreneurial base in the northern half of the state, there is also a lower index of enterprise creation per worker; with exactly the opposite situation prevailing in the southern half.

TABLE 3

Rio Grande do Sul: sector and total business start-up rates in each micro-region, in relation to the state average, 1996-2008
(Percentages)

Part of the state	Micro-regions	*Fir*				*Fir**			
		Agriculture	Industry	Commerce	Total	Agriculture	Industry	Commerce	Total
Northern half	Camaquã	1.03	0.92	0.99	0.95	1.04	1.55	1.27	1.34
	Carazinho	0.62	1.00	1.04	0.94	0.73	1.57	1.34	1.37
	Caxias do Sul	1.69	0.83	0.92	0.93	1.48	0.94	1.03	0.91
	Cerro Largo	1.12	0.91	1.07	1.06	2.35	3.15	1.88	2.15
	Cruz Alta	0.73	0.90	1.04	0.93	1.22	2.32	1.49	1.71
	Erechim	1.06	0.95	0.94	0.95	1.72	1.11	1.09	1.08
	Frederico Westphalen	1.16	1.22	1.10	1.13	2.28	4.04	1.87	2.17
	Gramado-Canela	1.56	1.22	1.06	1.11	2.41	0.93	1.37	0.92
	Guapore	1.59	0.98	1.05	1.05	1.60	1.40	1.50	1.26
	Ijui	0.80	0.87	1.01	0.97	1.04	1.23	1.35	1.34
	Lajeado-Estrela	1.23	1.01	1.03	1.04	0.92	0.69	1.46	1.00
	Montenegro	1.45	1.00	1.01	1.03	1.49	0.70	1.29	0.91
	Nao-me-Toque	0.67	0.81	1.02	0.89	1.20	1.08	1.63	1.51
	Osorio	1.12	1.32	1.24	1.26	1.25	2.07	1.73	1.84
	Passo Fundo	0.93	0.99	1.04	1.03	1.38	1.13	1.34	1.31
	Porto Alegre	1.18	1.08	0.98	1.02	1.19	0.92	0.72	0.75
	Sananduva	0.93	0.95	1.01	0.98	2.16	2.88	1.73	1.98
	Santa Cruz do Sul	1.00	0.93	0.99	1.00	0.86	0.54	1.19	0.89
	Santa Rosa	0.94	0.99	0.98	0.98	1.54	1.73	1.38	1.47
	Santo Angelo	0.90	1.02	1.00	0.95	2.00	1.99	1.37	1.65
	Soledade	0.99	1.31	1.16	1.14	1.49	4.26	1.74	2.05
	Tres Passos	1.05	1.05	1.07	1.07	2.01	1.51	1.54	1.58
	Vacaria	1.34	0.88	1.03	1.02	0.28	1.63	1.51	0.96
	Total North	**1.08**	**1.02**	**1.00**	**1.02**	**0.93**	**0.99**	**0.96**	**0.94**
Southern half	Santiago	0.85	0.95	1.09	0.95	1.45	1.61	1.54	1.77
	Santa Maria	0.94	0.86	1.02	1.00	2.12	1.53	1.19	1.40
	Restinga Seca	0.79	0.76	1.01	0.90	2.49	1.78	1.56	1.72
	Cachoeira do Sul	0.85	0.78	0.98	0.89	1.41	1.50	1.26	1.40
	Sao Jeronimo	1.25	1.28	1.05	1.08	0.69	0.81	1.15	1.02
	Campanha Central	0.77	0.84	0.95	0.85	1.06	1.93	1.43	1.64
	Campanha Meridional	0.91	0.89	0.92	0.85	1.27	1.52	1.17	1.46
	Campanha Ocidental	0.93	0.90	0.96	0.89	1.01	1.32	1.21	1.41
	Serras de Sudeste	1.18	0.99	1.02	0.98	1.11	0.85	1.43	1.43
	Pelotas	0.97	0.80	0.95	0.94	1.06	0.88	1.07	1.09
	Jaguarao	0.99	1.05	0.97	0.90	0.98	4.31	1.51	1.73
	Litoral Lagunar	1.02	0.99	1.03	1.03	0.52	0.72	1.07	1.06
	Total South	**0.93**	**0.88**	**0.99**	**0.94**	**1.10**	**1.13**	**1.20**	**1.32**
General total		*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*

Source: prepared by the authors on the basis of the Annual Social Information Report (RAIS).

Figure 3 shows business start-up rates for the northern and southern halves of the State of Rio Grande do Sul for the period 1996-2007. The paths of the *Fir* and *Fir** are similar in the two geographic units, trending slightly downwards over the period. Although residents in the southern half of the state are on average less entrepreneurial than workers across the state as a whole, table 3 shows that this disparity as diminishing through time, such that in 2007 the *Fir* rates are practically equal in the two regions. In the case of the *Fir** rate, there is some stability in the southern half of the state, while the north shows a small but steady reduction. These results suggest that the lower level of economic development in the southern half of the state is not related to the recent entrepreneurial impulse among local workers, but instead reflects a poorly developed business base. This suggests that the rate of enterprise creation relative to existing firms in the southern half of the state needs to be accelerated, to attain the development level of the rest of the state. Nonetheless, this is merely one hypothesis that warrants deeper analysis, because the effect could also be in the opposite direction. In other words, a high level of business renewal in a given region could indicate that the region does not yet have consolidated industries and sectors, and its competitive advantages are still poorly defined, resulting in slower economic growth.

The effect of enterprise creation on the growth of economic activity has been one of the main justifications for projects investigating the entrepreneurial spirit. Table 4 shows while the assumed effect does in fact exist, it is neither simple nor constant. As last two columns of table 4 show, the business start-up rate is initially negatively related to municipal economic growth (measured by GDP growth between 2005 and 2007). But, this relation is not significant, which means that high business start-up rates are not effective in promoting development in the short run; and only after a certain time will entrant enterprises be able to affect regional economic performance through the satisfactory introduction of new solutions, methods, processes and products. The negative relation may also point to lower productivity in the regional economy in the short run, owing to poor allocation of resources in new and, as yet, inefficient firms that are highly likely to close down.

On the other hand, the results also show that the effect becomes positive and significant as years pass, with an increase in the business start-up rate in a given year (n for example) being positively associated with GDP growth in n+1. The maximum effect is felt one year after the increase in the business start-up rate — *Fir** — fading thereafter. The peak occurs later in the case of the *Fir* rate, which remains positive and significant until the fourth and fifth years after the increase in the start-up rate.

FIGURE 3

Rio Grande do Sul: business start-up rates in the northern and southern halves of the state, 1996-2007
(Percentages)
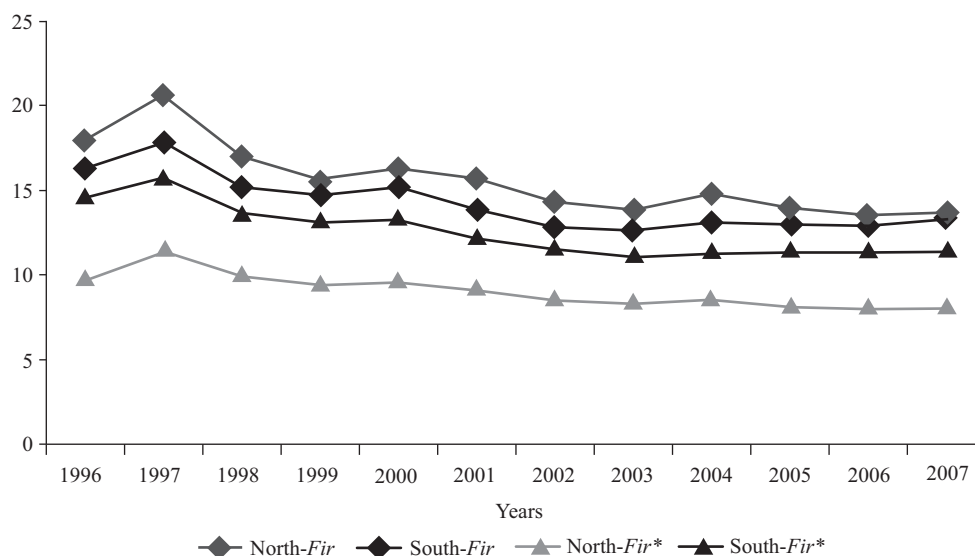
Source: prepared by the authors on the basis of the Annual Social Information Report (RAIS).).

TABLE 4

**Rio Grande do Sul: effect of enterprise creation
on average municipal GDP growth, 2005-2007**
(Regression coefficients obtained from equation 4)

Variables	2002		2003		2004		2005	
	Fir	*Fir**	*Fir*	*Fir**	*Fir*	*Fir**	*Fir*	*Fir**
Municipal GDP 2001	-.419*** (-9.00)	-.416*** (-9.01)	-.423*** (-9.06)	-.427*** (-9.31)	-.430*** (-9.39)	-.415*** (-9.09)	-.422*** (-9.25)	-.422*** (-9.26)
Per capita GDP 2001	.240*** (5.21)	.236*** (5.14)	.235*** (5.07)	.240*** (5.20)	.242*** (5.24)	.242*** (5.29)	.250*** (5.41)	.250*** (5.43)
Average size	-.177*** (-4.23)	-.110** (-2.43)	-.147*** (-3.52)	-.084* (.-1.84)	-.182*** (-4.33)	-.097** (-2.03)	-.220*** (-5.12)	-.228*** (-4.70)
Start-up rate	.090** (2.13)	.127** (2.76)	.078* (1.85)	.131** (2.85)	.046 (1.11)	.155*** (3.24)	-.006 (-.13)	-.013 (-.27)
No. of observations	494	494	494	494	494	494	494	494
Adjusted R²	.18	.18	.17	.18	.18	.19	.19	.19
F-test	28.62	29.57	26.99	28.42	28.35	31.19	31.06	31.07

Source: prepared by the authors on the basis of the Brazilian Geography and Statistical Institute (IBGE).
Note 1 – Beta coefficients, t-statistics in parentheses; *<.10 **<.05 ***<.001.

The effect of the business start-up rate on economic performance may therefore not be constant through time. Audretsch and Fritsch (2002) found similar results to those of this study, while also evoking the market-reaction stages proposed by Carree and Thurik (2006), who recognize that profits decline in the years directly following the entry of new firms. This is explained by the high rate at which the new firms disappear and pre-existing firms are replaced. After the first year of operations, the economy becomes more competitive thanks to improvements in production processes and products, and this enhances economic performance. In this period, the surviving firms start to make a real contribution to economic and social growth.

V

Final thoughts

This article has analysed the dynamic of new enterprise creation in Rio Grande do Sul, measured as the business start-up rate relative to the number of pre-existing firms and in relation to the labour force in each economic sector. The breakdown of the new business start-up rate as presented here could help to identify the source of the differences between a specific region and the rest of the state. For example, analyses for the southern half of the state showed that while there are differences in terms of development level, these are linked to a backlog in capacity to renew the entrepreneurial base compared to the situation in state as a whole. Moreover, the business start-up rate per 1,000 persons employed in the southern half of Rio Grande do Sul is higher than the average for the state as a whole, thereby potentially leading to convergence between the regions. Clearly, a direct consequence of this result is that the analysis of municipal income growth, particularly with respect to the convergence process, will be more robust if it takes account of the business start-up phenomenon between the different regions of the state.

While business start-up rates are not homogeneous regionally, they also vary at the sector level. This suggests that regional differences may not depend exclusively on differences between the regions in enterprise creation within a given sector, but on differences in the sector structure between regions. In other words, a region's sector structure could be more or less favourable for starting up new businesses. Nonetheless, as this study did not make a breakdown of the effect of the sector structure on the business start-up rate, it is impossible to claim that differences between one region and another depend

more on the business start-up rate in a given sector, or on differences in the sector structure between regions. Clearly, this is a topic for future research.

Although much remains to be analysed in terms of the importance of the entrepreneurial spirit and particularly new business creation for regional progress, this study provides an initial framework, given the scarcity of studies on the subject in Brazil. Deeper analysis in this area would clearly be very useful for understanding regional differences and for policy making.

In terms of the latter, the fact that the business start-up rate is related to wealth creation (as shown in table 4) shows that policies to improve the entrepreneurial drive and the quality of the entrepreneurial spirit could have significant effects on regional development. Although this relation needs to be controlled through other variables in future studies, to rule out spurious correlations, the authors believe this study is the first to empirically demonstrate the relation between the business start-up rate and performance variables such as GDP in Brazil.

Although shortcomings in the data and in the level of aggregation of the sectors need to be acknowledged, this study will benefit from future research to better understand regional differences in specific sectors. It will also be necessary to analyse regional differences in the quality of new business start-ups, mainly in terms of enterprise survival and growth.

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The health insurance market: lessons on the conflict between equivalence and solidarity

Andras Uthoff, José Miguel Sánchez and Rolando Campusano

ABSTRACT

Health-care systems are highly diverse, sometimes even sharing few basic aspects of design. In developing countries, demographic profiles, poverty, the labour market and public finances are such that a comprehensive approach to solidarity —combining contributory and non-contributory mechanisms— is essential. In 1981, Chile redesigned the contributory component of its system by means of private health-insurance companies. The rationale of private, individual insurance runs counter to the ethical imperatives of contracts based on social rights. In Europe, this dilemma has been tackled using risk-levelling mechanisms that resolve the conflict between accessibility, efficiency and selection. In Chile, competitive health insurance companies (Isapres) coexist with a solidarity-based State alternative, the National Health Fund (FONASA). The Isapres engage in aggressive risk selection. The challenge for health policy is to integrate the two systems to balance the principles of equivalence and solidarity.

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I

Introduction

A large body of literature exists analysing the conditions under which individual insurance schemes are useful for financing public health systems. The research explores why health insurance markets —in which subscribers are free to choose between insurance companies— generate heavy incentives not only for efficiency, but also for risk classification, segmentation and selection, which runs counter to the normative framework of social protection as it refers to health. Given that universal access is one of the main objectives of social insurance schemes, whereas markets for individual insurance impose a variety of selection processes, the basic question arises: Can high-risk individuals be assured of accessible coverage in an individual health insurance market?

The problem is that competitive markets tend to seek "equivalence" between the premium and the costs each contract is expected to generate. They are, therefore, poorly placed to provide "solidarity" by offsetting the probable losses arising from contracts with high-risk individuals with the profits presumed to flow from contracts with low-risk individuals, precisely because competition minimizes foreseeable profits.

Insurance companies make use of a variety of selection mechanisms:
- Risk classification: adjusting the insurance premium for each plan to individual risk.
- Risk segmentation: adjusting the insurance plan (i.e. benefit coverage and design) to attract different risk groups to each plan and charge a premium accordingly.
- Risk selection: adjusting subscribers' risk to the premium set for a given health plan.

Steps were taken in the third generation of reforms to Latin America's health systems to combat these effects, including explicit guarantees in Chile, the model of the Single Health System (SUS) in Brazil, the creation of the National Integrated Health System in Uruguay, and regulated competition in Colombia. These were all efforts to work towards universal access through a mix of contributory and non-contributory funding, aiming to extend health services to the entire population through solidarity from rich to poor, from young to elderly, from the healthy to the sick.

In its publication *Shaping the Future of Social Protection: Access, Financing and Solidarity,* the Economic Commission for Latin America and the Caribbean (ECLAC, 2006) identifies three types of interaction between public financing and social security contributions (see table 1):

Type 1: integrated system based on non-contributory financing.
Type 2A: integrated system which retains contributory financing and a single level of coverage delivered via social security.
Type 2B: integrated system with coverage differentiated between contributory and non-contributory financing.
Type 3: systems with little or no integration.

Chile uses a modality of articulation between the public and social-security systems, which may be construed as dual and partial. Its key feature is segmentation, inasmuch as mandatory health contributions can be paid to either of two health insurance systems that operate in parallel but have very different rationales. Contributors must choose between the National Health Fund (FONASA), a public health insurance scheme, and private health-insurance policies offered by companies called Isapres, which operate within the social security domain.

The funding of the public system and social security are articulated in the framework of FONASA, which is financed from the contributions paid by affiliates, supplemented from general tax revenues (in the case of individuals who are unable to contribute). Insofar as the system is financed in this combined manner and individuals may access benefits independently of their contributions, FONASA provides risk and income solidarity. However, the duality of the system and the individual nature of insurance in Isapres create obstacles to full integration of financing and to greater equity. Higher-income individuals tend to enrol in the Isapre system, especially at the stage of the life in which health

TABLE 1

Latin America and the Caribbean: combinations of public funding and social security contributions in the health sector

Type 1 Financing: general revenues, integrated systems based on non-contributory financing	Type 2 Financing: integration of general revenues and social security contributions	Type 3 Financing: little or no integration of general revenues and social security contributions
Services are structurally varied between public and private providers	In all cases there is some degree of explicit separation between financing and service delivery functions. The level of integration of financing also varies	The structure of public services is heterogeneous, and different types of relationship exist between the public and private sectors
Public and private service provision: Bahamas, Barbados, Belize, Brazil, Dominica, Grenada, Guyana, Haiti,[a] Jamaica, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Venezuela (Bolivarian Republic of) [b] Service provision through the public system only: Cuba	**Type 2A:** Integrated, maintaining contributory financing and uniform set of services delivered via social security: Costa Rica **Type 2B:** Integrated with coverage differentiated by contributory status: Antigua and Barbuda,[c] Colombia, Dominican Republic[c] **Type 2C:** Dual model with partial integration: Chile	Argentina, Bolivia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Note: In all countries, except Cuba, there is also a private subsector that provides health services.

[a] In Haiti there is practically no social security, and the provision and financing of health services are undertaken basically by the public sector and non-governmental organizations (NGOs).

[b] The reforms of the last few years have elicited greater participation and coverage in the public system.

[c] Both Antigua and Barbuda and the Dominican Republic are in a transition period, implementing health reforms aimed at greater integration of financing.

risks are relatively low; accordingly, they pay high contributions and carry low risk, but do not participate in contributory solidarity.

This paper examines this dilemma with reference to Chile, as a case of individual insurance schemes in the context of Latin America. The work is organized as follows: Section II discusses the implications of risk selection for well-being, section III draws lessons from the European experience and section IV looks at the implications for Chile. Section V concludes.

II

Conceptual considerations on health-care equity

1. Equity-driven interventions in the health-care market[1]

Equity in health-care provision has to do with notions of social justice. As applied to health, economic theory distinguishes two forms of equity: horizontal and vertical. Horizontal equity as it refers to health is equal treatment for people with equal needs.[2] The idea of vertical equity is that individuals of different types should be treated differently.[3]

Looked at in this manner, there are three arguments for intervening in the health-care market. First, to distribute information and power and ensure horizontal equity, thereby endowing affiliates in the system with perfect information and equal power to take decisions and access the various health plans the system has to offer. But access to information is costly and the ability

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[1] Adapted from Barr (2003).

[2] This means that people with the same clinical needs should receive the same clinical treatment; equal access for equal needs; equal resources used for equal expected health outcomes; equal funds per capita for equal needs.

[3] In taxation terms, this means that individuals with greater resources should pay more tax (or larger contributions to the health system) than the poor, thereby generating solidary redistribution from rich to poor.

to understand rights is unequal: this systematically disadvantages poorer socioeconomic groups and ultimately restricts their options. The solutions include regulation to ensure minimum standards,[4] price subsidies (for prescriptions, for example), income subsidies (monetary transfers) and, in extreme cases, State assignation or production, or both.

Second, to include consumption externalities, to make the rich pay higher premiums than the poor to consume the same quantity (or plan).[5] This may be rationalized in terms of concern for the needs of others, whether for reasons of national efficiency[6] or altruism.[7]

The third argument is that health care is a public good and as such should be exempted from economic calculations and provided outside the market. There are ethical and philosophical reasons that justify a morally superior method of distribution. But health care is also an economic good, which includes rivalries (the time a doctor devotes to one patient is time denied to another) and exclusivity (health care competes for resources with other possible allocations), which makes it a private good. So, although health care is a morally superior good, serious allocation problems arise if it is left to a market of pure competition governed by the forces of supply and demand with no intervention by some kind of authority. In this case, intervention is necessary to ensure the good's provision.

These notions give rise to several roles for the State. The first is that health care should be treated as a merit good to be distributed among the population in accordance with certain equity criteria and access should depend on need. Hence the importance that resources should be distributed by the State (either by setting down minimum health-care standards for the most vulnerable, or by limiting the current inequities in access to health care).

The second role for the State is to close information gaps with regulatory policies to shed light on complex biological processes, accredit professionals and services,

make health insurance plans transparent and avoid adverse selection.

A third role for the State is to invest directly or indirectly in health and health-care infrastructure (public drainage, hospitals and health posts, etc.) and in training health professionals. The complexity of these investments and the advanced knowledge and technology they require make them public goods which should be provided or subsidized by the State.

Lastly, a fourth role is lies in the regulation and tax treatment of goods generated by health status externalities, whether positive (physical activity, clean environment, and so forth) or negative (tobacco addiction, sedentary lifestyle, obesity, among others).

2. The scheme of health-care financing is not equity-neutral

The way the financing structure of the health-care system is designed imposes major limitations on social justice. Financing structure is usually designed around three alternatives: (i) production and allocation by the market (with or without insurance); (ii) intermediate strategies, and (iii) production and allocation by the State.

(a) *Provision by the market only, without insurance*

If health-care provision is treated as an economic good and delivered in market of pure competition, without insurance, then consumption will be limited by price. The equilibrium quantity may exceed (uncompetitive supply-side behaviour) or undershoot the optimum level (unincorporated externalities, uncompetitive supply-side behaviour, or both). The outcome will be inefficient allocation of total resources (macro-inefficiency) and of the volume and placement of benefits among the alternatives (micro-inefficiency). As well as inefficient, the system will be unequal, since health care will be determined by income distribution, and these inequalities will be greater where knowledge and power are correlated with income (the poor are the most disadvantaged), and in the presence of a perfect capital market and the absence of insurance. The end result will be underconsumption of the health-care "good", especially by the poorest and most at-risk.

(b) *Provision by the market only, with insurance*

Those on the demand side of the health-care equation face uncertainty, because as patients they do not know how much health care they will need or when they will need it. Neither do they know the outcome probabilities for different treatments or the relative efficiency of the

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[4] Of the professional qualifications of nurses and doctors, and of medicines, treatments and medical facilities, in both public and private sectors, in order to ensure that horizontal equity is satisfied.

[5] Or to ensure that if the rich consume twice as much as the poor, they also pay twice as high a contribution.

[6] Given that access to health services improves the quality of the workforce, labour productivity and economic growth, and that meeting the health-care needs of the most vulnerable averts social discontent.

[7] That is, the distribution of health care per se, in which health care is transferred to the poor in kind. Thus they are acknowledged as rights-bearing citizens, whereas targeted monetary transfers are perceived in terms of welfarism and poverty stigmatization.

various health-care providers. One solution is to enter the health-insurance market. Where insurance pays all medical bills, consumption is not limited by price and is determined by the supplier. The uncertainty of the patient demand curve thus becomes less important.

But insurance markets can have a perverse impact on health-care market outcomes:[8] moral hazard exists wherever the doctor has no supply-side incentives to ration demand. There will be a tendency towards overconsumption of benefits, because payment by a third party (the insurer) generates incentives towards waste and overuse. "Social inequity" exists with insurance, too, because some individuals are unable to buy an insurance scheme: the poor, the elderly and the chronically ill and others who, without being any of these things, simply cannot afford premiums driven up to inaccessible levels by overconsumption in the insurance market. This problem is exacerbated by insurance companies' use of selection mechanisms: be it by classifying risk by adjusting the premium for each plan to individual risk; segmenting risk by adjusting the plan (i.e. benefit coverage and design) to attract different risk groups to each plan and charge a premium accordingly; or selecting risk by adjusting affiliates' risk to the premium set in the plan.[9]

3. Intermediate strategies: the public-private mix

One solution to these dilemmas is a health system somewhere between public and private model. The design of such a system must be: (i) more efficient and equitable than the other solutions, and (ii) more acceptable, politically speaking, than other arrangements.

There are two coherent types of mixed strategies. One, where health care is delivered by some kind of health maintenance organization (HMO),[10] affiliation is mandatory and insurance premiums are paid by the individual (or by income transfers for the poor). The other, when health care is delivered privately (not via an HMO), paid by the State (directly, through social security, or through a regulated medical insurance) and the total product or expenditure is controlled by the State, either directly or through a general budget cap.

(a) Health-care production

In a mixed (public-private) system, the idea is to prevent out-of-pocket payments or third-party contributions from creating efficiency disparities or impeding the incorporation of externalities. Moral hazard must also be avoided by monitoring physicians' decisions, either by administrative measures or by budget constraints. Externalities are internalized by aligning the activities of the physician with those of the insurance company, forcing doctors to assume the marginal social costs of treatment prescribed. In HMOs the doctors themselves are the insurance providers, which internalizes the externalities and eliminates the incentive to overprescribe. In other cases, a limited network of doctors or a preferred provider organization (PPO) delivers administered health-insurance plans. In this case, an insured person receiving treatment from a preferred provider need pay only the pre-established co-payments. This sort of plan enables affiliates to predict out-of-pocket expenditures. The insurance company then pays the rest of the cost of treatment to the provider without involving the insured party.

A PPO differs from an HMO in that the insured party is freer to seek treatment outside the network of physicians and hospitals, and is not limited to the insurer's own resources. Different tools are used to protect the quality and cost of care, including oversight of the programmes administered, changes in the way physicians are paid, education programmes and restrictions on provider networks.

(b) Financing health care

There are two types of intermediate organizations:

— *Private financing, complemented by the State:*

Three groups may be identified in this system: (i) the non-poor, (ii) the uninsurable (elderly, children and expectant mothers, poor and non-poor with congenital and/or chronic illnesses), and (iii) the poor.

For the non-poor, the system operates through private insurance, subject to two types of regulation: threshold standards of coverage and the obligation to ensure that no externalities are associated with non-insurance (adverse selection).

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[8] This can occur is five conditions are met: (i) the probability of needing treatment must be independent from one individual to another; (ii) it must be less than 1; (iii) it must be known or estimable; (iv) it must not be able to be hidden (adverse selection), and (v) it cannot be manipulated (moral hazard).

[9] This does not imply that competitive private markets cannot exist for health-care inputs (meals, beds, medicines, towels, X-ray machines, and so forth). What is more, private input suppliers probably make that market become more efficient and preferable.

[10] An HMO is a private corporation holding contracts with doctors, hospitals and employers, which provides individual health insurance in exchange for a fixed cost or premium. Individuals must choose a primary care physician within the HMO network, through whom all health-care decisions will be channelled (medication, hospitalization, tests and referrals).

For the other two groups, the solution falls to the State, which subsidizes private insurance premiums fully, partially or both, as the case may be. Here, three problems arise: (i) a targeting problem related to the definition of health-care problems to be included, what guarantees of assistance the State will offer and what income level will trigger subsidization; (ii) developing the institutions to monitor and avoid oversupply, and (iii) the moral hazard that arises in this sort of scheme when rich individuals try to qualify as poor in order to secure State assistance.

— *Social security*:

The State pays medical bills through social security or general taxes. These are multi-payer systems in which health care is delivered indirectly. The best known system of this type is Germany's. Usually, the system is funded principally from payroll taxes. An analytically equivalent arrangement is obligatory affiliation to private, regulated and non-profit insurance institutions which act as agents of the State. This arrangement has two advantages: (i) since the scheme is obligatory, it encourages premium-setting by payment capacity, rather than by risk, with no loss of efficiency, and (ii) its universal coverage (of individuals and risks) sidesteps the difficulties of setting limits. Such social security institutions, because they are not strictly actuarial (for example, in not adjusting premiums to individual risk levels) can avoid the weaknesses of individual private insurance schemes.

4. Production, allocation and financing by the State

With State financing, the production of health care, quality control and the role of the insurance companies therein is assumed to be justified by imperfect consumer information. These two forms of oversight could be more effective if health care was produced by the State. It is also assumed that State production solves the problems of imperfect information of private insurance companies (the problems of the third-party payer), and makes all medical conditions insurable. It is also said to avoid large and inefficient increases in the production of health care.

This option is debatable inasmuch as it requires two conditions to be fulfilled: that the conditions for market efficiency fail (information problems), and that public production and allocation are less efficient than any other alternative (which is harder to establish).

This would mean proving that: (i) the treatment physicians decide upon largely resolves the difficulties arising from consumer ignorance; (ii) if it is financed (almost entirely) from general taxes, health care is largely free and excludes no one; (iii) if doctors receive little or no payment for their services, the incentives for oversupply by a third payer are reduced, and (iv) health care is rationed explicitly, partly by administrative measures, partly by the existence of budgetary limits. The idea is to limit the overconsumption generated by moral hazard.

III

The international experience with private health insurance markets[11]

At the international level, it is worrisome that in health insurance markets, in which subscribers are free to choose between insurers, strong incentives arise for insurance companies not only to seek efficiency, but also to classify, segment and select risk.[12] This runs counter to the principle of universal access, one of the main objectives of social security schemes. The question then arises:

How can high-risk individuals be assured of accessible coverage in an individual health insurance market?

Within the intermediate solutions discussed in the previous section, a number of countries have developed formulas for guaranteeing accessible coverage for high-risk groups in individual health insurance

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[11] On the basis of Van de Ven and Schut (2011).
[12] In this regard, it will be recalled that: (i) classifying risk is adjusting the insurance premium for each product according to individual risk; (ii) segmenting risk is adjusting the product (i.e. benefit coverage and design) the attract certain groups for each product and charge them premiums accordingly, and (iii) selecting risk is adjusting accepted risk to the premium set for a given product.

markets. A system of "risk-adjusted subsidies" is the preferred form of subsidy for making individual health insurance accessible in a competitive insurance market in which the consumer is free to choose an insurance company. In this approach, insurers are free to charge risk-adjusted premiums.

A comparison of five countries with insurance including obligatory health plans (see table 2), shows that in all cases consumers have a period to choose between insurers (health plans), which are responsible for buying them or providing them with the care they need. In all cases there are strict regulations on the premium paid directly by the consumer; however, all have imperfect risk-adjustment formulas. For that reason, insurers (health plans) have strong financial incentives for risk selection, which undermines solidarity, efficiency and care quality. Unless improvements are made to risk-adjustment formulas, risk selection is only likely to increase. This has become particularly serious in Germany and Switzerland. The analysis of the five cases concluded that public policy would be well advised to afford a high priority to improving risk-adjustment formulas. This can be achieved more readily by incorporating factors to adjust for morbidity. This same conclusion was found to be valid for other countries with competitive health insurance markets or insurance schemes like those in Argentina, Australia, Chile, Colombia, the Czech Republic, Ireland, the Russian Federation, Slovenia, Poland and the United States. Arriving at good adjustments for morbidity risk is the only effective strategy[13] for avoiding risk selection without loss of solidarity and without distorting competition between health risk plans.

Political, economic and pragmatic considerations come into determining how payment of risk-adjusted subsidies is organized. In practice, all the counties which use risk-adjusted subsidies stipulate the subsidy to the insurer, which reduces the consumer's premium by the per capita subsidy allowed by the adjustment mechanism to insure that consumer. This approach to organizing subsidies is termed "risk equalization". It uses

age and sex as risk adjusters, often alongside indicators of disability and institutional status and well-being. Thus far, only the Netherlands and the United States (Medicare[14]) have used morbidity-adjustment factors.

Risk-adjusted subsidies or "risk equalization" can be complemented with three mechanisms: (i) premium-based subsidies; (ii) offsets for excessive losses, or (iii) implicit cross-subsidies through restrictions on premiums for certain types of coverage. The better the premium subsidy is adjusted for relevant risk factors, the less necessary these three strategies and the less conflict there will be.

In practice, the most popular complementary strategy is community rating, which consists of obliging insurers to charge every affiliate the same premium for the same product, regardless of individual risk. This practice has short-term advantages, such as greater equity and service access. In the long term, it can make the system insolvent, mainly owing to the disincentives to provide good care to the chronically ill or, even if those incentives are well structured, can make the system unsustainable over time.

At least half the countries of the Organisation for Economic Cooperation and Development (OECD) have opted to provide tax subsidies to promote the purchase of private health insurance (deductions from taxable income). Some of these subsidies are quite considerable, such as in the case of Australia, with a 30% premium tax rebate and in the United States, with a 35% tax subsidy on health insurance. The analysis concludes that great strides could be made in terms of efficiency if premium subsidies were replaced by risk-adjusted subsidies.

The analysis of those five cases concludes that although a good risk equalization strategy helps to resolve the conflict between accessibility, efficiency and selection in a competitive individual insurance market, these strategies are still imperfect and need more investment in improving risk equalizing mechanisms. Such investment should include better databases and research and development of better risk adjusters.

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[13] Strictly speaking, the affirmation of "only strategy" is valid only taking into account the specific weight of pure goods, such as preventive aspects, the lifestyles promoted and, therefore, the role that national health systems should place in preventive care and promoting health (Wilkinson, 2006).

[14] Social security programme administered by the Government of the United States, which provides medical care for persons over age 65 and operates as a form of personal insurance.

TABLE 2

International experience with risk adjustment and distribution

	Belgium	Germany	Israel	Netherlands	Switzerland
Situation pre-reform (1980s)					
Financial responsibility	Zero	High (but none for pensioners)	High	Zero	High
Free choice of programme	Yes	Limited for 60% of affiliates	Yes	No	Yes, but insurers allowed to charge the elderly more
Coverage restrictions	Solidarity contribution to the health system, which distributed it equitably to insurers	Fixed percentage of contribution for pensioners, but variable for those paying into the system	Solidarity contribution as fixed percentage of income per contributor	Solidarity contribution to the health system, which distributed it equitably to insurers	Contribution regardless of risk and income
Problems of selection	No	Yes	Yes	Yes	No
Situation post-reform (year 2000)					
Adjustment variables and use of information	7 variables using retrospective information	5 variables using retrospective information	One variable using prospective information	5 variables using prospective information	3 variables using prospective information
Premium system and solidarity fund	One community rating per insurer; a percentage of this premium goes directly to a solidarity fund	Fixed percentage of income for each insurer. Then insurer transfers a portion to a solidarity fund	No direct contribution to insurer, but direct contribution to a solidarity fund	One community rating per insurer; a percentage of this premium goes directly to a solidarity fund	One community rating per insurer and region, a percentage of this premium goes directly to a solidarity fund
Insurers' financial responsibility	No financial responsibility for capital costs of hospitals	No financial responsibility for capital costs of hospitals	Financial responsibility for capital costs of hospitals through a payment included in per diem premiums.	Financial responsibility for up to 5% of the capital costs of hospitals	No financial responsibility for capital costs of hospitals
Risk sharing	Proportional, all eventualities	No obligation to share risk	Conditioned by payment of expenses (ceiling 6%) of 5 serious illnesses. There is also a safety net to finance the deficit.	Distribution of outstanding risks, proportional	No obligation to share risk

Source: W.P.M.M. Van de Ven and others, "Risk adjustment and risk selection on the sickness fund insurance market in five European countries", *Health Policy*, vol. 65, No. 1, Amsterdam, Elsevier, 2003.

IV

The Chilean experience with individual health insurance

The structure of Chile's health system was reformed by decree-law (No.3) in 1981. An individual health insurance system was created whereby, to avoid adverse selection, workers must pay in 7% of monthly income. Workers choose to pay their 7% into the public health fund (FONASA) or into the private system (Isapres). In the absence of regulation, this modality —which essentially has the merit of forcing higher earners to pay more— does not guarantee access to a health system in which risks are shared and solidarity assured.[15]

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[15] In fact, changes have been made almost continually to the Chilean health system and have been much more extensive than the creation of private insurance and the transformation of the Employees' National Medical Service (SERMENA) into FONASA, but a full account is beyond the scope of this work.

The private market has offered insurance that is fair, in actuarial terms, at the level of each individual contract, but which encourages risk selection by the Isapres and impedes the solidarity necessary for a social covenant on health. Solidarity operates only when subscribers migrate to FONASA. In effect, the health system segmented subscriber contributions to reflect the inequalities ingrained in Chilean society, making the reform regressive in terms of the contributory health system. In 2010, payments of mandatory premiums amounted to 2.2 billion Chilean pesos (Ch$) —equivalent to 2.1% of gross domestic product (GDP)[16]— of which 45.2% (Ch$ 974 million) was collected by the Isapres, which cover only 16.5% of the population. The average obligatory monthly premium, which would have been Ch$ 16,040 pesos had all insurance remained public, was, in practice, Ch$ 28,650 for Isapre subscribers and just Ch$ 11,770 for those in FONASA. The Isapres have been able to engage in heavy indirect risk selection by oversupplying health plans, which discriminate by risk and income, in addition to inequity in access to benefits.

1. The options in the case of Chile

The existing health system has both public and private financing. Both public and private providers produce health services and, depending on whether subscribers are in the private Isapre system or in the public system (FONASA), they are free to choose between public or private suppliers, or both. However, individuals enrolled in the FONASA institutional care modality (MAI) may receive treatment only in State establishments. In addition, benefits included in the Regime of Explicit Health Guarantees (RGES) are financed in the public system with State contributions in the health-care network established for the purpose, and in the private system, through higher contributions from affiliates treated in the establishments determined by each Isapre.

2. Data and evidence[17]

With the inclusion of insurance markets as a financing mechanism, despite the obligatory contribution of

7% of income, insurers have been able to charge high enough premiums to finance expected costs (claims plus administrative expenses). This has been achieved by offering a range of plans differentiated by premium, a price policy which has resulted in many high-risk, low-income individuals being unable to get insurance and migrating to the public system, FONASA.

There are five considerations that cast doubt on the use of private insurance as a mechanism of universal access to health care and protection. Two of these have to do with processes of exclusion, because of the way the system is designed: one between the insurance regimes (Isapres versus FONASA), and the other within each regime. The third is the loss of income compensation capacity (loss of solidarity) by treating social security contributions as voluntary private contributions. The fourth has to do with the difficulty in finding mechanisms to recover solidarity. The fifth is the heavy demand on public resources.

(a) Exclusion by income (distribution) and risk (selection) in the Isapre system

Exclusion from the private system and migration to the public system occur because the Isapres' risk selection mechanism pushes most of the lower-income and higher-risk population groups into the public system.

In table 3, Isapre affiliation rises with income level (by quintile). Affiliates' real possibility of choosing between the public and private systems is dictated by their ability to pay, not by their preferences. This runs counter to the original spirit of the reform and shows that only those in the fifth quintile can really choose between the systems according to their own preferences.

(b) Selection by income and risk within each modality

The public health system covers 78.8% of Chile's population and assumes the care of the poorest segments (93.2% of the first quintile). Those paying into the public system come under the responsibility of the Ministry of Health, with FONASA responsible for collecting and administering resources. FONASA operates as a social insurance, with a health plan executed by the agencies of the National System of Health Services and primary health-care establishments administered by municipal governments. The beneficiaries have access to this plan and are classified into different health groups by taxable income and number of dependants, from A for those who are indigent or without resources, to D for those with highest income. Thus there is one plan which works as

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[16] Data from the Central Bank of Chile, the Superintendence of Health and FONASA.

[17] Data for the preparation of this paper were taken from the National Socioeconomic Survey (CASEN) of 2009. CASEN is run by the Ministry of Social Development (formerly the Ministry of Planning) and was conducted by the Social Observatory of Alberto Hurtado University. The survey was taken between November and December 2009 and included interviews of 71,460 households, corresponding to an expanded sample of 16,977,395 inhabitants.

TABLE 3

Enrolment in health systems by quintile of independent income (*), 2009
(*Percentages*)

Health system	Income quintile					
	I	II	III	IV	V	*Total*
Public system	93.2	90.3	85.1	72.3	44.6	*78.8*
Forces of law and order	0.7	1.4	2.6	4.1	3.8	*2.4*
Isapre	1.5	3.5	6.7	16.6	44.3	*13.1*
None (private)	2.8	2.8	3.1	4.1	5.2	*3.5*
Other system	0.5	0.3	0.5	0.5	0.4	*0.4*
Does not know	1.4	1.7	2.0	2.4	1.6	*1.8*
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Source: Ministry of Social Development, Social Division, National Socioeconomic Survey (CASEN) of 2009 with expansion factors on the basis of the 2002 census.

(*) Does not include live-in domestic employees and their immediate family.

a solidarity system[18] —with all benefits free for those with fewest resources and for the elderly— and another for people with more resources, whose characteristics are similar to a private insurance scheme with a co-payment for care.[19]

Certain institutional factors entrench the effects of risk selection in Chile and explain why over 12 million are enrolled in FONASA. In fact, the existence of the free choice modality (MLE) in FONASA encourages middle socioeconomic sectors into the public system, where they can combine the system's two access modalities.

The private health system (financed through the Isapres) represents 16.5% of the population, but 44.3% of the individuals with most resources. Its affiliates have access to a health system consisting of a series of providers among which they may chose freely. These institutions administer the contributions received and, sometimes, also deliver the health plan agreed upon. In this case, and in the absence of regulation, plans were created according to the characteristics of each beneficiary, on the basis that there are separation equilibria which identify individuals by risk and payment capacity. Today 51,171 different health plans[20] exist with an average

of 55 beneficiaries each, making it very difficult to compare plans as they have no common parameters. In terms of risk selection, it is estimated that more than 30 pathologies are considered "pre-existent", whereas FONASA does not apply this criterion.

(c) *Segmentation of the mandatory premium or loss of income compensation (solidarity)*

Ultimately, the reform of 1981 divided access to the health component of social protection between rich and poor, by means of various sorts of selection. Seventy-nine percent of the poorest part of the population remains in the public system, which lacks the contributions the higher-income sectors make to the health system; thus income solidarity within the system is lost.

The average level of premiums entering the Chilean health system from the collection of obligatory contributions, which could be gathered into a solidarity system, is quite considerable. Whereas with the average premium in the current public system, solidarity benefits up to the sixth decile, with the hypothetical average premium —with all affiliates contributing to a single system—solidarity would benefit up to the eighth decile, making for a clearly more egalitarian and equitable system[21] (see figure 1).

[18] Under the institutional care modality (MAI), beneficiaries may receive treatment in State establishments, where payment depends on their income group as defined in the Health Benefits Regime set forth in Law N° 18.469.

[19] Under the free choice modality, beneficiaries may seek treatment from private health professionals or entities, or use State establishments and, in this case, in-patient stay-over facilities.

[20] Of the 51,171 health plans, 12,727 (24.9%) are being marketed (Superintendence of Health, 2011).

[21] The results from the CASEN survey correspond to a sample and the information collected is, generally speaking, self-reported, so it includes certain biases with respect to administrative information. However, the conclusions are still valid insofar as the proportions are maintained with respect to census information.

FIGURE 1

Average premium, per income decile and health system
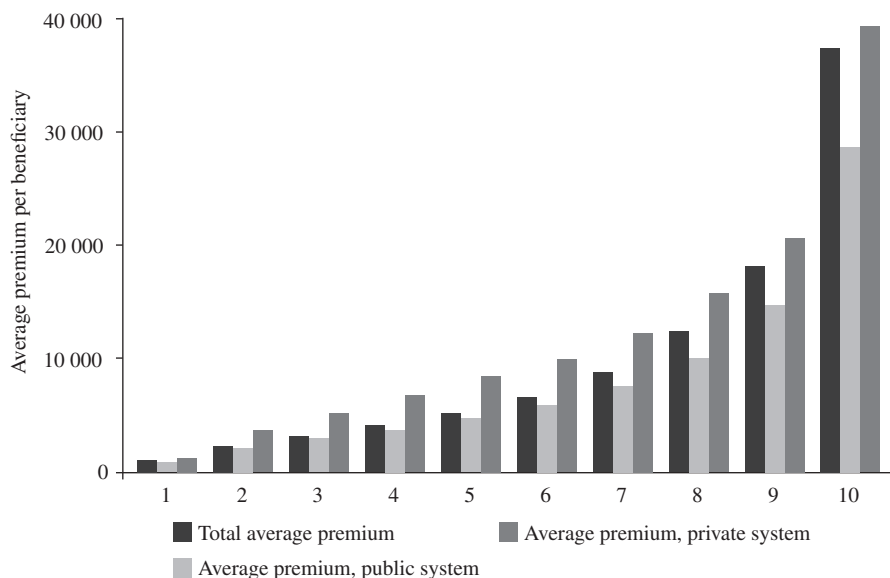
Source: prepared by the authors on the basis of National Socioeconomic Survey (CASEN) of 2009.

According to data from the Superintendence of Health, the Isapres collect Ch$ 1.4 billion per year, or 54% of the intake of the health system overall, to attend to only 16.5 % of the population. This represents a large loss of resources which could help the public health system to meet the objective of being more equitable and solidary.[22] Figure 2 shows that contributions to the public sector are made mainly by the lower deciles, contrary to the private system in which contributions rise in the higher income deciles.

A Lorenz curve[23] for Chilean's independent income alongside the concentration curves for health premium collections clearly shows how the Chilean health system overall reflects income inequalities, since the concentration curve for the system's total intake is very similar to the Lorenz curve. Breaking down the total premium collection by health system shows that public system collection corresponds to income in a more egalitarian manner, whereas the private system collection is clearly concentrated in the higher-income sectors. This gives rise to a system in which the poorest (concentration curve for the public system)

contribute more to the solidarity system, while the richest contribute to the private system for buying individual, not social, insurance.[24] So, in the public system —into which lower-income segments pay more— contributory solidarity applies, whereas in the private system —into which highest-income individuals pay— the principle of equivalence predominates to the detriment of solidarity.

(d) *Difficulty of regaining balance between equivalence and solidarity (explicit health-care guarantees)*

These outcomes have not gone unremarked in Chile. But, given the political framework inherited from the military regime and the vested interests in the health system, progress with reform has been limited. One such reform was the Regime of Explicit Health Guarantees (RGES), also known as the System of Universal Access with Explicit Guarantees (AUGE Plan). This aimed to establish a charter of health rights and duties and thus provide the population (regardless of socioeconomic status or enrolment in one health system or the other) with a list of health-care benefits for which the State would assume responsibility (see box 1). AUGE ensures solidary financing by eliminating the conflict with equivalence for at least one set of benefits for which the State will

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[22] For 2010, total collection by Isapres comprised: legal contributions, 7% (Ch$ 976,406,000), voluntary contributions (Ch$ 365,229,000), employers' contributions (Ch$ 33,599,000) and income from the compensation fund (Ch$ 668 million).
[23] See Lorenz (1905).

[24] In which the premium is determined by the risk of the individual, not of a larger group of individuals.

FIGURE 2

Total contributions to the health system by income decile and health system
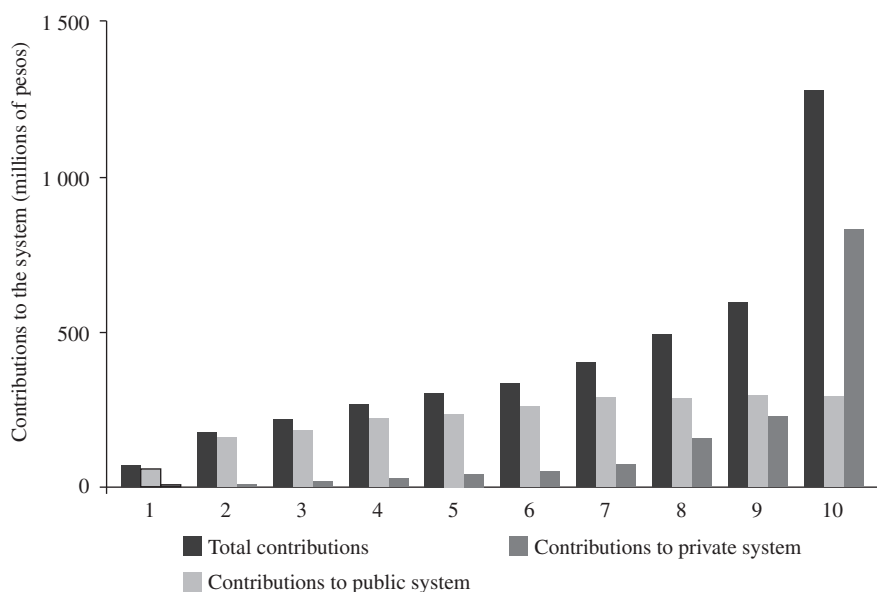
■ Total contributions   ■ Contributions to private system
■ Contributions to public system

Source: prepared by the authors on the basis of National Socioeconomic Survey (CASEN) of 2009.

FIGURE 3

Concentration and Lorenz curves
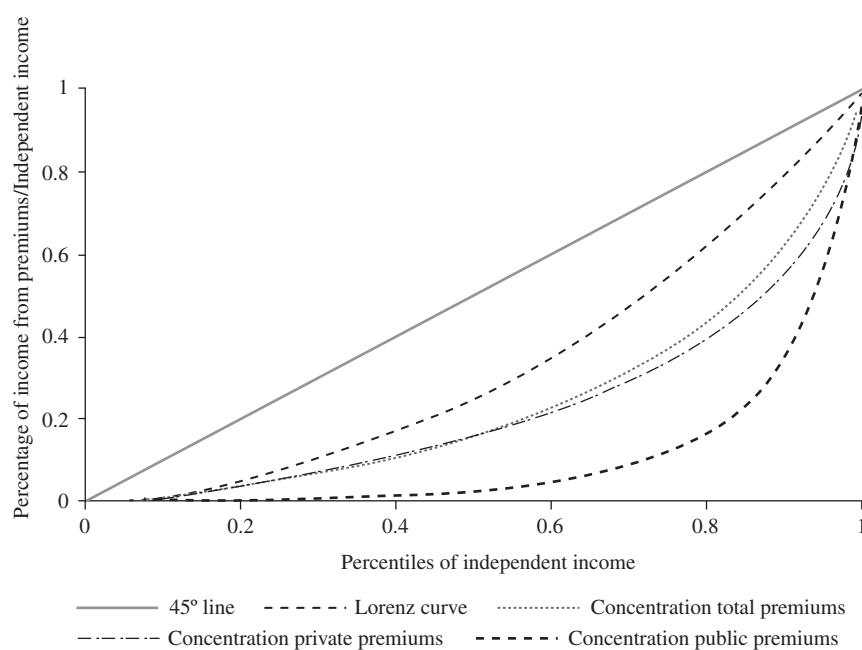
―― 45° line   ---- Lorenz curve   ············· Concentration total premiums
―·―· Concentration private premiums   ---- Concentration public premiums

Source: prepared by the authors on the basis of National Socioeconomic Survey (CASEN) of 2009.

pay, a set which will be extended as resources become available. However, when the AUGE legislation was passed, the creation of a solidary fund was not approved.

In order to reduce risk selection, the basic plan under RGES includes the highest-risk diseases, increasing coverage and access and including guarantees of quality and timeliness. Private insurers may set their own price to reflect differences in service, benefit quality and standard of accommodation; they also receive a fixed payment through a community rating[25] system for individuals availing themselves of AUGE benefits.

[25] As practised by various countries, community rating is equivalent to a per capita payment set according to the population's average risk level. This makes it imperative to take steps to bring independent and informal workers into the system, in order to improve the distribution of average risk and thereby lower average spending by the State.

RGES is meant to establish a long-term health system. Regulation is supposed to: (i) establish a benchmark plan and largely eliminate the numerous existing plans;[26] (ii) make public hospitals more efficient and autonomous, and make private providers more transparent, and make the two more complementary and aligned with the societal objectives of AUGE; (iii) establish rules on co-payments and obligations, including access (which FONASA was already obliged to provide and Isapres are now instructed to provide), quality (benefits can be provided only by a registered and accredited provider), financial protection (co-payments are regulated, and in some cases must be zero) and timeliness of access (waiting lists for treatment are regulated) (Sojo, 2006).

[26] Cost containment and gradual reduction of administrative expenses.

BOX 1

Explicit health-care guarantees plan (GES) (formerly AUGE)

The explicit health-care guarantees plan (GES) —formerly AUGE— seeks to avoid exclusion by morbidity status or entry conditions, by guaranteeing coverage by FONASA and Isapres for a number of health problems. Today GES covers 69 pathologies, and this range will increase over time. GES benefits apply to all these pathologies, regardless of whether they were diagnosed before or after the plan was set up. GES includes the right to a free preventive care check-up once a year for timely detection of certain diseases. The beneficiary may also have the right to free medication, depending on the particular health problem.

Diseases not included in the GES plan have the normal coverage set forth in the individual's health plan. For certain life-threatening, high-cost conditions, GES provides additional coverage for catastrophic illnesses (CAEC). In the case of FONASA the catastrophic conditions insurance covers 100%, i.e. there is no additional cost of the beneficiary, providing treatment is delivered in the institutional modality (MAI). In the Isapre system, additional coverage for catastrophic illness gives affiliates 100% coverage within the closed network of providers.

The purpose of additional coverage for catastrophic illness is to explicitly ensure: (i) access: obliging FONASA and the Isapres to assure health care; (ii) quality: demanding the delivery of guaranteed health care by a registered or accredited provider; (iii) timeliness: setting a deadline for the provision of the guaranteed care, at the stages of diagnosis, treatment and follow-up, and (iv) financial protection: capping the contribution, payment or co-payment the affiliate may be charged for a treatment or set of treatments, taking income into account.

In the event of a GES-covered illness, the plan is triggered in either FONASA or an Isapre, with a doctor's certificate showing the diagnosis and a special form, which refers the patient to a provider for confirmation of the diagnosis. If this is confirmed, the patient is referred to an establishment in the network of providers.

Here the Isapres and FONASA operate as preferred provider organizations (PPOs), with closed networks of providers for GES conditions. Patients may also opt to seek treatment with extra coverage from top-up plans.

In the case of FONASA, payments vary by vulnerability level and are subject to caps. Isapre affiliates pay 20% of the treatment —according to the reference rate available in each Isapre— with a cap on contributions by number of illnesses. The health plan itself also carries an additional charge for access to GES. The price varies by Isapre, but averages Ch$ 5,500 per affiliate.

When timeliness and access guarantees are not fulfilled, FONASA or the Isapre in question must provide treatment through the network of providers.

In the event that the financial protection guarantee is not met, beneficiaries may appeal to the Superintendence of Health, which resolves certain disputes relating to this problem and rules on the qualification or not of a disease for GES coverage.

Source: National Health Fund (FONASA) and Ministry of Health of Chile.

In 2010, with a view to endowing the system with the necessary solidarity, the State transferred to FONASA Ch$ 2.3 billion pesos to subsidize care for the poorest sectors of the population (see tables 4 and 5). This is equivalent to an additional per capita premium of Ch$ 191,537 per year (Ch$ 15,961 per month) and represents almost double the premium paid by group B, 133% of the group C premium and 86% of the group D premium. Of this amount, 39% is allocated to coverage for the poorest. Among those who pay into the system and are enrolled with FONASA, the most generous contribution goes to groups B (37.1%) and D (16.7%). Group C benefits least, with 7.6%.

(e) *Implications for public finances in the future*

As Panel A of figure 4 shows, age is a key factor in risk selection. Isapres show a clear tendency to select by age, as is evident in Panel B.

Chile is going through the final stages of the fertility translation. It will be another decade before the demographic dependency ratio begins to rise, but the proportion of older adults has already risen (Uthoff, 2010). If the current trends as regards risk selection and solidarity financing continue, it is likely that:

- Age groups with greater health-risk factors will increase vis-à-vis the rest of the population. The composition of the growing age groups in relation to the working-age population will change, as well, with fewer children and more older persons (see figure 5). This will significantly increase spending on health and pensions.
- The State will have to increase financing for the system owing to the coming demographic shift.
- Public health spending needs will rise significantly (see figure 6).
- Affiliations will tend increasingly to migrate to public health insurance, owing to the effects of risk section by sex and age by the Isapres.

TABLE 4

Breakdown of public health sector spending and financing, 2010
(*Millions of pesos*)

Health group	Expenditures				Financing				
	Incidences of medical treatment	Work incapacity allowance	Administrative costs	Total	Contributions	Co-payments	Group subsidies	State contribution	Total
A	903 905	0	0	903 905	0	0		903 905	903 905
B	1 202 725	121 444	12 694	1 336 863	406 022	60 554		870 287	1 336 863
C	441 918	66 116	6 911	514 945	314 117	21 662		179 166	514 945
D	736 937	160 418	16 768	914 123	464 448	57 034		392 641	914 123
Total	*3 285 485*	*347 978*	*36 373*	*3 669 836*	*1 184 587*	*139 251*	*0*	*2 345 998*	*3 669 836*

Source: prepared by the authors on the basis of:
– Statistics and budget statements of the National Health Fund (FONASA) and the National System of Health Services (SNSS).
– National Socioeconomic Survey (CASEN) of 2006, Ministry of Social Development.

Notes:
(1) Does not include spending on public health goods and investments.
(2) Incidences of medical treatment: corresponds to spending on both institutional care and free choice modalities (MAI and MLE). Does not include municipal contributions for primary care.
(3) Work incapacity allowance (SIL): includes SIL expenditures by Regional Ministerial Offices (SEREMI) and Family Allowance Funds (CCAF).
(3) Administrative costs: corresponds to internal operating expenditures by FONASA.
(4) Since main FONASA spending efforts are concentrated in the free choice modality (MLE) and SIL, and the distribution of administrative costs goes mainly to these items, the allocation of these expenditures to group A affiliates receiving these benefits is very marginal and is assumed to be nil for the purposes of this study.
(5) Contributions: affiliates' contribution of 7% of income. Includes 0.6% which goes directly to CCAF.
(6) Co-payments: corresponds to co-payments for MLE and for the explicit guarantees (GES) plan, assuming 10% SNSS income as co-payment for the institutional care system (MAI).
(7) Group subsidies: since the expenditures of each health group are far higher than the affiliate contributions and co-payments, subsidies are non-existent.
(8) State contribution: contributions to FONASA from taxes and from the *Chile crece contigo* programme, and municipal contribution to primary health care.

TABLE 5

Breakdown of expenditures and financing per capita in the public health sector, 2010
(Pesos)

Health group	Expenditures				Financing				
	Incidences of medical treatment	Work incapacity allowance	Incidences of medical treatment	Work incapacity allowance	Incidences of medical treatment	Work incapacity allowance	Incidences of medical treatment	Work incapacity allowance	*Total*
A	234 114	0	0	234 114	0	0		234 114	*234 114*
B	292 049	29 489	3 082	324 620	98 591	14 704		211 325	*324 620*
C	202 148	30 244	3 161	235 553	143 687	9 909		81 956	*235 552*
D	353 796	77 015	8 050	438 861	222 977	27 381		188 503	*438 861*
Total	*1 082 107*	*136 748*	*14 293*	*123 3148*	*465 255*	*51 994*	*0*	*715 898*	*1 233 147*

Source: prepared by the authors on the basis of:
– Statistics and budget statements of the National Health Fund (FONASA) and the National System of Health Services (SNSS).
– National Socioeconomic Survey (CASEN) of 2006, Ministry of Social Development.

Notes:
(1) Does not include spending on public health goods and investments.
(2) Incidences of medical treatment: corresponds to spending on both institutional care and free choice modalities. Does not include municipal contributions for primary care.
(3) Work incapacity allowance (SIL): includes SIL expenditures by Regional Ministerial Offices (SEREMI) and Family Allowance Funds (CCAF).
(3) Administrative costs: corresponds to internal operating expenditures by FONASA.
(4) Since main FONASA spending efforts are concentrated in the free choice modality (MLE) and SIL, and the distribution of administrative costs goes mainly to these items, the allocation of these expenditures to group A affiliates receiving these benefits is very marginal and is assumed to be nil for the purposes of this study.
(5) Contributions: affiliates' contribution of 7% of income. Includes 0.6% which goes directly to CCAF.
(6) Co-payments: corresponds to co-payments for MLE and for the explicit guarantees (GES) plan, assuming 10% SNSS income as co-payment for the institutional care system (MAI).
(7) Group subsidies: since the expenditures of each health group are far higher than the affiliate contributions and co-payments, subsidies are non-existent.
(8) State contribution: contributions to FONASA from taxes and from the *Chile crece contigo* programme, and municipal contribution to primary health care.

FIGURE 4

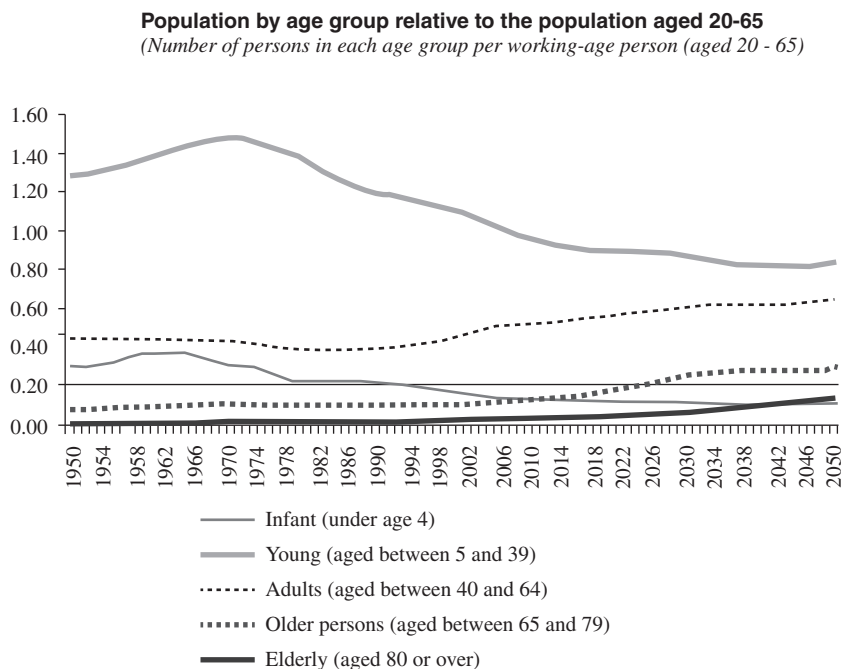**A. Age and sex as risk selection factors in Chile**

Figure 4 (concluded)

B. Public and private insurance by age
(Percentages)

Isapres ■ FONASA
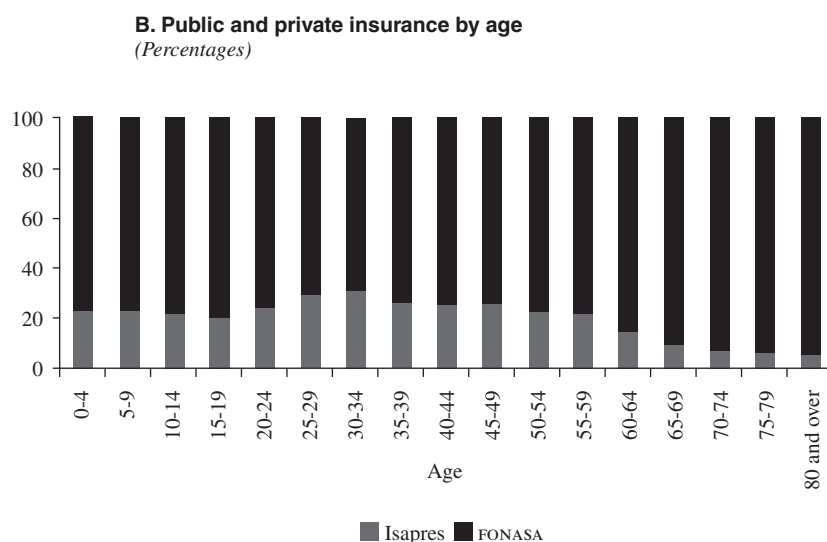
Source: prepared by the authors on the basis of data from the Ministry of Health of Chile on affiliation, risk factors by sex and age and five-year age groups in relation to per capita cost.

FIGURE 5

Population by age group relative to the population aged 20-65
(Number of persons in each age group per working-age person (aged 20 - 65)

Infant (under age 4)

Young (aged between 5 and 39)

Adults (aged between 40 and 64)

Older persons (aged between 65 and 79)

Elderly (aged 80 or over)
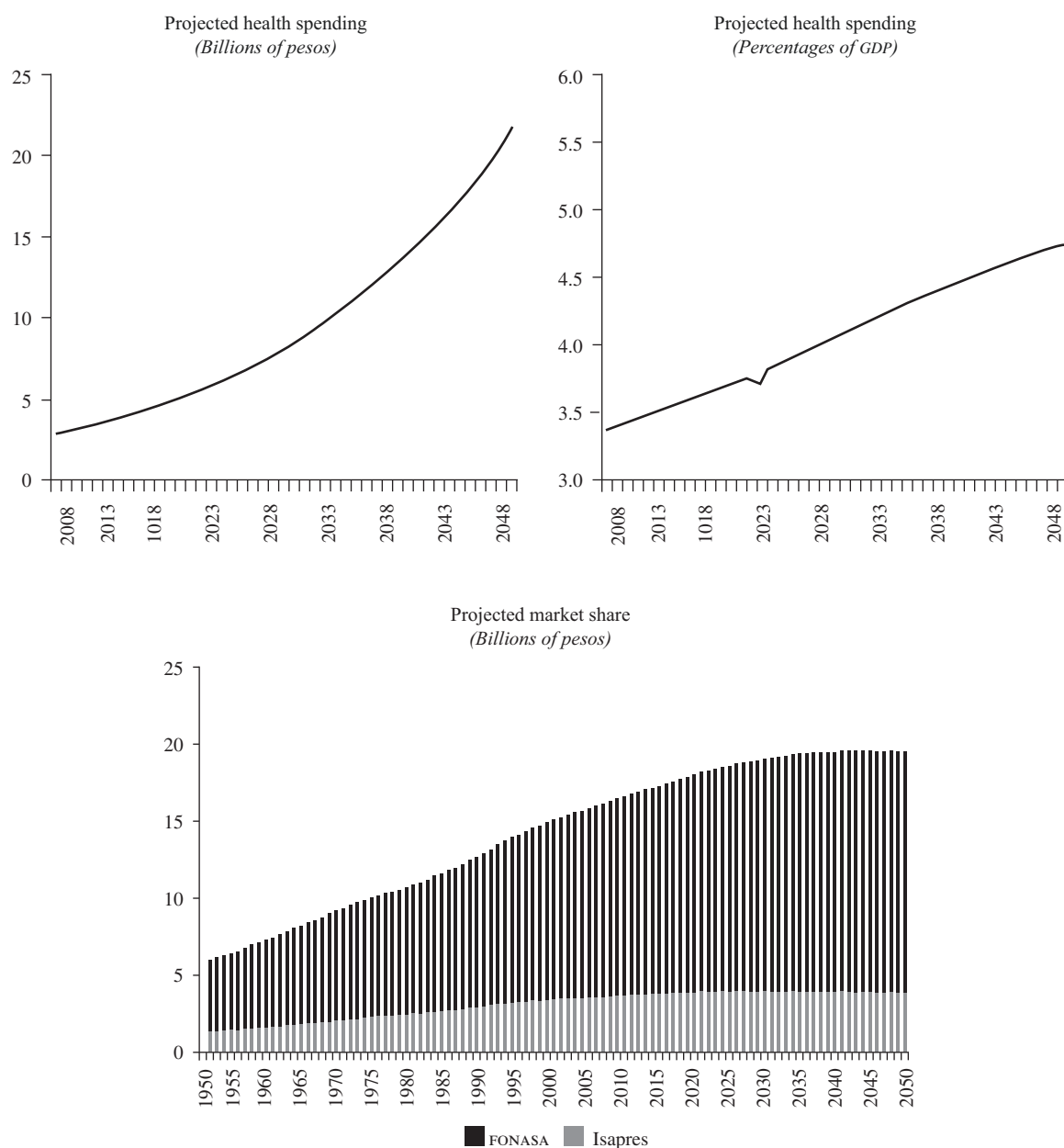
Source: prepared by the authors on the basis of population estimates and projections by age from the Latin American and Caribbean Demographic Centre (CELADE)-Population Division of ECLAC.

FIGURE 6

**Effect of demographic trends on public health spending and affiliation
Projected total health spending as a percentage of GDP**
(Scenario adjusted by per capita GDP)

Projected health spending
(Billions of pesos)

Projected health spending
(Percentages of GDP)

Projected market share
(Billions of pesos)

■ FONASA ■ Isapres

Source: prepared by the authors on the basis of data from the Ministry of Health (MINSAL), the Latin American and Caribbean Demographic Centre (CELADE)-Population Division of ECLAC and the Central Bank of Chile.

GDP: gross domestic product.

V

Conclusions and final remarks

As public health schemes, competitive markets for individual health insurance are running into difficulties the world over, as a result of pricing policy that tends to set premiums on the basis of foreseeable individual losses (i.e. according to the principle of equivalence). In the absence of proper regulation, this policy forces insurers to select risk and therefore to exclude the poor or those with high risk. This runs counter to the universal coverage required of a public system (i.e. the principle of solidarity).

The experience in countries which apply this sort of policy (Belgium, Germany, Israel, the Netherlands and Switzerland, among others) is that risk and income solidarity have to be factored into the insurance market in order to achieve universal coverage. To this end, all these countries have implemented some sort of risk-adjusted premium subsidy (or risk equalization among risk groups), together with strict regulation of the direct premiums paid to insurers by affiliates. In all cases, these risk-adjustment mechanisms are imperfect and, according to expert opinion, they must be improved if insurance markets are to remain operational.

In Chile, as part of public health funding, a public insurance with income-based contributions was launched and private administration of health insurance was allowed through individual contracts. The idea was to reduce State involvement in health care and move towards a system of individual insurance. An obligatory premium was set (to avoid adverse selection) at 7% of independent income and the health system was opened to private operators.

In principle, with strictly regulated risk adjustment, contributions by income level could produce vertical and horizontal equity by inducing redistribution from healthy to sick, and from rich to poor. Without appropriate regulation, however, this new health insurance market encouraged insurers to give priority to the principle of equivalence, adapting premiums to expected costs and thereby generating heavy direct and indirect risk selection and contravening the principle of solidarity (of cross-subsidies from rich to poor and from healthy to sick).

Today there are over 50,000 private health plans in the market, differentiated by individual risk. This has led to market-skimming and allowed the development of a dual model, with a private insurance market for the rich and public insurance for everyone else. The private market offers plans that are excessive in relation to real needs, with clear surpluses, while the public insurance covers 78% of the population, including those with lowest incomes and highest risk (including women of childbearing age, the chronically ill, the elderly and the poor). In the public system, indigents have no option other than public health provision, while non-indigent can opt for free choice modalities with co-payment. The private system has no risk equalization mechanism and displays serious problems of risk selection, with plans varying by mandatory premium and the affiliate's voluntary top-up.

The AUGE-GES system provides explicit guarantees by substantially reducing out-of-pocket expenditure. But problems remain with private insurers skimming risk from the public sector. Between 2005 when the GES system was set up and mid-2010, 12 times more guarantees were processed in the public system than in the private system, while the public system population numbered only five times the population in the private system. This bears out the hypothesis of skimming and shows that the public system comprises not only the poorest and most vulnerable, but also those with highest risk, including the chronically ill and the elderly (of whom 90% are in the public sector (Erazo, 2011)).

The financing of the Chilean system needs to be rethought in order to even out these inequalities. The current situation, far from reducing State involvement, engages the State even more heavily and, what is more, does so in a way that does not fully balance equivalence with solidarity. The solution necessarily lies in either consolidating the contributions from all affiliates (Isapres and FONASA) under a social security rationale or considering a tax reform. In either case, better regulation of the system is needed to delineate risk-adjustment schemes and guarantee basic packages of benefits.

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Chile's new middle classes: a cohort analysis

Oscar Mac-Clure

ABSTRACT   A cohort analysis methodology is used in this article to study Chile's "new" middle classes. It describes the members of these cohorts and compares them with older cohorts that are still economically active. The relative size as of the 1990s and 2000s of these occupationally determined middle classes or strata are analysed, and a distinction is drawn between "new" and "old" cohorts. The question as to whether or not the emergence of new occupational cohorts correlates with differences in income is also explored. This analysis leads to the conclusion that a new middle class has taken shape that is composed of people who became full-fledged members of the labour force during the economic growth surge of the 1990s and 2000s. The upper stratum of these new middle classes occupies a preeminent position, and social class influences income levels.

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I

Introduction

More and more attention is being focused on the middle classes in Latin America owing to concern about the persistence of poverty and social inequalities. The middle class also symbolizes a promise, of a sort, for large sectors of the population as their consumption levels rise (Franco, Hopenhayn and León, 2010). In terms of power politics in Latin America, in general, and in Chile, in particular, the sociopolitical matrix in place for much of the twentieth century has now been supplanted by one in which the economy is relatively independent of politics. This hinders the emergence of social classes –such as the working classes of past periods in history– that bring together large sectors of the population within the framework of predominant societal structures, as noted by Garretón (2007). The possibility exists, however, that the current social, cultural and political situation is being altered as "new" middle classes emerge, most of whose members belong to the younger generations. This is the line of thought that is explored in the present article.

In recent decades, as a corollary of the reduction in poverty, an "emerging" middle class has been making its appearance around the globe, including Latin America; but this new middle class is still at risk of slipping back down the income scale (Banerjee and Duflo, 2008; Kreckel, 2006; Ravallion, 2009; OECD, 2010). A specific case study of this emerging middle class in a country such as Chile has the potential to yield valuable findings. It must be noted, however, that –given how rapidly this change has been taking place– this process mainly involves the younger population, which is forming a new generation of the middle class. In addition, in past research the emphasis has been on studying the upward mobility of members of lower-income groups as they climb towards

positions in the middle class, but much less attention has been devoted to what has been happening in the rest of the middle classes, and particularly in the upper reaches of this income group. This article will therefore look at all the members of these middle classes, rather than focusing on just one sector within this catergory.

As noted by Bourdieu (1987), it can be posited that positions near the middle of the spectrum are associated with an indeterminate ("intermediate") economic and cultural status in any given period, but they also change over time. The future positions of persons in the middle class are fairly certain to be either higher or lower than their present positions. This means that we can draw a distinction between descending intermediate positions and those that are stable or ascending. Bourdieu reasons that the intermediate positions that offer a more secure future are those occupied by the persons making the greatest effort to move up the ladder – the future members of a "new" middle class. Focusing on the future of these new middle classes, rather than on what is happening at any given point in time or time period, Bourdieu attributes special importance to the particular features of different generations. This analysis will therefore seek to identify the upwardly and downwardly mobile sectors within the new generations of the middle classes.

The term "generation", as used here in a sociological sense to allude to the idea of a new middle class, dates back to the theory of generations developed by Mannheim (1952), who maintained that if individuals are in the same stage of the life cycle (e.g., if they were born in the same year), they will be influenced in similar ways by their societal environment and changes in economic and social conditions. Their membership in the same generation will mean that the gateways through which they can enter into various spheres of society will be similar. By way of illustration: people who were born in the same year, who enter the labour market at more or less the same time and whose level of education is similar will share fairly well-defined options that will differ from those open to people who do not have these characteristics.

The more specifically defined concept of a "cohort" (Ryder, 1965; Glenn 2005) provides a way of observing individuals who share a given initial characteristic (such as the same year of birth) and monitoring that group with the help of quantitative data in order to

gauge the impact on its members of one or more events over time.[1] The concept of cohorts has been used in studies of middle classes in other countries (Chauvel, 2002) and is employed in the new approach that will be proposed here for the quantitative analysis of data from the National Socio-economic Survey (CASEN), the main household survey conducted in Chile, for 1990 - 2009 (Ministry of Social Development (formerly the Ministry of Planning and Cooperation)). Studying these "new" cohorts of the middle class, whose members – unlike the members of "old" cohorts– still have many of the stages in the life cycle ahead of them, can offer something that methodologies based on population-wide data cannot: a systematic analysis of the path that this class may follow both now and in the future. In a broader sense, studying the cohorts making up the Chilean middle classes may contribute to a better understanding of these classes and of the associated inequalities and social processes.

In Chile, market liberalization, the growth of tertiary-sector jobs and the spread of education have influenced the composition of social classes and opportunities for social mobility (León and Martínez, 2001; Torche and Wormald, 2004). This gradual process continued to unfold as the country transitioned from a period of economic stagnation and instability to one of relatively rapid growth in the 1990s and 2000s. The hypothesis on which this study is based is that this had a different influence on cohorts whose members began their working lives during those two decades than it did on people who had done so earlier. The argument is made here that the changes in employment and income generated by rapid economic growth during those two decades had a stronger influence on the more recent cohorts of the middle class –those that became active members of the labour market during that period– than on the older members of the middle class.

Following this introduction, the article is structured as follows. Section II covers the change in focus from the middle class to the middle classes. Section III focuses on middle-class cohorts during a period of economic growth. Section IV looks at middle-class cohorts from the standpoint of income inequality and meritocracies. Section V concludes.

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[1] The cohort analysis methodology was initially developed for use in demographic studies and is now widely used in fields such as medicine and education.

II

From the middle class to the middle classes

In order to take a close look at the middle class, given its heterogeneity, we actually have to think in terms of the middle classes. One way of defining these classes and distinguishing between them is by looking at sets of traits, such as occupation, income and consumer goods in the home. This approach has been used to describe these classes in Chile and elsewhere in Latin America (Franco, Hopenhayn and León, 2011). For the cohort analysis being undertaken here, the focus will be on the different types of work that members of the middle classes do, since this factor strongly influences their income levels, lifestyles and cultural identities.

Viewed from this occupational perspective, class structure can be studied on the basis of various types of classifications.[2] Primarily in order to maintain comparability, the classification developed by Erikson

and Goldthorpe (1993) will be used here, since it is one of the most widely used systems both internationally and in recent major studies in Chile (Torche and Wormald, 2004; Espinoza and Barozet, 2009). In this occupation-based typology, categories are established on the basis of a combination of three criteria: ownership and control of means of production, the provision of services on a more or less autonomous basis, and the performance of skilled or unskilled manual work. Specific occupations are classified as falling into one or another social class, with those classes being defined on the basis of the above criteria, by referring to a combination of the variables on which employment statistics provide information: occupational category, economic activity, trade or profession, and company size.

Large- and medium-scale entrepreneurs, who accounted for 1.2% of all employed persons in 2009, will be excluded from the analysis because, if they were to be included, it would be necessary to measure their capital income, and the Chilean household surveys used

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[2] For a thorough discusión of the mostly frequently used classifications, see Leiulfsrud, Bison y Jensberg (2005).

in this study do not provide accurate data on that income category.[3] Apart from this group, the social classes in the country, defined on the basis of the Erikson and Goldthorpe classification, are shown in figure 1, which gives the percentage of employed persons in each class as of 2009.

Using the dividing line generally employed in studies on the subject, the middle classes are defined as being composed of the persons in the first four categories of non-manual workers in the classification system shown in figure 1 (54% of the employed persons in the country).
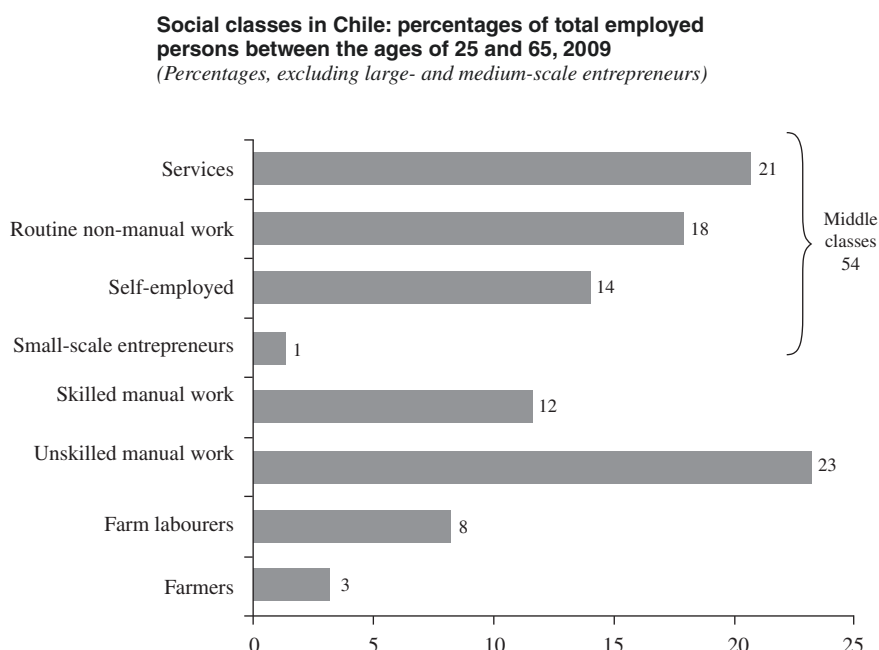
The services class is the first group of occupations associated with the middle classes. The top rung of the ladder is primarily occupied by professionals and high-level technical personnel working as business executives in the private sector or as officials holding leadership or senior management posts in the public sector. The next rung down is occupied chiefly by professors, professional administrative staff, highly trained technical personnel, mid-level health professionals and professional staff in the field of communications. Most of these people have a higher education and perform economic activities in the services sector, although some are employed in other areas.

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[3]   For the purposes of this study, large- and medium-scale entrepreneurs are defined as those who were reported as being employers or owners of businesses with 10 or more workers in the 2009 CASEN survey.

The second group included in the middle classes is made up of people who perform routine, non-manual tasks. These people often have jobs as high-level salespersons and administrative staff or, at a lower level, as secretaries or cashiers. Most of these wage earners have not gone beyond high school, and very few of them have completed their university education.

Independent or self-employed workers who are neither professionals nor trained technicians (mainly vendors at kiosks, market stands and grocery stores, taxi drivers, carpenters, seamstresses and tailors, hairdressers, garage mechanics, woodworkers and other craftspeople who employ traditional techniques in their work, etc.) are also considered to be part of the middle classes. Their occupations are ones that require more experience than formal education. About half of these people have at least completed their secondary education, but the other half have not. Many of these people work in what is known as the "informal" sector, to judge by the fact that most of them do not pay into the social security system. Given that their independent or non-wage-based activities are a distinctive feature of this middle-class group, their situation can be likened to those in the category that has traditionally been referred to as the "petit bourgeoisie", along with small-scale entrepreneurs. This latter –and comparatively smaller– category of

FIGURE 1

Social classes in Chile: percentages of total employed persons between the ages of 25 and 65, 2009
(Percentages, excluding large- and medium-scale entrepreneurs)

Source: 2009 National Socio-economic Survey (CASEN).

small-scale entrepreneurs is composed of those who employ between two and nine workers and constitutes a fourth stratum within the middle classes.[4]

When the occupation-based criterion is used as the only dividing line, then the categories of skilled and unskilled manual workers are not included in the middle classes. Wage earners engaged in manual work do not fit the conventional definition of the middle class, although many of them may self-identify or be identified as members of the middle –as opposed to the "lower"– class. Wage earners engaged in skilled manual work include mechanics, cooks and solderers, while wage earners engaged in unskilled work include less-skilled construction workers,

truck drivers, security guards, janitorial staff and domestic service workers. Unskilled manual workers make up the largest occupational group in the country and, although they are not included in the middle classes, they must nevertheless be taken into account in the analysis for reasons that will be discussed below.

The last two categories are those of farm labourers and farmers, who, because of the economic activities in which they are engaged (regardless of their subjective view of themselves as members of the lower, middle or upper class) are not defined as belonging to the middle classes because of their non-urban character.

It is a known fact that the expansion of economic activities in service industries and commerce has led to an increase in middle-class occupations associated with services and routine non-manual tasks, but it is not known how much of this increase has taken place in more recent or older cohorts. This question will be explored in the following section.

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[4] This inevitably arbitrary cut-off point for the number of wage earners corresponds to the internationally defined range based on the EGP stratification scale, as do the other definitions used in our classification. These numbers of employees per firm also correspond to the usual method for classifying small-scale employers based on CASEN data.

III

Middle-class cohorts in a period of rapid economic growth

The next step is to undertake a cohort analysis in order to distinguish "new" cohorts from "old" ones in the middle classes as defined above. Finding out how the new middle-class cohorts have fared during the period of relatively rapid economic growth seen during the 1990s and 2000s may provide a new and interesting perspective on the subject, as will be seen in the following dicussion.

This analysis starts off with the assumption that variations in the share of total employment accounted for by one or another cohort are attributable to structural changes that impact social classes. According to Bourdieu (1987, p. 350), quantitative downward movements generally reflect an economic and social decline. In other words, they are linked to a past situation that no longer exists or is on its way to disappearing. Conversely, upward mobility is associated with occupations that are the way of the future. Thus, in the past, Weber (1964, pp. 244 and 245) noted that the transition of craftspeople to membership in the "independent petit bourgeoisie" represented an "ideal" for manual workers, but this ceased to be a viable opportunity as middle-class ococupational groups such as office workers and bureaucrats expanded.

In order to take a closer look at the current situation in Chile, we will analyse middle-class cohorts based on their year of birth using the CASEN survey data compiled during the period of economic growth of interest to us here (the 1990s and 2000s).[5]

A classic Lexis diagram is used for the cohort analysis since, thanks to the existence of representative population surveys such as the CASEN series, data are available on people in the same cohort (i.e., people who were of a given age when the first survey was conducted in 1992 and who were 17 years older when the 2009 survey was taken).[6] By way of example, people who were 25 years of age in 1992 had been born in 1967 and were 42 years of age when the 2009 survey was conducted (based on the assumption that the survey respondents

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[5] Data from the CASEN surveys conducted in 1992, 1994, 1998, 2000, 2003, 2006 and 2009 have been used for this cohort analysis.
[6] The Lexis diagram provides a means of portraying population dynamics. It can be used to plot two dimensions of time: the dimension of calendar time and the temporal dimension represented by the ages of individual people. This combination gives rise to a third temporal dimension: the life line of a cohort, baed on the year of birth or any other relevant event.

in each of those years are generally representative of the people born in that same year and therefore belong to the same dummy cohort). The use of this method for all the surveys constitutes a departure from the usual approach, which involves setting age groups based on the ranges of ages in a series of surveys.

The following figures graph out the findings arrived at using this method. The percentages denote the relative size of the groups belonging to a given class as compared to the total number of employed persons of the same age (at the time that they were surveyed). Middle-class cohorts are identified according to their members' year of birth, and each graphed line represents a cohort. In order to simplify the analysis and mitigate reporting errors, this exercise is based on the percentages for five-year age groups for the bulk of the population and for three-year age groups for the youngest and oldest members (from 25 to 27 years of age and from 63 to 65 years of age). Thus, for example, each point shown on the graph for 30-year-olds corresponds to the percentage of employed persons between the ages of 28 and 32. The population under analysis is composed of employed persons between the ages of 25 and 65 at the time that each of the CASEN surveys was conducted.

The results obtained for the upper stratum (i.e., services) of the middle classes using this methodological approach are illustrated in figure 2.[7]

FIGURE 2

Services class: percentage of employees, by age and cohort, 1992-2009

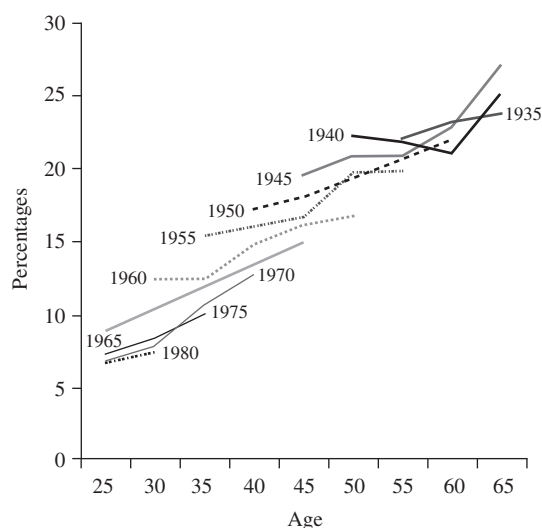*Source*: National Socio-economic Survey (CASEN), 1992 - 2009.

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[7]   The upper and lower strata of the services class have been added together because the results for the two are very similar.

The cohort effect is clear to see in the services class, as shown in figure 2. A larger percentage of the members of the younger cohorts, particularly those corresponding to 1970 - 1980, belong to this upper stratum within the middle class than is true of the members of older cohorts. At a given age (e.g., 30 years of age), a larger percentage of employed persons in the country from the 1970 cohort belonged to the services class than was true of the 1965 cohort. This change or cohort effect is not very noticeable after the 40-years-of-age mark, but a difference in the oldest cohorts can still be discerned.

By contrast, in the self-employed class, both the age-based progression and the share of new cohorts in total employment differ from what they were in the services class, as shown in figure 3.

FIGURE 3

Self-employed: percentage of employees, by age and cohort, 1992-2009

Source: National Socio-economic Survey (CASEN), 1992 - 2009.

Unlike what was observed in the case of the services class, self-employment increases with age, although less markedly in the younger cohorts (persons born around 1970 or more recently), as shown in figure 3. It is especially interesting to note that, unlike the results obtained for the services class (see figure 2), in which the percentage of younger cohorts expanded at the same age, the percentage of those same cohorts in the self-employment class (see figure 3) shrank quite markedly.

In a trend that is just the reverse of the one seen in the case of self-employed persons, a declining age-based

progression is seen in the category of routine non-manual work; this progression is also the same across the different cohorts, as shown in figure 4.[8]

Routine non-manual work: percentage of employees, by age and cohort, 1992-2009
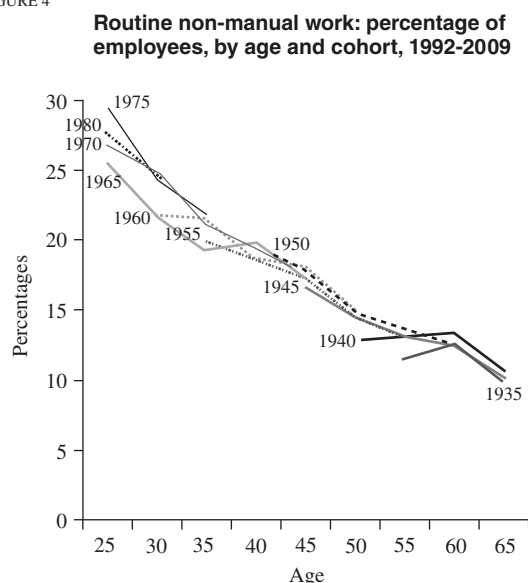
Source: National Socio-economic Survey (CASEN), 1992 - 2009.

As the age of survey respondents rises, the proportion of them who are engaged in routine non-manual tasks declines, and this occurs at a fairly even pace across the various cohorts, including the youngest ones, as may be seen from figure 4. In the younger cohorts, the age effect is stronger than the cohort effect.

Unlike what we saw in the case of the services class, the percentage accounted for by younger cohorts holds steady in the routine non-manual class. This is also a departure from the trend in the self-employment class, where the percentage declined. A change in the composition of the middle classes can be observed, particularly in the services class, whose membership is larger in the cohorts corresponding to people born between 1970 and 1984, according to the quinquennial data. When annual data are used, it can be seen that the turning point for the services class is clearly situated in 1971.

Strictly from the standpoint of quantitative differences, the larger size of the services class among younger cohorts is partially attributable to the shrinking

number of members of these cohorts who are self-employed and to a smaller decrease in the proportion of members of these same cohorts that are employed as unskilled manual workers.

Viewed from the standpoint of intergenerational social mobility, this could be interpreted as a transition that starts with the parents and continues on with their children. On the one hand, upwardly mobile people are rising up to the services class and, on the other, there is an inflow of people from outside the middle classes into the category of routine non-manual work. Some 60% of the younger cohorts in the routine non-manual class have parents who belong to the class of manual workers. By contrast, approximately 59% of the parents of members of the younger cohorts in the services class also belong to that class or some other stratum of the middle classes, and the parents of the rest belong to the manual worker or farmer categories.[9] A portion of the younger middle-class cohorts thus consists of members of an "emerging" sector who are seeking better options than the manual work performed by their parents and who succeed in gaining entry to the routine non-manual stratum of the middle classes; there is also, however, an upwardly mobile group that seizes the opportunity to bypass this stratum and to gain entry into the services class. The size of the routine non-manual category thus does not increase in the younger cohorts, as the upwardly mobile sector succeeds in differentiating itself from this stratum and becoming part of the services class. In addition, members of the younger cohorts distance themselves from the type of self-employment engaged in by their parents and instead become part of the emerging or upwardly mobile sectors.

The results of this cohort analysis of the middle class contribute two additional elements to this intergenerational explanation. First, the transition taking place in upwardly mobile and emerging sectors is an inherent aspect of the younger middle-class cohorts, since the changes that we have been discussing occurred more intensively in these cohorts than in older ones in the 1990s and 2000s. Consequently, contrary to what one might expect, this is not a phenomenon that is seen throughout the middle classes. Second, although the expansion of consumption may tend to focus our attention on the appearance of an emerging middle class whose members are drawn from

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[8]   The upper and lower strata in the routine non-manual category exhibit similar trends.

[9]   These figures are based on an analsyis of the data furnished by the National Social Stratification Survey conducted by the Inequalities Project (Anillo SOC12) of a nationally and regionally representative sample of the population in 2009. The figure given for parents engaged in manual work includes farm labourers.

the lower classes and from sectors living in poverty or in socially vulnerable situations, transitions of this type also involve upwardly mobile groups within the younger cohorts of the middle classes that are moving into the upper strata of these classes and swelling the ranks of the services class, as noted earlier.

It should be emphasized that the results of this analysis refer solely to the situation in the 1990s and 2000s and therefore do not relate to family lines or long-term processes – and therein lies their potential contribution to an explanation of long-term trends. As we have seen, if we look at groups whose participation in the labour market has increased during the review period, the results show that the newer middle-class cohorts are chiefly composed of people born from 1970 on who belong to the services class, which acts as a driving force. This influences the internal dynamics of the stratum of the middle classes engaged in routine non-manual work and, more broadly, the new middle-class cohorts as a whole.

The findings of this analysis indicate that cohorts whose members were born from 1970 on have a different class structure than earlier cohorts. This inflection point is located at the point on the spectrum marking the cohorts whose members were born in or after 1970 and who thus have turned 25 years of age since 1995. This means that they entered the labour market on a full-time basis during the economic boom of the 1990s and 2000s, and this is a defining characteristic of the new middle-class cohorts. The economic growth that occurred during this period heightened the changes taking place in the employment structure as the importance of different economic activities shifted. All of the Latin American economies have witnessed an expansion of the tertiary sector along with a contraction of the industrial and agricultural sectors. The additional information that this middle-class cohort analysis provides is that these changes have been more significant in newer cohorts than in older ones.

In terms of the size of the new cohorts, this finding is not trivial, since people born in 1970 on went from accounting for 7% of the middle classes in 1996 to 44% in 2009.

The results point to a recent shift in the make-up of the middle classes from the standpoint of their component cohorts. The next question is whether we are simply dealing with a change in the composition of the middle classes or whether, in line with the classical school of thought regarding social classes as espoused by Marx and Engels (1989) and Weber (1964), the important point is to determine whether this entails inequalities in terms of access to economic resources and income distribution.

IV

Middle-class cohorts, income inequality and meritocracy

In order to determine whether the trends discussed thus far denote seomthing more than a change in the occupational structure, the next step is to find out whether new cohorts' membership in the middle classes correlates with differences between their and older cohorts' income levels. We will seek to determine whether inequality increases or decreases in new cohorts and what factors influence how much they are paid.

The most widely accepted indicator of income distribution in empricial studies is the Gini coefficient. The available data can be used to compute this indicator for employed persons as a whole with a view to determining whether there is greater or less inequality in the two age-based groups of cohorts that we have been examining.

The data will not be disaggregated further than this in order to avoid problems of statistical representativity. The Gini coefficient distribution of the earned (labour) personal income of employed persons, by age, for the new and older cohorts is shown in figure 5.[10] As the

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[10] Problems of statistical representativity –which place a limit on how much data can be disaggregated– arise as a result of the fact that the first step is to calculate a Gini coefficient for all the people of each age (one-year age groups) for each survey. In order to lessen the statistical error that this procedure generates, moving averages for five-year age groups have been used to calculate the Gini coefficients for each one-year age group for all the surveys covered by this analsyis. Simple averages of the Gini coefficients for the one-year cohorts are then reported for the younger and older cohorts.

newer cohorts are composed of people who were born in 1970 or later, they included people of up to 39 years of age at the time of the 2009 survey. This is therefore the upper age limit for the comparison.

FIGURE 5

Gini coefficients for employed persons, by age[a] and by membership in new or old cohorts,[b] 1990-2009
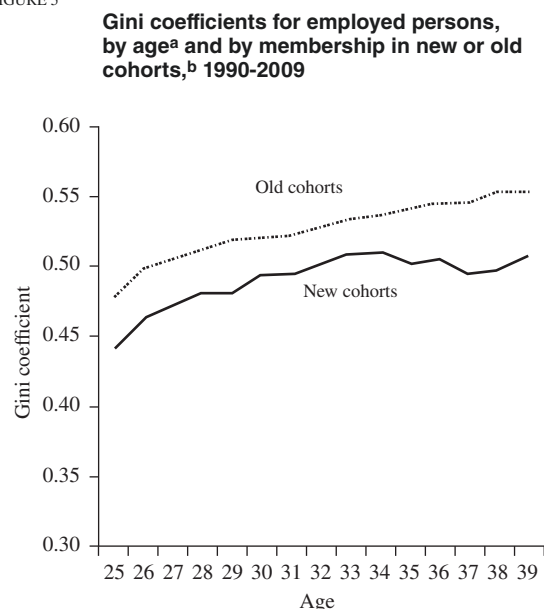
Source: National Socio-economic Survey (CASEN), 1992 - 2009.
Note: Earned personal income corresponds to the YAUTAJ variable used in CASEN surveys.

[a] Gini coefficients caculated as moving averages of earned personal income for persons between 25 and 39 years of age.
[b] New cohorts: Persons born in 1970 or later.
   Old cohorts: Persons born before 1970.

Income inequality as measured by the Gini coefficient is, in general, fairly low for younger persons and rises with age, although it does tend to level off somewhat in the newer cohorts, as shown in figure 5. In addition, the Gini coefficients of the newer cohorts are lower than those of the older cohorts, with an average differential of 0.04 points of the coefficient. This is in line with what Sapelli (2011a) has found to be the case for the Chilean population as a whole. In other words, there has been a change in the overall trend with regard to newer cohorts, which are subject to less inequality at the same age than earlier cohorts were. For example, for the period from 1990 to 2009, the Gini coefficient was 0.53 for employed persons aged 35 in the cohort of persons born before 1970, whereas it is only 0.50 for persons aged 35 who were born after that year. Here,

we have calculated the average Gini coefficient during the review period for the two groups of cohorts between which we have drawn an empirical distinction (i.e., those born before 1970 and those born in 1970 or later), but if the coefficients are computed for each one-year age group, then the sharpest jump is seen in the group of people born in 1971.

The fact that the Gini coefficient is lower for persons of all ages in the new cohorts than it is for people in the old cohorts (see figure 5) corroborates the validity of the distinction made between these two groups of cohorts, since this reflects a clear-cut cohort effect rather than just an age effect. This statement applies to employed persons as a whole; we cannot make it specific to the middle classes because of the problems of statistic representativity mentioned earlier. However, later on we will come back to this point and look at the effect on income of membership in each of the strata of the middle class, both for the new and the older cohorts.

The search for an explanation for the lower degree of income inequality found in the newer cohorts gives rise to two types of discussions regarding the middle classes. First, from an inter-cohort standpoint, one question to be asked is whether this lower degree of inequality may be at least partly attributable to the upward transition to employment in the services sector seen in these cohorts, which are chiefly composed of people who have completed their university or technical education. In theory, this opens the way for an equalizing, "meritocratic" effect (a possibility that will be explored later on), especially when higher education is within the reach of people not belonging to elite groups – which has increasingly been coming to be the case in Chile for several decades now. Second, the question arises as to what the main causes of the lower degree of inequality observed in the new cohorts may be.

The trend in the Gini coefficient, by cohort, in recent years (see figure 5) also poses a more general problem in connection with the level of inequality that it reflects, since even in the new cohorts, the coefficient is still quite high – far higher, for example, than the average Gini coefficient of 0.31 of the OECD countries (OECD, 2011). Thus, income inequality in the new cohorts is far from satisfactory, as noted by, for example, Sapelli (2011b). The expansion of the services class within the new cohorts has thus not led to any substantial reduction in inequality. This raises a question as to the effectiveness of education as an equalizing factor and, even more generally, as to the reasons why the level of inequality remains so high in both groups of cohorts.

Without seeking to establish any direct causal relationship between trends in the Gini coefficients for Chilean society as a whole and trends in the middle classes, the above opens up a number of avenues for exploration and points up the importance of taking a closer look at the inequalities existing in the new cohorts of the middle classes.

Maintaining the definition of new cohorts as those born in 1970 or thereafter, we will undertake an empirical analsyis of the differences in the income levels of new and older middle-class cohorts, with the focus being on determining which factors play a role in those inequalities and how closely they may or may not be aligned with membership in the middle classes. A multiple linear regression model –similar to the one employed by Leiulfsrud, Bison and Jensberg (2005) in studying the employed population of the European countries– can be used for this purpose. This will allow us to control for the effect of variables known to influence income, such as education and work experience, whose impact was originally postulated by Mincer (1974) and Becker (1975).

This regression model provides us with a picture of how important membership in a given social class is in determining the incomes of persons of the same sex who have the same number of years of work experience and a similar level of education (without considering any of the interactions among these variables). More specifically, the results given in table 1 refer to a benchmark income level that corresponds to the average earned income of a man who has not finished his basic education and who belongs to the class of unskilled manual workers. The computation is performed for members of the older cohorts (born between 1944 and 1969) and for members of the new cohorts (born between 1970 and 1984).[11] The results correspond to each of the CASEN surveys conducted in 1998 - 2009.

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[11] A similar exercise could be performed using the same linear regression for all the data, without dividing cohorts into separate groups, by adding a dummy variable that distinguishes between younger and older cohorts. However, this would mean that we would have to specify the age groups corresponding to those cohorts for each survey, a non-independent subset or combination of experience-related variables (as well as age data), which would mean that the high correlation to be expected among these variables would invalidate the results for each variable.

TABLE 1

Coefficients for the linear regression of the incomes of old and new cohorts,[a] 1998-2009

	Born between 1944 and 1969					Born between 1970 and 1984				
	1998	2000	2003	2006	2009	1998	2000	2003	2006	2009
Women	-0.25	-0.24	-0.24	-0.27	-0.26	-0.25	-0.25	-0.24	-0.29	-0.26
Apparent experience (age-years of school-6)[b]	0.34	0.28	0.29	0.26	0.21	-0.09	0.08	0.13	0.18	0.15
Apparent experience squared	-0.26	-0.17	-0.24	-0.24	-0.23	0.01	-0.07	-0.10	-0.12	-0.09
Completed basic education	0.08	0.10	0.09	0.09	0.08	0.03	0.06	0.06	0.07	0.07
Incomplete basic education	0.16	0.17	0.15	0.15	0.12	0.08	0.13	0.13	0.13	0.11
Completed secondary education	0.27	0.29	0.27	0.24	0.22	0.18	0.27	0.27	0.28	0.27
Incomplete technical or university education	0.18	0.16	0.16	0.14	0.12	0.13	0.16	0.19	0.19	0.17
Completed technical or university education	0.41	0.38	0.41	0.35	0.30	0.27	0.37	0.40	0.40	0.39
Services	0.21	0.20	0.20	0.20	0.21	0.31	0.28	0.31	0.28	0.30
Routine non-manual work	0.12	0.11	0.10	0.12	0.14	0.21	0.19	0.16	0.17	0.18
Small-scale entrepreneurs	0.19	0.17	0.19	0.17	0.16	0.14	0.11	0.15	0.13	0.12
Self-employed	0.26	0.21	0.23	0.23	0.27	0.25	0.19	0.21	0.19	0.22
Skilled manual workers	0.09	0.11	0.10	0.13	0.13	0.14	0.13	0.15	0.16	0.16
Farm labourers	0.02	0.06	0.04	0.07	0.09	0.05	0.07	0.06	0.07	0.08
Farmers	0.12	0.10	0.14	0.17	0.17	0.10	0.07	0.10	0.11	0.12

Source: 2009 National Socio-economic Survey (CASEN).

Note: The dependent variable corresponds to the logarithm of earned individual income. Earned personal income corresponds to the YAUTAJ variable used in the CASEN surveys.

Large- and medium-scale entrepreneurs (employers or owners of businesses in the services class) are excluded from the analysis. The results are statistically significant at 1% for all variables in both cohorts and for all years, with the exception of the variables for work experience in the new cohorts of the 1998 CASEN survey.

[a] New cohorts: People born in 1970 or later. Old cohorts: People born before 1970.
[b] Apparent experience is calculated as age-years of school-6.

The results shown in table 1 indicate that completion of a higher education is generally the factor that has the greatest influence on income levels, but the explanatory factors are not limited to education and years of work experience; social class also has a considerable impact. This finding is significant, because it means that being a member of the middle classes is also a substantive determinant of people's earned income levels. In addition, the earned income levels of members of the middle classes are fairly similar in that they are consistently higher than the incomes of unskilled manual workers. Nonetheless, the incomes of members of the routine non-manual occupational category are relatively closer to those of unskilled manual workers. All of these proportional differences remain in evidence and the variables continue to be statistically significant when the same linear regression is applied to the entire employed population between the ages of 25 and 65, with no distinction being made between different cohorts.

The results provided by an inter-cohort comparison of newer and older cohorts are particularly informative for the purposes of this study. As shown in table 1, class membership has a stronger relative impact on income levels among the new middle-class cohorts in the services and routine non-manual occupational categories than it does among the members of older cohorts.

Within the new cohorts, the incomes of members of the services class are strikingly higher than those of members of other middle-class strata and especially so compared to the incomes of manual workers. In other words, the occupational status of people in the services class in the new cohorts gives them access to clearly more advantageous earning opportunities.

From an intra-cohort perspective, the income trends for the new cohorts are particularly informative, since they not only trace past circumstances but also point the way towards possible future trends. One very interesting aspect is the possibility of seeing how the impact of having a higher education and the effect of membership in the services class have changed over time, since these variables have, as we have seen, played a very important role during the review period. The results relating to these factors are graphed in figure 6.

As can be seen from figure 6, in the case of newer cohorts, the income effect of having completed a university or technical education increased, in percentage terms, up to the early 2000s relative to the average pay levels of unskilled manual workers who had not completed their basic education. Since then, however, the effect of this variable has levelled off or even weakened as the number of graduates from universities and high-level technical institutes has risen. In other words, the well-known phenomenon by which the value added by education is devalued as education becomes available to the population at large has been at work. In contrast, membership in the services class continues to have a strong influence on income levels, although it fluctuates somewhat. These results make it possible to measure the effect of having completed a course of higher education; this could be analysed further to determine cross-university or cross-institution differences in terms of quality and prestige, as well as differentials in access to a high-quality education linked to the parents' class origin.

FIGURE 6

Relative income effect of completed higher education and membership in the services class for new cohorts, 1998-2009
(*Percentages*)
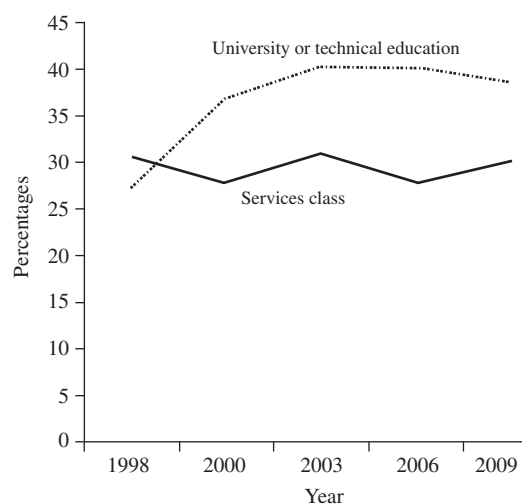
Source: original calculations on the basis of data presented in table 1.

Since, for the new cohorts in the services class, the simple fact of possessing a university degree has been devalued, the possession of a job in the services sector has come to have a greater influence on income levels, as is shown in figure 6. This is part of the reason why the level of income inequality remains high despite the spread of higher education, even in the new cohorts of the employed population, as is demonstrated by the Gini coefficients for these cohorts shown in figure 5. If a person hopes to earn a higher income, then that person will need to have, in addition to a degree, contacts with persons employed in the services class. The ability to make contact with people in that class can depend on such factors as having had a high-quality secondary education, having attended a prestigious university, having a means of networking with them (having "social capital", in the broad sense of

the term) (Barozet, 2006) and even having the ability to share certain cultural referents (i.e., "cultural capital) in a general sense. In addition, the ongoing incorporation of technological change spurred by the new information and communications technologies (ITCs) that are an inherent part of the globalization process is more readily embraced by more highly educated people than by persons with no more than a secondary school education who perform routine tasks in their jobs. This has the effect of heightening income inequalities (Mac Clure, Katz and Krueger, 2008) and calls for a discussion of the question as to what point this perpetuates inequalities within new cohorts and as to whether, regardless of the type of formal education initially received, the pace at which technological change is absorbed speeds up for people who are already employed in the services sector.

The results indicate that the income differential based on membership in different social classes remains in effect for most of the members of new middle-class cohorts and that it is actually greater in those cohorts than in the older cohorts in these intermediate categories (with the exception of self-employed persons and small-scale entrepreneurs). Membership in the new cohorts of the middle classes does appear to make a difference in terms of income, and this effect does not appear to be on the decline. This aspect is also closely related to the composition of the new cohorts, as discussed earlier. The

relatively higher incomes of people in the services class are linked to the rising percentage of the more recent population cohorts that belong to that class. By contrast, members of the routine non-manual occupational category do not earn as much as people working in the services sector, nor are they increasing in numbers within the new cohorts. Thus, in these new middle-class cohorts, there is a clear correspondence between average incomes –according to the linear regression model– and increases or decreases in membership in the relevant class.

In sum, the results discussed here indicate that new cohorts of the middle classes are not simply an occupational category but instead, at least from the standpoint of income levels, share a number of characteristics that set them apart from other classes and from older cohorts of the middle class. In addition, income differences between members of these new middle-class cohorts correspond to their membership in one or another stratum of that class. Furthermore, among the new cohorts in the services class, which act as a driving force within the middle classes, social class is having a significant and growing relative impact on their income levels in recent years. This finding does not provide any evidence to support the idea that progress is being made towards an increasingly meritocratic society in which opportunities and income levels are primarily determined by educational level.

V

Conclusions

The economic and social developments within Chilean society witnessed in the last two decades have generated a change in the middle classes. The cohort analysis performed in this study provides evidence of the emergence of a new middle class which is populated by people who were born in 1970 or later and who became full-fledged members of the labour force during the time of strong economic growth seen in the 1990s and 2000s. This pattern and the break in the trend that separates those born from 1970 or later from those born before that time constitute an informative contribution to the study of middle-class cohorts that has been made possible by the use of a cohort analysis methodology.

This cohort analysis also clarifies the fact that this process is not limited to the emergence of a middle class formed by people who would otherwise have been members of poorer classes; it must also be described in broader terms that encompass the various middle classes. It can

be concluded that the services class occupies a preeminent position within the middle classes and specifically the new middle classes – a finding that contributes to a better understanding of today's middle class. Relative to total employment patterns in the country, the proportion of the new middle-class cohorts in the services class has expanded more than the proportions corresponding to other middle-class strata, making the services class the most dynamic component of the new middle classes. The income levels deriving from this class membership are higher than those of members of older cohorts who belong to the same class and than the incomes of members of other middle-class strata. In other words, the middle class in contemporary Chilean society is chiefly populated by a new class of professionals and trained technicians, most of whom have a higher education and work as employees of companies or institutions. This marks a "before" and an "after" in the Chilean middle class in terms of its component cohorts.

Membership in the new middle classes, along with other factors such as level of education, influences people's income levels, and this finding contributes to a beter understanding of some of the causes of the income inequality that exists in Chielan society. In addition, the emergence of a new middle-class generation has social, political and cultural effects that may be beginning to influence the direction in which today's society is moving and the social movements that are taking shape.

The cohort analysis methodology employed in this study offers a systematic basis for gauging the possible current and future trajectory of the middle classes. It can be posited that the new middle classes share a generational set of circumstances that will induce them to seek out better opportunities in the face of the social inequalities generated by those who came before them. This serves to delimit the issue of collective forms of solidarity raised at the start of this article, although it does not resolve it, since the set of circumstances shared by the new middle classes is only the beginning of the generational issue –as characterized by Mannheim (1952)– surrounding the presence or absence of a bond based on a shared path. In particular, it remains to be determined whether this path will take society in the direction of a mesocracy (i.e., governance by the middle classes) – a question that goes beyond the bounds of this article.

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Distributional effects of eliminating the differential tax treatment of business and personal income in Chile

Claudio A. Agostini, Claudia Martínez A. and Barbara Flores

ABSTRACT

This paper estimates the distributional effects that would result from eliminating the differential tax treatment of business and personal income in the Chilean tax system, as well as from the elimination of the main personal income tax exemption, the one for voluntary retirement savings. The results of the analysis show that, while the majority of taxpayers benefitting from this exemption are in the upper income brackets, its elimination would not make the income tax more progressive. As to removing the favourable tax treatment for corporate income, the distributional effect is of relevant magnitude and the income tax becomes significantly more progressive. Generally speaking, the results suggest that income taxation in Chile is less progressive than it appears and that it is feasible to give it a more important redistributional role in reducing income inequality.

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I

Introduction

The last 20 years have seen small changes in the levels of inequality prevailing in Chile, despite sustained economic growth and a sharp reduction in poverty.[1] While there is evidence that government transfers have had an impact in reducing poverty and inequality (Agostini and Brown, 2000 and 2011), there is much disagreement in the public debate over the role that tax policy can play in reducing income inequality.

Evidence for the United States shows that a revenue-neutral tax reform can in fact make the income tax more progressive and can reduce income inequality. For example, using data from the 1994 Consumer Expenditure Survey, Metcalf (1999) shows that a tax reform in which the existing graduated tax is replaced by a uniform sales tax (equivalent to a value added tax, VAT) that raises the same amount of revenue would be highly regressive. Specifically, if the income tax in force in 1988 had been replaced by a national sales tax of 16.5%, the Suits index would have declined from 0.202 (a progressive tax) to -0.286 (a regressive tax). Similarly, Altshuler, Harris and Toder (2010) estimate for the United States the distributional effects of a revenue-neutral tax reform that cuts corporate taxes (a regressive reduction) and at the same time raises the taxes paid by individuals on capital gains and dividends (a progressive increase). The net effect of the reform is progressive and reduces after-tax income inequality.

Even a flat tax with an exemption threshold can be progressive and can reduce after-tax income inequality. For example, using a dynamic general equilibrium model with household heterogeneity and a utilitarian steady-state social welfare criterion, Conesa and Krueger (2006) show that the optimal income tax for the United States is well approximated by a flat tax rate of 17.2% and a fixed deduction of US$ 9,400. More generally, Davies and Hoy (2002) demonstrate that, with a given pre-tax income

distribution and a requirement to keep revenues constant, after-tax inequality will decline monotonically with the tax rate under a flat tax system in which the personal exemption level is adjusted to keep revenues constant.

Lastly, it is important to consider the evidence on taxpayers' response to changing tax rates in terms of income reporting, in particular among high-income families. Lindsey (1987) finds that the reduction in the top marginal tax rate (from 70% to 50%) introduced by the Economic Recovery Tax Act of 1981 in the United States was associated with a significant increase in the portion of income reported by the top 1% of taxpayers. Feenberg and Poterba (1993) also show that the stable increase in the portion of gross taxable income received by the richest 0.5% of the population since 1970 is consistent with taxpayers' responses to the tax rate cuts for high-income families during that time. A time series analysis by Slemrod (1996), designed to isolate the nontax factors of inequality shows evidence consistent with tax cuts increasing the incomes of wealthy families. Kleven and Schultz (2011), using data from Denmark, found that the elasticity of taxable income is greater for high than for low incomes.

In the specific case of Chile, several characteristics of the income tax explain its limited role in reducing inequality (Engel, Galetovic and Raddatz, 1999). The income tax accounts for around a third of total tax revenues and, although it includes income from all sources, it treats the income of individuals differently from corporate income. The tax rate on corporate profits is only 17% when the profits are not distributed to the owners.[2] In the case of certain small businesses, no corporate taxes are due as long as the profits are not distributed.[3] When profits are distributed, the corporate tax already paid is considered a credit against the personal income tax.[4]

[1] Between 1990 and 2009 gross domestic product (GDP) per capita in Chile grew by 98% (World Indicators, World Bank). The poverty rate fell from 38.6% in 1990 to 15.1% in 2009. Indigence also dropped sharply in this period, from 13% to 3.7%. The Gini coefficient, on the other hand, was 0.56 in 1990 and 0.53 in 2000 (MIDEPLAN, 2010a and 2010b).

[2] In order to finance the reconstruction plan following the 2010 earthquake, this tax rate was raised temporarily to 20% in 2011 and 18.5% in 2012. After extensive debate, the national Congress approved a tax adjustment proposed by the government, setting a permanent tax rate of 20%, which is to come into force in 2013.

[3] 60% of firms fall under the general tax regime based on accrued earnings, and 40% have a special regime based on distributed profits or presumed income (Jorrat, 2009).

[4] In contrast to Chile, business profits in the United States pay corporate taxes first and the owners of the firm then pay personal taxes on the dividends received from the firm without any credit for the corporate taxes already paid. A portion of the retained profits is

For example, if a firm has profits of 100 Chilean pesos (Ch$ 100), it will pay Ch$ 17 in corporate taxes. Let us assume that the firm subsequently distributes Ch$ 50 in dividends to each of the owners, and that those persons, after totalling their income including dividends, are liable for Ch$ 20 in personal income tax. The tax paid by the firm then constitutes a credit against their personal income tax, so that in the end they have to pay only Ch$ 11.50 ($20 - 0.5*$17).

If all profits were distributed, this mechanism would not generate any problem in terms horizontal tax equity. However, data from the Internal Revenue Service show that less than 30% of corporate profits are distributed each year (Jorrat, 2009).

In addition, there are two special tax regimes under which corporate profits are taxed only when they are distributed.[5] The objective of these special regimes is to provide liquidity to small businesses.[6] However, they can also be used by small investment companies owned by a family group whose members can shift their personal income to corporate income. Empirical evidence shows that 52% of all retained earnings in Chile in 2006 are reported in family firms of this type, the owners of which belong to the highest income decile and make wide use of these special tax regimes (Jorrat, 2009).[7]

A second specific feature of the Chilean tax system is the high level of tax-exempted income, which is well above the average wage. This high level, together with a skewed income distribution, implies that few people actually pay income taxes. In 2009, 82.7% of taxpayers had incomes below the exemption threshold and, therefore, did not have to pay income tax. As a consequence, all the tax exemptions and incentives contained in the income tax benefit the top 17% of income earners in the country. Despite this, and notwithstanding the apparent public concern over inequality, recent years have seen an increase in the number of personal income tax exemptions designed to serve a variety of purposes (encouraging general savings and retirement savings, housing purchases, hybrid automobile purchases, purchase and installation of solar panels in dwellings, etc.), and Congress is now considering several additional incentives and exemptions.

According to statistics from the Chilean Internal Revenue Service (DIPRES, 2009), tax expenditures amounted to around 5.72% of GDP in 2010, and the main component of that expenditure (4.90% of GDP) is related to the income tax. The main source of tax expenditure is tax deferral (4.03% of GDP), which represents an amount almost equal to the total revenue collected through the income tax. Consequently, eliminating the deferral provision has the potential of nearly doubling income tax revenues. Among the various tax mechanisms for postponing the payment of income tax, the most important in terms of magnitude are undistributed profits (2.01%) and distributed profits reinvested before 20 days (0.94%).

This paper describes and analyses the impact that the voluntary retirement savings (*Ahorro Previsional Voluntario*, APV) exemption and the deferred payment of corporate income taxes have on the progressive nature of the income tax. To this end, data from the Chilean Internal Revenue Service (SII) and from the CASEN (National Socioeconomic Survey) are used. Both the APV and the corporate profits tax deferral were discussed as potential sources of revenue for financing the reconstruction effort following the 2010 earthquake, but no agreement was reached on eliminating these tax benefits.

The results show that the APV, although it is used by the highest income groups, has little impact in terms of making the income tax less progressive. However, the distributional effects of corporate profit tax deferral are indeed important. A shift in the tax base from "distributed profits" to "accrued profits", while maintaining the corporate tax credit for purposes of the individual income tax, makes the income tax significantly more progressive and raises the average tax rate paid by those with the highest incomes.

Previous studies have shown contrasting results with respect to this last point. On the one hand, Engel, Galetovic and Raddatz (1999), for example, find that this kind of change has no effect on the scanty impact of taxation on income distribution. They conclude that only targeted social spending can be effective in redistributing income. The main reason is that incomes across all deciles are very low and the average tax rate is barely 3%. It is important to highlight that in their study these authors used data from the CASEN survey,

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also taxed a second time when the owners of the firm obtain capital gains from these retained earnings.

[5] Articles 14bis and 14ter of the Income Tax Act. Under the article 14bis tax regime firms pay taxes only when profits are distributed. To be eligible for this tax regime a firm must have annual income of less than 5,000 UTM (until 2008 the cutoff was 3,000 UTM) and an initial capital of less than 1,000 UTM (200 UTM until 2008). Under the article 14ter tax regime, firms pay tax on the basis of cash flow, and they are allowed to keep simplified accounts and to deduct investments and inventories as expenses. To be eligible, a firm must collect and pay VAT, it must have annual income of less than 5,000 UTM on average for the last three fiscal years (3,000 UTM until 2008) and an initial capital of less than 6,000 UTM.

[6] Firms with annual sales of less than Ch$ 127 million (around US$ 270,000) or with capitalization below Ch$ 7.5 million (equivalent to US$ 16,600) can use these special regimes.

[7] 77.9% of all retained earnings belong to the highest income decile.

and consequently incomes for the higher deciles are underreported and the distributional effect of the income tax is therefore underestimated. Moreover, the authors assume that corporate profits are not distributed to the firm's owners, which also limits the potential redistributional power of the income tax. On the other hand, Cantallops, Jorrat any Scherman (2007), using SII data, show that a revenue-neutral tax reform that eliminates both income tax exemptions and special tax regimes for corporate profits and reduces the value added tax (VAT) would make the tax system more progressive and would contribute substantially to improving income distribution in Chile. In this case, taxing the retained profits of the firm's owners plays a key role in the outcome.

This paper uses SII data to analyse the impact of the APV exemption and the CASEN survey as the basis for examining the impact of a change in the corporate profits tax base. For the latter analysis, data equivalent to those employed by Engel, Galetovic and Raddatz (1999) are used, whereas the simulations in this study explicitly consider the distribution of profits to firm owners.

The paper then proceeds as follows. Section II looks in greater detail at the income tax in Chile, with particular emphasis on the current APV exemption. Section III presents the two databases used in the subsequent empirical analysis. Section IV analyses the distributional effect of the main existing exemptions and the mechanism for deferring corporate taxes. Finally, section V summarizes the principal findings and conclusions.

II

The Chilean tax system

1. General description

Tax revenue represents the main source of funding for the Chilean State, and generates around 70% of its total revenue. In 2010, net tax revenue represented 13.6% of GDP.[8] Of that amount, 53.6% was generated by the value added tax (VAT), 10.4% by specific excise taxes (on fuels, alcohol, cigarettes and tobacco), 32.2% by the income tax and the remaining 3.8% by taxes on legal transactions and foreign trade.

Since January 2013,[9] the income tax has a single permanent rate of 20% for corporate profits and a 7-bracket structure of marginal tax rates, plus an exemption threshold, for personal income. As noted above, the corporate tax rate does not determine the final tax burden on corporate profits, as the corporate tax is integrated with the personal income tax. The corporate tax is just a withholding tax from personal taxable income, and when profits are distributed among shareholders or owners of the firm, the dividends received constitute part of the personal tax base: they are added to all other income received, and individuals pay tax according to the tax bracket in which their income level

places them. For these purposes, corporate taxes paid in advance by the firm constitute a credit against personal taxes. In this respect, the corporate tax serves merely as a withholding of the personal tax that must ultimately be paid by the owners of the firm. However, there are two special tax regimes for small businesses that allow profits to be taxed only when they are withdrawn by the owners. In these cases, there is no 20% withholding from the accrued profits for each year. The tax expenditure inherent in deferring taxes until profits are distributed to the owners is estimated at 2.01% of GDP for the year 2010 (DIPRES, 2009).

The seven brackets of the personal income tax have marginal rates that range from 5% to 40%. The exemption threshold is such that 83.42% of taxpayers did not have to pay income tax in 2009.[10] Moreover, 10.8% of taxpayers are in the first income tax bracket and pay a marginal rate of 5%. As a result, only 5.78% of taxpayers face a marginal rate of 10% or more. When it comes to the highest marginal rate of 40%, only 0.22% of taxpayers are in this income bracket, meaning that, while the marginal rate of 40% may be considered relatively high compared to other countries in Latin America, in practice it applies to fewer than 1% of individuals.

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[8] In 2008 this figure was 18.5% and the average for the period 2004-2008 was 17.4%, indicating that tax revenues were particularly low in 2009.
[9] The tax rate, which was 17% until 2010, was temporarily fixed at 20% for 2011 and at 18.5% for 2012.

[10] The exemption threshold was 508,302 pesos per month in the 2009 tax year, equivalent to US$ 908. This exemption threshold is higher than the average income in Chile, which was 269,921 pesos per month, equivalent to US$ 482.

Figure 1 shows the marginal tax rates in each bracket and the total number of taxpayers subject to those rates. It can be seen that the largest proportion of taxpayers face a marginal tax rate equal to zero. In light of this, it is not surprising that empirical simulations have shown that the income tax system in Chile has little redistributive power and that, in global terms, the tax system is slightly regressive (Engel, Galetovic and Raddatz, 1999).[11]

In general, the government can affect income distribution through progressive taxes and targeted spending. In practice, Chile has opted exclusively for the social spending route, while collecting taxes in the most efficient manner possible regardless of its distributional effects.[12]

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[11] According to the 2010 Budget Law, published by the Budget Office, the largest source of revenue is the value added tax (VAT), which in that year accounted for 32% of total revenue (41% of tax revenue). In light of this, and of the structure of the income tax, it is not surprising that the tax system is not progressive.

[12] In the 2009 CASEN survey the Gini coefficient of autonomous income per capita is 0.55, but after monetary transfers from the government it drops to 0.53.

FIGURE 1
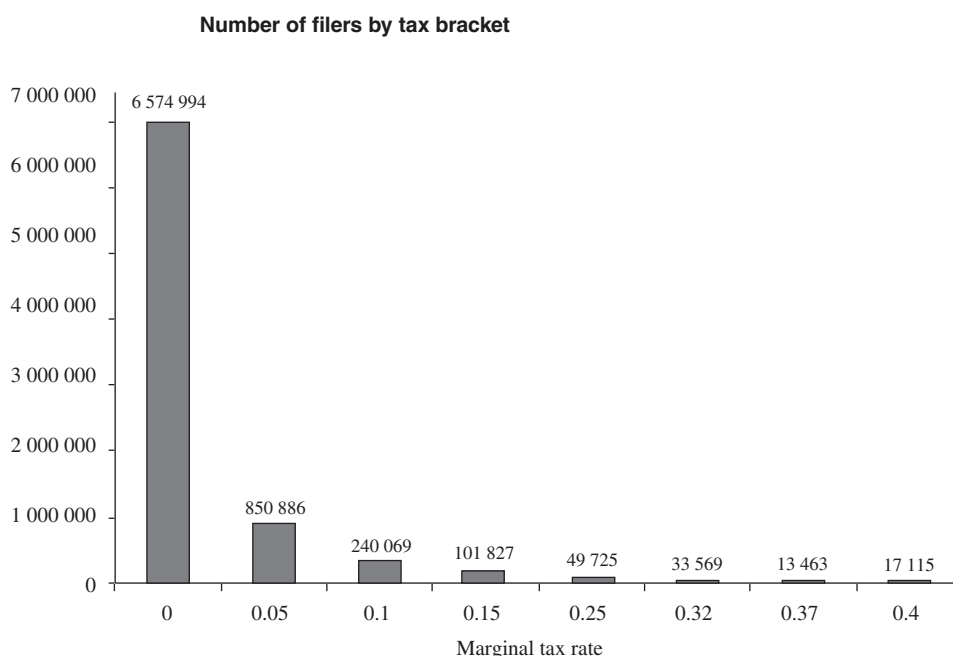
Number of filers by tax bracket

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

The structure of the Chilean income tax generates a salient horizontal tax inequity by granting preferential treatment to corporate profits in comparison to income from work. As a consequence, two persons with identical incomes may face very different tax rates. A person who earns only labour income pays tax at a marginal rate that can be as high as 40%, while a person whose income derives solely from business pays only 20% until the profits are distributed. If the firm comes under the special distributed profits tax regime it pays no tax at all until the profits are withdrawn as dividends. Obviously, this tax gap produces incentives to create firms for the sole purpose of paying less tax, leaving all personal savings in the firm as tax-free retained profits (or subject to a tax rate of 20% in the case of large firms).

The horizontal inequity thus generated by the income tax could potentially be only temporary and limited to a financial gain of the cost of money over time, because

once the firm's profits are distributed as dividends they are subject to income tax based on the tax bracket and the marginal tax rate on total income of the firm's owner. In this respect, the scope of the inequity would be limited to the financial gain attributable to the deferral of tax payment. However, Jorrat (2009) shows that less than a third of corporate profits are distributed each year, and that there are many legal loopholes for withdrawing profits without ever paying taxes on them, implying that the horizontal inequity is not only persistent over time but is of substantially greater magnitude.[13]

A second source of horizontal inequity is tax evasion (Slemrod and Yitzhaki, 2002; Slemrod, 2007), since a tax evader pays fewer taxes than a non-evader with the same income. In Chile, tax evasion is estimated at 30% for the corporate income tax and at 46% for the personal income tax. In the latter case, 92% of evasion comes from the distribution of profits and dividends to business owners (Jorrat, 2009).

At the same time, the Chilean tax system, like that in most countries, contains tax exemptions and credits with

multiple objectives.[14] However, it must be considered that, given the high exemption threshold for the personal income tax, these exemptions generate distributional effects only for the top 17% of income earners, who are those able to take advantage of preferential tax treatment. In this paper, the focus is on the retirement savings exemption, known as the voluntary retirement saving (APV), which involves a tax expenditure equal to 0.06% of GDP (see table 1).

2. Voluntary retirement savings (APV)

The main purpose of this exemption is to increase retirement savings through voluntary contributions to their individual capitalization accounts. Chile has a pension system based on individual capitalization accounts and compulsory savings, with monthly contributions of 10% of salary and wages, up to a ceiling of 64.7 UF (*Unidades de Fomento*, an inflation-linked accounting unit).[15] People can choose their pension fund manager (*administradora de fondos de pensiones*, AFP) and the risk profile of the assets portfolio in which their funds are invested. These compulsory savings are exempted from personal income taxes; in fact they are part of a worker's gross salary but are not considered in the tax base.

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[13] One way of withdrawing profits without paying tax is to generate expenses in the firm, which actually correspond to household consumption, e.g. through the purchase of automobiles and 4WD trucks or computers. Another alternative is to create debts artificially with related firms or to purchase all the shares of a related firm for a value that yields a tax-free capital gain. It is also possible to have children over the age of 18 as shareholders or partners: if they are not working, they can each withdraw amounts up to the tax-exempt threshold (around 6 million pesos a year).

[14] Table 1 shows the principal sources of tax expenditure in 2010.
[15] Pension fund managers (AFP) charge commissions to administer the compulsory retirement funds. For a description of the system, see Superintendencia de Pensiones (2003).

TABLE 1

Key items of tax expenditure in Chile, 2010

Tax expenditure	Millions of pesos	Percentage of GDP
Retained business profits pay no tax	3 660	2.01
Treatment of income in the pension fund system	1 723	0.94
Distributed profits reinvested before 20 days pay no tax	646	0.35
Other temporary differences	400	0.22
Special credit for housing construction	377	0.21
Accelerated depreciation	332	0.18
VAT exemption for health services	290	0.16
Housing rental income covered by DFL 2	250	0.14
VAT exemption for education establishments	239	0.13
Leasing quotas	228	0.12
Special treatment for voluntary contributions, contractual deposits and the APV	54	0.06

Source: Subdirección de Estudios, Chilean Internal Revenue Service (SII), September 2009.

Notes:
1. Includes tax returns in foreign currency.
2. Excludes negative expenditure items and items corresponding to the observed average.
3. Using an exchange rate of 522.46 pesos per dollar, corresponding to the average observed for 2008.

In 2002, the low replacement rates for pensioners in the system (39% for women and 58% for men, according to Berstein, Larraín and Pino, 2006) led to the creation of a tax incentive for additional voluntary contributions to individual capitalization accounts: the APV (voluntary retirement savings). Since October 2008, people using this benefit can choose between two tax alternatives. The first is a tax exemption for the voluntary contribution at the time it is made, i.e. the amount of the APV is deducted from taxable income. Voluntary contributions are deducted from taxable income up to a maximum of 50 UF per month (with a ceiling of 600 UF per year). Subsequently, when the funds are withdrawn, they become part of taxable income in the year in which they are withdrawn. If the funds are withdrawn after retirement age, the tax rate is that for the corresponding tax bracket in the regular personal income tax structure. If the funds are withdrawn before reaching that age, an additional tax of between 3% and 7% has to be paid, thereby penalizing the use of the funds for other than retirement purposes.

The second option, in contrast to the first, does not exempt the APV from the tax base in the year the contribution is made. The tax benefit materializes when the funds are withdrawn, at which time only the return to savings become part of taxable personal income. Moreover, the person receives a 15% contribution from the State, to a maximum of six Monthly Tax Units (UTM) per year.

The two alternative tax incentives available are intended to boost the retirement savings of two different kinds of taxpayers. The first alternative benefits people who must pay personal income tax in the year in which they make the voluntary retirement contribution. The second alternative benefits individuals who are exempt from personal income tax at the time they make their contribution to their retirement fund account. This second option was created in 2008, six years after the creation of the APV.

Since the marginal income tax rates rise with the level of income, the APV tax benefit also rises with income, up to a ceiling. Therefore, when people with different income levels but with the same amount of APV are compared, the tax benefit that each receives as a fraction of their income is exactly that person's marginal rate, provided the APV is less than the ceiling and the exemption does not bring the person into a lower income tax bracket. For example, if the APV is 200,000 pesos (around $ 450), the tax savings is 10,000 pesos for a person in a tax bracket where the marginal rate is 5%, and it is 80,000 pesos for a person in the 40% tax bracket.

Obviously, people who pay no income tax because they are exempt, as is the case for 82% of workers in Chile, will not benefit from this tax exemption. Exempted persons do receive a tax benefit under the second option described above, but only when they retire and not when they make the APV investment.

According to statistics from the Superintendency of Pensions, in December 2010 there were 827,574 APV accounts in the system, with an accumulated balance of 1,000,817,424 pesos. The tax expenditure associated with these accounts is estimated at 0.8% of personal income tax revenue.

III

Empirical analysis

Two different sources of data are used for the empirical analysis of the distributional impact of the APV tax exemption and the preferential treatment of corporate profits.

First, data from the SII produced especially for this study are used. The SII has a policy of not providing individual taxpayer data, releasing only highly aggregated figures on revenues by type of tax.[16] However, for purposes of this study the SII supplied data for the year 2007 at a substantially disaggregated level, calculating pre-tax income and the various exemptions used by taxpayers for 1000 income quantiles. These data allow a detailed analysis of the effects on tax progressivity of the main tax exemptions and credits in the personal income tax.

Second, the National Socioeconomic Survey (CASEN) for the year 2003 is used.[17] The data from that survey include the socioeconomic characteristics

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[16] The SII has long held that Chilean law prohibits the disclosure of individual taxpayer data, even if the information is completely anonymous.

[17] The 2006 and 2009 CASEN surveys, with the disaggregated income variables needed for this study, were not yet available while working on this study.

of household members, dwelling characteristics, the main durable goods in the household, and its different sources of income, including transfers received from the State.

The 2003 CASEN survey was conducted by the University of Chile for the Ministry of Planning and Cooperation (MIDEPLAN),[18] but the data were subsequently adjusted by the Economic Commission for Latin American and Caribbean (ECLAC) using the national accounts as a reference. The adjustments are related primarily to the problems generated by the lack of income data for certain households and the under- or over-reporting of certain income sources in the sample.[19]

The CASEN survey uses a random multi-step sampling method with stratification. In the first step, each of the country's 13 regions is divided into rural and urban zones and the primary sampling units are selected with probabilities proportionate to the population. In the second step, given the stratification, households are selected so that all of them have the same probability of being selected in the sample.[20]

Table 2 provides a statistical description of data from the 2003 CASEN survey. In the expanded sample there are 6,921,064 individuals with positive incomes.[21] The average autonomous income (excluding monetary transfers from the State) is Ch$ 311,803 (equivalent to US$ 660). Pre-tax income is calculated on the basis of each individual's income as calculated in the survey, adjusted to replicate the income tax base. This adjustment requires consideration of components of autonomous income that are not part of the personal income tax base, such as the value of self-consumption, imputed housing income in the case of home ownership, rental income and presumed costs for income as self-employed.[22]

Once the pre-tax income of each individual is calculated, the structure of marginal tax rates by income bracket is applied and then each person's tax liability estimated. The average income tax rate for persons in the CASEN survey is 0.5%, slightly below the average of 0.6% in the SII data. Because the sample is nationally representative and the structure of the sample is considered when the average is calculated, the difference between the two average tax rates may indicate income tax avoidance and evasion or may simply reflect the fact that higher-income individuals are generally not

[18] The name of this entity was changed to Ministry of Social Development in October 2011.
[19] While the adjustments made by ECLAC could have introduced some bias in the data, the evidence suggests that this did not happen (Contreras and Larrañaga, 1999). In any case, unadjusted data are simply not available.
[20] The methodological framework is available at: http://www.mideplan.cl/casen/pdf/Metodologia_%202003.pdf

[21] The unexpanded sample covers 68,153 households containing 257,077 individuals.
[22] Pre-tax income using the CASEN is calculated as: autonomous income-self consumption-imputed rent-receipts not constituting income-presumed expenses (up to the ceiling allowed for the self-employed).

TABLE 2

Descriptive statistics based on the 2003 CASEN survey

Variable	N° of observations	Mean	Standard deviation	Minimum	Maximum
Independent income	6 921 064	311 803	757 864	46	80 000 000
Self-consumption	6 921 064	1 070	9 773	0	823 334
Self-supply	6 921 064	1 042	15 198	0	2 964 000
Rental value	6 921 064	31 750	45 663	0	2 185 000
Property rental	6 921 064	4 416	179 642	0	60 000 000
Property rental 2	6 921 064	81	4 625	0	833 333
Presumed expense (fees and commissions)	6 921 064	3 432	28 431	0	2 400 000
Interest and dividends	6 921 064	91	3 670	0	594 780
Pre-tax income with self-reported interest and dividends	6 921 064	3 239 053	8 365 931	324	666 000 000
Pret-ax income with imputed interest and dividends	6 921 064	9 259 341	227 000 000	324	39 600 000 000
After-tax income with self-reported interest and dividends	6 921 064	3 062 463	6 145 910	324	410 000 000
After-tax income with imputed interest and dividends	6 921 064	6 750 239	136 000 000	324	23 800 000 000
Average tax rate (self-reported interest and dividends)	6 921 064	0 005	0 022	0	0 385
Average tax rate (imputed interest and dividends)	6 921 064	0 008	0 037	0	0 400

Source: prepared by the authors on the basis of the 2003 National Socioeconomic Survey (CASEN).

represented in the survey.[23] The average maximum rate in the CASEN survey is 38.5%, higher than the average top rate of 37.09% calculated from SII data. If business profits are included as part of the personal income tax base regardless of whether they are distributed or not, the average tax rate rises from 0.5% to 0.78% and the average maximum rate increases from 38.5% to 39.9%.

Table 3 shows descriptive data of the tax database from the SII. Each income quantile contains 7,422 or 7,423 taxpayers. The data consist of tax returns aggregated for each of the 1,000 pre-tax income quantiles. The average personal income tax rate paid for all taxpayers in Chile is 0.626%. The maximum rate is 37.09% in the last income quantile, i.e. the one containing the richest 0.1% of taxpayers in the country. The low average rate obviously reflects the fact that the great majority of taxpayers have a rate of zero. The average rate rises to 0.627% when the APV tax benefit is eliminated.

[23] Obviously, this could be a simple sampling error.

TABLE 3

**Descriptive statistics based on administrative data
from the Chilean Internal Revenue Service**

Variables	Nº of observations	Mean	Standard deviation	Minimum	Maximum
Nº of taxpayers	1 000	7 422	0	7 422	7 423
Withdrawals (Arts. 14 and 14 bis)	1 000	3 790 000 000	53 300 000 000	0	1 670 000 000 000
Dividends (Arts. 14 and 14 bis)	1 000	268 000 000	2 460 000 000	0	70 600 000 000
Expenses disallowed	1 000	970 000 000	13 600 000 000	0	421 000 000 000
Presumptive income	1 000	296 000 000	675 000 000	0	13 400 000 000
Income per simplified accounts (Art. 14 ter)	1 000	247 000 000	883 000 000	0	18 100 000 000
Professional and directors' fees	1 000	2 880 000 000	6 750 000 000	0	125 000 000 000
Income from securities, withdrawals of freely available surpluses, and capital gains	1 000	157 000 000	785 000 000	0	19 600 000 000
Income exempted from GC [graduated general income] tax	1 000	36 600 000	344 000 000	0	10 300 000 000
Income art. 42 (salaries, pensions etc.)	1 000	8 500 000 000	27 100 000 000	0	440 000 000 000
Increase in corporate income	1 000	692 000 000	10 400 000 000	0	325 000 000 000
Corporate and property taxes paid	1 000	962 000 000	13 100 000 000	0	405 000 000 000
Capital losses	1 000	65 000 000	254 000 000	0	5 750 000 000
Pension contributions by owners or partners	1 000	2 774 558	16 300 000	0	286 000 000
Mortgage allowances	1 000	429 000 000	1 020 000 000	0	6 150 000 000
Mutual funds and APV	1 000	38 300 000	186 000 000	0	2 230 000 000
GC tax base	1 000	14 500 000 000	46 700 000 000	0	826 000 000 000
Mutual funds	1 000	255 079	2 023 752	0	52 600 000
Ahorro Previsional Voluntario (APV)	1 000	37 900 000	184 000 000	0	2 220 000 000
57 bis (net positive savings)	1 000	5 185 888	38 900 000	0	957 000 000
Global complementario [graduated general income] tax	1 000	-59 100 000	3 070 000 000	-3 230 000 000	89 500 000 000
Tax base	1 000	31 500 000 000	105 000 000 000	48 236	2 980 000 000 000
Tax base without deduction of APV	1 000	31 500 000 000	105 000 000 000	48 236	2 980 000 000 000
Tax calculated on tax base	1 000	2 240 000 000	35 600 000 000	0	1 100 000 000 000
Tax calculated on tax base without deduction of APV	1 000	2 250 000 000	35 600 000 000	0	1 110 000 000 000
Average tax rate applicable to tax base	1 000	0.00626	0.02377	0.00000	0.37090
Average tax rate applicable to tax base without deduction of APV	1 000	0.00627	0.02384	0.00000	0.37092
APV exemption	1 000	37 900 000	184 000 000	0	2 220 000 000

Source: Chilean Internal Revenue Service (SII) database.

Note*:* under Article 14 ter businesses are taxed on the basis of their cash flow; they may keep simplified accounts and deduct investments and inventories as expenses. To be eligible, firms must collect and pay VAT, they must have annual sales of less than 5,000 UTM (the average for the last 3 business years was 3,000 UTM until 2008) and their initial capital must be less than 6,000 UTM.

IV

Empirical findings

As discussed in the description of the Chilean income tax system, there are two main factors reducing the progressivity of the income tax. The first is the preferential tax treatment of retained profits, especially in the case of small businesses that pay taxes only when profits are withdrawn. This creates incentives to disguise personal income as corporate income and thereby defer or even avoid the payment of personal tax. The second is the set of tax incentives for personal savings and investment: this paper focuses in particular on the APV tax benefits.

Ideally, SII data would be used to analyse the effect of these two sources in the reduction of tax progressivity. However, SII tax data are available only for personal incomes as reported in the personal income tax return form. Thus, the information on withdrawals and dividends relates only to profits that have been distributed and not to those that are retained in firms. Although the SII has information on the profits of each business through the corporate tax returns, it would be necessary to allocate each firm's retained earnings to each of its owners in proportion to their shares in the firm. Such information was not available from the SII for purposes of this study, nor is it made public. Therefore, the impact of tax exemptions and deductions is analysed using data for 1000 SII quantiles and the impact of the special treatment of retained profits using data from the CASEN survey.

The two empirical analyses presented below make the assumption, as do Metcalf (1999) and Altshuler, Harris and Toder (2010), that the tax incidence on labour income falls on individuals and the incidence of corporate income taxes falls on firms.[24] It is important to note that this assumption about the impact of corporate taxes affects, as a practical matter, only the degree of progressivity of the tax. Evidence for the United States shows that the tax is always progressive, even when the burden falls on salaries and wages instead of on capital (Harris, 2009).

The basic principle of horizontal equity in tax policy simply requires that two individuals receiving the same income should pay the same amount in taxes, regardless of the source of that income. Complementarily,

the principle of vertical equity holds that persons with higher incomes should pay higher taxes on average. A tax is progressive, then, if the average tax rate paid rises with income.

One of the indices most widely used in the literature for quantifying the degree of progressivity of a tax is the Suits index (Suits, 1977), which measures progressivity using a Lorenz curve for income and tax revenues as shown in figure 2.

If the area under the proportional line is defined as K and the area under the Lorenz curve as L, the Suits index is defined as follows:

FIGURE 2

Suits index
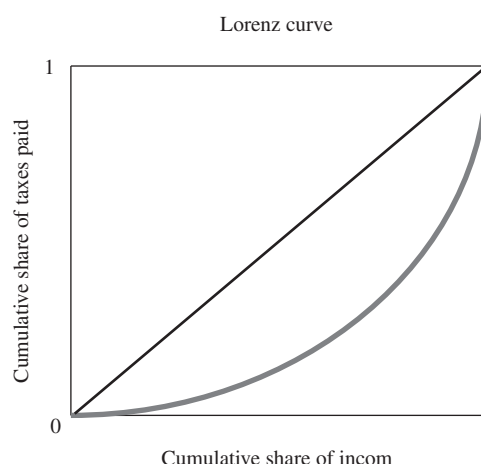
Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

$$S = 1 - \frac{L}{K} = 1 - \frac{1}{5000} f_0^{100} T(Y) dY$$

The Suits index has values between -1 and 1. Thus, if the tax is proportional then S = 0; if the tax is progressive, S > 0; and if the tax is regressive, S < 0. The Suits index makes it possible to analyse changes in progressivity resulting from changes in tax codes, and a re-sampling ("bootstrapping") statistical technique

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[24] Similarly, Altshuler, Harris and Toder (2010) assume that the highest tax rates on capital gains and dividends are borne directly by the persons reporting this type of income in their tax returns.

can then be used to estimate confidence intervals for the index. This allows testing hypotheses about changes in progressivity due to tax changes (in the tax base or in tax rates).

1. Simulations with tax data

The following section presents the effects on income distribution of eliminating the APV tax incentive.

The potential distributional effects of this exemption depend on the structure of income brackets and of marginal income tax rates, as well as on the distribution of pre-tax income. Figure 3 shows the average tax rate by income quantile, from which it can be seen that the fraction of persons paying income taxes in Chile is small. If pre-tax income is distributed among 1,000 quantiles, only persons in quantiles 824 and higher have a positive tax liability. In other words, 82.3% of individuals fall below the exemption threshold and, therefore, do not pay personal income tax.[25] The average tax rate for the total population of taxpayers is 0.63%, a figure that rises to 3.54% when the population is limited to those

actually paying taxes. The average top rate is 37.1% for the 1,000th quantile.

Figures 4 and 5 show the APV distribution by income level. As can be seen from figure 4, the APV is close to zero in the first 800 quantiles and is positive in those income levels for which the marginal tax rate is greater than zero. In both figures, it is clear that the use of APV rises with income level, as would be expected since tax savings are greater for higher income levels (up to the ceiling of 600 UF or 6 UTM per year, depending on the regime selected). Figure 6 also shows that the ratio of APV to pre-tax income also rises with income. In this case, the effect of the APV cap becomes clearer: once the ceiling is reached and income exceeds that level, the APV falls as a proportion of income. Nevertheless, it is important to note that the average ratio is barely 0.3%.

The evidence on APV use by level of income suggests that eliminating this tax benefit would make the personal income tax more progressive. However, as the APV fraction is low in relation to pre-tax income and the great majority of filers are exempted from the tax, the distributional impact is limited. This can be seen in figure 7, which shows the level of tax exemption resulting from the APV for those income quantiles that have positive average tax rates.

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[25] In these circumstances, the existence of seven marginal tax rates seems odd.

FIGURE 3

Average tax rate by income quantile

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

FIGURE 4

Voluntary retirement savings accounts (APV) by income quantile

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

Note: the APV variable has been scaled, dividing its value by 100,000.

FIGURE 5

**Voluntary retirement savings accounts (APV) by
income quantile with positive average tax rates**

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

Note: the APV variable has been scaled, dividing its value by 100,000.

FIGURE 6

**Voluntary retirement savings accounts (APV) as percentage
of income for levels with positive average tax rates**

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

FIGURE 7

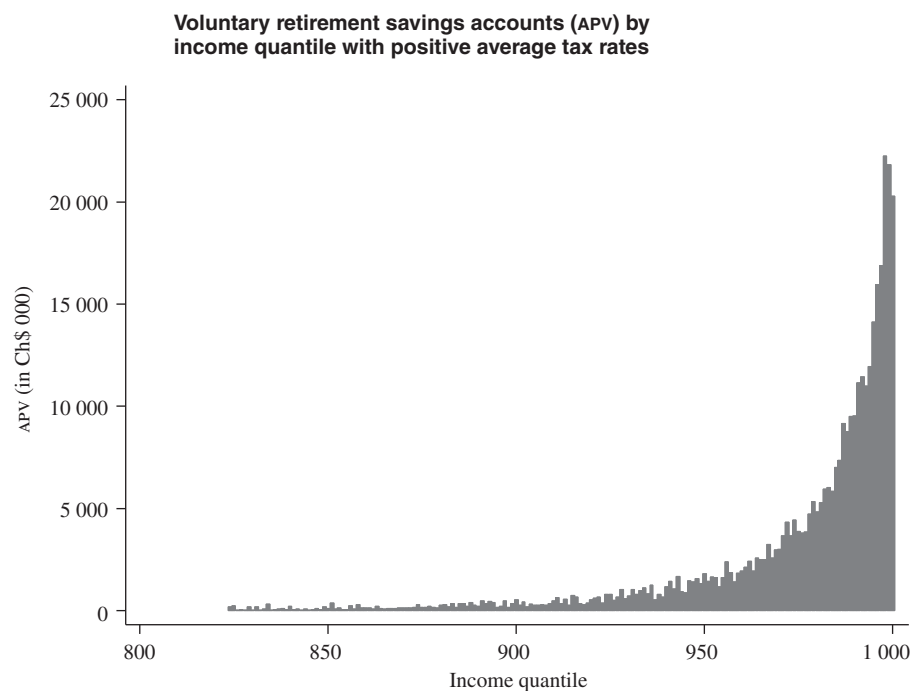**APV exemption by income quantile with positive average tax rates**

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

Note: the exemption variable has been scaled, dividing its value by 100,000.
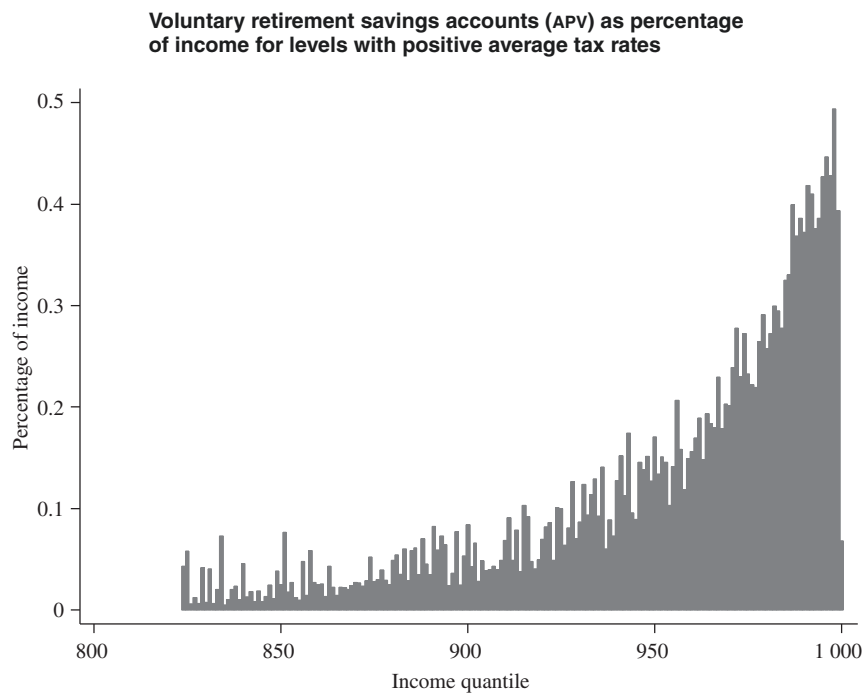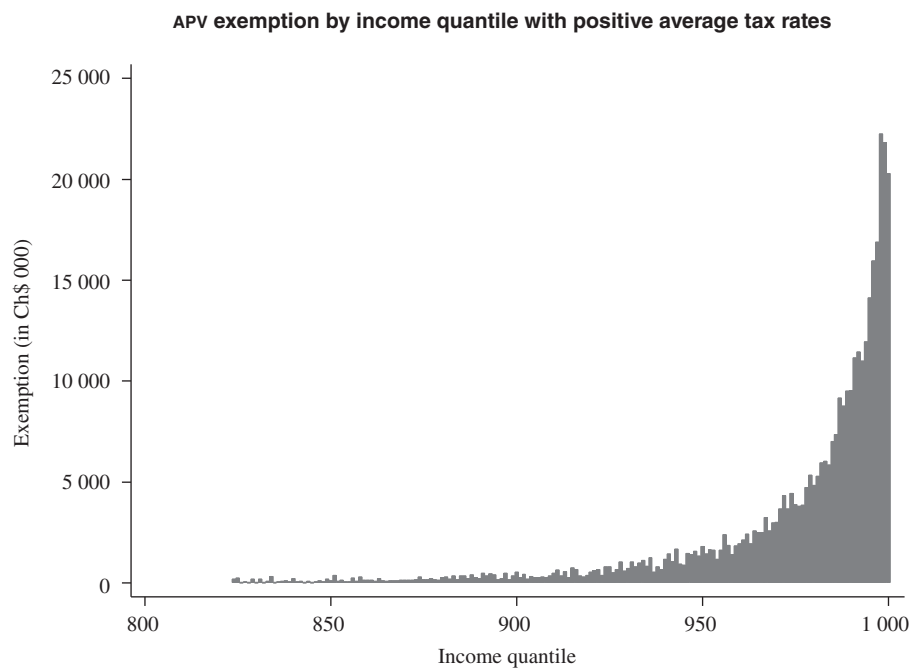
Table 4 shows the Suits index for the personal income tax with and without the APV tax benefit. The index declines from 0.67995 to 0.67951, a change that is small in magnitude but opposite in direction to what would be expected, i.e. towards lesser rather than greater progressivity. The change in the index is statistically significant. As can be seen in table 4, the zero value is not contained in the estimated confidence interval. However, in terms of economic rather than statistical importance, elimination of the APV tax benefit would have no meaningful impact for purposes of changing the potential redistributional role of the personal income tax.

One possible explanation for the reduction in the progressivity of the personal income tax that results from eliminating the APV exemption is the role played by the tax benefit cap. For high-income individuals who contribute with the maximum APV, the ceiling represents a small fraction of their taxable income, and consequently their average tax rate would scarcely rise if the benefit were eliminated. By contrast, for lower-income individuals (with positive but low marginal tax rates), the APV benefit cap represents a greater fraction of their taxable income, and consequently their average tax rate would rise significantly if the benefit were eliminated. In fact, the increase in the average tax rate for the first 10 quantiles of individuals with a positive marginal rate is 1.09 percentage points,[26] while for the 10 highest income quantiles it is 0.34 percentage points.[27]

A situation in which the increased revenue from elimination of the APV exemption is distributed proportionately among the population is also simulated. In this case, the Suits index rises slightly from 0.67995 to 0.68001. This would indicate that the personal income tax has become more progressive. The difference between the two indices is statistically significant, as the estimated confidence interval does not contain the value zero (see

table 4). In economic terms, however, the change in the index would have no meaningful distributional effect.

The Suits index is an application of the Gini coefficient for measuring tax progressivity. As such, it constitutes a measure of average progressivity across the entire range of incomes. This must be considered in interpreting the index, because there are tax systems that can be progressive in one income range and regressive in another. In this respect, the Suits index cannot capture the more subtle details which require information on higher-order moments in the distribution of tax payment (variance and kurtosis, for example).

In the case of Chile, changes in tax progressivity through the elimination of exemptions and deductions or changes in positive marginal tax rates can take place only within the income range of that small portion of taxpayers who actually pay personal income tax. The only tax change that would affect a greater number of taxpayers is the reduction of the exempt-income threshold. Because the Suits index implicitly gives greater weight to the taxes paid by persons who fall in the midrange of the distribution, and because in Chile persons who fall within this midrange pay no taxes, tax changes that merely increase the taxes paid by high-income groups —who are at the right-hand end of the distribution— cannot be expected to have much impact on the index. It can be argued that the Suits index —although it is the most widely used in the economic literature and in tax policy analysis (Congressional Budget Office, 1988)— is not the most appropriate one for assessing the progressivity of an income tax structure such as the Chilean one. However, it is not clear which index would be more appropriate because, to date, no other measure has been shown to be superior to the Suits index for this purpose.[28]

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[26] The average tax rate for these 10 quantiles rises from 0.108% to 0.110% when the APV exemption is eliminated.
[27] The average tax rate for these 10 quantiles rises from 18.441% to 18.504%.

[28] Seetharaman and Iyer (1995) have criticized the seven most widely used indices of tax progressivity, including the Suits index. Similarly, Kiefer (1984) identified inconsistencies in various progressivity indices that have been proposed. Finally, Greene and Balkan (1987) compared various indices used in the academic literature.

TABLE 4

Suits index

	Suits index	Difference between Suits indices	Confidence interval for difference between Suits indices	
Base case	0.67995			
Without APV exemption	0.67951	-0.0004369	-0.00043689	-0.00043671
Proportional allocation of increase in revenues through elimination of APV exemption	0.68001	0.00006045	0.00006045	0.00006047

Source: prepared by the authors using administrative data from the Chilean Internal Revenue Service (SII).

2. Simulations with data from CASEN survey

Using data from the 2003 CASEN survey, which contains specific information on all sources of individual income (wages and salaries, rent, interest, capital gains, dividends, profits withdrawals from businesses, capital income), a change in the tax base for dividends and profits that involves a shift from distributed profits to accrued profits was simulated. This change in the tax base maintains the integration of the corporate tax with the personal income tax, whereby a credit against personal income tax is granted for corporate tax paid on accrued profits. In this way, the final income tax rate is the personal rate paid by the firm's owner or shareholders.

The survey data do not show which fraction of the profits is distributed and which portion is maintained as retained earnings. For simulation purposes, then, it is assumed that the total of retained earnings estimated by Jorrat (2009) is proportional to the dividends reported by each individual in the CASEN survey. In this way, an amount of retained earnings is imputed to each individual in proportion to the dividends received.[29] Then, the individual's pre-tax income and the taxes that would have to be paid according to the two different tax bases (distributed profits and accrued profits) are calculated.[30]

Table 5 shows the average tax rate for each percentile of income before and after this change in the tax base. As can be appreciated from the table, there are two significant implications. The first is that many taxpayers below the 86th percentile will now pay a positive tax rate, whereas before the reform they paid no taxes. This reveals the scope of the horizontal inequity that currently exists in the tax base: in fact, many taxpayers who would have to pay taxes in light of their income level are able to defer those taxes because their main sources of income are the profits of firms of which they are owners. If these taxpayers had the same level of income but derived solely from wages and salaries, they would pay tax in accordance with the current tax base, as that base would not be changed through the addition of corporate profits. The second implication of this reform is that those taxpayers who now pay personal income tax would face a much higher marginal tax rate, as they would move into a higher income bracket. A tax reform such as that simulated in this study would certainly spark a behavioural response from taxpayers, who would try to reduce their tax burden (by working less, for example). Consequently, the change in progressivity resulting from this tax reform must be considered as the maximum change that could be obtained by shifting the tax base from distributed to accrued profits.

[29] The annual interest and dividends received by individuals are calculated and their share in total interest and dividends received by the population are estimated. Then the 450,625,000,000 pesos of tax expenditure estimated by the Research Branch of the Internal Revenue Service for the year 2003 (Tax Expenditure Report, December 2004) are allocated among individuals according to each person's share in total interest and dividends.

[30] The Suits index is not used to examine the progressivity impact of tax reforms with CASEN survey data. There are two reasons for this: first, the progressivity of the income tax in Chile depends critically on the increase of the average tax rate of those who pay this tax, in line with increases in their incomes. However, as only 17.3% of income recipients pay income tax, the progressivity of the tax depends exclusively on what happens in the tail of the distribution. In the second place, the CASEN survey, with its primary focus on poverty, contains proportionally fewer observations in the upper tail of the distribution than do the SII population data. Despite these limitations, it is possible to calculate and report the average income tax rates as a correct approximation for quantifying the income distribution effects of a tax reform, but it is not possible to correctly measure the total progressivity of the income tax using the Suits index. These problems mean that, in calculating the Suits index with CASEN survey data, an index of about 0.23 is obtained, and this does not coincide with the Suits indices calculated from the SII date, which include the total population of taxpayers.

TABLE 5

Average tax rate by income percentile, before and after tax reform

Percentile	Average tax rate (distributed profits)	Average tax rate (accrued profits)
1	0.001	0.000
2	0.005	0.000
3	0.009	0.000
4	0.000	0.000
5	0.002	0.000
6	0.001	0.000
7	0.001	0.000
8	0.000	0.000
9	0.000	0.000
10	0.000	0.000

Table 5 (continued)

Percentile	Average tax rate (distributed profits)	Average tax rate (accrued profits)
11	0.003	0.000
12	0.001	0.000
13	0.000	0.000
14	0.000	0.000
15	0.000	0.000
16	0.000	0.000
17	0.000	0.000
18	0.000	0.000
19	0.001	0.000
20	0.004	0.000
21	0.000	0.000
22	0.000	0.000
23	0.000	0.000
24	0.000	0.000
25	0.000	0.000
26	0.000	0.000
27	0.001	0.000
28	0.000	0.000
29	0.000	0.000
30	0.000	0.000
31	0.001	0.000
32	0.003	0.000
33	0.002	0.000
34	0.001	0.000
35	0.000	0.000
36	0.001	0.000
37	0.000	0.000
38	0.002	0.000
39	0.001	0.000
40	0.001	0.000
41	0.000	0.000
42	0.000	0.000
43	0.001	0.000
44	0.000	0.000
45	0.000	0.000
46	0.001	0.000
47	0.007	0.000
48	0.002	0.000
49	0.002	0.000
50	0.001	0.000
51	0.001	0.000
52	0.002	0.000
53	0.001	0.000
54	0.001	0.000
55	0.000	0.000
56	0.002	0.000
57	0.001	0.000
58	0.002	0.000
59	0.002	0.000
60	0.001	0.000
61	0.003	0.000
62	0.001	0.000
63	0.000	0.000
64	0.002	0.000
65	0.001	0.000
66	0.002	0.000
67	0.000	0.000

Table 5 (concluded)

Percentile	Average tax rate (distributed profits)	Average tax rate (accrued profits)
68	0.001	0.000
69	0.001	0.000
70	0.006	0.000
71	0.001	0.000
72	0.002	0.000
73	0.001	0.000
74	0.003	0.000
75	0.004	0.000
76	0.001	0.000
77	0.002	0.000
78	0.001	0.000
79	0.001	0.000
80	0.002	0.000
81	0.004	0.000
82	0.005	0.000
83	0.003	0.000
84	0.004	0.000
85	0.007	0.000
86	0.002	0.001
87	0.007	0.003
88	0.010	0.006
89	0.013	0.008
90	0.018	0.011
91	0.018	0.014
92	0.027	0.016
93	0.028	0.018
94	0.036	0.022
95	0.034	0.024
96	0.039	0.028
97	0.048	0.037
98	0.068	0.052
99	0.098	0.078
100	0.211	0.188

Source: prepared by the authors on the basis of the National Socioeconomic Survey (CASEN), 2003.

V

Conclusions

This paper has examined the distributional effect of the main exemptions and deductions in the Chilean income tax. In addition to the CASEN survey, which is a well-known database widely used in several studies, an exclusive tax data generated by the SII was used.

The tax data show that 82% of individuals are exempted from the personal income tax owing to their income level and the structure of the income tax brackets and marginal tax rates. In this context, our empirical analysis shows that the APV exemption has no meaningful economic effect on the progressivity of the

income tax. Although those who take advantage of these exemptions and deductions are the individuals with the highest incomes, and although the use of that exemption rises with income, the relatively small magnitude of the tax benefits vis-à-vis income and the fact that few people face a positive tax rate implies that abolishing these benefits would do very little to make the income tax more progressive.

A different finding emerges when considering a tax reform that eliminates the most important benefit in terms of tax expenditure: that whereby the profits of

firms are taxed only when they are distributed to the owners. Based on CASEN survey data, and assuming a conservative scenario for profit distribution, a change was simulated in the corporate tax that would shift the payment of taxes to an accrual rather than a distributed basis but would maintain its integration with the personal income tax. The results of this empirical analysis show that a tax reform of this kind has a significant impact in terms of increasing the progressivity of the personal income tax and reducing after-tax income inequality.

The results of this study provide a useful and relevant analytical framework for understanding the income tax system in Chile and its potential as a tool for redistribution. In the first place, the fact that only 16.6% of taxpayers are subject to a positive tax rate means that any tax exemption will benefit higher-income groups. This limits the potential of income taxes as a tool for reducing the great income inequality prevalent in the country, and for that reason it should create public and parliamentary debate over the drawbacks of introducing exemptions in the income tax. Any exemption not only generates inefficiencies and incentivizes evasion, but also consistently favours the richest 10% of the population.

In the second place, given the small proportion of persons who actually pay taxes, the only changes with the potential to achieve a more progressive tax system are those that will affect large-scale tax benefits. One such change would be to eliminate the favourable tax treatment of the retained profits of businesses. In the third place, the fact that the elimination of tax exemptions has no great impact on the progressivity of the personal income tax does not mean that this cannot be used as a tool for income redistribution. The conclusion is that greater changes are needed in the current tax structure in order to make it an effective tool. One aspect for debate concerning the structure is the current level of exempted income, as a result of which nearly 83% of the population does not have to pay any income taxes.

This work could be extended in a number of useful ways which depend, unfortunately, on access to data supplied by the tax administration. In particular, there is room for a more detailed analysis of the other exemptions, credits and deductions that now exist in both the personal income tax and the corporate tax, not only to describe their distributional effects, but also to estimate their effects on individual taxpayer behaviour.

TABLE 6

Percentage increase in taxable income and taxes paid after eliminating the APV exemption, by percentile
(Tax-paying percentiles)

Percentile	Percentage increase in income	Percentage increase in tax
824	0.04	21.76
825	0.06	9.16
826	0.01	0.56
827	0.01	0.83
828	0.01	0.33
829	0.04	1.73
830	0.01	0.25
831	0.04	1.22
832	0.01	0.17
833	0.02	0.49
834	0.07	1.58
835	0.00	0.10
836	0.01	0.18
837	0.02	0.34
838	0.02	0.36
839	0.01	0.15
840	0.05	0.62
841	0.01	0.16
842	0.02	0.22
843	0.01	0.09
844	0.02	0.20
845	0.01	0.08

Table 6 (continued)

Percentile	Percentage increase in income	Percentage increase in tax
846	0.01	0.13
847	0.02	0.23
848	0.01	0.10
849	0.04	0.34
850	0.02	0.21
851	0.08	0.62
852	0.02	0.14
853	0.03	0.21
854	0.01	0.09
855	0.01	0.07
856	0.05	0.33
857	0.01	0.09
858	0.06	0.38
859	0.03	0.17
860	0.02	0.15
861	0.03	0.15
862	0.01	0.08
863	0.04	0.24
864	0.02	0.12
865	0.01	0.08
866	0.02	0.12
867	0.02	0.11
868	0.02	0.10
869	0.02	0.12
870	0.03	0.13
871	0.03	0.12
872	0.02	0.11
873	0.03	0.13
874	0.05	0.23
875	0.03	0.12
876	0.03	0.13
877	0.04	0.16
878	0.03	0.12
879	0.02	0.10
880	0.05	0.19
881	0.05	0.21
882	0.04	0.13
883	0.06	0.22
884	0.03	0.10
885	0.06	0.21
886	0.06	0.21
887	0.03	0.12
888	0.07	0.24
889	0.04	0.15
890	0.03	0.11
891	0.08	0.27
892	0.06	0.19
893	0.07	0.23
894	0.06	0.20
895	0.02	0.07
896	0.04	0.11
897	0.08	0.23
898	0.02	0.07
899	0.05	0.15

Table 6 (continued)

Percentile	Percentage increase in income	Percentage increase in tax
900	0.08	0.24
901	0.04	0.12
902	0.07	0.18
903	0.03	0.08
904	0.05	0.13
905	0.04	0.10
906	0.04	0.10
907	0.04	0.11
908	0.04	0.10
909	0.05	0.12
910	0.07	0.17
911	0.09	0.22
912	0.05	0.12
913	0.08	0.19
914	0.04	0.09
915	0.10	0.24
916	0.09	0.21
917	0.05	0.11
918	0.04	0.09
919	0.05	0.11
920	0.07	0.15
921	0.08	0.18
922	0.09	0.19
923	0.05	0.10
924	0.10	0.21
925	0.10	0.21
926	0.06	0.13
927	0.08	0.17
928	0.13	0.26
929	0.07	0.14
930	0.09	0.17
931	0.12	0.24
932	0.09	0.18
933	0.11	0.22
934	0.13	0.25
935	0.09	0.17
936	0.14	0.26
937	0.06	0.11
938	0.09	0.16
939	0.07	0.23
940	0.13	0.45
941	0.15	0.52
942	0.11	0.37
943	0.17	0.56
944	0.10	0.30
945	0.09	0.27
946	0.15	0.43
947	0.14	0.40
948	0.15	0.43
949	0.13	0.35
950	0.17	0.46
951	0.13	0.35
952	0.15	0.39
953	0.15	0.36

Table 6 (concluded)

Percentile	Percentage increase in income	Percentage increase in tax
954	0.10	0.25
955	0.14	0.34
956	0.21	0.48
957	0.16	0.36
958	0.12	0.27
959	0.15	0.33
960	0.16	0.34
961	0.17	0.36
962	0.19	0.39
963	0.15	0.30
964	0.19	0.39
965	0.18	0.36
966	0.18	0.35
967	0.23	0.43
968	0.18	0.33
969	0.20	0.37
970	0.20	0.36
971	0.24	0.63
972	0.28	0.71
973	0.23	0.57
974	0.27	0.65
975	0.23	0.54
976	0.22	0.50
977	0.22	0.48
978	0.26	0.56
979	0.29	0.60
980	0.26	0.52
981	0.27	0.54
982	0.30	0.57
983	0.29	0.55
984	0.28	0.51
985	0.32	0.95
986	0.33	0.92
987	0.40	1.05
988	0.37	0.92
989	0.39	0.91
990	0.37	0.84
991	0.42	0.90
992	0.41	1.06
993	0.38	0.91
994	0.39	0.86
995	0.43	0.89
996	0.45	0.86
997	0.43	0.86
998	0.49	0.88
999	0.39	0.65
1000	0.07	0.07

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

APV: *Ahorro Previsional Voluntario* [voluntary retirement savings account].

TABLE 7

Share of total taxes paid by percentile before and after eliminating the APV
(Tax-paying percentiles)

Percentile	Share of total tax paid (percentage)		Percentage change
	With APV exemption	Without APV exemption	
824	0.000	0.000	21.30
825	0.001	0.001	8.75
826	0.001	0.001	0.18
827	0.001	0.001	0.45
828	0.002	0.002	-0.05
829	0.002	0.002	1.35
830	0.003	0.003	-0.13
831	0.003	0.003	0.84
832	0.004	0.004	-0.21
833	0.004	0.004	0.11
834	0.004	0.005	1.19
835	0.005	0.005	-0.28
836	0.005	0.005	-0.19
837	0.006	0.006	-0.04
838	0.006	0.006	-0.02
839	0.007	0.007	-0.23
840	0.007	0.007	0.24
841	0.008	0.008	-0.22
842	0.008	0.008	-0.16
843	0.009	0.009	-0.28
844	0.009	0.009	-0.18
845	0.010	0.010	-0.30
846	0.010	0.010	-0.25
847	0.011	0.011	-0.15
848	0.011	0.011	-0.28
849	0.012	0.012	-0.04
850	0.012	0.012	-0.17
851	0.013	0.013	0.24
852	0.013	0.013	-0.24
853	0.014	0.014	-0.17
854	0.015	0.014	-0.29
855	0.015	0.015	-0.31
856	0.016	0.016	-0.05
857	0.016	0.016	-0.28
858	0.017	0.017	0.00
859	0.017	0.017	-0.21
860	0.018	0.018	-0.23
861	0.019	0.019	-0.23
862	0.019	0.019	-0.30
863	0.020	0.020	-0.14
864	0.020	0.020	-0.26
865	0.021	0.021	-0.30
866	0.022	0.022	-0.26
867	0.022	0.022	-0.27
868	0.023	0.023	-0.28
869	0.024	0.024	-0.26
870	0.024	0.024	-0.25
871	0.025	0.025	-0.25
872	0.026	0.026	-0.27
873	0.026	0.026	-0.25
874	0.027	0.027	-0.15
875	0.028	0.028	-0.26
876	0.029	0.028	-0.25
877	0.029	0.029	-0.22
878	0.030	0.030	-0.26
879	0.031	0.031	-0.28
880	0.032	0.032	-0.19
881	0.032	0.032	-0.17
882	0.033	0.033	-0.25
883	0.034	0.034	-0.16
884	0.035	0.035	-0.27
885	0.036	0.036	-0.17
886	0.037	0.036	-0.16

Table 7 (continued)

Percentile	Share of total tax paid (percentage)		Percentage change
	With APV exemption	Without APV exemption	
887	0.037	0.037	-0.26
888	0.038	0.038	-0.14
889	0.039	0.039	-0.23
890	0.040	0.040	-0.26
891	0.041	0.041	-0.11
892	0.042	0.042	-0.19
893	0.043	0.043	-0.15
894	0.044	0.044	-0.18
895	0.045	0.045	-0.31
896	0.046	0.046	-0.27
897	0.047	0.047	-0.15
898	0.048	0.048	-0.31
899	0.049	0.049	-0.23
900	0.050	0.050	-0.14
901	0.051	0.051	-0.26
902	0.052	0.052	-0.20
903	0.054	0.053	-0.30
904	0.055	0.055	-0.25
905	0.056	0.056	-0.28
906	0.057	0.057	-0.28
907	0.058	0.058	-0.27
908	0.060	0.059	-0.28
909	0.061	0.061	-0.26
910	0.062	0.062	-0.21
911	0.063	0.063	-0.16
912	0.065	0.065	-0.26
913	0.066	0.066	-0.19
914	0.067	0.067	-0.29
915	0.069	0.069	-0.14
916	0.070	0.070	-0.17
917	0.071	0.071	-0.27
918	0.073	0.073	-0.29
919	0.074	0.074	-0.27
920	0.076	0.076	-0.22
921	0.077	0.077	-0.20
922	0.079	0.079	-0.19
923	0.080	0.080	-0.27
924	0.082	0.082	-0.17
925	0.084	0.084	-0.17
926	0.085	0.085	-0.25
927	0.087	0.087	-0.21
928	0.089	0.089	-0.12
929	0.091	0.091	-0.24
930	0.093	0.093	-0.21
931	0.095	0.095	-0.14
932	0.097	0.097	-0.20
933	0.099	0.099	-0.16
934	0.101	0.101	-0.13
935	0.103	0.103	-0.20
936	0.105	0.105	-0.12
937	0.108	0.107	-0.27
938	0.110	0.110	-0.22
939	0.112	0.112	-0.15
940	0.117	0.117	0.07
941	0.122	0.122	0.14
942	0.128	0.128	-0.01
943	0.133	0.133	0.18
944	0.138	0.138	-0.08
945	0.144	0.144	-0.11
946	0.150	0.150	0.05
947	0.156	0.156	0.02
948	0.163	0.163	0.05
949	0.169	0.169	-0.03
950	0.176	0.176	0.08
951	0.183	0.183	-0.03
952	0.190	0.190	0.01

Table 7 (concluded)

Percentile	Share of total tax paid (percentage)		Percentage change
	With APV exemption	Without APV exemption	
953	0.198	0.197	-0.02
954	0.205	0.205	-0.13
955	0.213	0.213	-0.04
956	0.221	0.221	0.10
957	0.229	0.229	-0.02
958	0.238	0.238	-0.11
959	0.247	0.247	-0.05
960	0.257	0.257	-0.04
961	0.267	0.267	-0.02
962	0.277	0.277	0.01
963	0.287	0.287	-0.08
964	0.298	0.298	0.01
965	0.309	0.309	-0.02
966	0.321	0.321	-0.03
967	0.333	0.333	0.05
968	0.346	0.345	-0.05
969	0.359	0.358	-0.01
970	0.372	0.372	-0.02
971	0.387	0.388	0.25
972	0.409	0.410	0.33
973	0.432	0.433	0.19
974	0.456	0.458	0.27
975	0.481	0.482	0.16
976	0.507	0.507	0.12
977	0.534	0.535	0.10
978	0.563	0.564	0.18
979	0.593	0.594	0.22
980	0.624	0.625	0.14
981	0.658	0.660	0.16
982	0.694	0.695	0.19
983	0.731	0.733	0.17
984	0.770	0.771	0.13
985	0.822	0.826	0.57
986	0.895	0.900	0.53
987	0.973	0.980	0.67
988	1.062	1.068	0.54
989	1.161	1.167	0.53
990	1.269	1.275	0.46
991	1.388	1.395	0.52
992	1.535	1.546	0.68
993	1.735	1.744	0.52
994	1.978	1.988	0.48
995	2.280	2.291	0.50
996	2.659	2.672	0.48
997	3.257	3.272	0.48
998	4.182	4.202	0.50
999	6.034	6.050	0.27
1000	49.317	49.167	-0.30

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).

APV: *Ahorro Previsional Voluntario* [voluntary retirement savings account].

TABLE 8

Change in total revenues from eliminating exemptions

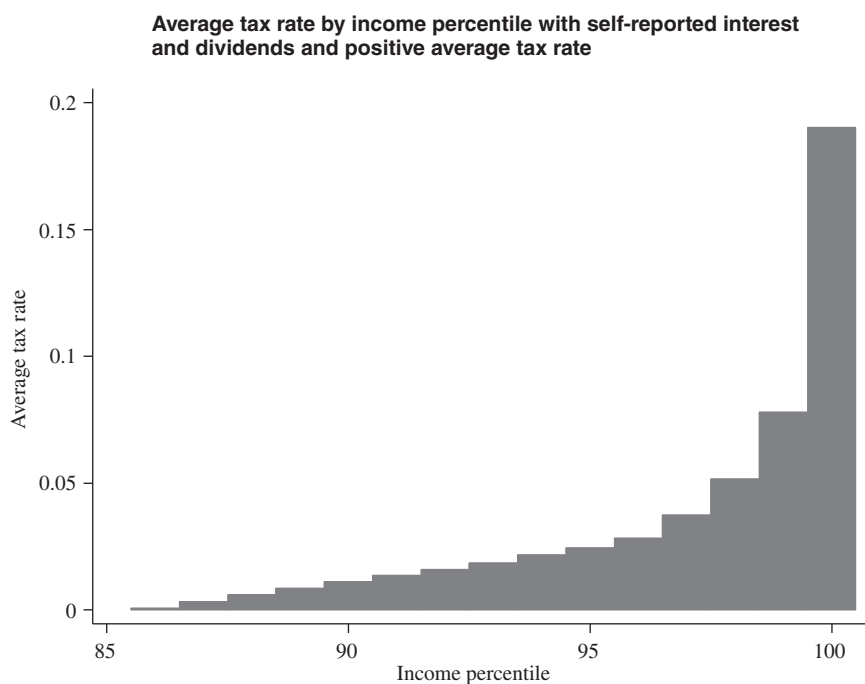| Revenue	Millions of pesos	Percent change from base situation
Base case	2 240 000	
Without APV exemption	2 250 000	0.4

Source: prepared by the authors on the basis of administrative data from the Chilean Internal Revenue Service (SII).
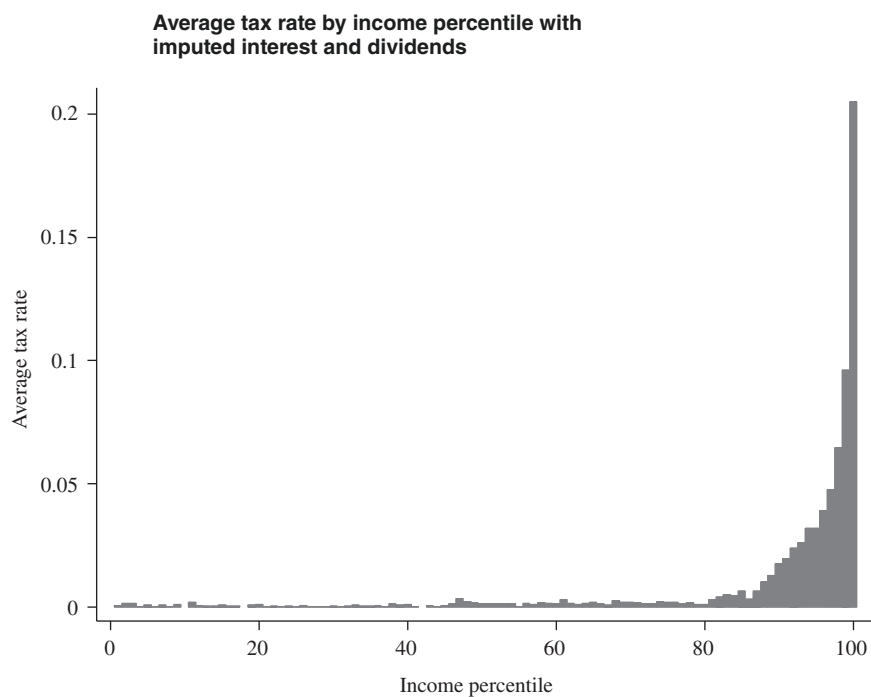
FIGURE 8
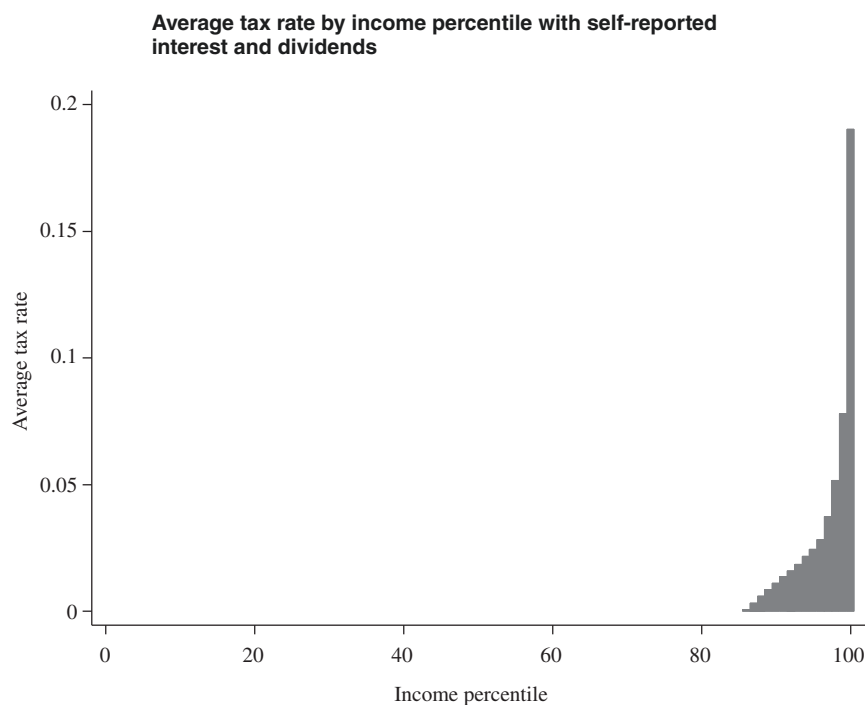
**Average tax rate by income percentile with self-reported
interest and dividends**

Source: prepared by the authors on the basis of the 2003 National Socioeconomic Survey (CASEN).

FIGURE 9

**Average tax rate by income percentile with self-reported interest
and dividends and positive average tax rate**

Source: prepared by the authors on the basis of the 2003 National Socioeconomic Survey (CASEN).

FIGURE 10

Average tax rate by income percentile with imputed interest and dividends

Source: prepared by the authors on the basis of the 2003 National Socioeconomic Survey (CASEN).

FIGURE 11

Average tax rate by income percentile with imputed interest and dividends and positive average tax rate
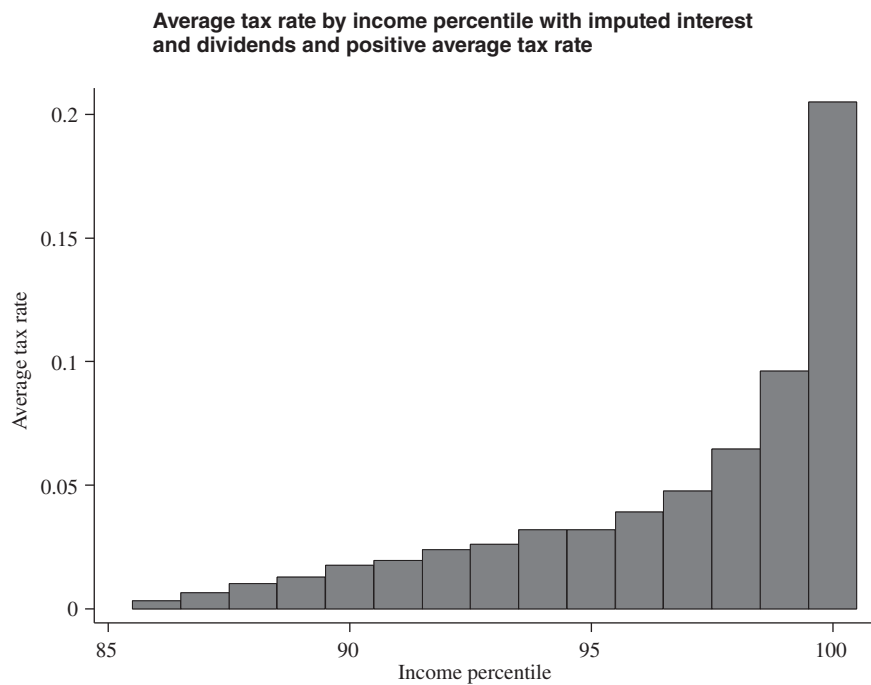
Source: prepared by the authors on the basis of the 2003 National Socioeconomic Survey (CASEN).

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