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DEMOGRAPHIC CONSEQUENCES OF STRUCTURAL ADJUSTMENT IN CHILE

CONTENTS

Demographic consequences of structural adjustment in Chile

Abstract

Adjustment in Chile has been successful in that it has achieved a reasonable degree of macroeconomic stability and in that external restrictions by the beginning of the 1990s are not binding for future growth. However, the burden of the external adjustment during the last two decades has been supported internally by prolonged pressure on the labor market, characterized by instability, depressed real wages, high open unemployment levels, the informalization of employment, and a high incidence of poverty. The costs of adjustment during the eighties have been high, have exceeded the requirements for closing the gap between aggregate income and expenditures and to accommodate the needed external transfers. Social expenditures, instead of compensatory, have in general behaved in a pro-cyclical fashion, and have not recovered to date the real per capita levels that prevailed at the beginning of the seventies.

The repercussions on demographic variables have been most noticeable regarding nuptiality and fertility. The fluctuations in births are mainly due to variations in first to third-order births, since fourth and higher-order births show a smooth declining trend during the last two decades. Health conditions, as represented by nutrition, morbidity and mortality statistics have been less affected by the aggregate economic fluctuations and adjustment, partly due to the existence of nutritional programs for children, and the focalization of governmental policies regarding mother and child health care. On the other hand, infant mortality and deaths due to specific causes have been negatively affected in the short term during some periods of economic setback. As regards to internal migration and spatial distribution, fragmentary evidence suggests that short-term movements associated with seasonal and other temporary phenomena, have apparently become more common. These types of movement may have been facilitated by the improved highway network and overall communications, stimulated in part by the growth of primary and semi-manufactured exports starting around the mid-eighties, which has been an important feature of structural adjustment efforts.

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Introduction

The macroeconomic adjustment process of Chile over the last two decades has been widely reviewed, discussed, and subject to both praise and criticism by national and foreign scholars, policymakers and multilateral lending agencies. Detailed studies of this period are found, for example, in Arellano (1988), Corbo et. al. (1986), Edwards (1986), Foxley (1986), Ffrench-Davis (1987), Ffrench-Davis and Muñoz (1990), Meller (1990, 1991) and Ritter (1990), among others. I will draw heavily from these studies for all discussion on adjustment generally. Like most other countries in the region, Chile has experienced marked macroeconomic swings during the last two decades associated in part with the international oil crisis in the early to mid-seventies and world recession-*cum* debt crisis in the early eighties. During this last decade, the country underwent a severe crisis characterized by a deep recession, high unemployment, low wages, high indebtedness levels and onerous debt servicing. It shares with the other Southern cone countries a notable effort to implement structural reforms starting around 1974 while authoritarian military regimes were in place, and at least on the face of it, it experienced initial success during the second half of the seventies, ending in a severe bust by 1982. Unlike many other countries, after the 1982-83 recession Chile has stabilized and experienced persistent overall economic recovery characterized by rapid export expansion, and currently encounters no serious external restrictions to future growth. Other distinctive features of the chilean adjustment are the intensity and persistency of reforms and policies oriented toward economic liberalization, deregulation and an outward-looking growth strategy, which were nonetheless not always consistently applied. Extraordinarily sharp economic fluctuations, and exceedingly high adjustment costs in terms of aggregate austerity, unemployment and regressive income distribution are elements that serve to complete overall macroeconomic picture.

The social consequences of adjustment and of the changes in social policies have also been studied in a less prolific, but equally interesting literature (e.g., Arellano, 1985; Foxley and Raczynski, 1986; Meller, 1991; Raczynski, 1987). In addition to the broad economic reforms, there have been institutional changes during the last couple of decades in Chile that have affected both the level of public and private expenditures in social services and their allocation: per capita public expenditures in health, education and housing have behaved pro-cyclically and have remained below the 1970 level during the most part of the last two decades. This, together with other adjustment policies and the privatization of a significant part of the provision of health services and pensions contributed to accentuate the unevenness of income distribution within the population. On the other

hand, relatively sharp and increasing focalization of certain public programs, particularly those related to child nutrition and health have had a compensatory effect, and have provided a partial buffer to the acute economic fluctuations over the last two decades.

Chile is an interesting case to consider from the general economic viewpoint as a rather extreme experiment of neoliberal transformation, as well as from the demographic perspective, regarding the behavioural and policy responses that affect these variables. As described in some detail in the remaining of the paper, nuptiality has responded quickly and sensitively to economic fluctuations, while natality and fertility, though generally responding to short-term economic changes in the expected fashion, have done so less pronouncedly, in any case not strongly enough to revert the broad declining long term trend. Nutrition levels, infant and adult mortality have on the whole been less sensitive to economic fluctuations, while some studies have identified specific time periods, diseases and causes of death that display negative short-run responses. Little is known about the consequences on internal migration patterns and the spatial distribution of the population, but it is likely that the adjustment process has contributed indirectly to the increased internal mobility in response to local job opportunities, and the increased importance of temporary agricultural workers living in cities.

The remainder of the paper is organized as follows. A brief overview of the adjustment process is given, highlighting its major phases during the last 20 years. The economic changes, including the evolution of the principal social policies are then linked to demographic fluctuations in separate sections devoted to describe the changes in nuptiality, natality and fertility, health conditions and mortality, migration and spatial distribution. The paper ends with a summary and conclusions.

A. Structural adjustment during 1973-1990

The military *junta* which seized power in 1973 aimed in the first place, at reversing many aspects of the Unidad Popular government's strategy of "transition to socialism", which had included land reform and the enlargement of the state sector through nationalizations. It also attempted to neutralize the macroeconomic instability that had built up as a consequence of expansionary fiscal and monetary policies, which was aggravated by intense strike activity, disruptions in production and general political upheaval. A third general orientation that soon emerged from the military government was a switch to externally oriented development relying internally on a radical version of free-market, monetarist approach to economic adjustment. Thus commenced one of the most

consistently applied experiments in neoliberal economic transformation within the region, both with respect to the reliance on automatic mechanisms and shock treatments to achieve adjustment, and the structural and institutional changes, including privatization, deregulation of goods and financial markets, opening to international trade, changes in labor legislation, and major reforms to the systems of social security and health services.

Analysts generally distinguish three main phases within the military government: (1) 1973-79, which defined some of the global economic rules of the new strategy: the restoration of market mechanisms by reverting state controls and regulations, reduction of the size of the state by cutting on public expenditures and varied policies aimed at preparing the ground for long term structural changes, such as the return of expropriated mining companies, agrarian counter-reform, liberalization of imports and of norms regulating foreign investment, the suppression of collective bargaining and curtailment of labor union activities. (2) 1979-82, where the open-economy, monetarist approach was more fully set in place. Tariff reductions were completed in 1979, set down to 10% except for cars, and the nominal exchange rate was fixed while restrictions to capital flows were reduced substantially. In this context, the exchange rate appreciated about 30% between 1979 and 1981 as a result of greater domestic than international inflation. A temporary production and consumption boom took place -made possible in part by cheap imports-, but finally the cumulative loss of competitiveness combined with external shocks and policy mismanagement lead to the 1982-83 recession, one of the worst crises in chilean history. (3) 1983-89, a period of adjustment and recovery aided by three multilateral adjustment programs, supported mainly by the IMF and the World Bank. Loans from multilateral lending agencies represented 3 to 4 per cent of GDP over a period of five years, and provided a consistent and orderly macroeconomic program which was a clear improvement over the chaotic macro policies of 1982. Adjustment in the eighties, however, imposed heavy costs in terms of high unemployment, salary contraction, and worsening income distribution.

How macro adjustment and the associated policies translated into some basic economic indicators is illustrated in figure 1, where the short-term fluctuations[1] of per capita GDP, the unemployment rate and real wages are displayed. They show the main economic cycles during the period under study: sharp real wage reduction and increase in unemployment from the early seventies until one year after the severe 1975 recession;

[1] Short-term fluctuations in figures 1 and 2 are represented as the value of each observation point divided by a 9-year moving-average.

and a reversal of these trends during the period of 'economic miracle' (1976-1981). Real wages fall again together with per capita GDP during the 1982-83 recession while unemployment climbs up again to reach 30% of the labor force (see table 1). Gradual but persistent recovery sets in after 1983.

Throughout the entire period, social policies generally evolved in the direction of tampering the total volume of public expenditures, while concentrating these reduced funds in focalized programs. This occurred, however, after significant advances in social policies originating early in the century had already been achieved, which meant that a broad coverage existed for many social services, such as basic education, housing, social security, and access to basic health care. By 1970, Chile exhibited one of the most equitable income distributions in the Latin American region; public social expenditures represented nearly 20 per cent of GDP and kept growing during the Unidad Popular government. This initial base, together with the expenditure reallocation provided a effective -though partial- insulation against economic downturns. At the same time, during the military regime legislation was enacted which allowed a much more important role of the private sector in the provision of health, social security, and education. Privatization in this sphere had counteracting effects on the strength of the social service buffer: it released substantially the state's burden of providing these services and allows pension funds to contribute to private savings, but created a transitional public deficit, and has lead to increased segregation of the middle and middle-low segments of the population with regard to the access to social services.

The following sections discuss the changes in some basic demographic variables, trying to relate them to the economic fluctuations, to possible effects of structural adjustment, incorporating the mediating role of social policies. The basic statistical methods used are of the type developed by Lee (1990) and Galloway (1988), which have been widely applied to the analysis of short term demographic fluctuations.[2]

B. Marriage patterns

The annual marriage rate is the variable that has displayed the greatest variability of all crude rates shown in figure 2. Also, it is the one that shows the most consistent and close

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[2] Pioneering demographic short term analyses in the Latin American region are found in interesting studies by Dr. Raúl Prebish, originally published in 1927 (see the Special Issue of *Notas de Población*, Year XIX, No. 54, 1991).

association with economic fluctuations, as measured by any of the variables represented in figure 1. Tables 2 and 3 show bi-variate correlations and the distributed lag elasticities; the estimates are based on relatively few observations, and should therefore be regarded as suggestive. The response of nuptiality to economic swings has been immediate, and the sharpest among the dependent demographic variables. It is noteworthy that nuptiality in the late 1960s started to increase one year earlier than per capita income, perhaps as a consequence of favorable expectations by young couples regarding improvements in employment opportunities, salaries and social benefits, which were in fact materialized to some extent during the first couple of years of the Unidad Popular government. Then the marriage rate started to fall sharply in 1973, well before the 1975 recession. This may have been affected by the environment of political upheaval during 1973, that of repression and uncertainty that followed the military coup, and possibly also by the reversal of the aforementioned expectations of the previous period. The immediate reaction of nuptiality to the 1982 recession and to recovery starting in 1984 is also striking.

Since all age groups reacted in a similar fashion, the age composition of those who married remained fairly constant: the mean age at first marriage has shown little change over the last thirty years, remaining around 23.5 for women and near 25.8 for men.[3] It seems that couples do postpone the timing of marriage in response to adverse economic junctures, but since marriage rates rise quickly once signs of economic recovery are perceived, the initial effect is largely compensated, tampering what might have been larger fluctuations.

C. Natality and Fertility

Natality rates have also changed in close association with economic cycles, although the responses have been more delayed and less acute by comparison with those of nuptiality. The first large drop in natality occurred during the nineteen-sixties, was interrupted temporarily during the years of the Unidad Popular government, and has remained below 25 per thousand since. The short-term lag structure suggests that births tend to respond (positively) to changes in GDP with one to two years of lag, and (negatively) to the unemployment rate with 0 to 1 year of lag. First births react more quickly (0 to 1 year lag) than higher order births, whose less acute response is more

[3] Slightly different estimates are obtained by using vital statistics or Hajnal's singulate mean age method, but both sources coincide in showing the relative stability of average patterns of first marriage.

evenly spread out over the three-year lag period. In all likelihood, the behaviour of first births is associated, at least in part, with the contemporary response of first marriages, but such a concentrated response at lag zero can be fully explained only if pre-marital conceptions and births are considered. In fact, illegitimate births have increased substantially in Chile over the last twenty years and represent now about one third of all births; this percentage being larger among adolescents and young adult mothers.

Governmental social policies and the way structural adjustment was implemented may have had a more subtle type of effect on fertility (and possibly also, on other demographic variables), which is more difficult to quantify: the low levels and large fluctuations of employment and salaries that prevailed during most of the period under study may have reduced the perceived level of permanent income and its degree of certainty, while the reduction of main earner's income has motivated a greater incorporation of women to the labor force. This, together with the perceived larger user costs of education and health care may well have lead to lower family size desires. The effects are hypothesized to have worked through the conventional micro-economic channels: changes in the household's budget constraint, opportunity and childbearing costs. Improved internal communications through roads and the mass media, may have also contributed to the process of convergence of fertility levels among population sub-groups evident in Chile since the mid 1960s (INE, 1989).

As in the case of the age at first marriage, the average age at the first birth has remained fairly constant around 23.6 years over the last few decades, but spacing is now more spread out: whereas in the 1960s the second and the third births came on average 2 years later each, now the spacing to the second and third birth has increased to about 3 years. This is associated not only with postponement behaviour, but also with stopping at lower average parities than before; as seen in figure 3, fourth and higher order births have declined even in absolute terms over the last thirty years.

D. Nutrition, morbidity and mortality

Chile's history of intervention in the health sector stretches back to the 1920s. Programs for the control and maintenance of minimum nutritional levels among infants and young children have been particularly successful, both in terms of reducing the prevalence of undernutrition among children under six years of age and as an effective buffer against extreme economic fluctuations and adjustment. These programs are among the most frequently cited examples of successful focalization (World Bank, 1988, 28-32). As shown

in a previous study (Bravo, 1990), the short-term fluctuations in infant nutrition and mortality have been linked to short run economic changes during periods of economic crisis, but their absolute variations have been very moderate by any standard. Tables 2 and 3 confirm the fact of very small, and non-significant effects of either GDP or the unemployment rate on infant mortality. Health checkups and food provided through the national program of complementary feeding (PNAC) constitutes one of the few items of social public expenditure that have not been permitted to passively change in a pro-cyclical fashion, and have therefore had a compensatory effect.

The insulation of infant mortality to the severe recent crises has been a subject of much debate and attempts at explanation; the conclusions that have emerged from that debate suggest that improved access to primary health care, the effective focalization of resources in these programs, increasingly broad access to basic sanitary services, including piped water and sewerage, as well as better education of mothers and behavioural demographic responses (i.e., reductions in high-risk births) are all factors that contribute to insulation (see Bravo, 1990, 1992, and references therein).

While most diseases and causes of death continued their historical declining trend during the 1980s, there are some that displayed significant decelerations in their mortality rates (see Bravo and Vargas, 1991), such as certain diseases related to the digestive tract (enteritis, typhoid fever, hepatitis) and respiratory infections such as pneumonia, a very frequent cause of death by comparison with other countries with similar levels of life expectancy. Influenza, hepatitis, and whooping cough mortality rates have responded negatively to economic swings. Of the three economic variables included in previous studies (per capita GDP, unemployment, real wages), the one that shows the closest association with undernutrition, morbidity and mortality is the unemployment rate. This is to be expected given that in an institutional context where compensation for the loss of employment is practically nonexistent, unemployment represents a much more extreme reduction in income than any fluctuation in the salary of those who keep their jobs; since some factors associated with health risks do not change significantly during crisis episodes (education, basic sanitary infrastructure and hygienic conditions), only large fluctuations in income are likely to have an effect on mortality.

It is worth noting that the greater response to the unemployment rate (rather than to GDP) observed in the case of mortality and other health indicators (Bravo, 1990), does not apply to nuptiality and fertility, where in general the contrary is true (see tables 2 and 3).

E. Migration and Spatial Distribution

No time series comparable to those of marriages and vital events that come from civil registers are available to follow through year by year the evolution of migration and the spatial distribution of the population; the data in this case comes from population censuses and special purpose studies. The available information is thus fragmentary and the analysis limited. Nevertheless, some studies (Raczynski, 1986; Chang and Garrido, 1989; Szasz, 1992) suggest that there are signs of increasing internal mobility. Given that Chile is already highly urbanized, most of the recent migration flows occur among cities. The historical female dominance of migration to Santiago has given way to a virtual balance in the sex ratio of migrants; they are more highly educated than those of previous decades, and are more frequently of urban origin.

Structural adjustment may have affected migration and spatial distribution patterns in two main ways: First, economic downturns, deliberate reductions in government spending and employment led to 'terciarization' and informalization of the labor market, specially among women and secondary income earners. During economic recovery, however, employment levels have lagged behind, showing little change in its degree of informalization over the last two decades. Since fluctuations in open unemployment were more acute in large cities, particularly in Santiago, they have lost some of their traditional attractive force, and migration between intermediate-sized cities has been revitalized in response to local economic conditions. Short-term movements associated with seasonal and other temporary phenomena, such as those that followed the recent mining boom in the north or agricultural workers residing in cities (León, 1991), have apparently become more common. These types of movement are facilitated by the improved highway network and overall communications, stimulated in part by the growth of primary and semi-manufactured exports starting around the mid-eighties, which was (and continues to be) a key component of structural adjustment strategies.

Secondly, the regional distribution of per capita social public expenditures has favored systematically the extreme northern and extreme southern regions, and to a lesser extent, the metropolitan region of Santiago. The extreme regions have gained population and have experienced the largest positive in-migration flows. The association between the two is not casual: per capita public expenditure emerges as one of the most consistent attraction factors of inter-regional migration, in both bivariate and multivariate analyses (Chang and Garrido, 1989). On the other hand, inter and intra-regional inequality has been lessened to some extent by a reorientation of resources toward basic education and

primary health care (Raczynski, 1986), mirroring the focalization of certain social programs at the national level.

Summary and Conclusion

Although adjustment in Chile can be judged as successful in terms of some basic macro indicators, the burden of the external adjustment during the last two decades has been supported internally by prolonged pressure on the labor market, characterized by increasing inequality, instability, depressed real wages and high open unemployment rates. The costs of adjustment during the eighties have been high, have exceeded the requirements for closing the gap between aggregate income and expenditures and to accommodate the needed external transfers. Social expenditures, instead of compensatory, have in general behaved in a pro-cyclical fashion, and have not recovered to date the real per capita levels that prevailed at the beginning of the seventies.

The repercussions on demographic variables have been most noticeable regarding nuptiality and fertility. The fluctuations in births are mainly due to variations in first to third-order births, since fourth and higher-order births show a smooth declining trend during the last two decades. Health conditions, as represented by nutrition, morbidity and mortality statistics have been less affected by the aggregate economic fluctuations and adjustment, partly due to the existence of nutritional programs for children, and the focalization of governmental policies regarding mother and child health care. On the other hand, infant mortality and deaths due to specific causes have been negatively affected in the short term during some periods of economic setback. As regards to internal migration and spatial distribution, fragmentary evidence suggests that short-term movements associated with seasonal and other temporary phenomena, have apparently become more common. These types of movement may have been facilitated by the improved highway network and overall communications, stimulated in part by the growth of primary and semi-manufactured exports starting around the mid-eighties, which has been an important feature of structural adjustment efforts.

The chilean experience suggests that the heavy costs in terms of unemployment and increasing inequality could have been lessened, both at the level of macro stabilization policies, of economic reforms and via compensatory social policies and programs. The few public programs that were not allowed to passively contract during adjustment (nutritional and maternal and child health care) are illustrative of this, but their applicability to other countries should be qualified by the fact that Chile had initiated structural reforms

and adjustment at a time when there was a broad coverage of many basic social services, and the traditional social sectors had accumulated substantial infrastructure. In Chile, as well as in other countries, continued improvement in health conditions will require a significant recovery of investment in the sector during the 1990s. It would be interesting to confirm whether the quick and sharp reaction of nuptiality to economic changes is generalizable to other countries in the region, as well as the response patterns of births of different orders. The patterns of migration and the spatial distribution of the population may have been affected very sensitively, but unfortunately, the data limitations in Chile on this topic are likely to be shared by most countries in the region.

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Table 1. Economic and Demographic Time Series, Chile 1960-1991

Year	GDPpc (1980 US$)	Unemployment Rate (%)	Real Wages (1970=100)	Per capita Public Expenditure (1970=100)		Crude Marriage Rate	Crude Birth Rate	Infant Mortality Rate	Live Births by Order			
				Health	Education				1	2	3	4+
1960	1.768	7.1	64.5			7.3	37.5	119.5	60,772	45,515	38,983	113,108
1961	1.791	8.0	69.0			7.4	38.0	106.4	61,737	47,196	39,872	118,995
1962	1.844	7.9	69.0			6.9	37.9	109.2	63,532	48,198	40,582	120,444
1963	1.937	7.5	61.3			6.9	37.4	100.3	62,987	49,073	39,422	123,676
1964	1.909	7.0	59.6			7.2	36.2	103.7	62,767	49,966	39,240	121,480
1965	1.888	6.4	66.5			7.6	35.2	97.3	66,414	49,815	38,659	119,021
1966	2.024	6.1	77.2			7.5	33.6	98.5	68,194	50,470	37,227	111,931
1967	2.052	4.7	86.3			7.3	30.5	94.7	70,437	50,490	35,312	102,994
1968	2.086	4.9	88.9			7.2	28.7	87.0	70,402	50,915	34,349	93,067
1969	2.116	5.5	94.1			7.2	27.0	83.1	71,663	51,429	33,565	82,832
1970	2.121	5.7	100.0	100.0	100.0	7.5	26.4	82.2	74,183	53,232	33,870	76,866
1971	2.266	3.8	122.9			8.8	27.0	73.9	78,795	56,191	35,852	75,499
1972	2.203	3.1	102.5			8.7	27.4	72.7	85,320	59,659	36,935	72,622
1973	2.052	4.8	76.5			8.3	26.8	65.8	87,931	60,760	36,703	68,167
1974	2.052	9.2	66.3	86.6	79.9	7.8	25.9	65.2	85,164	62,231	36,833	64,890
1975	1.769	16.4	60.2	67.1	63.2	7.4	24.2	57.6	84,135	59,768	35,051	57,516
1976	1.806	19.9	81.5	62.7	67.6	7.0	23.0	56.6	83,974	57,822	34,021	51,759
1977	1.939	18.6	81.7	67.8	78.9	7.0	21.4	50.1	83,188	56,261	31,831	44,006
1978	2.059	17.9	90.4	75.0	83.0	7.2	21.3	40.1	87,585	58,207	31,369	39,866
1979	2.188	17.7	98.0	73.8	90.8	7.3	21.4	37.9	90,116	60,574	32,551	38,103
1980	2.315	15.7	108.9	82.4	88.7	7.7	22.2	33.0	95,289	65,100	35,197	37,221
1981	2.411	15.6	119.3	74.8	96.7	8.0	23.4	27.0	101,068	70,909	38,939	39,221
1982	2.073	26.4	114.7	80.1	114.8	7.0	23.8	23.6	99,468	74,446	41,659	40,930
1983	2.012	30.4	102.9	63.8	99.2	7.0	22.2	21.9	93,634	71,797	40,284	37,997
1984	2.089	24.4	101.8	67.2	94.5	7.3	22.2	19.6	98,111	75,425	40,966	37,263
1985	2.100	21.4	96.6	64.7	92.0	7.5	21.6	19.5	99,053	72,689	40,990	34,598
1986	2.184	16.0	99.5	63.4	89.4	7.6	22.1	19.1	105,803	74,932	42,219	34,841
1987	2.270	12.2	100.3	68.8	86.8	7.6	22.3	18.5	108,916	78,073	42,980	34,225
1988	2.399	9.0	106.1			8.1	23.3	18.9	115,675	83,346	46,018	35,250
1989	2.590	6.3	109.6			8.0	23.4	17.1	118,413	86,489	47,467	34,841
1990	2.598	6.0	111.6			7.5	23.3	16.0				
1991	2.754	6.5	117.1									

Sources: Per capita GDP: Estimates by ECLAC; unemployment rate, real wages, per capita public expenditures: CIEPLAN, Resultados Económicos de Cuatro Gobiernos Chilenos, 1958-1989. Apuntes CIEPLAN No. 89, Octubre 1990, updated with data from CIEPLAN, Set de Estadísticas Económicas No. 93, Julio de 1992. Crude marriage rate, birth rate, infant mortality rate, live births by order: Instituto Nacional de Estadísticas, Anuario Demografía, several years.

Table 2. Correlation coefficients between detrended variables*
Chile, 1960-1991

	Lag (years)	NUP	CBR	IMR	BORD1	BORD2	BORD3	BORD4
GDP	0	0.68	0.24	-0.11	0.59	0.22	0.05	-0.12
	1	0.47	0.64	-0.27	0.77	0.70	0.57	0.36
	2	0.15	0.68	-0.23	0.44	0.77	0.78	0.65
	3	-0.16	0.40	-0.11	-0.04	0.55	0.62	0.63
UR	0	-0.83	-0.34	-0.16	-0.76	-0.34	-0.19	-0.03
	1	-0.35	-0.62	-0.17	-0.55	-0.62	-0.53	-0.48
	2	-0.04	-0.58	-0.21	-0.18	-0.51	-0.58	-0.68
	3	0.09	-0.40	-0.32	0.17	-0.24	-0.41	-0.65
W	0	0.44	-0.05	-0.24	0.25	-0.02	-0.06	-0.26
	1	0.40	-0.02	-0.15	0.32	0.16	0.06	-0.20
	2	0.27	-0.05	-0.25	0.35	0.18	0.07	-0.19
	3	0.07	-0.16	-0.13	0.19	0.15	0.02	-0.25

* Detrending was achieved by dividing each observation point by a 9-year moving average.

Variables:
NUP = nuptiality (crude marriage rate)
CBR = crude birth rate
IMR = infant mortality rate
BORDi = Births of order i (i=1 to 4)
GDP = per capita GDP (1980 US$)
UR = unemployment rate
W = real wages (constant 1970 pesos)
For data sources, see table 1.

Table 3. Regression results, Chile 1960-1991
(distributed lags from 0 to 3 years, with correction for first-order serial correlation).

A. Model: $Y_t = C + \sum_{i=0}^{3} \alpha_i \mathbf{GDP}_{t-i} + \phi \cdot u_{t-1} + \epsilon_t$

		NUP	CBR	IMR	BORD1	BORD2	BORD3	BORD4
	C	0.29	0.17	1.22[a]	0.36[b]	0.05	0.05	0.06
Lag:	0	0.64[a]	0.16	0.02	0.22[b]	0.13	0.07	-0.01
	1	0.06	0.27[a]	-0.20	0.32[a]	0.33[a]	0.28[a]	0.23[b]
	2	0.05	0.24[a]	-0.06	0.09	0.16[b]	0.30[a]	0.32[a]
	3	-0.04	0.16	-0.03	0.00	0.33[a]	0.30[a]	0.38[a]
	ϕ	0.48[a]	0.66[a]	0.57[a]	0.45[b]	0.41	0.56[a]	0.67[a]
	R^2	0.63	0.77	0.38	0.71	0.85	0.83	0.81
Adj.	R^2	0.52	0.70	0.20	0.62	0.80	0.77	0.74
	DW	1.37	1.53	2.15	1.74	2.08	1.54	1.85

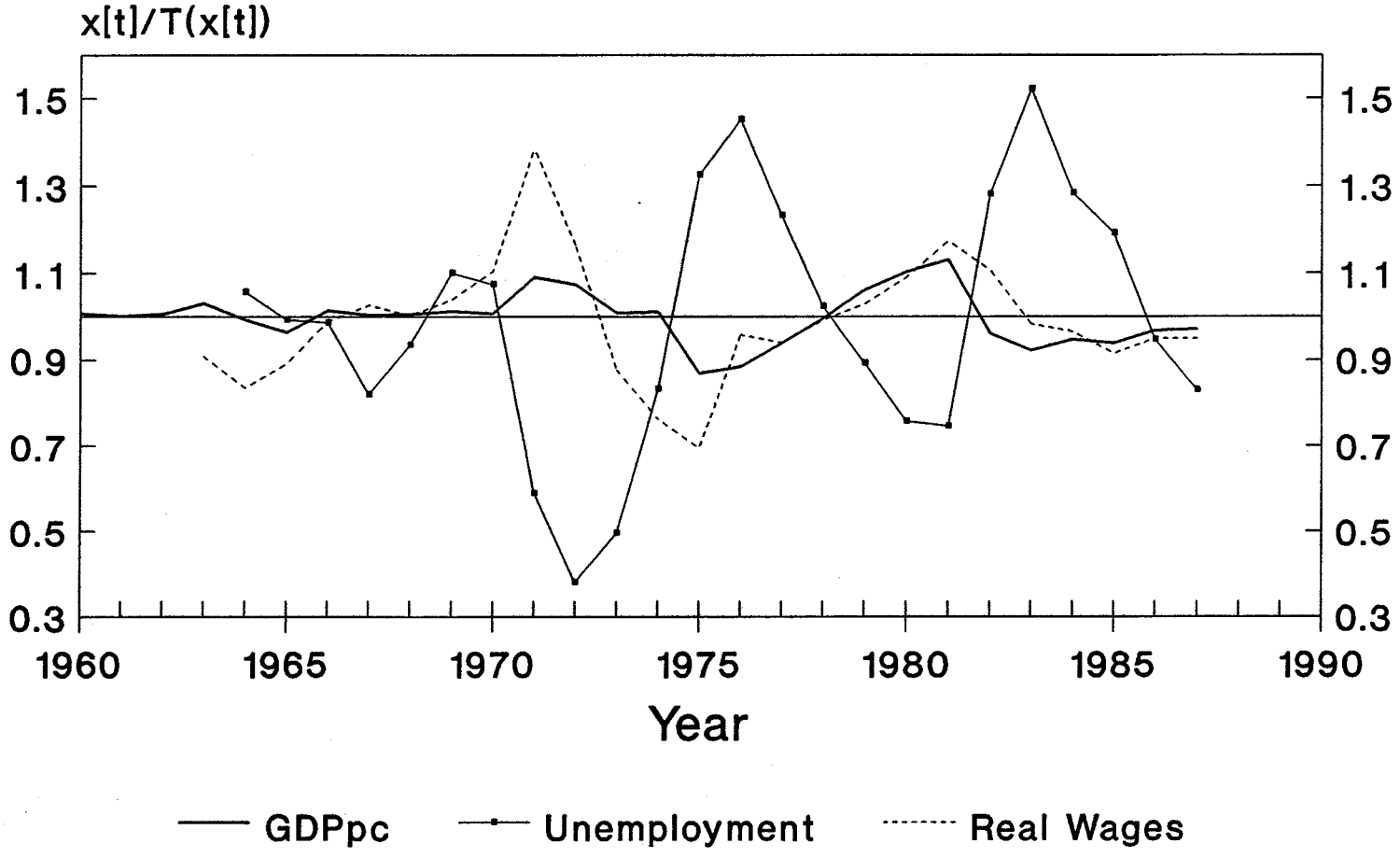
B. Model: $Y_t = C + \sum_{i=0}^{3} \alpha_i \mathbf{UR}_{t-i} + \phi \cdot u_{t-1} + \epsilon_t$

		NUP	CBR	IMR	BORD1	BORD2	BORD3	BORD4
	C	1.23	1.23[a]	0.97	1.18[a]	1.23[a]	1.24[a]	1.20[a]
Lag:	0	-0.21[a]	-0.08[a]	0.02	-0.11[a]	-0.07[a]	-0.06[a]	-0.05
	1	0.02	-0.05[a]	-0.02	-0.03[a]	-0.06[a]	-0.05[a]	-0.04
	2	0.00	-0.03	0.01	-0.02	-0.03	-0.05[b]	-0.05
	3	-0.04	-0.07[a]	-0.01	0.02	-0.07[a]	-0.08[a]	-0.08[a]
	ϕ	0.17	0.67[a]	0.60[a]	0.51[a]	0.67	0.70[a]	0.61[a]
	R^2	0.77	0.79	0.36	0.80	0.80	0.79	0.75
Adj.	R^2	0.70	0.74	0.17	0.74	0.74	0.72	0.67
	DW	1.10	1.39	2.13	2.00	2.01	1.52	1.52

Significance levels: **a** $p \leq 5\%$, **b** $5\% < p \leq 10\%$.

Variables:
NUP = nuptiality (crude marriage rate)
CBR = crude birth rate
IMR = infant mortality rate
BORDi = births of order i (i=1 to 4)
GDP = per capita GDP (1980 US$)
UR = unemployment rate
W = real wages (constant 1970 pesos)
For data sources, see table 1.
Y_t represents the dependent variables at time t, the α's the elasticity coefficients, u_t a first-order, serially correlated error term, and ϵ_t a constant variance, serially uncorrelated disturbance.

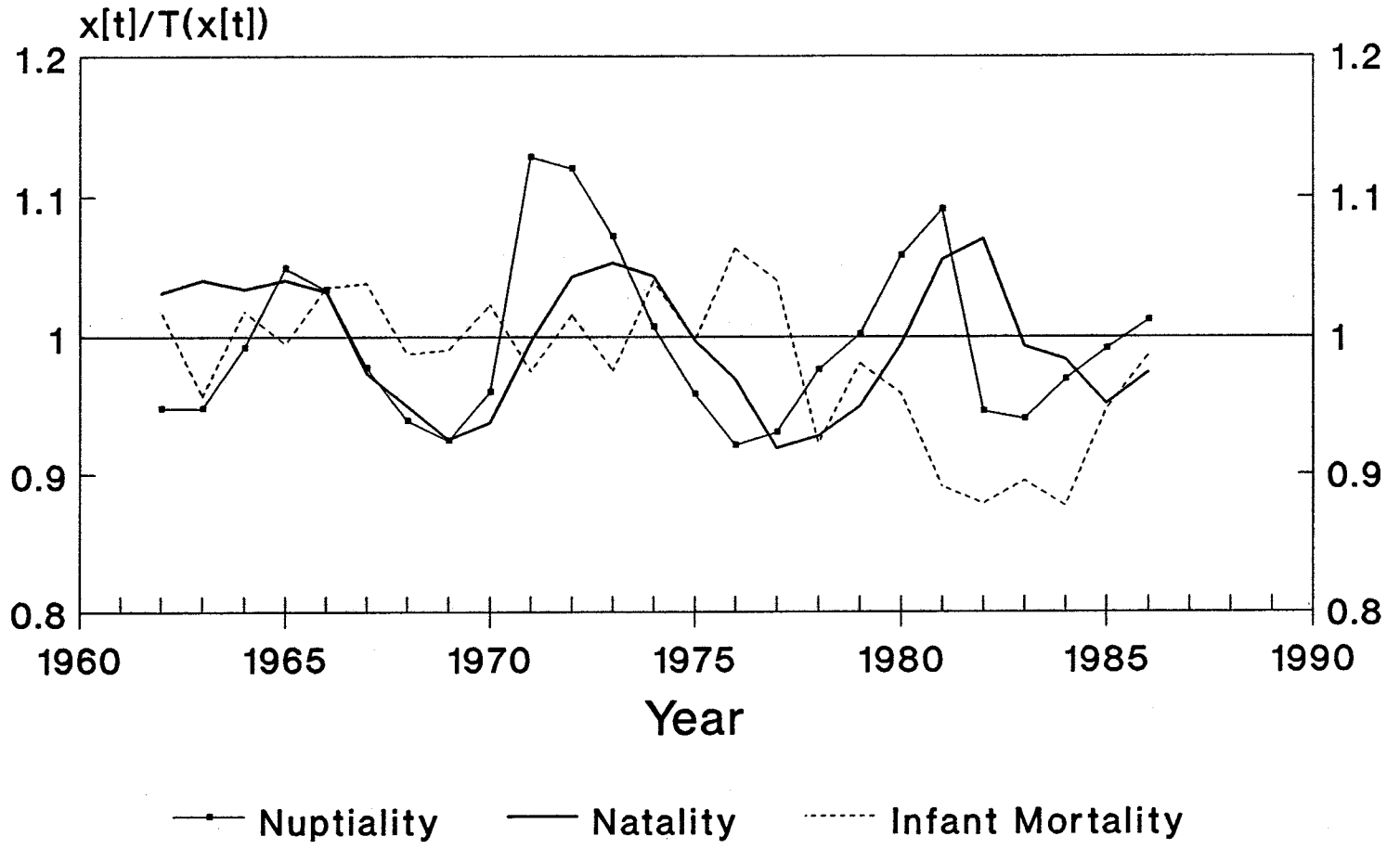
Figure 1. Economic Fluctuations
Chile 1960-1990



x[t] is the value of variable x at time t, and T(x[t]) is a 9-year moving average.

source: Table 1.

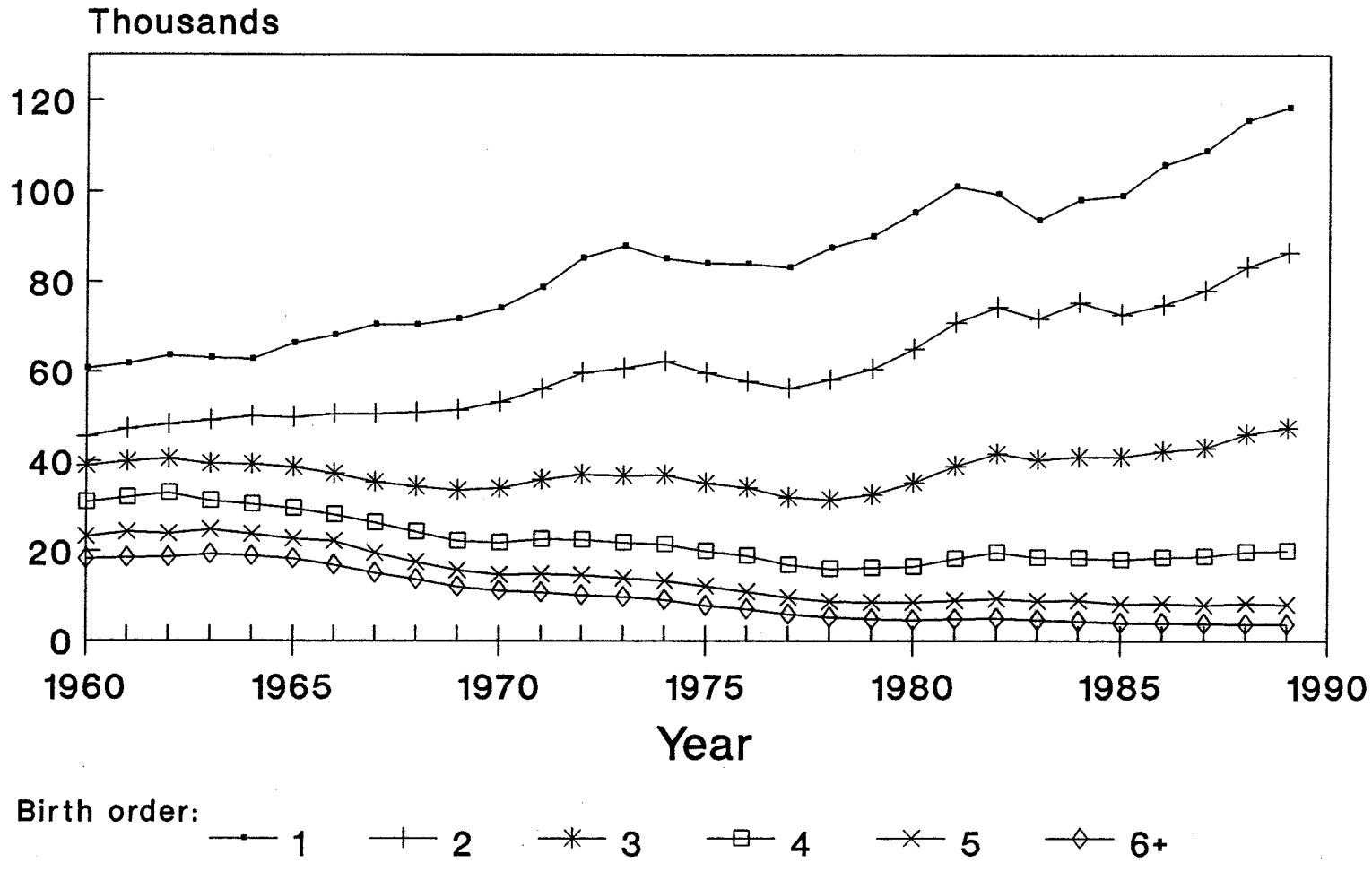
Figure 2. Chile: Fluctuations in Marriages, Births and Infant Deaths, 1960-1990



x[t] is the value of variable x at time t and T(x[t]) is a 9-year moving average.

source: Table 1.

Figure 3. Chile: Live Births by Order 1960-1990



source: table 1.