Public Policies for Human Development

Achieving the Millennium Development Goals in Latin America

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Introduction

When the Millennium Development Goals (MDGs) were established in the early 1990s, achieving these in Argentina seemed a doable, though challenging enterprise. The fifteen years following 1990 (the reference year for the MDG targets) were characterized by great turbulence, with periods of growth, recession and profound social crisis. As a consequence, Argentina's progress towards the goals has been far from satisfactory. The stop-go growth process did not lead to setbacks in improvements in primary education, children's health and basic sanitation, but progress in these areas has been rather modest. Progress towards MDG 1 (the eradication of extreme poverty and hunger) has been more dismal and income poverty has increased substantially since 1990. The target of halving extreme poverty between 1990 and 2015 seemed reachable in the early 1990s, but now has a low probability of being achieved.

Whether Argentina can make more rapid progress towards achieving all MDGs will depend, to a considerable extent, on public spending efforts. Resources for education, health and basic sanitation, among others, will need to be scaled up in order to achieve the MDGs. This chapter will analyze the impact of public policies of enhancing resources for the achievement of the MDGs in Argentina. The analysis revolves primarily around results generated from the use of the computable general equilibrium (CGE) model called MAMS, which is described in Chapter 3. By combining the application of MAMS with a microsimulation methodology explained in Chapter 2 (see Appendix A2.1), the impact of the expansion of basic social services on poverty and inequality is estimated. The CGE model incorporates equations that specify the determinants of MDGs achievement and links these to public expenditure. The model also makes it possible to estimate the impact that increased public spending for the MDGs will have on the rest of the economy. The modelling framework also captures the synergies that can be generated when more than one goal is

reached at the same time; for example, how the reduction of under-five mortality rates (MDG 4) increases attendance in primary schools (MDG 2). All these issues are analyzed in the remainder of this chapter for the case of Argentina.

The next section describes recent socio-economic trends in Argentina. The country's prospects of reaching the MDGs in the areas of education, under-five child mortality and water and sanitation are discussed in the third section, showing the gaps between the MDG indicators and their respective targets established for 2015. The fourth section presents a brief description of how the CGE model is implemented and calibrated to Argentine data. In addition to other information, key ingredients in the estimation of the model for Argentina are the parameters that quantify the relationships between determinants and outcomes in education, health and basic sanitation. Because of the importance of these determinants in the analysis, the subsequent section is dedicated to introducing and discussing the econometric estimates of these relationships. The next two sections are the central focus of the chapter. Using the CGE model, the first analyzes a baseline scenario which determines whether or not the targets associated with MDGs 2, 4, and 7 would be reached by 2015 under "business-as-usual" assumptions for growth of the economy and public expenditures. Alternative policy scenarios are subsequently considered in order to determine the amount of public spending that would be required to achieve the goals and the various mechanisms that could be used to finance that spending. How that spending and its financing affect the economy at large is also analyzed. In the other section, the microsimulation analysis will be used to determine to what extent the general equilibrium effects of the MDG scenarios on labour market outcomes translate into sufficient progress towards the target for poverty reduction (MDG 1). Finally, the last section 4.8 summarizes the main conclusions and policy recommendations.

Argentina: a turbulent economy

Argentina's economic performance has been dismal in recent decades. Not only has the economy been unable to grow at sustained rates for any prolonged period, but it has also suffered recurring crises (see Figure 4.1). As a result, the level of per capita GDP does not differ substantially from that reached in the early 1980s. In fact, the average rate of growth between 1980 and 2004 was -0.1 per cent per year.

Indicators presented in Table 4.1 also show the high degree of volatility of the economy and lack of consistent growth trends. The 1980s, in particular, were very rocky. The first years of the decade, under de facto governments, were characterized by domestic financial crises on top of the external debt crisis of 1982. The democratic government that took power in 1983 faced a persistent fiscal deficit that caused an upward inflationary spiral, culminating in hyperinflation in 1989 and 1990. The view that the 1980s was a "lost decade" for economic

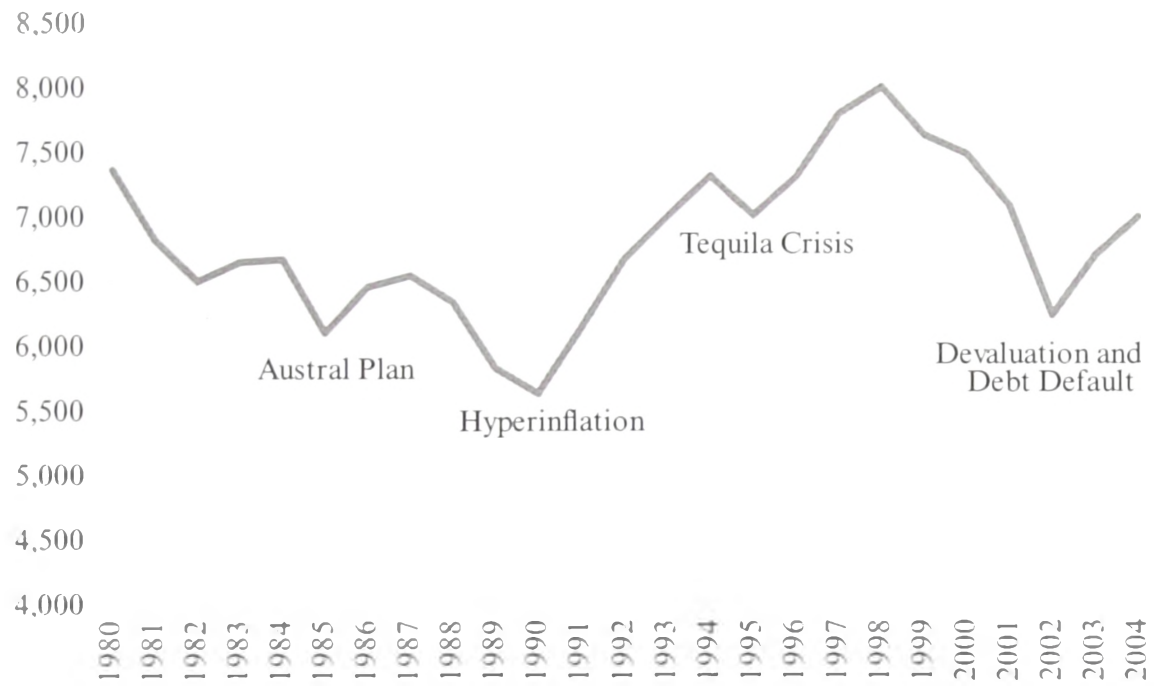

Figure 4.1 Argentina: per capita GDP at constant prices, 1980-2004
Source: International Monetary Fund (IMF).

development in Latin America applies most in particular to Argentina. While the Latin American economies shrank on average by 0.9 per cent per year (in terms of real GDP per capita), Argentina's income per capita fell by 2.6 per cent per year, according to IMF data.

During the 1990s, Argentina could benefit from a more favourable external environment and was beginning to surmount a deep crisis by implementing a series of macroeconomic and structural reforms. The reforms included the "Convertibility Law" that tied the peso to the US dollar, a large-scale privatization programme, further trade liberalization and a policy of deregulation. These measures helped to control inflation and invigorate the economy. However, the economic restructuring this induced also led to a significant reduction in the demand for unskilled labour. In the 1990s, workers with low- and medium-level skills saw their employment opportunities reduced considerably, along with reductions in job quality in terms of lower real wages, social protection and job security.

Argentina's economic vulnerability manifested itself towards the end of the decade. Fears of default on public debt payments and of exchange-rate devaluation mounted and added to existing institutional weaknesses in managing the economy. These and other factors weakened the banking system and led to a new economic crisis at the end of 2001. The year 2002 was characterized by a deep recession as per capita GDP fell by 12 per cent and poverty increased even more than during the episode of hyperinflation in the late 1980s. The new government began negotiations to restructure its debt, allowed a strong depreciation of the real exchange rate, and began a process of gradual rescue and recovery of the financial system.

Table 4.1 Argentina: key macroeconomic indicators, 1980-2004

Year	GDPpc	Cpr	Cpu	INV	TB	INFL[a] (%)	RER	UNEMP[b]
1980	7,357	65.1	12.5	24.7	-2.3	100.8	0.8	n.a.
1981	6,813	66.4	12.9	22.2	-1.6	104.5	1.1	n.a.
1982	6,489	66.8	13.2	18.3	1.6	164.8	2.1	5.3
1983	6,637	67.2	13.1	17.7	2.0	343.8	2.4	4.7
1984	6,656	68.4	13.4	16.6	1.6	626.7	2.0	4.6
1985	6,089	67.3	14.1	15.4	3.2	672.2	2.3	6.1
1986	6,442	68.8	13.5	15.9	1.7	90.1	2.2	5.6
1987	6,530	67.8	13.6	17.5	1.1	131.3	2.4	5.9
1988	6,325	66.4	13.8	17.2	2.5	343.0	2.5	6.3
1989	5,810	66.6	15.0	14.5	3.9	3.079.5	3.1	7.6
1990	5,614	67.1	15.2	12.3	5.4	2.314.0	2.2	7.5
1991	6,121	69.0	14.5	14.4	2.1	171.7	1.5	6.5
1992	6,660	70.2	14.0	17.5	-1.6	24.9	1.3	7.0
1993	6,983	69.2	13.5	19.1	-2.4	10.6	1.2	9.6
1994	7,293	69.4	12.8	20.5	-3.1	4.2	1.2	11.5
1995	6,994	68.3	13.3	18.3	-0.4	3.4	1.3	17.5
1996	7,286	68.3	12.9	18.9	-1.3	0.2	1.3	17.2
1997	7,778	68.8	12.3	20.6	-2.9	0.5	1.3	14.9
1998	7,977	68.6	12.2	21.1	-2.8	0.9	1.3	12.9
1999	7,610	69.6	13.0	19.1	-1.5	-1.2	1.1	14.3
2000	7,458	69.6	13.2	17.9	-1.2	-0.9	1.1	15.5
2001	7,059	68.7	13.5	15.8	0.9	-1.1	1.0	17.4
2002	6,217	66.0	14.4	11.3	7.3	25.9	2.3	19.7
2003	6,681	65.6	13.4	14.3	6.4	13.4	2.3	16.3
2004	6,966	65.9	12.6	17.7	4.8	4.4	2.3	13.2

Source: Ministry of the Economy, Centre for International Economics (CEI).
Abbreviations: GDPpc: Real per capita GDP (pesos); Cpr: Private consumption (% GDP); Cpu: Public consumption (% GDP); INV: Investment (% GDP); TB: Trade balance (% GDP); INFL: Inflation rate; RER: Real exchange rate (2001=1); UNEMP: Unemployment rate.
[a] Annual change in the consumer price index (CPI).
[b] Unemployed population as a percentage of the economically active population (EAP).
n.a.: data not available.

High export prices contributed to keeping the crisis from worsening and facilitated economic recovery. Nevertheless, by around 2006, public debt still amounted to about 66.7 per cent of Argentina's GDP, despite the recovery and recent debt negotiations.[1] The decline in real wages (including for public employees) following the currency devaluation was important for achieving a significant primary fiscal surplus, which helped contain inflationary expectations. The fiscal space created further allowed for the allocation of substantial public resources for the cash-transfer programme "Heads of Household" (*Programa Jefes de Hogar*) with large coverage among the population. From 2003, the economy recovered and showed robust growth till the global financial crisis of 2008.

Progress towards the MDGs in Argentina

Given the strong economic turbulence, the country has only made modest progress towards some of the Millennium Development Goals, but it has regressed with respect to others.

Rising poverty (MDG 1)

MDG 1 aims to eradicate extreme poverty and hunger. The target is to halve the percentage of the population with income under one dollar a day (valued at purchasing power parity (PPP)) between 1990 and 2015. The incidence of extreme poverty (using international or national poverty lines) is generally computed using information contained in household surveys. Poverty indicators for Argentina are calculated based on data from the Permanent Household Survey (EPH). It is important to indicate four methodological limitations when assessing poverty trends in Argentina:

- *The EPH only covers the urban population.* Hence the poverty estimates do not cover the total population, but given that 85 per cent of the Argentine population lives in urban areas, this may not be a major restriction.
- *Total household income as estimated by the EPH is not consistent with the national accounts.* Between 1992 and 2004, the annual growth rate for per capita GDP was 0.4 per cent while according to the EPH per capita household income fell by 2.9 per cent per year. This study does not settle these discrepancies, but rather coincides with Deaton (2003) and other authors who recommend the use of information as recorded in the surveys.
- *1990 is not a good year to use as a baseline for analysis.* In 1990, Argentina was immersed in one of its deepest economic crises (see Figure 4.1). Poverty was very high but started to fall soon thereafter (and to increase again later on). Thus, the prospects of reaching the goal for reducing extreme poverty in the case of Argentina changes significantly whether 1990 or some other year is used as the starting year. For instance, when using later years of greater economic stability as the reference, progress towards MDG 1 would look dramatically different. For this reason, this study uses 1992 as the starting year rather than the year of deep crisis.[2]
- *The dollar-a-day poverty line is not very relevant in the case of Argentina.* Being a middle-to-high income country, extreme poverty as measured through the international poverty line is relatively low and economic policy discussions tend to mostly address poverty measured through a poverty line of two dollars per person per day or through national (extreme and moderate) poverty lines.

Table 4.2 presents poverty trends according to four different poverty lines. The poverty incidence as measured through the two-dollars-a-day poverty line increased sharply from 4.2 per cent in 1992 to 14.2 per cent in 2004. Data from

Table 4.2 Argentina: poverty incidence according to different poverty lines, 1992-2004 (per cent of total population under given poverty line)

	1-dollar-a-day poverty line at PPP	2-dollars-a-day poverty line at PPP	National extreme poverty line	National moderate poverty line
1992	1.4	4.2	3.8	19.7
1998	3.4	9.4	8.2	30.1
2002	9.9	24.7	27.6	57.5
2004	5.2	14.2	15.0	40.2

Source: CEDLAS.

the Centre for Distributive, Labour and Social Studies (CEDLAS) of the National University of La Plata show that there has been a systematic increase in the incidence of moderate poverty (as measured through the national poverty line) since the early 1980s. This is the result of the combination of two factors: the stagnation of mean income and the increase in income inequality. As mentioned, mean per capita household income fell, on average, by 2.9 per cent per year during 1992 and 2004, according to the EPH data. Inequality increased substantially during the same period. The Gini coefficient of the distribution of per capita household income increased from 0.45 in 1992 to 0.51 in 2004; a rise in inequality unparalleled in Latin America.

Gasparini and others (2005) have determined that Argentina would have to maintain an annual rate of income growth of about 5 per cent through 2015 if it wants to half the incidence of moderate poverty from its 2004 value.[3] This would be an unprecedented performance, as Argentina's economy has never been able to sustain growth rates of 5 per cent per year for a whole decade. However, even if it could sustain this rate of growth it would not be sufficient to also reduce extreme poverty by 50 per cent as targeted through MDG 1. Income redistribution policies, therefore, may be needed to ensure meeting the target for poverty reduction, assuming such policies would not jeopardize economic growth. Politically viable income redistribution measures may not make a sufficiently large impact, however. For instance, in 2002 the government implemented one of Latin America's most ambitious cash transfer programmes, the "Heads of Household Programme", covering nearly 2 million families, but even with this programme in place, progress towards achieving the millennium goal of eradicating extreme poverty would not be enough.

Table 4.3 shows that when taking 1992 as the reference year and using the poverty line of two dollars a day, the poverty incidence would need to be reduced from 4.2 per cent to 2.1 per cent by 2015. This would not appear to be a very demanding target. In reality, however, poverty has moved in the opposite direction as by this measure it increased to 14.2 per cent in 2004. In other words, to meet the target of halving poverty between 1992 and 2015, a 12 percentage-points reduction would have to be achieved in just ten years. This

Table 4.3 Argentina: trends and targets of the MDG indicators

MDG-related Indicators	Initial Year		Base Year		Target	
	1990	1992	2003	2004	2015[a]	2015[b]
MDG 1: Eradicate extreme poverty						
Poverty incidence (1-dollar-a-day line at PPP)[c]	4.3	1.4	7.9	5.2	2.1	0.7
Poverty incidence (2-dollar-a-day line at PPP)[c]	11.6	4.2	23.7	14.2	5.8	2.1
MDG 2: Universal primary education						
Net enrolment rate[c]	97.5	98.0	99.3	99.2	100.0	100.0
Graduation rate (youth 15-24)[c]	95.4	95.6	96.4	96.0	100.0	100.0
Literacy rate (youth 15-24)[c]	99.1	99.1	99.3	n.a.	100.0	100.0
MDG 3: Promote gender equality						
Proportion of boys to girls in:						
gross enrolment rates for primary school	1.0	1.0	1.0	1.0	1.0	1.0
net enrolment rates for primary school	1.0	1.0	1.0	1.0	1.0	1.0
gross enrolment rates for secondary school	0.9	0.9	1.0	1.0	1.0	1.0
net enrolment rates for secondary school	0.9	0.9	1.0	1.0	1.0	1.0
MDG 4: Reduce mortality in children under five						
Under-five mortality rate (per 1,000 live births)	29.6	27.7	19.1	16.6	9.9	9.2
MDG 7: Guarantee environmental sustainability						
Goal 7a: Access to drinking water[c]						
Urban (EPH)	97.1	97.1	98.6	n.a.	98.6	98.5
National (Population Census)	92.2	92.2	92.9	92.9	96.1	96.1
National, public provisioning (Population Census)	65.1	67.3	78.4	79.7	82.5	83.7
Goal 7b: Access to basic sanitation[c,d]						
Urban (EPH)	87.8	87.8	87.7	n.a.	93.9	93.9
National (Census)	85.8	85.8	83.1	83.1	92.9	92.9
National (Census) (public system)	33.6	35.0	42.5	43.4	66.8	67.5

Source: National Population, Households and Housing Census (CNPV 1991 and 2001), PNUD (2006) and elaboration based on the EPH.

[a] With 1990 as initial year.

[b] With 1992 as initial year.

[c] Percentage of the population.

[d] Includes access to a button or chain flush toilet.

makes it unlikely that the target for MDG 1 can be met, in spite of the fact that the country has overcome the worst of the crisis of the early 2000s and gains in poverty reduction have been made since 2002.

Nearing the targets for MDG 2 and 3: education and gender equality

As Table 4.3 shows, by 2004 Argentina had already nearly met the target for MDG 2 of achieving universal primary education. Primary school attendance is nearly 100 per cent in urban areas. Only a very small group of children in poor families have not been able to access school. The graduation rates from primary school for youth between the ages of 15 and 24 are quite high (around 96 per cent) and are increasing gradually. Attendance rates did not fall significantly during the severe economic crisis of 2001-2002, which is an indication of the solidity of priority that parents give to the education of their children. Literacy rates are also at near 100 per cent levels.

Given that Argentina has practically reached the goal for universal primary education and complete literacy, education policies nowadays focus on other concerns, in particular on improving the quality of primary and secondary education and increasing access to secondary schooling and college education.

As Table 4.3 shows, the education gap for women (MDG 3) has been closed in Argentina. Most indicators suggest that the country has reached full gender equality for education, and some indicators even suggest that girls outperform boys in school attendance and performance, also at the secondary school level. This emerging gap for men is not considered a sign of discrimination, but rather the result of gender differences in opportunity costs and prospects of finding jobs in the labour market.

Slow progress towards targets in child health and basic sanitation (MDGs 4 and 7)

The child mortality rate (per 1,000 live births) has continued to decline during the past decades, despite the severe deterioration in incomes and living conditions of the poor (see Table 4.3). This result has been influenced primarily by the general progress in medicine, which has allowed substantial reductions in mortality all over the world. Greater coverage and access to potable water and sanitation services in some regions of the country have also been important factors (Galiani and others, 2005).

Under-five mortality rates dropped from 29.6 per 1,000 live births in 1990 to 16.6 in 2004. While the pattern has been positive, reducing this mortality rate further has now become more difficult since the numbers have reached relatively low levels. The target is to reduce it to 9.9 by 2015, which seems possible especially if the government is successful in providing the poorest groups with access to potable water, basic sanitation, basic health services and health education.

MDG 7, which seeks to ensure environmental sustainability, also includes targets related to basic services of potable water and sanitation. In the case of Argentina, the target is to reduce by half, between 1990 (or 1992) and 2015, the percentage of the population without access to both services (MDG 7a and 7b). A large share of the population already has access to drinking water in Argentina, in both urban and rural areas (see Table 4.3). It seems likely, therefore, that the country will reach the target for this goal by 2015, assuming past trends in expanding water and sanitation systems continue. Access to basic sanitation services (sewers) is more restricted. According to the population covered by the EPH, nearly 88 per cent of the urban population has access to a bathroom with the minimum sanitary requirements. The percentage of households connected to the public sewage system is less, however. The Population Census reports that while more than 80 per cent of the population has access to hygienic bathroom facilities, less than 50 per cent are connected to the public sewage system. Since progress in this area has been modest, achieving the target for basic sanitation is more challenging.

Social spending and the MDGs

Public social spending in Argentina has been strongly affected by the high economic volatility. Growth in social spending that has taken place since the early 1980s has been frequently interrupted, primarily by the deep economic crises (see panels (a) and (b) of Figure 4.3). Since the signing of the Millennium Declaration in 2000, the level of public social spending, both when measured as a percentage of GDP and in constant 1992 dollars, tended to fall significantly during the most recent economic crisis. The depreciation of the exchange rate, in particular, had a contractionary effect on real public social spending. Since salaries make up a large share of social spending, the drop in real wages cause by the exchange-rate adjustment explains a good part of this decline in expenditures. After 2002, social spending recovered somewhat.

Trends in real public spending on education and health are similar to that of the aggregate public social spending (see panels 'd 'and 'e' of Figure 4.2). Social welfare spending, in contrast, has increased substantially since the early 1990s and, beginning in 2002, this spending accelerated with the introduction of the "Heads of Household Programme" (see panel c of Figure 4.2).[4] Expenditures on water and sanitation, on the other hand, show large fluctuations (see panel f of Figure 4.2).

Public social spending is an important ingredient in the efforts to reach the MDGs. Yet, increasing expenditures as such may not be enough. As mentioned earlier, the increase in social welfare expenditures since the 1990s, for instance, has been sufficient to prevent a rise in poverty (see Table 4.2). At the same time, the indicators do show that the increases in spending on education and health since the early 1990s are closely correlated with the progress made towards several

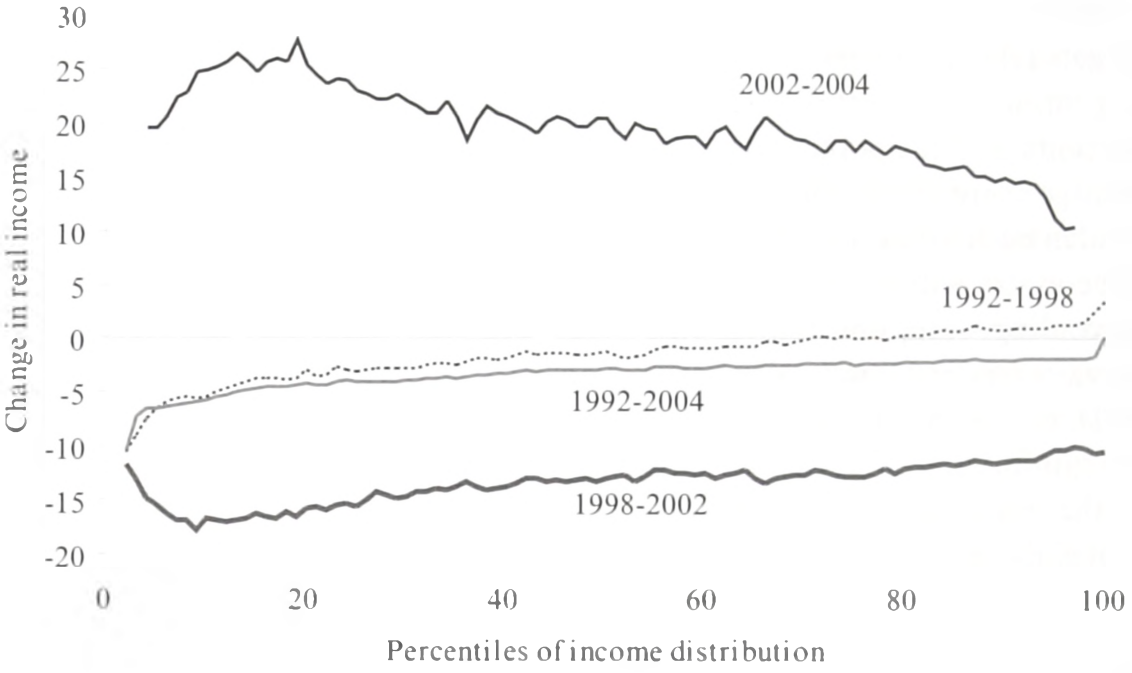

Figure 4.2 Argentina: Growth incidence curves, 1992-2004
Source: CEDLAS.

goals linked to performance in both sectors. The sharp decrease in public social spending after the 2002 devaluation has not affected either school enrolment rates or indicators in the health sector, possibly because, as indicated, the decline in spending affected mainly the wage bill rather than the delivery of the services.

Calibration of MAMS for Argentina

As explained in Chapter 3, MAMS captures the general equilibrium effects that are generated following the increase in public social spending required for reaching the targets associated with MDG 2, 4, and 7[5] and under alternative financing mechanisms. As mentioned, MDG 1 is evaluated through the micro-simulation methodology (see Appendix A2.1 of Chapter 2).

The structure of MAMS is determined by the functional forms described in Chapter 3. This section briefly describes the data sources used in the process of estimating and calibrating the model.

The accounting framework of the model is provided by a Social Accounting Matrix (SAM) for 2003, which was constructed in line with the key identity equations of MAMS.[6] The labour factor is disaggregated by level of educational attainment. Unskilled workers are those who have not finished their secondary education; semi-skilled are those who have incomplete higher education; and skilled workers are those who have completed their degrees in tertiary education. Changes in the composition of the labour supply by type of worker thus depend, in part, on the functioning of the education system. The employment data used to calibrate the model were obtained from the EPH.

The data for the MDG 2-related indicators (that is, the percentage of students that enrol in primary school and finish the cycle on time) were estimated using data from the EPH (graduation rates and repetition rates, among others) and from the administrative records of the Ministry of Education (number of students by educational level). Information on child mortality was obtained from the Ministry of Health. Data on access to potable water and basic sanitation coverage were derived from the 2001 National Census of Population, Households and Housing, and projected through the year 2003.

The elasticities that measure the links between determinants and outcomes of MDG achievement were estimated econometrically. These estimates suffer from some important limitations because of deficiencies in the data. The methodology and the results of these estimations are explained briefly in the next sub-sections on education and infant mortality. Before moving on to those issues, however, it is important to mention that the estimated elasticities were not introduced directly into MAMS, since the CGE model uses functional forms that are different from those estimated on the microeconometric data analysis and as a sensitivity analysis was conducted to find a consistent solution for MAMS.[7]

Education

Since Argentina has taken significant steps towards meeting MDG 2—namely, making primary education universal—graduation rates are also analyzed for secondary and tertiary levels. In the case of primary education, in particular, a model was estimated for analyzing the enrolment rates at the relevant age groups. Based on the extended human capital model, the decision to attend school is seen to depend on the rate of return to education, a range of individual, household and community characteristics and restrictions faced by each individual in financing his or her education.[8] In addition, probit models of the probability of graduation were estimated for each of the three levels of education. The explanatory variables used in the probit models are the same as those used for the primary education enrolment model.

The main data source for the econometric estimation was the EPH, covering 28 urban areas in Argentina for the 1997-2003 period.[9] Information on public expenditures on education and on infant mortality rates were derived from, respectively, the Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

Infant mortality is included as an explanatory variable with the hypothesis that a better health status of children enhances the probability of school attendance and performance. This specification also makes it possible to determine whether synergies exist as different millennium goals are achieved. At the same time, the passing of each of the grades of a particular cycle—a key variable in MAMS—is modelled by using the same determinants as those used in the decision to enrol in primary school.

As observed in Table 4.4, the model for enrolment in primary school at the mandatory age was estimated using more than 5,000 observations. Based on the marginal effects of the various explanatory variables, it was found that the likelihood of enrolment is slightly higher for girls and further that enrolment rises with the level of family income and education level of parents and, conversely,

Table 4.4 Argentina: results of the probit model estimated for primary school enrolment at mandatory age

Variable	dF/dx[a]	Error	Z	P>|z|	Average	95% confidence interval	
Male	-0.012	0.009	-1.280	0.202	0.523	-0.030	0.006
Logarithm of adult-equivalent income	0.004	0.007	0.660	0.508	5.221	-0.009	0.017
Years of education of head of household	0.002	0.001	1.210	0.227	9.304	-0.001	0.005
Female head of household	-0.024	0.031	-0.860	0.389	0.117	-0.085	0.037
Single parent household	0.019	0.018	0.910	0.363	0.105	-0.016	0.055
Number of siblings	-0.002	0.003	-0.630	0.530	2.181	-0.008	0.004
Per capita income by city/year	0.000	0.000	0.090	0.932	250.484	0.000	0.000
Years of education by city/year	-0.049	0.037	-1.350	0.178	7.472	-0.122	0.024
Wage gap (skilled/ semiskilled)	-0.041	0.031	-1.360	0.173	1.872	-0.102	0.019
Wage gap (semiskilled/ unskilled)	-0.059	0.068	-0.870	0.382	1.309	-0.191	0.074
Infant mortality	-0.003	0.002	-1.290	0.196	17.324	-0.007	0.002
Per capita spending on basic education	0.000	0.000	-0.300	0.763	211.144	0.000	000
Observations	5,357						
Dummy variable for cities	yes						
Dummy variable for years	yes						
Pseudo R^2	0.035						

Source: Estimates based on data from EPH, the Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

[a] In this and other tables through Table 4.8, dF/dx refers to the changes in the probability of enrolment in primary school at the mandatory age for an infinitesimal change of 0 to 1 in the independent variable, for a continuous or dummy variable, respectively. The change in probability is calculated for the average value of each one of the independent variables.

it falls with family size. The provinces with the highest infant mortality rates appear to have lower enrolment rates, suggesting a better health status positively influences access to education. The level of per capita spending on basic education was not found to be statistically significant. Most coefficients are not statistically significant, however, which may not be surprising, considering the small degree of variation observed for the dependent variable; that is, that approximately 95 per cent of Argentine children enrol in primary school at the age when they should do so.

The determinants of the model of primary school completion have greater statistical significance (see Table 4.5). Graduation rates tend to be higher for girls, at any grade of primary education and for students belonging to households with a higher income, fewer members and whose head of household has a higher level of education. Graduation also appears to be inversely related to the average years of education achieved by the population of cities and positively correlated with the wage gap between skilled and semi-skilled workers. Expenditures on basic education per capita appear to have a negative effect, though its marginal effect is close to zero.

The model for secondary school completion was estimated using a sample of more than 21,000 observations (see Table 4.6). Some of the model results seem counterintuitive. The city-specific control variables (per capita income and years of education), as well as per capita spending on basic education, seem to have a negative effect on the probability of graduation, but this could be caused by the fact the these effects are already picked up by the individual and household characteristics. Those determinants show similar results as for primary education, that is, girls and the students who belong to higher income households, with few members and whose heads of household have a higher level of education are the ones who have the greatest probability of graduating. A difference with the model for primary school graduation is that in the case of secondary education the probability of graduation decreases with the age of the students.

Finally, graduation rates fall considerably at the level of higher education. Only 50 per cent of the students at this level complete their studies. The model of completion of higher education was estimated using a sample of almost 7,000 observations (see Table 4.7). Results show that the explanatory power of the model is not very satisfactory. Few of the variables considered appear to influence the probability of graduation at this level. None of the variables that are statistically significant in the models of school completion at primary and secondary levels seem to explain graduation from higher education.

Infant mortality

MAMS assumes that changes in child mortality are determined by a number of socioeconomic conditions. Survival models are appropriate for analyzing infant or child mortality.[10] In the case of Argentina, however, it is not possible

Table 4.5 Argentina: results of the probit model estimated for primary school completion

Variable	dF/dx	Error	Z	P>|z|	Average	95% confidence interval	
Age	0.030	0.006	4.850	0.000	9.527	0.018	0.042
Age squared	-0.001	0.000	-4.720	0.000	96.063	-0.002	-0.001
Male	-0.020	0.006	-3.330	0.001	0.512	-0.032	-0.008
Logarithm of adult-equivalent income	0.018	0.004	4.420	0.000	5.172	0.010	0.026
Years of education of head of household	0.004	0.001	4.850	0.000	9.128	0.003	0.006
Female head of household	-0.008	0.017	-0.500	0.620	0.142	-0.043	0.026
Single parent household	-0.002	0.017	-0.100	0.921	0.134	-0.035	0.032
Number of siblings	-0.010	0.002	-5.250	0.000	2.399	-0.014	-0.006
Per capita income by city/year	0.000	0.000	0.540	0.587	252.047	0.000	0.000
Years of education by city/year	-0.089	0.025	-3.610	0.000	7.502	-0.137	-0.040
Wage gap (skilled/ semiskilled)	0.041	0.020	2.050	0.041	1.876	0.002	0.080
Wage gap (semiskilled/ unskilled	-0.029	0.041	-0.700	0.482	1.314	-0.109	0.051
Infant mortality	-0.001	0.001	-0.470	0.639	17.189	-0.003	0.002
Per capita spending on basic education	0.000	0.000	-2.420	0.015	212.027	-0.001	0.000
Observations	39,067						
Dummy variable for cities	yes						
Dummy variable for years	yes						
Pseudo R^2	0.039						

Source: Estimates based on data from EPH, Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

to estimate a detailed model of this type, given the lack of adequate micro data. Instead, a simpler regression model is applied to test the significance of the determinants of infant mortality rates as specified in MAMS. While target for MDG 4 relates to reducing the child mortality rate, we use the infant mortality rate as a proxy, given that better data are available for this indicator in

Table 4.6 Argentina: results of the probit model estimated for secondary school completion

Variable	dF/dx	Error	Z	P>|z|	Average	95% confidence interval	
Age	-0.008	0.004	-1.760	0.078	15.992	-0.016	0.001
Age squared	0.000	0.000	0.640	0.520	264.466	0.000	0.000
Male	-0.067	0.010	-6.520	0.000	0.507	-0.087	-0.047
Logarithm of adult-equivalent income	0.027	0.008	3.410	0.001	5.393	0.011	0.042
Years of education of head of household	0.004	0.002	2.530	0.011	9.569	0.001	0.007
Female head of household	0.011	0.023	0.500	0.619	0.172	-0.033	0.056
Single parent household	-0.030	0.024	-1.250	0.211	0.176	-0.077	0.018
Number of siblings	-0.007	0.004	-1.850	0.064	2.044	-0.014	0.000
Per capita income by city/year	0.000	0.000	-2.080	0.038	262.960	0.000	0.000
Years of education by city/year	-0.082	0.043	-1.910	0.056	7.601	-0.167	0.002
Wage gap (skilled/ semiskilled)	-0.016	0.033	-0.500	0.620	1.883	-0.081	0.048
Wage gap (semiskilled/ unskilled)	0.072	0.064	1.130	0.261	1.317	-0.053	0.197
Infant mortality	0.000	0.002	-0.160	0.874	16.968	-0.005	0.004
Per capita spending on basic Education	-0.001	0.000	-2.460	0.014	211.326	-0.001	0.000
Observations	21,237						
Dummy variable for cities	yes						
Dummy variable for years	yes						
Pseudo R^2	0.023						

Source: Estimates based on data from EPH, Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

Argentina.[11] We estimate a proportions model of infant mortality using panel information by province for a period of 12 years (1992-2003).

Table 4.8 shows the results of the infant mortality model. The mortality of children younger than one year of age is negatively related to the level of per capita income and the level of per capita expenditures on health in each province. Contrary to what might be expected, the percentage of households with access

Table 4.7 Argentina: results of the probit model estimated for higher education completion

Variable	dF/dx	Error	Z	P>|z|	Average	95% confidence interval	
Age	0.015	0.015	0.970	0.331	21.994	-0.015	0.045
Age squared	0.000	0.000	-1.460	0.144	495.789	-0.001	0.000
Male	-0.028	0.020	-1.370	0.170	0.418	-0.068	0.012
Logarithm of adult-equivalent income	0.008	0.016	0.490	0.621	5.996	-0.023	0.038
Years of education of head of household	0.000	0.003	0.110	0.912	11.533	-0.006	0.006
Female head of household	-0.063	0.050	-1.260	0.208	0.203	-0.160	0.035
Single parent household	0.000	0.049	-0.010	0.992	0.216	-0.097	0.096
Number of siblings	0.026	0.009	2.760	0.006	1.256	0.008	0.044
Per capita income by city/year	0.000	0.000	-0.950	0.343	288.152	-0.001	0.000
Years of education by city/year	-0.190	0.087	-2.180	0.029	7.889	-0.360	-0.019
Wage gap (skilled/ semi-skilled)	-0.018	0.070	-0.250	0.799	1.888	-0.154	0.119
Wage gap (semi-skilled/unskilled)	0.060	0.117	0.510	0.610	1.321	-0.170	0.289
Infant mortality	0.002	0.005	0.340	0.737	16.351	-0.009	0.012
Public spending on higher education	0.002	0.005	0.390	0.697	18.614	-0.008	0.012
Observations	6,798						
Dummy variable for cities	yes						
Dummy variable for years	yes						
Pseudo R^2	0.015						

Source: Estimates based on data from EPH, Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

to water does not appear to influence infant mortality.[12] However, the variable representing access to water in the estimated model refers to the presence of a source of water in the home. It is important to point out that the simple presence of water is not a necessary and sufficient condition for assuring access to water that is fit for human consumption.

The time dummies capture the presence of factors not included in the model that generate a tendency towards a decline in infant mortality rates. At the

Table 4.8 Argentina: determinants of infant mortality

Variable	Coefficient	Error	Z	P>|z|	95% confidence interval	
Log of per capita income	-3.724	1.070	-3.48	0.001	-5.831	-1.618
Per capita expenditures on health	-0.007	0.003	-2.54	0.012	-0.013	-0.002
Percentage of households with access to water	-0.011	0.100	-0.11	0.911	-0.209	0.187
Observations	270					
Dummy variable for cities	Yes					
Dummy variable for years	Yes					
Pseudo R^2	0.686					

Source: Estimates based on data from EPH, Office of Analysis of Public Spending and Social Programs and the Office of Health Information and Statistics of the Ministry of Health.

same time, the spatial variable indicates that there are significant differences in infant mortality rates across the regions of the country. In particular, the northern region of the country, both east and west, has rates that are much higher than the national rates, even after controlling for their lower levels of income, more limited access to water, and lower public expenditures on health.

Additional information for the calibration of MAMS

The variation in the indicators associated with MDG 7 (access to potable water and to basic sanitation) is also defined by a series of elasticities with respect to a series of underlying determinants. These determinants could not be estimated econometrically, however, because of a lack of relevant data. The values assumed by the corresponding elasticities were defined by validating the trajectories of the MDG 7 indicators generated by MAMS in the baseline scenario described in the following section, taking into consideration the past trends of these indicators.

MAMS also requires other information about the conditions under which the goals associated with the MDGs would be met. Specifically, a trajectory needs to be defined for scaling up per capita consumption, the provision of the relevant service (for example, health services for MDG 4) and the level of public infrastructure such that the MDGs are met by 2015. For MDG 2, projection estimates presented in Vargas de Flood (2006) were used as a reference. For MDGs 4 and 7, the information collected in PNUD (2006) about public expenditures in health and water and sanitation for 1990-2003 was used. Additionally, expert opinion was sought in sectoral matters to validate the results of the model. As mentioned in the third section, Argentina is close to meeting some

of the MDG targets. As explained below, however, it is precisely because of this that large increases in public spending will be required as the marginal costs of the required interventions to meet the targets become higher.

The other elasticities of the model, which define the behaviour of the agents (producers and consumers, primarily), were obtained from a review of literature. Many parameters were taken from Díaz-Bonilla and others (2004). These authors calibrate a static model of the Argentine economy based on the CGE framework developed by Lofgren and others (2002) which, as indicated in Chapter 3, also forms a starting point for MAMS.

General equilibrium analysis

As explained in Chapter 3, MAMS is used to simulate a baseline scenario that shows how the economy would behave in the absence of economic shocks and with certain assumptions for growth of production and public spending. The MDGs are not necessarily reached in this scenario which serves as the reference for comparison with alternative policy scenarios that target the achievement of MDGs 2, 4 and 7 in a context of endogenous adjustment of growth of production and public spending. In the case of Argentina, all these scenarios are simulated for the 2003-2015 period and the results are presented in Table 4.9.

Baseline scenario: key assumptions and results

The baseline scenario assumes that GDP will grow at an annual average rate of 3.2 per cent. This pace of growth is derived from estimates of potential GDP for Argentina which in turn are based on information on factor endowments for the 1990-2001 period.[13] For 2003-2006, however, relatively higher growth rates are used with the objective of replicating the behaviour of the Argentine economy during those years.

The population growth of the country increases exogenously in the baseline scenario, at a rate consistent with the official projections of the Institute of Statistics and Censuses (INDEC). The supply of factors varies over time as the growth of the labour force depends on population growth and on the performance of the education system, while growth of the capital stock depends on the rate of investment. Both types of production factors are assumed to be perfectly mobile between sectors. Adjustment of the labour market is characterized by the existence of unemployment and downward rigidity of real wages. Full utilization of capital is assumed and the market for the factor capital clears for its price.

It is also assumed that government consumption will grow at the same rate as GDP. With respect to government financing during the entire period, it is assumed that public external debt will be reduced, that public domestic debt will grow, and that the government will not have to resort to the Central Bank to finance its deficits. As a result, the government pays interest primarily on

Table 4.9 Argentina: main results of policy simulations, 2003-2015

	2003 (values)	Baseline scenario	MDG 2 scenario			MDG 4 scenario		
			tax	fbor	dbor	tax	fbor	dbor
Macroeconomic aggregates (billions of pesos)[a]		**Annual average growth for period (%)**						
GDP at market prices	379.1	3.2	3.2	3.2	2.8	3.2	3.2	3.0
Private consumption	236.0	3.9	3.7	3.8	3.5	3.7	3.9	3.7
Public consumption	47.2	3.2	3.5	3.5	3.5	4.2	4.1	4.2
Gross capital formation	56.6	4.2	3.9	4.1	2.3	4.0	4.4	2.0
– Private	50.4	4.3	4.0	4.3	2.3	3.9	4.4	1.8
– Public	6.2	3.4	2.6	2.8	2.3	4.1	4.1	3.7
Exports	89.9	1.2	1.1	0.8	0.7	1.1	0.1	0.8
Imports	50.7	4.0	3.8	4.0	3.3	3.9	4.2	3.4
Public expenditure (% of GDP)		**Annual average for period (% of GDP)**						
Final consumption in education	2.9	2.8	3.4	3.4	3.5	2.8	2.8	2.9
– Primary cycle	1.5	1.4	2.0	2.0	2.0	1.4	1.4	1.4
Final consumption in health	1.5	1.4	1.4	1.4	1.5	2.1	2.0	2.1
Final consumption in water and sanitation	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Final consumption in other government services	7.2	7.0	7.0	7.1	7.2	7.0	7.0	7.1
Investment in education	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2
– Primary cycle	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1
Investment in health	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Investment in water and sanitation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Investment in other public infrastructure	0.5	0.6	0.5	0.6	0.5	0.5	0.6	0.5
Investment in other government services	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Table 4.9 (cont'd)

	2003 (values)	Baseline scenario	MDG 2 scenario			MDG 4 scenario		
			tax	fbor	dbor	tax	fbor	dbor
Financing of MDG strategy (% of GDP)					Value in 2015			
Income tax revenue	10.0	11.2	12.2	11.2	11.3	13.6	11.3	11.3
Government domestic borrowing	1.3	1.6	1.6	1.6	3.8	1.6	1.6	4.9
Government foreign borrowing	-2.6	-1.3	-1.3	-0.3	-1.3	-1.3	1.3	-1.3
Outstanding domestic public debt	45.9	44.4	44.8	44.6	61.1	44.3	44.5	55.2
Outstanding external public debt	82.3	25.9	26.1	36.3	27.2	25.8	32.9	26.5
Real exchange rate (index, 2003=100)	100.0	91.4	91.4	90.1	91.3	91.5	87.6	91.1
Labour market					Annual average growth for period (%)			
Employment (millions of workers)	13.8	1.8	1.8	1.8	1.7	2.0	1.8	1.7
– Unskilled workers	7.5	1.4	1.4	1.3	1.2	1.5	1.3	1.2
– Semi-skilled workers	4.3	2.5	2.6	2.5	2.4	2.7	2.5	2.5
– Skilled workers	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Real labour income per worker (pesos)[a]	9,279	2.1	2.2	2.2	2.1	2.1	2.3	2.2
– Unskilled workers	3,366	2.0	2.0	2.0	1.8	1.9	2.0	1.9
– Semi-skilled workers	10,497	1.4	1.4	1.4	1.3	1.3	1.4	1.4
– Skilled workers	28,039	2.2	2.4	2.4	2.2	2.6	2.6	2.5
MDG outcomes					Value in 2015			
Primary school completion rate (%)	81.7	86.1	98.0	98.0	98.0	86.0	86.3	86.1
Child mortality (per 1,000 live births)	19.1	12.6	12.8	12.6	13.1	9.9	9.9	9.9
Population with access to drinking water (%)	78.4	79.9	79.8	79.9	79.8	79.8	79.9	79.8
Population with access to basic sanitation (%)	42.5	51.4	51.3	51.3	51.0	51.3	51.4	51.1

Table 4.9 (cont'd)

	2003 (values)	Baseline scenario	MDG 7 scenario			All MDGs scenario		
			tax	fbor	dbor	tax	fbor	dbor
Macroeconomic aggregates (billions of pesos)[a]		**Annual average growth for period (%)**						
GDP at market prices	379.1	3.2	3.3	3.2	3.2	3.1	3.1	2.5
Private consumption	236.0	3.9	3.8	3.9	3.8	3.5	3.9	3.4
Public consumption	47.2	3.2	3.5	3.5	3.5	4.5	4.4	4.6
Gross capital formation (investment)	56.6	4.2	4.1	4.2	3.7	3.6	4.3	-0.6
– Private	50.4	4.3	4.2	4.3	3.7	3.7	4.4	-1.2
– Public	6.2	3.4	3.6	3.6	3.5	3.3	3.4	2.9
Exports	89.9	1.2	1.2	1.0	1.1	1.0	-0.3	0.2
Imports	50.7	4.0	4.0	4.1	3.9	3.7	4.2	2.6
Public expenditure (% of GDP)		**Annual average for period (% of GDP)**						
Final consumption in education	2.9	2.8	2.8	2.8	2.9	3.4	3.4	3.5
– Primary cycle	1.5	1.4	1.4	1.4	1.4	2.0	2.0	2.0
Final consumption in health	1.5	1.4	1.4	1.4	1.4	1.9	1.8	1.9
Final consumption in water and sanitation	0.7	0.7	0.9	0.9	0.9	0.9	0.9	0.9
Final consumption in other government services	7.2	7.0	7.0	7.0	7.0	7.1	7.1	7.2
Investment in education	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
– Primary cycle	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Investment in health	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Investment in water and sanitation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Investment in other public infrastructure	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Investment in other government services	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

Table 4.9 (cont'd)

	2003 (values)	Baseline scenario	MDG 7 scenario			All MDGs scenario		
			tax	fbor	dbor	tax	fbor	dbor
Financing of MDG strategy (% of GDP)				Value in 2015				
Income tax revenue	10.0	11.2	11.7	11.2	11.2	14.7	11.3	11.5
Government domestic borrowing	1.3	1.6	1.6	1.6	2.4	1.6	1.6	7.6
Government foreign borrowing	-2.6	-1.3	-1.3	-0.7	-1.3	-1.3	2.0	-1.4
Outstanding domestic public debt	45.9	44.4	44.4	44.4	47.4	44.7	44.6	74.4
Outstanding external public debt	82.3	25.9	25.9	28.0	26.1	26.1	42.9	28.0
Real exchange rate (index, 2003=100)	100.0	91.4	91.4	90.6	91.4	91.5	86.4	91.1
Labour market				Annual average growth for period (%)				
Employment (millions of workers)	13.8	1.8	1.9	1.9	1.8	2.0	1.9	1.6
– Unskilled workers	7.5	1.4	1.5	1.4	1.4	1.4	1.3	1.0
– Semi-skilled workers	4.3	2.5	2.6	2.6	2.5	2.9	2.7	2.5
– Skilled workers	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Real labour income per worker (pesos)[a]	9,279	2.1	2.0	2.1	2.1	2.3	2.4	2.2
– Unskilled workers	3,366	2.0	2.0	2.0	2.0	2.0	2.0	1.7
– Semi-skilled workers	10,497	1.4	1.4	1.4	1.4	1.3	1.4	1.2
– Skilled workers	28,039	2.2	2.2	2.2	2.2	2.8	2.7	2.5
MDG outcomes				Value in 2015				
Primary school completion rate (%)	81.7	86.1	86.1	86.2	86.1	98.0	98.0	98.0
Child mortality (per 1,000 live births)	19.1	12.6	11.7	11.6	11.7	9.9	9.9	9.9
Population with access to drinking water (%)	78.4	79.9	82.5	82.5	82.5	82.5	82.5	82.5
Population with access to basic sanitation (%)	42.5	51.4	67.7	67.6	67.7	67.8	67.6	67.9

Source: MAMS for Argentina.

[a] In real terms at base-year prices.

its domestic debt. These assumptions are justified for the Argentine economy based on MECON (2005). Additionally, an exogenous reduction of public debt is introduced in 2005, as a result of the debt swap the government conducted in that year. At the same time, it is assumed that transfers between institutions will grow exogenously at the same rate as GDP.

Chapter 3 explains how the macroeconomic closure rules are defined in MAMS for all country applications in this volume. Basically, the fiscal balance is assumed fixed following a closure rule whereby the direct tax rate is allowed to vary to ensure the government generates enough revenue to finance its capital outlays. The real exchange rate adjusts to balance the external account, while foreign savings are assumed to be exogenous. Finally, private investment is assumed to adjust proportionally to total domestic absorption, while private savings adjust endogenously to finance private investment.

The results in Table 4.9 show that real wages increase in all scenarios over the simulation period, benefiting primarily the labour categories with lower supply growth. The supply of semi-skilled workers is growing faster than that of other types of workers due to an increase in the number of students and higher rates of secondary school completion.[14] Consequently, the wage gap between skilled and unskilled workers narrows somewhat over time. Employment also increases for the three types of labour and the overall unemployment rate falls. As explained in the following section, the reduction in unemployment and the increase in real wages contribute to poverty reduction.

The MDG indicators improve in the baseline scenario, but not sufficiently to meet the given targets (see Table 4.9 and Figure 4.3). The percentage of students that enrol in primary school and complete it as scheduled increases from 82 per cent in the base year to 86 per cent in 2015, but falls short of the 100 per cent target. The reduction in the under-five child mortality rate replicates its observed change in the 2003-2006 period, to drop further by three points in the remaining period until 2015. In the baseline scenario, the share of the population with access to potable water increases, but falls 3 percentage points short of the target by 2015. The percentage of the population with access to basic sanitation also increases in the baseline, but falls short of the 2015 target by 15 percentage points. Since none of the desired goals are met, public spending in social services associated with the MDGs must increase in order to meet the established targets.

MDG scenarios

A total of 16 scenarios in which MDG targets are met were simulated, and these were divided into four sets. The first three sets target the achievement of, respectively, MDG 2, MDG 4 and MDG 7. In the fourth set, simultaneous achievement of all those MDGs is targeted. In all cases, MDG 1 is not targeted as explained in the sixth section. These scenarios generate results for the

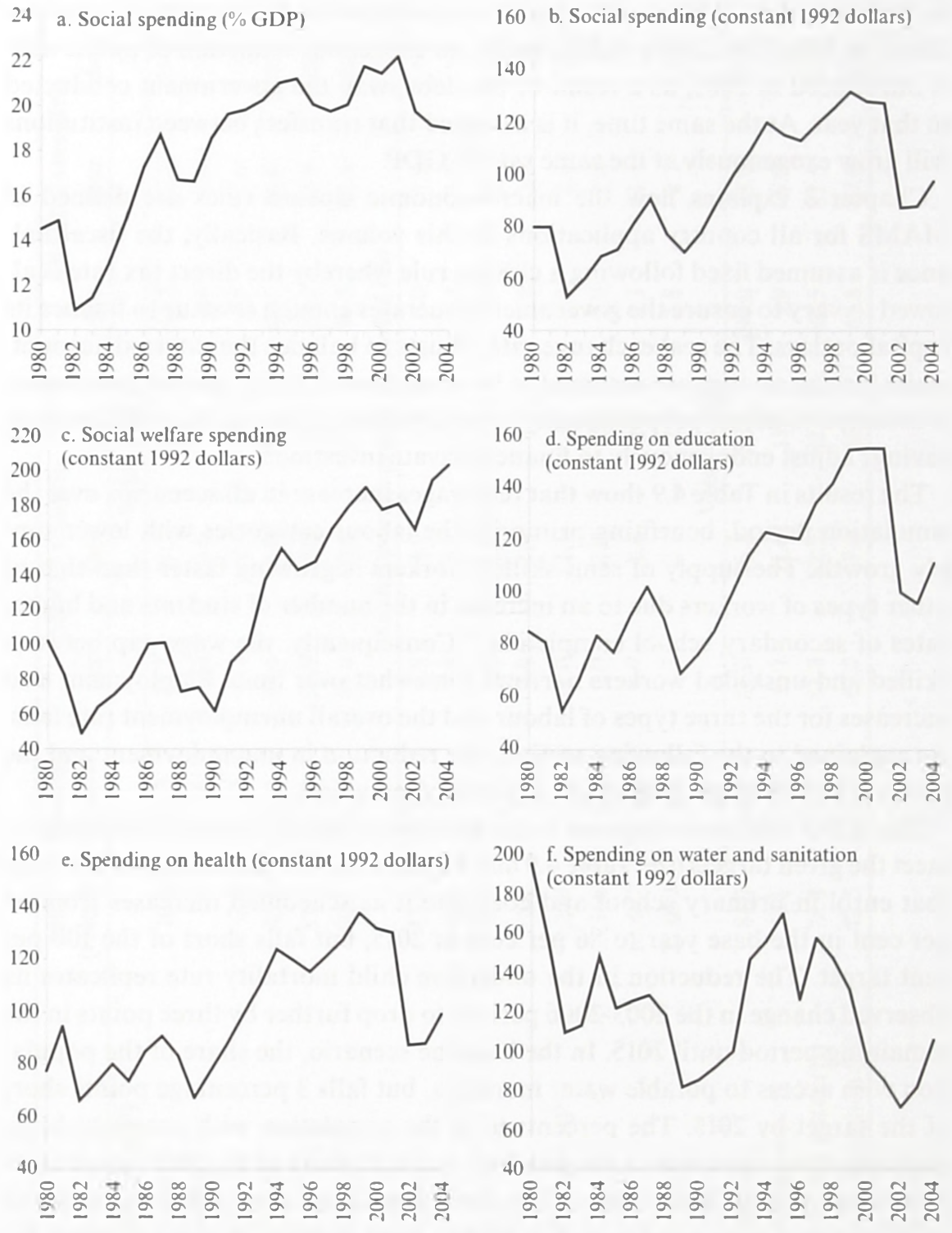

Figure 4.3 Argentina: trends in public social spending, 1980-2004
Source: Own elaboration using data from the Office of Analysis of Public Spending and Social Programs.

required additional public spending to achieve the given targets under four alternative financing options: increasing the income tax rate (tax), domestic borrowing (dbor), foreign borrowing (fbor) or foreign grants. The latter financing strategy is not considered relevant for Argentina and, therefore, its results are not discussed here. If new public spending is not financed through taxes, the

macroeconomic closure rules of the baseline scenario must be modified. For example, in the foreign-borrowing scenario, foreign savings are "endogenized" in order to finance the MDG strategy, while fixing direct tax rates at the same time. Direct tax rates are also kept fixed, when the government uses the option of domestic borrowing. This way, it is possible for the government's financing strategy to have repercussions on the growth rate of the economy, through different mechanisms discussed in the below.

Achieving the goal for primary education

In order to reach the target for primary education, three conditions must be met: all children must enrol in primary school at the mandatory age, no child may drop out of school and no child may repeat a grade.[15] Given the baseline results, meeting these conditions require additional public expenditures on education (see Table 4.9). By construction, solely targeting the goal for primary education does not directly influence progress towards the other goals. However, there may be indirect effects through changes in per capita consumption (as compared to the baseline scenario). For instance, tax financing could affect disposable incomes of households and hence per capita consumption, thereby affecting progress towards MDGs 4 and 7.

As primary education goals are met, wages for skilled workers rise (see Table 4.9) and their unemployment rate declines. The additional public spending in education increases the demand for teachers pushing up the average remuneration for skilled workers. Real wages for other types of workers decline slightly (with respect to the baseline scenario) in the case of the domestic borrowing scenario. This is caused by a crowding out of private investment which slows economic growth and the demand for semi-skilled and unskilled workers as compared with the baseline. For its part, financing through taxation reduces disposable household incomes and private spending on primary education, thus requiring additional public spending on education in order to meet the target.

Achieving the MDG for primary education is more costly than achieving those for health and basic sanitation when measured in terms of the required public spending (as a percentage of GDP), independent of the source of financing used. As Table 4.9 shows, the total additional spending (as compared to the baseline scenario) expressed as the annual average for 2003-2015 is equivalent to 0.7 or 0.6 points of GDP, respectively for the scenarios of domestic resource mobilization (taxes or domestic borrowing) and external borrowing.

Child mortality

The additional public spending in health required (with respect to the baseline scenario) to meet the target for reducing child mortality is estimated at 0.8 per cent or 0.6 per cent of GDP per year on average for the 2003-2015 period,

respectively for the scenarios with domestic borrowing or the other two financing options. The required additional spending increases towards the end of the period, as the marginal costs of interventions increases the closer one gets to the target. It is important to recall that, according to the microeconometric analysis, public spending on health has a weak effect on infant mortality. Furthermore, the target for MDG 4 is close to zero.

Financing the increase in health spending through domestic borrowing has an adverse simulated effect on GDP growth, caused by the "crowding-out" effect on private investment (Table 4.9). Since per capita consumption—an important determinant for MDG 4—is also affected as compared with the baseline scenario, the government must increase health spending by more than, for instance, the scenario of foreign borrowing in order to meet the target set for 2015.

As in the case of the MDG 2 scenarios, real wages of skilled workers show a slight increase, as a result of the expansion of health services and as a high share (approximately 45 per cent) of the labour employed in the health sector has completed higher education.

As Table 4.9 shows, reaching the child mortality goal does not have a significant direct impact on the primary education goal. Based on the econometric estimates presented, it is assumed that the behaviour of the students (graduating, repeating grades, dropping out, and others) has a weak relationship with child mortality. To the extent that better education of parents influences child mortality, this likely will take effect beyond the simulation period given the time lags involved.

Water and sanitation

As indicated above, there has been progress in providing the population with drinking water and basic sanitation. Deficits remain large in the area of sanitation, however. Marginal costs of raising coverage in water and sanitation are relatively low, such that with modest additional investments (around 0.2 GDP points per year) the targets for water and sanitation could be met by 2015 (see Table 4.9). Consequently, the macroeconomic repercussion effects of this scenario are negligible and achieving the goals for water and sanitation would be quite affordable, especially if recent trends in economic growth could be sustained.

Reaching the MDGs simultaneously

The macroeconomic costs of achieving MDGs 2, 4 and 7 simultaneously are lower than the corresponding sum for the previous three scenarios, owing to synergies that emerge are the goals are achieved. The synergy effects are relatively small, however, in part because Argentina has already made substantial progress towards the targets. It can be deduced from Table 4.9 that reaching all the goals simultaneously would reduce the required additional

public spending by between 0.2 and 0.3 percentage points of GDP per year, as compared with pursuing each goal separately, respectively for the domestic and external financing scenarios.

Tax financing seems the more viable option to fund the additional government spending required to achieve the MDGs, even though it would affect disposable household incomes and private consumption. Domestic borrowing would cause total public debt to increase to likely unsustainable levels of over 100 per cent of GDP by 2015 and it would also slow economic growth as it would crowd out private investment. Resorting to external borrowing would go counter to Argentina's objective of reducing its foreign debt and equally would push up public indebtedness to high levels (87 per cent of GDP by 2015). Furthermore, external financing would lead to an appreciation in the real exchange rate, causing a drop in export volumes by -0.3 per cent compared with the baseline. This, in turn, will affect tax revenue from international trade, thus increasing the need for public resources to finance the MDG strategy.

Microsimulations and extreme poverty

The policy scenarios of MAMS only optimize towards the achievement of MDGs 2, 3, 4 and 7. Poverty is assumed to be a result of the overall performance of the economy, in particular labour market outcomes, rather than of specifically targeted public policies. Poverty and inequality outcomes are estimated through the microsimulation methodology after imposing labour market changes of the scenarios simulated with MAMS on the full income distribution derived from household survey data. The labour market shifts were simulated sequentially for the following components: unemployment rate (U), the sectoral composition of employment (S), relative wages (W1), the average wage (W2) and the composition of employment according to the skill level of those employed (M). Since the microsimulation methodology is non-parametric and involves a randomized process, each estimation procedure was repeated several times in Monte Carlo fashion in order to obtain 95 per cent confidence intervals for the simulated changes in poverty and inequality indicators.

The EPH from the second semester of 2005 was used as the basic set of micro data. The results of MAMS used in the microsimulations cover the period from 2005 to 2015.[16] The final effects on moderate poverty and inequality (measured through the Gini coefficient) correspond to the cumulative effects of the various changes in labour market parameters (that is, U+ S+W1+W2+M). The analysis of the target for MDG 1 is based on the official (moderate) poverty line, since as discussed in the third section, the international poverty line of one dollar a day is not very relevant for Argentina.

Baseline scenario

Poverty declines in the baseline scenario, owing to the drop in the unemployment rate and the increase in the average real wage. The decline in unemployment alone helps to reduce the poverty incidence by 2.6 percentage points between 2005 and 2015.

The simulated changes in the sectoral structure of employment and the composition of employment by skill level do not have a significant impact on poverty. All labour market effects combined contribute to a reduction of poverty of 7.2 percentage points over the simulation period. This is not sufficient, however, to meet the target of reducing poverty to 9.9 per cent by 2015.

The baseline scenario also records a slight fall in inequality, which is mainly on account of the decline in the unemployment rate. As mentioned, inequality in labour incomes across types of workers and sectors does not change much in the baseline scenario, except that wages of skilled workers increase slightly more than those of unskilled workers. Overall, however, the simulated shift in relative wages does not significantly affect the distribution of per capita household income.

MDGs scenario

Most scenarios in which the goals are achieved generate weaker effects on poverty and inequality than the baseline scenario. Hence, as in the baseline scenario, the target of halving poverty by 2015 is not met and this applies to poverty as measured by any of the four poverty lines. The degree of poverty reduction is somewhat less under the scenarios of tax financing and domestic borrowing, while the scenario with foreign borrowing reaches a similar degree of poverty reduction as in the baseline. These outcomes are driven by the fact that the economy would grow more slowly in the scenarios with domestic resource mobilization for the explained reasons. Slower growth implies a smaller reduction in the unemployment rate and a more modest increase in the average real wage. At the same time, the stronger shift in relative wages in favour of skilled workers counteracts poverty reduction in the MDGs scenario as compared to the baseline scenario.

Conclusions and policy recommendations

Between 1990 and 2005, Argentina made visible progress towards the achievement of MDGs 2, 4 and 7. There have been considerable setbacks with respect to reducing poverty (MDG 1), despite the introduction of targeted social welfare programmes. The MDG scenarios analyzed in this chapter indicate that, despite the progress made, business as usual is not good enough to meet the targets set for MDGs 2, 4 and 7. As a consequence, additional public spending efforts are needed. Given the existing pattern of economic growth, however, the increased social spending in order to achieve the goals for education, health, and water and basic sanitation would not provide the employment impetus and

redistributive effects needed to also achieve the target of halving poverty by 2015. Furthermore, achieving MDG 1 by 2015 has become more challenging, because of the substantial rise in poverty caused by the economic crisis just prior to the base year used for the scenario analysis. Recently, however, the Argentine government has extended its programme of targeted conditional cash transfers, which could help accelerate achievement of the poverty reduction target. Whether this will work will depend on a multiplicity of factors whose analysis exceeds the scope of the present study, including the effects of the economic and financial crisis that hit the world in 2008.

The way in which the MDG strategy is financed matters for the macroeconomic trade-offs generated by the scaling up of public spending. If the government finances the additional expenditures through increasing its domestic debt, it would tend to crowd out resources available for private investment which would, in turn, adversely affect growth. This slows progress towards the poverty-reduction goal as it diminishes employment and real wage growth. This trade-off is much less of a problem in the tax-financing scenario in which case it is disposable household income that is affected by the higher direct taxes and private consumption fall (including in MDG-related areas). This, in turn, requires that public spending is increased further in order to ensure that the goals are reached. The external financing strategy avoids the previous trade-offs, but instead generates an appreciation of the real exchange rate with negative repercussions on the volume of exports which, in turn, affects government revenues.

While all financing options generate macroeconomic trade-offs, the tax-financing strategy is considered more viable for Argentina, as it would not significantly slow output growth during the simulation period and does not push up public debt to unsustainable levels, as the other two financing options would do. The trade-offs generated in the increased tax-financing scenario are the result of the assumption of the model that only income tax rates adjust endogenously to mobilize the resources for the additional government spending. Tax reform options may be considered to minimize the impact on disposable household income, especially of lower income groups. The scenarios of external or domestic borrowing seem less desirable given Argentina's recent history of defaulting on public debt, which conditions access to future financing.

Alternatively, improving the efficiency of social public spending might also contribute by reducing the need for additional financing, but this option was not analyzed for the present study. In any case, the model-based analysis suggests that reaching MDGs 2, 4 and 7 is affordable in the case of Argentina, though specific measures will also have to be taken to ensure reaching the goal of poverty reduction as well. The analysis has focused on achievement of nation-wide targets. The policies as discussed may not suffice to eliminate all differences in human development and MDG achievement across regions of the country. In fact, as proposed in PNUD (2006), additional targets have been set to eliminate regional differences in MDG achievement by 2015.

Notes

1 As explained below, this high degree of public indebtedness relative to GDP affects the viability of some financing scenarios for the additional public expenditures required to reach the MDGs.

2 The base year of the CGE model is 2003 but, for similar reasons, this year is not used as the starting point for the poverty analysis using the microsimulation methodology because in 2003 the economy just started recovering from the crisis of the early 2000s. Hence, 2005 is used instead as the year of reference for this part of the modelling analysis.

3 The growth rate varies depending on the type of poverty measure used. It would be 4.7 per cent annually using the official estimate for the extreme poverty incidence or 5.6 per cent using that for the moderate poverty incidence.

4 This includes the expenditures of programmes aimed at the poor—primarily monetary transfers.

5 As explained in Chapter 3, MAMS can also be used to simulate reaching the goal of maternal mortality (MDG 5). However, the lack of reliable information on maternal mortality, as well as the expected small impact of an increase in overall public health spending on reaching this goal in the case of Argentina, makes it less viable and interesting to evaluate MDG 5 (see also PNUD, 2006).

6 A detailed presentation of the procedure followed to construct the SAM is found in Cicowiez and others (2006).

7 Notice that the specification of some of the independent variables in the estimated microeconometric models differ somewhat from the determinants identified in the MDG bloc of MAMS. For more details on the latter, see Chapter 3.

8 See, for example, Gertler and Glewwe (1990), Glewwe (1999), Bedi and others (2004) and Vos and Ponce (2004).

9 The Argentine education system is traditionally divided into three levels. The primary level, which is mandatory, generally has a cycle of 7 years, from 6 to 12 years of age. Secondary school includes 5 or 6 years of study and the relevant age cohort is from 13 to 17/18 years of age, while higher education includes short tertiary degrees of 2 or 3 years and university degrees of 4 to 6 years. In the early 1990s, several provinces changed their education system, extending primary education to 9 years, dividing it into three cycles, and renaming it into Basic General Education. The secondary level was shortened to 3 years, and renamed to the "Polymodal." For this analysis, the information pertinent to these provinces was adapted in order to work solely with the traditional structure of the educational system.

10 For more details about the models of determinants of access to health services and health outcomes, see, for example, Gertler and others (1987) and Mwabu and others (1993).

11 According to the Office of Health Information and Statistics of the Ministry of Public Health, the annual rate for infant mortality is the number of deaths among children under one year of age in the population of a particular geographic area during a particular year, divided by the number of live children born and recorded in the population of that geographic area during the same year.

12 Galiani and others (2005) find that the privatization of water services led to a significant increase in access to water and a significant drop in infant mortality. As a result, the MAMS model used here assumes that an increase in the provision of potable water would cause mortality rates to fall for children under five.

13 For the estimation of the capital stock of Argentina, see Coremburg (2003).
14 Graduation rates and students' enrolment increase for all three education levels during the entire period.
15 This way, the indicator associated with MDG 2 only considers the students who belong to a particular age cohort. This is consistent with the goal of reducing the number of over-age students in education as set by the Argentine government for 2015 (PNUD, 2006).
16 The results of MAMS are transmitted to the micro dataset to implement the micro-simulations as deviations from the value simulated for 2005 and not for 2003 which is the base year of the model.

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