

TWO MODELS FOR ANALYZING THE IMPACT OF ECONOMIC POLICIES

BILL GIBSON

ABSTRACT. This paper discusses two growth models in an effort to simulate the post-war macroeconomy for Argentina. The models, structuralist and neoclassical, are based on a social accounting matrix and then calibrated over a fifty-year period. The standard model is seen to perform well until the 1970s. Thereafter, a demand-driven framework is necessary to parse the reasons for the collapse of the Argentinean economy. A more complex labor market is then introduced to study the associated distribution of income.

1. INTRODUCTION

Policy coherence requires a macroeconomic focus. The transition to openness requires a series of measures to be in place that might work at cross purposes, leading to a sub-optimal pattern of allocation, higher poverty levels and poorly distributed income. A successful policy regime in the context of globalization emphasizes human capital accumulation as much as physical. This paper discusses the implementation of methodologies and indicators for analyzing the impact of economic policies, especially on the labor market. The aim of the paper is to compare two approaches to understanding the post-war economic history of Argentina. The first is the standard growth model of Solow (1956). The second approach considered is a dynamic structuralist macromodel with a fairly elaborate labor market. Both are calibrated to the same data base. It is seen that the structuralist model allows for considerably wider scope for analyzing the causes of the Argentinean crisis and this is especially true when the model is augmented by a detailed account of the labor market.

The paper is organized as follows: section 2 provides a brief background to the Argentinean crisis. The third section describes the results of the standard growth model as calibrated to the post-war growth trajectory. The fourth section introduces more detail on the demand side, which is modeled as a stochastic process. The fifth section describes the labor market. The sixth section compares the results of the augmented standard model. The seventh section addresses the most recent crisis in Argentina and the penultimate section discusses the coherence of labor and

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economic policies. A final section offers some concluding observations. The social accounting matrix to which the model is calibrated is presented in an appendix.¹

2. OVERVIEW

Before the Chilean miracle, there was Argentina.² Guided by the received wisdom of import substitution industrialization (ISI) and Keynesian demand management policies, the immediate post-war period brought 30 years of sustained growth. As seen in Table 1, real GDP grew an average of 3.3 percent per annum and inflation was moderate.³ But by the mid-1970s, the party seemed to be over. Along with most of the rest of the world, Argentina abandoned ISI and began to open its economy, as shown by the openness index in Table 1. It is usually argued that macropolicy reform, however, did not keep pace. Much of the Washington Consensus was ignored, as the government continued with policies of the past. Beginning in the late 1970s, the inherent conflict between aggressive, pro-growth macroeconomic management, along traditional Keynesian lines, and an assumed outward, pro-trade orientation could no longer be contained (Saxton, 2003). By the end of the next decade, inflation peaked at over 3,000 percent. Subsequently, the real exchange rate index plummeted from an average of 1.16 in the 1980s, as seen in Table 1, to 0.52 for the decade of the 1990s.

Despite rapid real appreciation, the current account improved during the crisis years, because of the fall in imports. The economy contracted by an average of 1.9 percent from 1980 to 1989, as seen in the table.

Liberalization had been first attempted under the military dictatorship (1976-1983), although incompletely. Menem came to power in 1989 with populist campaign rhetoric (promising wage hikes, a productive revolution, etc.). But by 1991, the Menem government began to undertake deeper reforms to align the economy more closely to the Washington Consensus, reversing the electoral mandate. As a result, inflation declined dramatically, as shown in the table.

The Menem policies stabilized the economy, restored positive growth rates, and re-established fiscal balance. The recovery was based on renewed access to foreign capital that covered the shortfall in domestic savings. Investment, buoyed by shared international confidence and credibility of the regime, boomed. Debt, domestic and foreign, soared.

In 1990, an ambitious privatization process began, aimed at reducing growing public debt. The revenue from privatization certainly helped and Argentina's debt did not increase between 1989 and 1993 (MECON, 2004). During the 1990s most state-owned enterprises (SOEs) were sold off and unemployment increased (Chisari *et al.*, 1999). After the social security privatization in 1994, fiscal deficits became the norm and it is argued that the explosion of public debt had its roots in the privatization effort (Baker and Weisbrot, 2002). Interest payments began to dominate the public budget.

The liberalization process was accompanied by a monetary currency board in 1991, the *Plan de Convertibilidad*, which established one-to-one convertibility of the peso to the US dollar (Galiani *et al.*, 2003; Damill *et al.*, 2002). Besides establishing

¹The data and the detailed results of the model simulations are available at www.uvm.edu/~wgibson.

²This section draws heavily on Lovinsky and Gibson (2005).

³The data is from Heston *et al.* (2004) and Marquetti (2004).

TABLE 1. Macroeconomic indicators

	1950-59	1960-69	1970-79	1980-89
Real growth ³	2.4	4.1	2.8	-1.9
Real exchange rate ⁴	—	—	—	1.16
Real wage ⁵	—	—	—	80.6
Inflation ³	—	22.4	132.9	565.7
PSBR/GDP ⁶	—	—	2.9	10.2
Govt expenditure/GDP ⁶	14.2	12.5	10.9	11.4
Interest payments/GDP ⁶	—	—	—	1.4
Current account/GDP ⁶	-1.0	-0.4	0.9	2.0
Openness ⁷	8.4	8.9	8.5	11.4
		1989-91 ¹	1992-94 ²	1995-2000
Real growth ³		1.9	6.9	2.2
Real exchange rate ⁴		1.22	0.52	0.51
Real wage ⁵		74.1	142.4	143
Inflation ³		1,855.1	13.2	0.8
PSBR/GDP ⁶		9.3	12.8	12.4
Govt. expenditure/GDP ⁶		5.5	11.6	12.3
Interest payments/GDP ⁶		0.8	1.1	1.7
Current account/GDP ⁶		4.9	-1.9	-0.9
Openness ⁷		14.6	17.9	23.1

Source: Damill *et al.*, 2002; MECON, 2004.

1. Stabilization program in effect 1990:4-1991:1. 2. Convertibility plan in effect 1992:2-1994:4. 3. Percent change. 4. Pesos per US dollar. 5. Average wage in constant US dollars. 6. Percent. 7. Exports plus imports/GDP.

the peso peg to the dollar, the law also prohibited emissions not backed by dollars. The idea was that capital outflow would force a reduction in government spending, with contractionary economy-wide effects (Fanelli and Damill, 2004).

In the early 1990s, domestic absorption rose dramatically as a share of GDP. A five-year expansion, beginning in 1990, was followed by a recession in 1995, the result of contagion from the Mexican peso crisis, known as the *tequila crisis*. Argentina was second only to Mexico in terms of capital inflow and thus vulnerable. A second external shock materialized in the third quarter of 1998 with the Asian and Russian financial crises. After the third quarter of 1998, growth did not resume again until the second quarter of 2002.

As a result of the external shocks and privatization of social security, debt began to rapidly increase once more (Cibils *et al.*, 2002). With an overvalued exchange rate, Argentine exports were increasingly uncompetitive and imports surged. The trade deficit worsened in 1999 when Brazil, Argentina's main regional trading partner, devalued (Stiglitz, 2002). The IMF supplied emergency finance up until September 2001, but thereafter declined, citing a persistent lack of fiscal reform (Mussa, 2002).

The cost of corralling the inflation of the 1980s was severe. The anchor of the price system in the early 1990s was the rapidly appreciating real exchange rate and this multiplied the vulnerability of the economy to external shock (Damill *et al.* 2002). The privatization effort had helped bring in foreign exchange and the country also benefited from significant support to the public sector from the IMF. The gross flows from all sources, the World Bank, IMF and the Inter-American Development Bank, averaged USD2.2 bn per quarter from 1995 to 2000. The capital inflow to the public sector exceeded its dollar denominated liabilities. The overvalued exchange rate spurred imports and set the stage for a massive capital outflow, as the private sector happily borrowed the dollars contracted by the government at a cheap rate.

Part of the problem lay in the *success* of the privatization effort, as Argentina's SOEs, the large, vertically integrated natural monopolies that controlled utilities (electricity, water and sewage, and communications), raw materials (minerals, petroleum, and gas), transportation system and banking system were liquidated (Galiani *et al.*, 2003). The tide had turned against public ownership: as fiscal support for public enterprises declined, a sense of frustration among users of state services increased public support for privatization (Cibils *et al.*, 2002). Employment in the public sector (federal, provincial, and municipal levels) fell from 5.1 million in 1991 to approximately one million in 2000. On the other hand, employment in the private sector increased from about 8.1 million in 1991 to more than 12 million in 2000.

The economy drew closer to the profile of the Washington Consensus and the next step would be to abandoned demand management entirely. The transition was chaotic, but job loss was held to a minimum. Overvaluation of the exchange rate, due to the *Plan de Convertibilidad*, however, caused foreign investment to slow and the private sector never fully picked up the slack. Despite rising unemployment, there was essentially no trend in the share of government spending in GDP since the early 1980s.

The trade deficit moved procyclically, achieving surplus only in the recessionary years of 1995 and 2000-01. Net financial services were in structural deficit and the current account deficit averaged some 3.6 percent of GDP between 1993 and 2000. Net interest payments in the balance of payments increased steadily throughout the convertibility period and until 1998. Except for the recessionary years, capital inflows exceeded the current account deficit for most of the 1990s, allowing for some reserve accumulation. This implied a rapid accumulation of foreign debt, and by 1999, net interest payments were more than 100 percent of total exports. But after 1998, inflows began to decline, setting the stage for the full-blown financial crisis of 2001-02 as capital flight accelerated and banks began to fail.

Investment, on the other hand, shows an increasing trend as a share of GDP since the early 1980s. The financing, as already noted, was largely external. As the unemployed drew down domestic savings, foreign savings increased to fill the gap. The public sector only contributed to the problem with the PSBR as a share of GDP increasing from less than 1 percent in the early 1990s to almost 5 percent by 1999, largely due to rising interest payments (Damill *et al.*, 2002, Table 4a). By the end of the 1990s, it had become obvious that the convertibility plan and the currency board were not working, contributing to the instability caused by the overvalued peso. The cost of external borrowing increased as most lenders could

see that lending to Argentina was a risky proposition (as, indeed, it turned out to be).

The devaluation of the currency in 2002 following the default on loans in late 2001 was implemented in a manner that significantly increased the damage done to the economy (Stiglitz, 2002). Strict limitations on cash withdrawals from bank accounts were imposed in December 2001 after a run and were followed in January 2002 by the freezing and reprogramming (substantially extending maturity) of all bank time deposits.

These accounts were then converted to pesos at an artificially high (as it turned out) exchange rate. Subsequent floating of the peso in February 2002 was followed by a rapid decline in the value of the peso. This in turn wiped out the savings of large parts of the middle class. Unemployment soared as a result of the foreign shock. GDP fell by 20 percent between 1999 and 2002, but recovery began in the second quarter of 2002. By 2003, the outlook was brighter. Exports rose 17 percent in the first seven months of 2003, thanks to improved terms of trade for agricultural commodities. Imports rose 41 percent in the first seven months after declining 56 percent in 2002. The official unemployment rate dropped below 16 percent in late 2003.⁴

Why did Argentina suffer the multiple crises of the 1980s and 1990s? Can growth models aid in the understanding of why it occurred? Let us review the stylized facts as we have them. The economy did well for three decades, or the first phase of its post-war development, and then faltered for two, the second phase. Macropolicy shifted from demand management in the first phase to piecemeal Washington Consensus policies in the second. Two important features of the Washington Consensus were not adopted, namely, a competitive exchange rate and a PSBR contained to 3 percent of GDP. Those who favor the Washington Consensus approach could reasonably argue that it did not work in Argentina because it was not fully implemented. Improper macropolicy, combined with a series of external shocks, then combined to produce the Argentine debacle. This is certainly an attractive and reasonable argument, but is it what really happened? To answer this question, we turn to the calibration of a growth model to see if it can shed some light on this question.

3. THE STANDARD MODEL

Recent catastrophic events in Argentina may be beyond the ability of the standard growth framework to model adequately (Solow, 1956; Barro and Sala-i-Martin, 2004). This section uses numerical simulations to show that once augmented by additional detail on the demand side, the standard model can yield insights into the severe recession Argentina experienced in the late 1980s and early 1990s.

The standard model is very well-known. There is a homogeneous capital, an aggregate Cobb-Douglas production function and marginal productivity determines distribution of the product. Savings drives investment in this framework. The model is remarkably easy to simulate; the required parameters are few in number and are shown in Table 2. The growth of the labor force, n , is taken as exogenously

⁴The official unemployment datum is only partially correct. In order to improve appearances, the government decided to include those receiving transfer payments as *employed*. When this benefit is excluded from the count, official calculations put unemployment at 16.2% currently, more than 20% in late 2003.

TABLE 2. Calibration parameters for the Solow model

Population growth	n	1.54
Capital share	β	0.585
Labor share	$1 - \beta$	0.415
Depreciation	δ	0.04
Imported factor share	η	0.04
Productivity growth	ϕ	0.007

given at 1.54 percent on average (WDI, 2004). The share of labor $1 - \beta$ in post-war Argentina is on average about 41.5 percent (Marquetti, 2004) and is shown in the social accounting matrix in the appendix. Depreciation is also estimated at 4 percent based on the Marquetti's (2004) capital stock data.

The savings rate, s , is used to calibrate the model dynamically. It is a constant share of profits, which are in turn calculated as output less payments to labor and foreign factor payments ηX . The share of the latter is estimated to be around 4 percent of total. The savings rate out of foreign factor payments earnings is s^* and could be greater than one but for the moment we subsume this into the overall savings rate used to calibrate the model.

Technical change proceeds at just under 1 percent. Since the production function is Cobb-Douglas, we need not worry about what kind of technical change it is (Barro and Sala-i-Martin, 2004). The production function can be used to estimate the initial capital stock. Taking the base wage rate at unity, the labor force L is read directly from the base SAM. With output and factor shares known (also from the base SAM), we solve for the level of capital stock. This gives an initial capital-output ratio of 2.3.

We now calibrate the model dynamically by varying the savings rate until the model's dynamic trajectory replicates the historical data. A savings rate of 0.4 or 40 percent of profits produced the fit shown in Figure 1. This is clearly a subjectively determined "best fit." A higher labor share ($1 - \beta$) would raise the savings rate required to produce this fit, as would a higher rate of imported inputs or depreciation. On the other hand, higher productivity growth rate, ϕ , would reduce required savings or allow for more imports, or a higher labor share. Figure 1 is thus a blended compromise of simple theory and historical data.

The standard model is, of course, a full-employment model so that the real wage rate, w , adjusts endogenously; over the simulated period, it grows by about 1.7 percent, equal to labor-productivity growth and in rough agreement with data supplied by Marquetti (2004). The growth decomposition is shown in Table 3 with the share of labor determined by the base SAM. The growth accounting "works," approximately, since the calculations were done with discrete changes. These are all reasonable estimates.⁵

⁵Argentina has no consistent functional distribution of income series. What data exist are very incomplete, although there have been some recent attempts at constructing such a series. A labor share of 41.5 percent is very high for what little we do know of the post-1976 period. Labor's share of income peaked at about 44 percent in the mid-70s, but declined steadily since then. This feature is not yet built into the model.

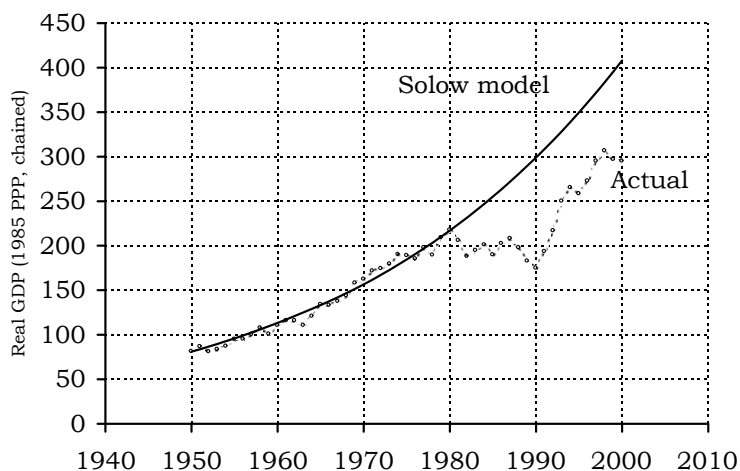
FIGURE 1. Solow model, $s = 0.4$

TABLE 3. Growth accounting

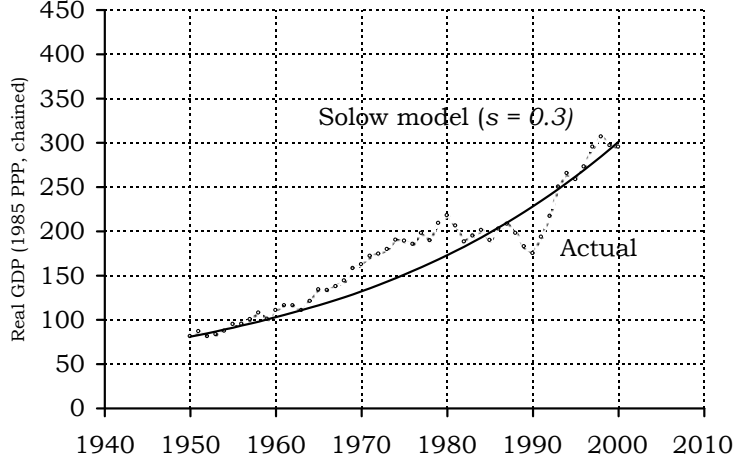
Growth rates	
Output	3.29
less labor	1.54
less capital	3.30
= productivity	0.78
. $\beta = 0.545$	

The model is, of course, quite sensitive to the savings parameter, s . Figure 2 shows the Solow trajectory for $s = 0.3$. This is, in some ways, a better fit since, arguably, the over all growth experience is captured in the Solow trajectory. Indeed, this fit suggests that there was no real crisis at all; the growth rate in 1 simply over estimates what was a sustainable rate of growth. Instead of 3.3 percent, it is only 2.7 percent. The crisis, then, requires no more comment or explanation than does the above-trend performance in the 1960s through the mid-1980s.

Strictly speaking, there is nothing incorrect about this conclusion. But notice how closely the model fits the first phase in Figure 1. The R^2 for the whole period in is 0.869 while for the first 30 years of Figure 1, the R^2 is 0.994.⁶

If we accept Figure 1 as a counterfactual against which we measure the cost of the crisis, it is evident that it was very expensive. Measured in terms of the GDP of the year 2000, some 5-plus years were lost; in terms of the GDP of 1950, the loss is more than 17 times. Absent the crisis, output per worker would have been 38 percent higher in the year 2000. Seen in this way, the social cost of the mismanagement is staggering.

⁶For the 50-year period, however, the fit with $s = 0.4$ is much worse, at $R^2 = 0.291$.

FIGURE 2. Solow model, $s = 0.3$

Oddly, the steady state is nowhere to be seen in this analysis. The rate of growth GDP in Figure 1 is simply an average and were the model run to be extended, would change. The existence of a steady state for this model is without question; the issue is whether it has any direct bearing on the conclusions we have extracted so far. Figures 1 and 2 are calculated for 50 years, but this is only the “medium run” for the Solow model. If we simulate the economy for another 90 years, the growth rate converges to approximately 3.25 percent, no matter what the savings rate.

Figure 3 shows how the two versions of the standard model, with different savings rates converge to the a similar (although not exactly the same) equilibrium. Certainly by 2030, the two economies are virtually indistinguishable. We conclude that for practical purposes, the long run is largely irrelevant. The usefulness in understanding real economies comes from its ability to track data in the 50-year “medium run.” Tracking difficulties with the model present themselves long before the steady state is reached.

The standard model, with $s = 0.4$, fits the data well for the first three decades, but ignores some fundamental features of the economy that occur after 1980. The real economy is driven substantially away from its potential by a series of shocks to some of the fundamental parameters of the model. In the case of the standard model, these include the saving rate, factor productivity or one of the other parameters listed in Table 2. It is not obvious which of these is responsible. We can always adjust the savings rate to force the model to track the actual data, as in Figure 4. This analysis suggests that the problem with the Argentinian economy was simply wild fluctuations in the savings rate, from 40 to 70 percent of total profits. During the 1980s (and the last part of the 1990s) the savings rate had to have gone to zero to produce a decline in modeled output.

Again, there is nothing inherently wrong with this analysis, at least *a priori*, and changes in other parameters might well produce a better fit. But as it stands, the model may well fail to convince policymakers owing to its lack of realism, what has

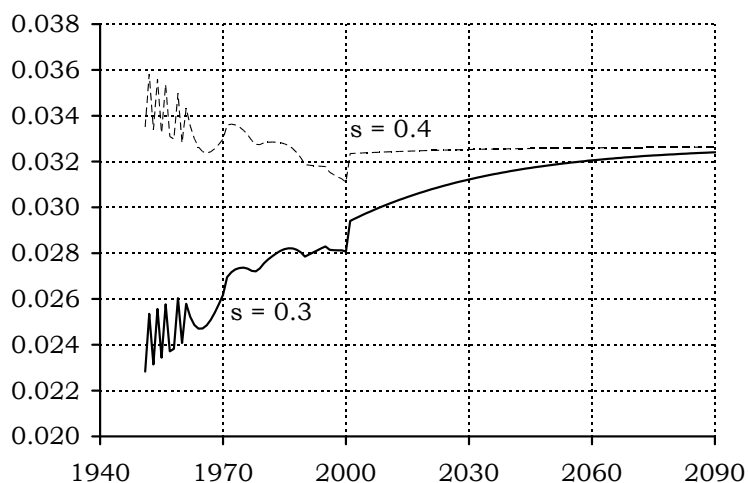


FIGURE 3. Growth rate of output in the standard model

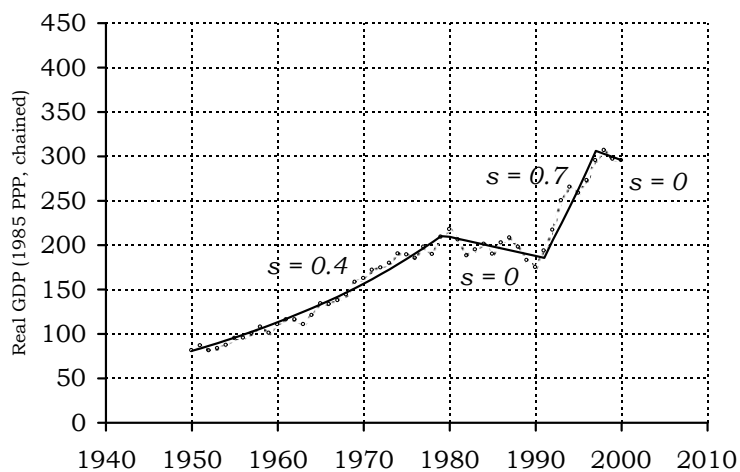


FIGURE 4. Tracking the data in the standard model

been called the “duck test” (Gibson, 2003). Moreover, the framework is not terribly suggestive of what might have gone wrong in the Argentinean economy. Indeed, there seems to be no connection to the narrative above.⁷

⁷Each time the savings rate changes, the economy proceeds ahead to an altogether different steady state. Since the data suggest that output will continue to fluctuate, it is fairly clear that the level of capital per man to which the economy converges is all but random. Since it is well established that the growth rate of output in the steady state is independent of fluctuations in the savings rate (although not in the rate of technical change) the criticism is hardly worth making.

4. TOWARD A MORE REALISTIC FRAMEWORK

We seek realism in models for several reasons. The first, alluded to above, is that it is easier to convince policymakers that shocks in the modeled economy will fairly well represent shocks to the real economy. In every sub-discipline of science generally, simulation models seek realism and are credible on this basis, whether we have in mind simulated thunderstorms, nuclear explosions or folded proteins (Gibson, 2003). Strict adherence to fundamental principles is necessary (up to a point) but hardly sufficient to be convincing. For a model to make a difference in policymaking, it must look like the economy it is modeling.

A second reason is more subtle and need not always obtain. Building layers of reality into a model can cause it to behave in surprising ways, ways that can expand our understanding the underlying process. Models based on first principles can do the same thing, but more frequently, they increase our knowledge of the first principles themselves rather than the empirical object. This section shows how a more realistic model may suggest hypotheses for what caused the macroeconomic imbalances that began in the 1980s and persisted into the 1990s.

We continue to use the standard model discussed above, but as a counterfactual, a model that describes what would have been possible had other events not intervened. In essence, the argument is that the demand-side model must keep up with the capacity to produce. If capacity utilization is inadequate, investment demand will fall and this will have negative consequences for the economy as a whole. This approach is as well known as the standard model discussed above. What is new and potentially interesting is not the model itself, but what we can learn by making the model fit track the data, as we did above by changing the savings rate.

Since there are so many variations of the demand-driven model, it will be worth specifying precisely what we have in mind. Generally speaking, it is a one-sector dynamic model, calibrated to the same SAM as above.⁸ Like all demand-driven models, savings adjusts to an independent investment function.

The growth rate of the capital stock, g , is given by

$$(4.1) \quad g = f(u, r^e)$$

where u is capacity utilization and r^e is the expected future rate of profit on new investment. Both partial derivatives, f_u and f_{r^e} are positive.⁹ Capacity utilization, u , is given by the ratio of output X to capacity output Q

$$(4.2) \quad u = \frac{X}{Q}.$$

Capacity output is given by the same production function as used in the Solow model. It is at this point that the two models come together as one. The assumption

⁸Gibson and van Seventer (2000) compare a multisectoral structuralist CGE with a neoclassical version, calibrated to the same database, for South Africa.

⁹The simulation model employs a linear version of f :

$$g = \alpha_0 + \alpha_1 u + \alpha_2 r^e$$

where α_0, α_1 and α_2 are calibration constants. The term α_0 is an intercept, designed to capture the effect of the interest rate and other exogenous variables. The term α_1 is akin to the accelerator and is usually given a simple interpretation, namely when capacity utilization is high, there is a stimulus to more investment and vice-versa. But even with high capacity utilization, the expected profit rate term must validate the urge to invest. The strength of the responsiveness of investment to profits given by the constant α_2 .

is that producers calculate the level of Q using the standard model. Capacity output is thus consistent with the available capital stock and the supply of labor. The labor demand associated with Q is notional, of course; actual employment is determined by the current level of demand.

The expected rate of profit is defined as the last period rate of profit plus a random error term

$$r_t^e = r_{t-1} + \varepsilon$$

where $\varepsilon \sim N(0, \sigma^2)$. The variance, σ^2 , of the error term determines the volatility of investment and thus total demand in the modeled economy.

The savings-investment balance is given by:

$$(\pi X + J)(1 - t_\pi)s + S_g + S^* = p(I + I_g)$$

where π is profits per unit of output, J is domestic interest payments on government debt, t_π is the direct tax rate on the “rich” defined as profit recipients, and s is the savings propensity out of profits as above.¹⁰ Only profit recipients save as reflected in the SAM. The next two terms are government and foreign savings respectively and on the right is the nominal value of total investment, split in the SAM between private, I and government investment, I_g . Price, p , can then be expressed as

$$p = (1 + \tau)(wl + \eta)$$

where τ is the fixed and given mark-up, w is the wage rate, l the direct labor coefficient and η is foreign factor payments, as above. The fiscal balance for the SAM is given by

$$pG + S_g + w_g + J + eJ^* = (\pi X + J)t_\pi + (wlX + w_g)t_w$$

where G is current real government expenditure, S_g is public sector savings on the current account, e is the nominal exchange rate and J^* is foreign interest payments. The two terms on the right are the tax revenues from profits and wages respectively. The first is revenue from profits tax at rate t_π and the second is on wages, at rate t_w . The wage bill is the sum of private sector wages, calculated as the product of the wage rate, w , the direct labor coefficient, l , and the level of output. Nominal government wages are w_g .

The foreign balance is

$$pE + S^* = e[p^*(\eta X + M) + J^*]$$

where E is exports and S^* is foreign savings. Foreign factor payments, ηX , imports, M , and foreign interest payments on are on the right-hand side. Here, p^* is the foreign price of imports,

The next step is to normalize savings-investment balance by the gross value of production, $Y = pX$. Define the PSBR ratio, ρ , as

$$\rho = \frac{pI_g - S_g}{Y}$$

and in parallel fashion, foreign savings

$$\rho^* = \frac{S^*}{Y}.$$

¹⁰This is obviously more realistic for a country like Argentina than more advanced, industrialized countries.

The ratio of after-tax interest payments to GDP can be written as

$$j = J(1 - t_\pi)/Y$$

so we can then express the savings-investment balance as

$$\pi X(1 - t_\pi)s/Y + sj + \rho^* = I/X + \rho.$$

Next, note that since $I = \Delta K + \delta K$, with δ as the rate of depreciation of the capital stock, we can write

$$I/K = g + \delta$$

where g is the growth rate of the private capital stock $\Delta K/K$ in equation 4.1. Denoting the ratio of capacity to capital stock as $q = Q/K$, we can write

$$I/X = (g + \delta)/qu.$$

Substituting into the savings-investment balance

$$\pi X(1 - t_\pi)s/pX + sj + \rho^* = (g + \delta)/qu + \rho.$$

Define the *after-tax* profit rate (not including interest payments) as $\bar{r} = \pi X(1 - t_\pi)/pK$. From the price equation, this after-tax rate of profit can be expressed as

$$\bar{r} = \frac{\tau(1 - t_\pi)}{(1 + \tau)}qu = \bar{\tau}qu$$

where $\bar{\tau} = \tau(1 - t_\pi)/(1 + \tau)$ for notational simplicity. Substituting equation 4.1, we then have the short-run equilibrium of the model, u , as the solution for

$$(4.3) \quad f(u, r^e) = [s(\bar{\tau} + j) + \rho^* - \rho]qu - \delta.$$

It is clear that this demand-driven model is more complex than the standard model alone, but not yet clear that it is better. The standard model focuses on factor growth, while the central feature of the demand-driven model is that agents form expectations on the basis of how the actual economy fares relative to its potential as determined by the standard model itself.

5. THE LABOR MARKET

The labor market in the calibrated model is fairly ordinary. The wage in the base SAM is taken to be unity and nominal wages change according to the excess supply of labor. Labor supply is the same as in the Solow model above, that is, it grows at the historically observed rate. Labor demand depends on output and the labor coefficient, l , which changes according to an exogenously determined rate of productivity increase, λ , or

$$l_t = l_{t-1}(1 - \lambda_t).$$

The growth of labor productivity in turn depends inversely on the excess supply of labor, U , with an elasticity of ϵ

$$\lambda_t = \lambda_0 U_t^\epsilon.$$

Thus, low unemployment induces labor productivity growth. In this way the model prevents the unemployment from turning negative.¹¹

The nominal wage rate adjusts according to

$$w_t/w_{t-1} = 1 + \theta \frac{U_{t-1}}{U_t}.$$

¹¹If a run were to produce a negative unemployment rate it could be interpreted as satisfied by in-migration from neighboring countries.

TABLE 4. Calibration parameters for the demand driven model

Tax rate on profits	t_π	0.15
Tax rate on labor income	t_w	0.08
Savings rate	s_r	0.4
Wage adjustment coefficient	θ	0.1
Labor productivity growth	λ	0.015
Accumulation function parameters		
Autonomous (intercept)	α_0	0.005
Coefficient on capacity utilization	α_1	0.023
Coefficient on expected profit rate	α_2	0.01

Thus, if the unemployment rate is constant, the wage rate rises at rate θ . If the unemployment rate falls, the wage increases still, but at a slower pace. Monetary policy influences θ , but this not in the model.

The values of the key parameters in the model are shown in Table 4.

6. SIMULATING THE MODEL

The claim is that this framework is more realistic than the standard model alone and calibrating it to the historical data will allow us to understand the Argentine debacle. We proceed as follows. The two key parameters of this equilibrium expression, ρ^* and ρ , allow foreign and fiscal shocks enter the model. In an initial run of the model will we allow these two parameters to grow at their historically observed average rates over the fifty-year period. We linearize the function f and taking into account equation 4.1 generate a stochastic process for u .¹²

Figure 5 shows the results of a run of the calibrated demand-driven model, with government expenditure, including interest payments, exports and imports taken as growing at a constant, historically observed rate from 1950 to 2000. The R^2 of this model run is 0.872.

As noted above, the standard model does a good job of tracking the actual data through 1980, but fails progressively after that. The random component in the demand-driven investment function causes it to move more somewhat erratically and arguably more realistically. The volatility of the random component is set exogenously and different runs produce different approximations. The run shown in the figure is characteristic of the model's behavior and is quite typical of the results it produces. Repeated runs of the model confirm that it does not diverge, at least for runs of 70 years or less.

The demand-driven model does an adequate job of approximating the path of the actual economy until 1980, although not as good as the standard model for the first phase. Thereafter, a bias develops and the demand-driven model also over-predicts the actual data, although not as badly as the standard one.

The R^2 of the standard model with a savings rate of 0.3 is only marginally lower, 0.869, than that of the demand-driven model, 0.872, and one could hardly be blamed for thinking that all the extra effort is simply not worth the small improvement. An important difference is in the curvature of the path in the longer

¹²See the appendix for details.

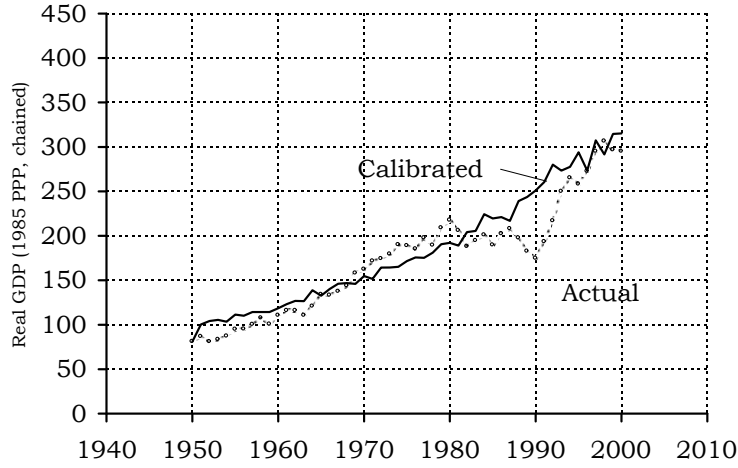
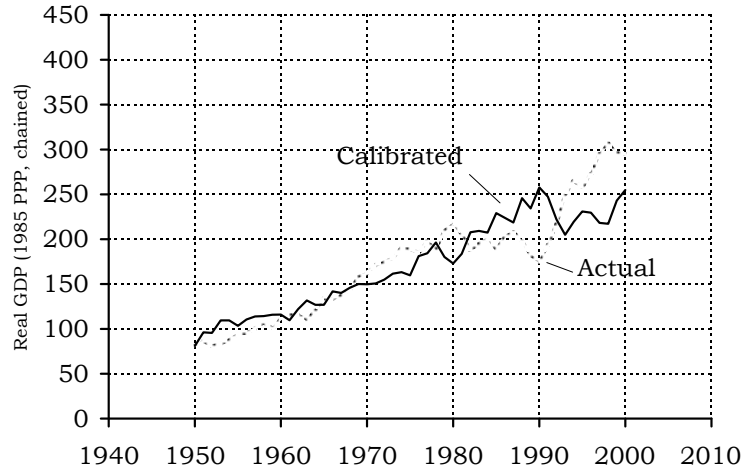


FIGURE 5. Calibrated demand driven model

FIGURE 6. Demand-driven model with historical ρ^*

term. Extrapolating out from the endpoint, the standard model predicts steady improvement, while the demand-driven model predicts slower growth.

The principal advantage of the demand-driven model, derived from its complexity, is that it can be used for analysis. When we substitute the *actual historical* ρ^* into the demand-driven model in order to see how much the foreign sector influences the economy, we find that the variance of the estimated path increases significantly relative to Figure 5.

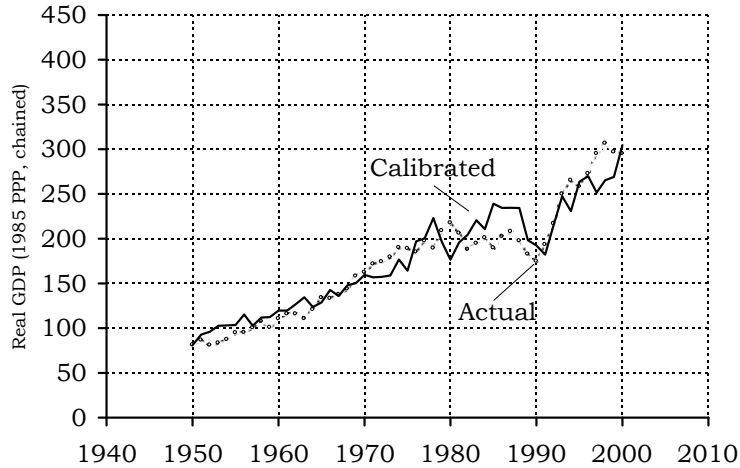


FIGURE 7. Calibrated model with historical data for ρ and ρ^*

Figure 6 suggests that foreign shocks were a factor driving the economy, especially after 1990, since the calibrated model sinks dramatically. The overvalued exchange rate affected imports much more than exports. This caused a collapse in GDP that the trend-value simulation ignores. Similarly in 1980, the pattern is reversed, with the foreign-savings shock producing a downturn while the actual economy experienced an upturn.

The important hypothesis that one can extract from Figure 6 is that fiscal policy was stabilizing throughout most of Argentina's history, with the rather glaring exception of the late 1980s and early 1990s. The data suggest that during the 1950s, changes in ρ offset positive foreign sector shocks. Then again in the 1960s, when the foreign sector shocks were negative, fiscal policy was again stabilizing.

In the mid-1970s, fiscal policy appears to be neutral, but it turns destabilizing in the late 1970s to early 1980s. By destabilizing in this period, we simply mean that government policy pushed the economy too far in the direction it needed to go, thereby overshooting. The same is true in magnified form for the late 1980s to early 1990s. The economy would have expanded on the basis of the foreign sector, yet contractionary fiscal policy brought it down.

To investigate this hypothesis, consider Figure 7. There we replace the trend-level PSBR ratio, ρ , with its historical series as well.¹³

This fit, while certainly better, ($R^2 = 0.89$) is still imperfect. The first conclusion must be that, in reality, there are more factors in macroeconomic performance than simply fiscal and foreign shocks. Not only is investment modeled stochastically, but consumer behavior is controlled by constant savings rates. Running the model repeatedly shows that in the 1960s the model always over-predicts the actual and in the 1970s under-predicts the actual. This suggests that personal savings rates

¹³The reader is to be reminded that as a stochastic process, Figure 7 is only one run of the model. The run shown is typical, but some runs show larger gaps between the calibrated and actual series, that is, a smaller R^2 .

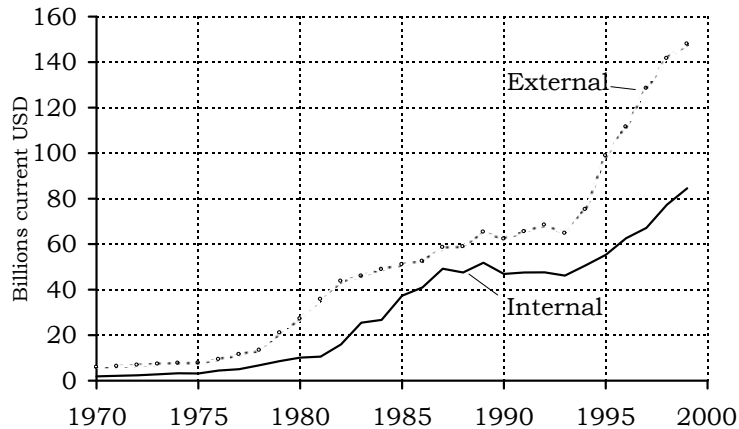


FIGURE 8. Argentine debt

for that time period are probably underestimated in the model for the 1960s and overestimated for the 1970s. The year 1980 remains a problem and seems to have been caused by a blip in savings behavior, at least as far as the methodology of this paper can tell.

We could, of course, adjust the savings rate as we did in Figure 7, on a period-by-period basis. But again, there is nothing in the narrative above that suggests that this would be appropriate.

7. THE MODEL AND THE RECENT CRISIS

Can the model shed some light on recent events in Argentina? As noted above, the conventional wisdom is that excessive public sector expenditure derailed the growth process. The exercise just completed suggests otherwise: perhaps the a less violent approach to privatization might have shielded the economy from the deep recession at the beginning of the 1990s. Indeed, it appears that fiscal policy has played a positive, stabilizing role through much of the post-war period. Fiscal policy was excessively contractionary and counterproductive in only one episode, 1990. Moreover, in the latter part of the 1990s, the opposite occurred; fiscal policy apparently helped to offset the violent external shock the economy experienced.

In a final simulation, we look to the future and ask how excessive interest payments on accumulating fiscal debt will affect the recovery. Figure 8 shows the historical trends of debt in current US dollars.

It is clear that there has been a significant accumulation of debt since 1990. So far, this fact has not been included in formal structure; we have assumed that interest payments have increased at exogenously determined growth rate.¹⁴

¹⁴ If foreign interest payments are then reinvested in Argentina, then this run-up in foreign debt will obviously have no impact on the growth profile of the country. But that assumption is dubious, especially if foreign interest payments are perceived to have a contractionary effect on

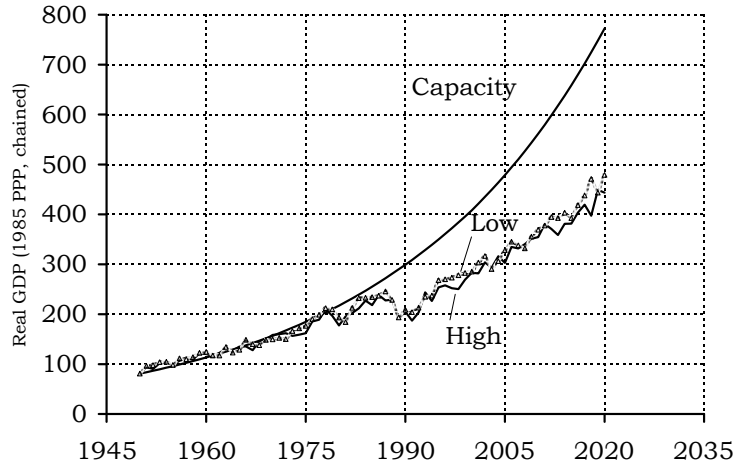


FIGURE 9. High and low rates of growth of interest payments

Figure 9 shows how the model responds to faster growth in interest payments. The base rate of growth of J^* and J was increased by 50 percent in 1983 and then by 100 percent in 1993. It clear from the diagram that the difference is small. In repeated runs of the model, it becomes apparent that the volatility of investment swamps the effect of higher interest payments. It is, in fact, easy to produce a run in which GDP is higher for most of the trajectory despite elevated interest payments.

The reason that the effect is not large can be read directly from equation 4.3 above. There it is clear that domestic interest payments J are recycled and so apart from a small redistributive effect, it is only foreign interest payments that lower capacity utilization through higher ρ^* .

8. THE COHERENCE OF LABOR AND ECONOMIC POLICIES

The approach to the labor market in the foregoing is excessively simplified and gives little indication as to how economic policy might affect individual households. This section shows how the model can be amplified considerably to take into account the impact on a sample of households. This exercise is undertaken for illustrative purposes only in that no attempt has yet been made to calibrate the characteristics of actual households in Argentina to the data base.

The labor market in this model tracks groups of similar individuals. In the simulation model below there are 75 different groups that constitute the labor supply in the first period of the model in 1950. The average growth rate of the labor force is just over 2.1 percent for the simulated period. In principle, the number of individuals tracked by the model is arbitrary.

local economic activity. In that case, interest outflows are less likely to return and the prophecy is self-fulfilling.

The groups in the simulation are intended to represent scaled responses to household income and expenditure surveys.¹⁵ They are scaled to conform with the national accounts and interpolated between periods in which household surveys are normally taken. Clearly, then, the simulations assume a level of data availability that is far beyond what currently exists. Behavior in the model is, however, heavily parameterized so that when adjusted reasonably, the model does exhibit extremely realistic behavior.

The labor market is hierarchically segmented. There is demand for two kinds of labor, skilled and unskilled. Workers who lack a qualifying level of education and experience as skilled workers cannot apply for skilled positions. In contrast, skilled workers who do not find employment commensurate with their qualifications can compete for unskilled jobs. This is the meaning of hierarchic segmentation. (Skott, 2005)

There is a representative worker for each group of households. An initial distribution of education and experience is randomly assigned to this representative worker for period one, 1950. Thereafter, the accumulation of education and experience is endogenous in the model. Human capital accumulation is therefore responsive to the evolution of macroeconomic policies and performance.

There are many behavioral assumptions embedded in the model framework and they are discussed in the continuation. The essential idea is that employers rank candidates according to a point score. Workers get points for education, experience, recent experience and good luck. Luck is, of course, randomly distributed, but it means that a worker without education, experience or recent (last period) experience can get a job for which there are more qualified applicants in the market. This is the function of luck, ϵ . Just as in the real world, of course, luck cannot be relied upon. In the current configuration, luck at most is neutral and at worse subtracts *at most* one point, since ϵ is

$$\epsilon[-1, 0] \sim U(-0.5, 2\sqrt{3})$$

distributed uniformly with an expected value -0.5 with a standard deviation of about 0.288. On the other hand, education and recent skilled labor experience also add one point with perfect certainty.

As noted, the growth rate of the labor force $\hat{L}$ is exogenous. Growth is the result of the difference between new entrants and retirees. Workers may retire because of health, age, out-migration or other reasons. The number of retirees in any one period is determined by an exogenous retirement probability, p_r , set now so there is a 5% probability that any worker will retire at the end of any year. Retirement has no relationship to age, currently, but this could be added. Retired workers are assumed to receive transfers from employed workers, just as other dependents do.

As an individual retires, he is replaced by a new worker on a one-for-one basis. Experience and recent experience are set equal to zero for the new worker who replaces the retiree. The probability that new workers will retire at the end of the first year is set exogenously to zero. New workers may enter the labor market with or without an education adequate to qualify for a skilled position. In the next period, all workers including those who entered last period are treated equally. New workers build up on-the-job experience and qualify for skilled positions through

¹⁵There are problems with this approach in that often household surveys conflict with the national accounts. See McLeod (2005).

educational achievement in the same way as their colleagues. When a worker retires, he or she is replaced with a new worker with no experience. Whether the new worker is educated or not when entering the labor market is determined exogenously according to probability $p_e = 0.5$. They could begin with negative wealth, but they do not in the current version of the model. The retirement feature of the model counterbalances the accumulation of experience. It is nonetheless true that a worker who manages to keep a skilled position for a few years builds up a considerable advantage in the competition during the next year.

New labor market participants are then added each year to conform to the exogenous growth rate. Added workers have the same experience and educational profiles as those who replace retirees. In the simulations, the number of household grows from 75 in 1950 to 234 in 2000.

Since the expected value of luck is only -0.5 , workers without education or experience (recent or otherwise) will almost never be preferred to a worker with education and experience, even if the unskilled worker is extremely lucky and the skilled worker is extremely unlucky. To see this, consider an educated worker with no experience and bad luck. Her total score might then be zero, since the bad luck would nullify the level of education. An unskilled worker would at most have a zero if luck took on its maximum value of zero. Although there could be a tie, an unskilled worker can never be preferred to a skilled worker from the employer's point of view. Effectively, then, in order to qualify for participation in the skilled labor market, workers must have either previous experience, L_x , as a skilled worker or a qualifying level of education, L_e . Skilled labor experience builds year by year, but does not increase linearly. The expression for experience in year t , $L_{x,t}$, is

$$L_{x,t} = L_{x,t-1} + \frac{1}{L_{x,t-1}}$$

so that the contribution of experience to a candidate's total score accumulates quickly in the early years and then falls off with continued employment. At the beginning of each period, all contracts are renegotiated. Previously employed workers may therefore lose their jobs and be replaced by someone else. Since previous employment and experience are modeled separately, a worker who has many years of previous experience, yet was laid off the previous year, may be less eligible than a worker with less experience, but with recent employment as a skilled worker. As workers build experience, this is less likely to happen.

Education can be accumulated only if a worker is unemployed in the previous period. If a worker loses his job, the probability that the worker will enter the educational sector is p_E . Workers who do not seek additional training and education are unemployed and may join the informal sector, although that is not modeled here explicitly.¹⁶ If a worker is in school, there is an associated penalty in the skilled labor market. The penalty, L_u , is currently set equal to minus one. It is therefore possible that an individual could be employed despite the penalty. The penalty can be adjusted, however, so that no student is effectively eligible for full-time employment.

¹⁶See Gibson (2005) for a formal model of this process.

The total eligibility score for a skilled position, L_s , is determined by the sum of education, experience, recent experience and a random error term, ϵ , with exogenously determined weights

$$(8.1) \quad L_s = \gamma_e L_e + \gamma_x L_x + \gamma_m L_m + \gamma_u L_u + \gamma_\epsilon (1 - \epsilon)$$

where the exogenous weights are given by the associated γ_i and the subscript t has been suppressed for simplicity. Here L_e is defined as 0 or 1 and L_x is a continuous variable with a lower bound of 0 and no upper bound (although retirement eventually causes the value to be reset to zero). Recent experience, L_m and the penalty for current education are also binary. Thus, in the current configuration all the γ are one.

With workers' eligibility determined by L_s in equation 8.1, firms then rank the candidates and make skilled labor employment offers in descending order. Thus if there is demand, L_d , in a given period for skilled labor, workers with

$$rank(L_s) \leq L_d$$

are hired as skilled workers. They are hired as unskilled workers if

$$rank(L_s) \leq L_d + L_{du}$$

where L_{du} is the demand for unskilled labor. If this last inequality does not hold, then the worker is unemployed.

The presence of the random error term, ϵ , implies that workers with bad luck can be replaced by workers with good luck and so there is considerable variability in the simulation. Workers may therefore have sufficient education and experience for a given skilled job, but nonetheless remain unemployed because of bad luck. Despite the random error term, experience tends to dominate the model since it is the only accumulated variable over time. Those who are unemployed tend to remain unemployed, *ceteris paribus*. Adjustment of the weights, γ , in equation 8.1 can improve the realism of the model.

The model's decision tree is summarized below. Let $\epsilon(l_i)$ be a random draw of i .

$$\begin{aligned}
& IF \\
& \epsilon(l_i) > p_r : \text{worker retires} \\
& \quad : \text{replaced by a new worker } i + 1 \\
& \quad : \text{set } L_x = 0 \\
& \epsilon(l_{i+1}) < p_e : \text{set } L_e = 0 \\
& \quad : \text{else set } L_e = 1 \\
& \quad : \text{set } p_r = 0 \\
& \epsilon(l_i) < p_r : \text{worker does not retire} \\
& IF \\
& L_{t-1} = w_{s,t-1} : \text{worker earned skilled wage, } w_{s,t-1} \\
& L_x = L_{x,t-1} + \frac{1}{L_{x,t-1}} : \text{update experience} \\
& L_m = 1 : \text{update recent experience} \\
& L_e = L_{e,t-1} : \text{update education} \\
& IF \\
& L_{t-1} < w_{s,t-1} : \text{set } L_m = 0 \\
& L_{e,t-1} = 0 : \text{worker may return to school} \\
& \epsilon(l_i) > p_e : \text{set } L_e = 1 \\
& L_u = -1 : \text{apply in-school penalty} \\
& \quad : \text{set } L_s = \gamma_e L_e + \gamma_x L_x + \gamma_m L_m \\
& \quad \quad + \gamma_u L_u + \gamma_\epsilon (1 - \epsilon) \\
& rank(L_s) \leq L_d : \text{hired as skilled worker} \\
& rank(L_s) > L_d : \text{retreats to unskilled labor market} \\
& rank(L_s) > L_{du} : \text{unemployed}
\end{aligned}$$

To integrate the labor market block with the macromodel above, we apply the current wage for skilled and unskilled labor to the employed workers. Unemployed workers get a wage of zero, but their total income might not be zero if they have some property income. Presently savings is determined as a fraction of after-tax distributed profits. Savings is accumulated from year to year in the form of wealth. Profits in the model are distributed according to wealth plus a random term in a way that preserves consistency with profits reported by the macromodel.

Consumption is then defined as the difference between after-tax income and savings and aggregated across households and inserted back into the macromodel. The entire model solves as a simultaneous system of equilibrium in the goods and labor markets.

The performance of the model is shown in Figure 10 and it is easy to confirm that it is similar to Figure 5, despite the significant number of modifications. The employment profile of the model is given in Figure 11. Both categories of labor demand increase with output with unskilled labor employment rising more steeply, despite the fact that there is some skilled labor bias built into the model. The rate

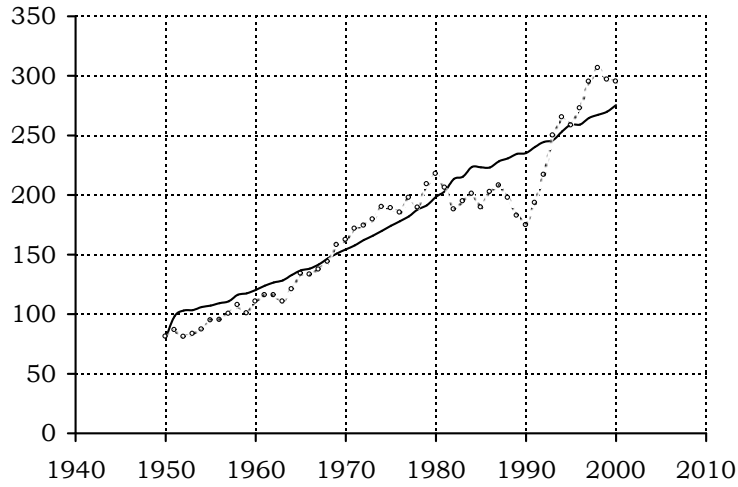


FIGURE 10. Model with integrated labor market

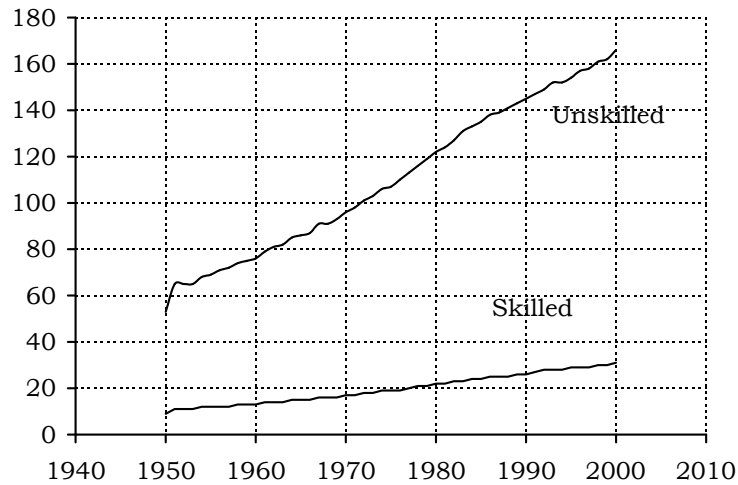


FIGURE 11. Employment of skilled and unskilled labor

of growth of skilled labor employment is actually higher, given its lower initial level. Even more striking is the excess supply of skilled and unskilled labor as shown in Figure 12. Observe that the effect of the crisis is much more severe on skilled labor than unskilled. Here the reasons are evident and one of the most important conclusions of these simulations. During the crisis, the probability that a worker will return to school rises, since in order to return to school, a representative worker must have been unemployed in the last period. The effect is observable from 1990 onward. Over all there is a steady rise in the percentage of educated workers in the

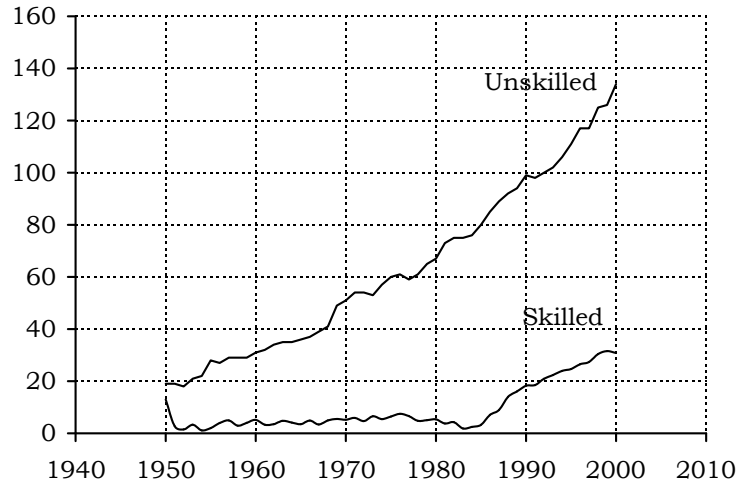


FIGURE 12. Excess supply of labor

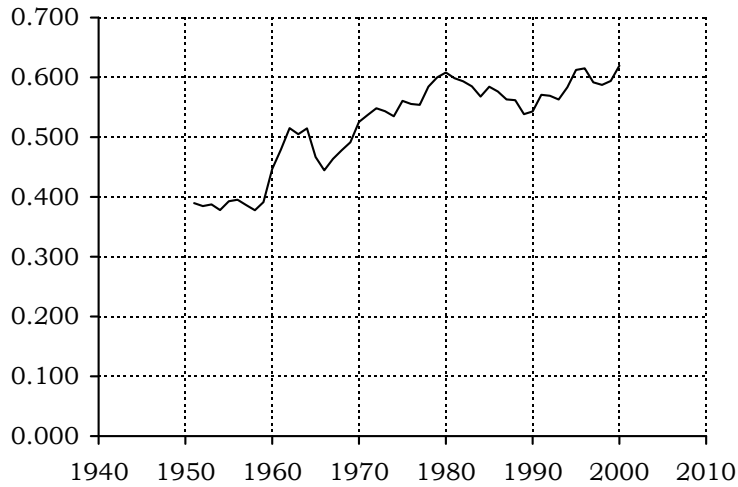


FIGURE 13. Percentage of labor force with qualifying level of education

simulation, consistent with post-war trends. The clear implication is that there is no need for government subsidies of education without commensurate support for aggregate demand, in order to provide employment opportunities. The distribution of income in the model is calculated on the basis of ranking individual households in quintiles. The results of one run of the model are shown in Table 5. According to the model, the income distribution has deteriorated substantially in the post-war period. The distribution of income appears to worsen in the crisis, contrary to the usual expectation. During the period for which the standard growth models held,

TABLE 5. Income distribution in the integrated model

	Q1	Q2	Q3	Q4	Q5	Q5/Q1
1950	0.5	0.8	1.1	1.3	1.6	3.0
1960	0.7	0.9	1.2	1.5	2.0	2.8
1970	0.6	1.0	1.3	1.7	2.0	3.1
1980	0.6	0.8	1.0	1.4	2.8	4.4
1990	0.5	0.7	0.8	1.2	3.1	6.2
2000	0.3	0.7	0.7	1.0	3.2	11.1

Source: Model calculations

1950 to 1970, it seems as if the distribution of income was relatively stable; it only begins to diverge in 1980, when the ratio of the richest to poorest quintile begins to accelerate.

Finally, note that the average income of the poorest quintile, Q1, rises initially and then falls steadily as the model approaches the year 2000. This suggests that poverty is a growing problem in the model. While the income of the most well-off increases slowly, the ratio increases more radically precisely because of the effect of unemployed skilled labor competing for unskilled jobs.

9. CONCLUSION

This paper has shown that reasonably realistic dynamic models can be constructed and calibrated to real data and used for policy advice. Despite the fact that the models of this paper were built using simple computational tools, they nonetheless can give some important insight into the functioning of actual economies. We have seen why the standard growth model employed throughout economics is so popular; it is elegant, simple and robust. It seems to progressively fail, however, when analyzing the Argentinean economy in the post 1970 period.

The paper has shown the power of a modeling methodology that seeks realism rather than consistency with first principles of maximization or other theory. Indeed, it is evident that models and methodologies concerned with the transition to openness must be concerned with the traverse, or transient part of the solutions of growth models. Steady-state comparisons are of little value, because steady-states in practical models take so long to achieve. Policy is only relevant during the traverse since the economy slows down so radically as it approaches the steady state.

The models of this paper are simplified but serve as an introduction to more complex computable general equilibrium models that naturally require more sophisticated solution methods. These CGE models are more detailed and can shed light on problems in specific sectors. The general methodology, however, is the same. The impact of policy must be measured against a reasonable *counterfactual*. It is in the construction of counterfactuals that a CGE model is almost uniquely qualified. These models can impress policymakers with their realism and in so doing earn the confidence required to put the model to actual use. Models of the kind studied in this paper are capable of constructing reliable counterfactuals, but

if that is not the intended use, they have little application. There is little value added in using a CGE model for forecasting, since they are based more on empirical coherence than classical or Bayesian statistical theory.

The models of this paper have been used in precisely the way just outlined. The Solow model was used to show just how expensive economic crises can become and thus to remind us that they must be avoided. The Solow framework is not particularly realistic, but it does seem to fit the first three decades of the Argentinean post-war experience fairly well. It thus provides a measure of the lost opportunities and unemployment and growth that the crises caused. The structuralist version of the standard growth model also implicitly offers a counterfactual. Had there not been such a collapse in government spending, the recession would not have been so deep. The departure from the neoclassical path would have been much less severe. Demand management is necessary if policymakers intend to position the economy as an exporter of sophisticated goods into the world market. Attention must be paid to educational opportunities, educational costs and opportunity costs in the current labor market. If demand is overstimulated, or skilled/unskilled wage differentials are artificially maintained, the result can be an over-educated and uncompetitive labor force. Some skilled-unskilled differential is necessary, however, to provide the proper incentive to accumulate human capital.

The more elaborate model of the labor market needs further development. But it is clear that the approach is promising. It is not only possible to study trends in income and income distribution at a more disaggregated level, but also to track individual cohorts longitudinally. The labor market model of this paper is illustrative and not intended at this stage to represent real Argentinean history. It could be calibrated to household surveys and other sources of information on trends in income distribution to greatly enhance its realism.

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11. APPENDIX

The initial social accounting matrix for 1950 in local currency units is shown in Table 6.

With f in linearized form, we have

$$[s(\bar{\tau} + j) + \rho^* - \rho]q - \alpha_1] u = \alpha_0 + \alpha_2 \bar{\tau} q u_{t-1} + \varepsilon + \delta.$$

With q constant, this would be a stochastic process for u of the form:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \varepsilon_t$$

with

$$\begin{aligned} \beta_0 &= \frac{\alpha_0 + \delta}{s(\bar{\tau}q + j) + \rho^* - \rho - \alpha_1} \\ \beta_1 &= \frac{\alpha_2 \bar{\tau}q}{[s(\bar{\tau}q + j) + \rho^* - \rho]q - \alpha_1}. \end{aligned}$$

The condition for convergence is $\beta_1 < 1$, or

$$(s - \alpha_2)\bar{\tau}q > sj + \rho - \rho^* - \alpha_1$$

Hence, if foreign savings just covers the PSBR, and there is no autonomous growth ($\alpha_1 = 0$) or domestic interest payments, the condition reduces to the standard stability criterion for the simple demand driven growth models. On the other hand, if the PSBR ratio is high or foreign capital inflow is inadequate the model is more likely to diverge in the short run. A large α_1 can also cause the model to become explosive, but this is well known.

TABLE 6. Social Accounting Matrix for Argentina (1950)

	Firms	Households		Investment		Govt	Exports	Imports	Total
		Poor	Rich	Public	Private				
Firms		35.51	22.31	1.71	9.68	5.97	3.68	1.03	77.84
Poor	32.31					6.29			38.59
Rich	42.43					0.94			43.37
Savings			14.55			-3.93		0.77	11.39
Taxes		3.09	6.51						9.59
Foreign	3.11					0.31			3.43
Total	77.84	38.59	43.37		11.39	9.59		3.43	

Source: Author's estimates, MECON 2004, Heston *et al.* (2004), World Bank (2004).

JOHN CONVERSE PROFESSOR OF ECONOMICS, UNIVERSITY OF VERMONT, BURLINGTON, VT
05405-4160 USA 413-548-9448.

E-mail address: `bill.gibson@uvm.edu`

URL: `http://www.uvm.edu/~wgibson`