

Should the Financial Sphere be Included in Empirical Macro-CGE Models?

The Case of Economic Liberalization in Argentina

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Abstract

The significant real effects arising from the present international financial crisis suggest that the workings of the financial sphere significantly affect the value of social production, the distribution of income and wealth, and the magnitude of income poverty, all important social welfare indicators. Reflecting this, should macro CGE models take the financial dimension into account? To shed some light on this issue, I extend the IFPRI Standard Model to make it dynamic and take consideration of the financial sphere, and then I compare the outcomes of historical simulations coming from these models against observed variables for the Argentinean economy in the 1991-2006 period. Preliminary results suggest that the inclusion of the financial dimension may help the CGE model to historically track observed variables.

Key words: CGE model. Financial dimension. Historical simulation. Argentina.

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Introduction

The significant real effects arising from the present international financial crisis suggest that the workings of the financial sphere significantly affect the value of social production, the distribution of income and wealth, and the magnitude of income poverty, all important social welfare indicators. However, most CGE models with macroeconomic focus neglect the financial sphere of the economy, omitting money, deposits, loans, as well as all other financial holdings. This has the drawback of opening a gap between CGE and macroeconomic models (Robinson 2006), making it difficult for these areas to cross-fertilize and, in particular, letting CGE models typically omitting the relevant macroeconomic effects of wealth stocks and liquidity constraints.

Including the financial sphere in macroeconomic CGE models has a series of potential benefits, but also costs, which were analyzed in the past by Robinson (1991) and Adam and Bevan (1998). Overall, there is a case for the inclusion of the financial sphere in standard economic modelling to the extent that the financial sphere matters in the determination of economic outcomes but also that we have a good grasp of how actors behave in this area. This leads to wonder whether our present grasp on the financial behaviour of economic actors is good enough to argue for this inclusion. To help answer this question, a validation test can be devised: if our understanding of the financial dimension is relatively good, then financial-inclusive models will be better at tracking economic outcomes than their analogous non-financial counterparts.

To determine if this is the case, I start by reviewing the theoretical mechanisms at stake in the trade liberalization of an economy following, among others, Stiglitz (2002), Winters, McCulloch et al (2004), and Taylor (2004). After briefly describing

the evolution of the Argentinean economy from 1991 to 2006, I proceed then to compare the effects of trade liberalization in the country during this period using: 1) a real model which completely omits the financial sphere (**R-Model**); 2) a model which includes the financial dimension but with financial holdings not directly affecting the supply of goods (**RF-Model**); 3) a model which includes the financial sphere and enlarges the production factors to include financial holdings ('working capital'), i.e. with financial liquidity of producers directly affecting their supply of goods (**RFP-Model**). I then contrast the models results for the main endogenous variables vis-à-vis the observed realizations of the variables in the period under analysis, including the items of the balance of payment, as well as income and wealth distribution indicators.

The Impact of Liberalization on Growth and Income Distribution: Theory and Evidence

To shed light on the effects of the specific aspects of globalization on growth and income distribution from the start of the Convertibility Plan (April 1991) up to 2006, and having into account the most relevant spheres of globalization during this period, I succinctly identify in the literature the transmission channels involved in the impacts of trade and capital liberalization on growth and income distribution.

Effects of Trade Liberalization on Growth

In mainstream view trade liberalization is expected to have positive medium run and long run effects on growth. The former would come from liberalization producing changes in relative prices signals, which in turn generate a more efficient resource allocation (Taylor 2004; Winters, McCulloch et al. 2004). The latter would come from increased access to technology, improved access to intermediate and capital

goods, and benefits of increased scale and competition (Winters, McCulloch et al. 2004).

However, these positive effects are not guaranteed (Winters, McCulloch et al. 2004).

The link from trade liberalization to growth may be affected by the presence of market failures (e.g. sector specific ‘learning by doing’ effects, or imperfect capital markets) (Wood and Ridaio-Cano 1996; Rodriguez and Rodrik 2001) and the absence of accompanying sound demand policies, which may imply a switch in aggregate demand outside the liberalizing country, reducing the demand for the country’s output and hence growth (Stiglitz 2002). Besides, contractions in output, due to lack of incentives to investment, may prolong low growth dynamism. Finally, worsening terms of trade (possibly related to specialization caused by trade liberalization) may lead to “immiserising growth” i.e. physical GDP going up with its nominal value -and purchasing power- going down (Bhagwati 2004).

Effects of Trade Liberalization on Distribution

In the short run, openness to trade will affect income distribution by the increasing adoption of international prices. On the imports side, the competition of cheaper imported goods will erode the rents (profits, wages, land rents) of the domestic producers operating in the protected sector (Milanovic and Squire 2005), with the consequent alteration in income distribution. On the exports side, the action will come from a reduction in wedges (taxes and subsidies) to exports and also to inputs imported for the purpose of subsequent exporting.

If the adoption of international prices leads to an increase in net imports and real devaluation does not take place -e.g. because of capital inflows financing current account deficits at an uncompetitive fixed exchange rate- then i) net imports will be sustained, lowering aggregate demand for domestic production; ii) producers will shift to non-tradables production. Both effects will potentially affect not only growth but also income distribution (Taylor 2004; Evans 2005). If compensating demand policies (e.g. fiscal or monetary policy) are absent and liberalization is done prior to the adoption of social safety nets, lost jobs will make income distribution get worse (Stiglitz 2002).

Effects of Financial Liberalization on Growth

Capital account liberalization comes with a significant increase in volatility of capital flows, which in turn makes the rate of growth less stable (Birdsall 1999; Wade 2001). Even worse, capital flows tend to move procyclically, providing an additional source of instability (Stiglitz 2002, p143), and probably generating uncertainty, a loss in efficiency, and a lower trend growth (Gottschalk and Cirera 2003).

The effects of capital account liberalization, particularly in the context of Latin America, are pretty well described by Taylor (2004): in his view, which will be taken as a building block for modeling the effects of liberalization in Argentina, capital inflows have typically led to an appreciated real exchange rate, causing Dutch disease across LAC (Stiglitz 2002), with switch in aggregate demand outside the liberalizing country, increases in relative labour costs and job losses, reduced labour income, worsened income distribution and, in turn, even lowered demand for domestic goods. The appreciations come with high real interest rates which add to production costs

and penalize capital formation, and with a switch of aggregate supply to the non-tradable sector, where the lack of competition of imports still allow for economic benefits (e.g. a positive mark-up on costs). The capital inflows are accompanied by domestic credit expansion and stimulus to aggregate demand, reducing domestic savings, and stimulating not only investment but also consumption with a high imports component and generating a speculative asset price bubble; sooner or later, the demand expansion finishes due to unsustainable external balance or capital outflow.

Effects of Financial Liberalization on Distribution

This channel has not been appropriately mapped in the literature. Even so, the most relevant mechanisms seem to come from: 1) the effect of an appreciated real exchange rate on the demand for labour (Taylor, 2004), and 2) devaluations affecting differently the net financial wealth of different household groups, which will be taken into account in the (RF) model specification.

Case Study and Modelling Methodology

Brief description of the Argentinean economy 1991-2006

The Argentinean government put the so-called Convertibility Plan into practice in April 1991, tightening national currency to dollar in a one-to-one relation, prohibiting price indexation, and allowing contracts and payments in external currency. During its operation, commercial and financial opening was broadly implemented: while commercial opening included significant decreases in import tariffs and progress in the conformation of Mercosur free trade area, financial opening included reduction in

restrictions to mobility to all forms of capital, with equal treatment to national and foreign capital; increase of deposits and credits in dollars, free entry of direct and portfolio investment, elimination of the barriers to the entry of foreign banks, free bank emission of negotiable titles in foreign currency and unrestricted entry of foreign capital in pension funds (Bustelo 2002; Damill, Frenkel et al. 2002)².

In relation to the commercial opening, and following a period of unilateral liberalization, in January 1991 a 22% uniform tariff was introduced in the country for most of the tariff universe (Berlinski, Kume et al. 2006,p10). Then, the Asuncion Treaty (March 1991) determined the conformation of a free trade area with Brazil, Uruguay and Paraguay starting in the beginning of 1995 (Mercosur area) and stated in its article 5 that “during the transition period, the main instruments for the constitution of a Common Market will be: a program of trade liberalization, which will consist in tariff reduction which will be progressive, linear and automatic, accompanied by the elimination of non-tariff restrictions or measures with equivalent effects, as well as other restrictions to trade among the conforming States, to reach a zero tariff the 31 of December of 1994, without non-tariff restrictions over the totality of the tariff universe”. For the extrazone area, a common external tariff was agreed, with multiple exceptions and a convergence path to the common external tariff. The agreed average tariff for extrazone was, for agricultural products: 10%/12%, for capital goods: 12%/16%, and for consumption goods: 18%/20%. The Asuncion Treaty also set the stage for the coordination of macroeconomic policies and the establishment of future sector level agreements (Berlinski 1998; Berlinski 2004; Berlinski, Kume et al. 2006).

² The specificities of the policies conducted during the Convertibility Plan are informed in Annex, organized as a Policy Matrix, taking account of the evolution of Capital Account Policy, Other Monetary and Financial Policies, Trade Policy, Fiscal Policy, Privatizations and Deregulations, and Labor Market Policy.

After financial liberalization, a flow of capital inflows was generated in the first years of the Convertibility Plan, allowing the economy to maintain its fix nominal exchange rate, with a real exchange rate which was appreciated at the beginning of the Plan (Damill, Frenkel et al. 2002) and which appreciated even more during the Convertibility Plan. Trade and financial liberalization, in the context of this uncompetitive exchange rate (at least when compared to the precedent decade's one) and of significant foreign capital financing absorption, generated a switch in aggregate demand outside Argentina, increasing net imports, reducing the demand for the country's output and hence reducing domestic growth.(Damill, Frenkel et al. 2002; Taylor 2004).

With time, the capital flows going into and out of the country proved to be particularly volatile, and affected, in turn, the volatility of growth. As argued by Damill et al (2002)³, capital inflows - mostly to the private sector in the first half of the decade and to the public sector in the second half-, by increasing international reserves and the monetary base, stimulated bank deposits and bank loans, lowered the interest rate, and stimulated aggregate demand (consumption and investment) and hence output and growth, while the reduction in capital inflows and capital outflows generated opposite processes.

The evolution of imports in Argentina is explained among the nineties by an increased imports coefficient and by the evolution of the domestic activity level: the higher the activity level was, the larger the deficit of the current account⁴. Overall, increasing

³ They find a statistical relationship between cyclical capital flows and the cyclical component of GDP in Argentina during the Convertibility Plan

⁴ Strong positive correlation between the volume of imports and the level of output found by Damill, M., R. Frenkel, et al. (2002). Argentina: una decada de convertibilidad. Un analisis del crecimiento, el empleo y la distribucion del ingreso, ILO.

imports generated a deficit in the current account, increasing in turn the external debt of Argentina during the Convertibility period and deteriorating, overall, the international investment position of the country e.g. with foreign direct investment putting in the hand of non-residents an increasing share of the physical capital stock, which over time ended up increasing the payments to the rest of the world in terms of interests, profits and dividends during most of the Convertibility Plan (Damill, Frenkel et al. 2002).

The liberalization with appreciation also generated: 1) a switch towards the production of non-tradable goods, an area where the lack of competition of imports still allowed for economic benefits (e.g. a positive mark-up on costs), which were accompanied by switches in the relative magnitude of full-time positions across sectors (Damill, Frenkel et al. 2002), and 2) a reduction in the price of capital (basically a tradable factor of production) in relation to the price of labour (basically a non-tradable factor of production), generating imports and the gradual introduction of capital goods into the production process implying in turn the adoption of an unskilled labor-saving technology, characteristic of the developed countries where these imports came from (Altimir and Beccaria 2000; Bisang and Gomez 2000; Damill, Frenkel et al. 2002). This process ended up generating a reduction in the unskilled labour demand, with effects on total hours worked and real wages, affecting unskilled labour income, and, in the relative absence of social safety nets, worsening income distribution. The skilled, in turn, operated as a complement of (imported) physical capital, as explained by Milanovic and Squire (2005). As described by Altimir and Beccaria (2000), wages changed similarly across different sectors following general

patterns e.g. increases in unemployment led to stagnant wages. Besides, wages did not vary with productivity or output prices.

The current account deficits together with capital outflows in the beginning of the century forced the Convertibility Plan to collapse. After its collapse, Argentina moved to an administered flexible exchange rate which allowed the domestic currency to depreciate. The country's competitiveness increased, allowing it to improve its trade and current account balances and, hence, aggregate demand, domestic output and the employment level, but also exerting inflationary pressure on the economy.

Outline of Real Model (R-Model) for Argentina as a modification of IFPRI Standard Model

In order to model the real sphere of the Argentinean economy, the IFPRI Standard Model seems particularly suitable as a departure point given that: 1) it is clearly documented, 2) its code is publicly available, 3) it is particularly transparent in conceptualizing how the economy works in terms of agents seeking to maximize profits or utility responding to economic signals in a consistent way, 4) it is widely used for analyzing the effects of policies and shocks related to international trade, 5) it inspired other widely used CGE models, like GLOBE.

The Argentinean Real Model (R-Model) follows in essence the IFPRI Standard Model (Lofgren, Lee Harris et al. 2002), with the following main differences: 1) the Real Model is dynamic, while IFPRI's is static, 2) the Real Model disentangles Mercosur from the Rest of the World in terms of trade policies and prices of traded goods, while IFPRI's has a single Rest of the World, and 3) the Real Model accounts

for some (but not total) wage rigidity (as explained below), while IFPRI's either shows no wage rigidity or total wage rigidity.

More in detail, in the R-Model there are only five economic activities: two mainly producing tradables (primary and industrial activities) and three mainly producing non-tradables (construction, private services and public services). Each activity can produce more than one commodity, and each commodity can be produced by more than one activity (except public services). Factors are classified in capital and labor, with labor segmented according to skill (skilled vs unskilled) and formality (formal vs informal). Households are classified in skilled wage recipients, unskilled wage recipients, and profit-earner recipients.

As can be seen in Figure 1, domestic output supplies are CES functions of value added and aggregate intermediate inputs, allowing to account for increases in imported inputs at the expense of domestic value added as occurred in Argentina following reductions in the relative price of imports (Bisang et al, 2000, p.401). Value added, in turn, is generated by a nested production function, being a CES function of two CES composites: a physical capital - skilled labor composite, and a formal - informal unskilled labor composite, with a relatively low elasticity of substitution in the capital - skilled labor CES function accounting for the complementarity among these two factors described in the evolution of the Argentinean economy. Among all these productive chains, as usual, demanded quantities are derived from short-run profit maximization at exogenously-perceived prices.

Overall, activity levels are determined by the interaction of supply and demand forces, with demand levels determined by the sum of demands of consumers (private

consumption in domestic goods), enterprises (private investment and intermediates used in domestic goods), and government (public consumption and public investment in domestic goods). The aggregate intermediate inputs, in turn, are determined as Leontief functions of specific intermediate inputs. Total factor productivity grows at a constant rate, as dynamically calibrated with the 1-2-3 model.

Tradable good supplies are allocated either to exports or to domestic sales, according to a CET function, and exports are allocated to Mercosur or ExtraZone Area according to another CET function. On the demand side, imports and domestic outputs are treated as imperfect substitutes through a CES, and imports from Mercosur and ExtraZone Area are also imperfect substitutes as captured through an additional CES function. Again, optimal mixes are derived from profit maximization or cost minimization under perfect competition.

Prices are endogenous, except for the world prices of exports and imports (small country assumption) and the nominal exchange rate (the price of the US dollar in domestic currency), which are exogenous. Variations in all the other commodity prices occur through Walrasian adjustment, with excess demands (supplies) generating price increases (decreases) until equilibrium is achieved.

Incomes, expenditures and saving levels are explicitly computed for households, enterprises, and government. Households income consist of factor income, public transfers, and net interest flows, the latter ones being all exogenous in this model, similar to how most transfers are treated in the IFPRI Standard model. Households save a constant fraction of their income, and spend the rest in a set of goods allocating the expenditure according to a LES function. Before-tax enterprise profits are

determined by subtracting payments to labor and intermediates from the activity revenues, and adjusting for transfers and net interest flows. Exogenously determined fractions of pre-tax profits are used to pay profits tax, dividends to domestic equity holders, and dividends to non-resident equity holders, with the remaining flow being saved. The government, capturing main workings of the Argentinean tax system, gets its income from taxing value added, firm's profits, payments to labour, imports, and exports, and spends in primary public consumption, public investment, public transfers, and interest payments on public bonds, with the difference determining (typically negative) public savings.

In the factor markets, total supplies of skilled and unskilled labor grow following observed data (Table 1). The labor market is segmented by skill and formality. In the formal sector, skilled and unskilled workers are taxed, and there is some real wage rigidity modelled through skill-specific wage curves (Blanchflower and Oswald 1994). In the informal sector, workers are not taxed and wages adjust fully to achieve full employment. Labor in each segment is fully mobile across activities. While the skilled are allocated to the formal sector (as observed in Argentina), the unskilled are allocated also to the informal sector. Following Harris and Todaro (1970) tradition, this allocation of unskilled labour supply into formal and informal labour markets depends on expected incomes in each market, with a parameter accounting for the elasticity of the 'migration' flow across these markets with respect to the expected wage differential, where the expected wages account for the different probabilities of

finding a job in each market⁵. The capital supply evolves according to the gross investment flow and an exogenous depreciation rate of the capital stock. Capital is mobile across activities, with its overall rental rate adjusting for the associated markets to clear.

Generalization of the R-Model into a Real-Financial model (RF-Model)

To get to the RF-Model, the R-Model is generalized by deriving payments among holders of financial assets and liabilities as a function of dynamic holdings and returns. For this, in turn, financial holdings are tracked by currency and holder, and prices and returns on financial assets are determined. More specifically, the institution-specific net financial wealths are determined by the accumulation of institution-specific past and present savings derived from the R-Model. The interest flows, which were exogenous in the R-Model, are endogeneized in this model. In particular, each interest flow comes from multiplying a relevant interest rate by a relevant financial stock. The model includes 6 interest rates: on rediscounts, on deposits abroad, on domestic public bonds, on domestic bank deposits, on domestic bank loans and on required reserves. The interest rates on rediscounts and required reserves are assumed to be exogenously determined by the monetary authority, and the interest rate on deposits abroad is assumed to be exogenous (small country assumption). Interest rates on deposits and bonds are assumed to be determined such that they clean their respective markets. Interest on loans is a function of interest on deposits, the reserve ratio and an exogenous mark-up ratio. Relevant financial stocks held by the different institutions come from the interplay of their asset demands, which are explained below.

⁵ In practice, this probability is one in the informal sector, and one minus the lagged skill-specific unemployment rate in the formal sector.

The actors participating in the financial markets of the model are households, firms, the government, commercial banks, the central bank and non-residents, and each of them define (interacting with the other actors) their own portfolios, whose assets can be seen in Figure 2. Given that until 2001 there was a fixed nominal exchange rate regime and that after that it was a regime of administered fluctuation with a high degree of monetary intervention, to keep the model tractable it is assumed that the agents expectations over the future exchange rate did not have a crucial role in determining the assets demanded by agents.

i. Households

Households borrow from commercial banks up to the point where banks are willing to finance them, which reflects the presence of credit rationing and which might have a role in the determination of household consumption. In the present version, the total money holdings are derived from the difference between the monetary base and required reserves, and the monetary base is dynamically allocated to households in proportion to the households shares in the current value of household consumption, as in Agenor (2003). This is not totally satisfactory, in the sense that it is not good at capturing the effect of households liquidity on their consumption levels.

The remaining household's wealth is deposited in domestic banks or, in the case of profit-earner households, held also as public bond stocks or deposits abroad, with magnitudes depending on the relative returns of these financial instruments. More specifically, profit-earner households determine the shares of non-monetary assets to maximize a CES utility function which takes the earnings coming from the different non-monetary financial assets as arguments, reflecting in a simple and low-data-requiring way, that agents look at relative returns when deciding portfolio shares and

try to avoid corner solutions reflecting their risk aversion. Skilled and unskilled households, on the contrary, do not hold government bonds neither foreign assets because of assumed informational difficulties and transaction costs for these actors in entering to associated markets. Overall, the differences in the assets included in the portfolios of different households provide a transmission channel from variations in asset returns and in the exchange rate to wealth and income distributions, with a potentially relevant role when taking account of the 2001 maxi-devaluation.

ii. Enterprises

Firms finance their working capital needs with own retained earnings, equity emission and borrowings from domestic banks. The paths of these last two are not determined by firms, highlighting the ceilings that firms may face in their access to financial markets. Eventual excess liquidity is allocated by firms in short-term deposits at domestic banks⁶.

iii. Government

The emission of public bonds during each period is determined by the level of public deficit. While the demand of public bonds from the central bank and non-residents is exogenous⁷, the demands of public bonds by profit-earner households and banks are endogenous and depend on the relative return of public bonds vis-à-vis other financial instruments.

⁶ While it does not make much sense for a firm to get a loan and deposit it at the bank at a lower interest rate until it has to be repaid, deposits of enterprises in banks and loans from banks to enterprises in the same sector are observed due to: a) different periods of loans and deposits and b) some enterprises getting loans while others depositing funds into banks.

⁷ Reflecting the main motion idea of the ISS Money and Finance Project, capital flows to the public sector (in this case in the form of changes in public bonds held by the foreign sector) are assumed to be supply determined. The idea of exogenous international capital was at the heart of the iss money and finance project, which sought to correct the imbalance where many macro models saw the capital account as a balancing item which adjusted to current a/c. this view was also applied to aid by Howard White in the early 90s, with the main idea that aid creates deficits rather than fills them.

iv. Commercial Banks

Banks accept whatever financial savings households, private enterprises and non-residents wish to hold in the form of bank deposits, and borrow from the central bank (i.e. get rediscounts). The total amount of funds available for bank lending equals the sum of bank deposits, rediscounts and net financial wealth minus the sum of banks' required reserves -in turn a share of total deposits-. For simplicity, as in IMMPA, banks are assumed to hold no excess liquid reserves. These funds are in turn used by banks to engage in new lending to the government (acquiring public bonds), to domestic household and enterprises, and to non-residents, the bank allocating these funds with a CES utility function similar to the one described for profit-earner households. Banks transfer to the private service enterprise the difference between interests earned and paid, keeping their net financial wealth constant over time.

v. Central Bank

The Central Bank provides some limited exogenous credit to banks (i.e. rediscounts) and buys an exogenous limited amount of public bonds (i.e. deficit monetization). A fix exchange rate regime is assumed for the whole period, with a series of devaluations at stake after the end of the Convertibility Plan. In this regime, the Central Bank's change in international reserves is given by the sum of the current and capital account balances. Central Bank's reserves directly affect the monetary base, accounting for the Convertibility Plan obligation of backing up the monetary base with international reserves held at the Central Bank. The Central Bank earns interests from allocated rediscounts and deposits of international reserves abroad, and pays interests on its debt with non-residents. Without variations in the exchange rate, central bank's profits only comes from the difference between interests earned and

paid, which is then transferred to the central government. Note that eventual deficits in the current account with a balanced capital account of the balance of payments generate, via decreases in the international reserves held by the Central Bank, decreases in the monetary base and hence in the liquidity present in the economy, but that this is not the case if the deficit in the current account is compensated by a superavit in the capital account as occurred during most of the Convertibility Plan in Argentina. In fact, if the capital account superavit is large enough, the economy is allowed to have a current account deficit accompanied by increasing monetary base and liquidity.

Generalization of the RF-Model to include financial assets as Production Factors (RFP-Model)

To get to the final RFP-Model, the RF-Model is generalized with the production function of each of the private activities including an additional argument: working capital determined by the sum of the stocks of retained earnings and bank loans held by the activity-specific firms.

Static and Dynamic Calibration of the Models

As usual, most model parameters are calibrated from the observed SAM, thereby ensuring that the SAM represents the original (assumed) economic equilibrium, following the tradition started by Shoven and Whalley (1972). TFP growth is calibrated using a simplified version of the model: a dynamic version of the 1-2-3 static model described in Devaragan, Lewis et al (1990). The calibration of TFP can be done either by regressing GDP on factor uses⁸ or, as is the case here, by running a simplified version of the model letting TFP as an endogenous variable, and then using

⁸ Which is out of the scope of the research

the values determined by the model as exogenous in the R-Model and subsequent versions, an approach which is novel to my knowledge⁹. Elasticities are borrowed from other studies. For every period and every model, it is checked that a consistent SAM is delivered, i.e. in every simulation, agents incomes coincide with their respective sum of expenditures and savings.

Data

Construction of a real-financial SAM for Argentina

A Social Accounting Matrix taking account of economic flows in the initial year (1991) is specially designed and estimated, and can be seen in Figure 3. It has the following particular features: i) the saving-investment account is disaggregated to take account of the shuffling of assets among economic actors in the financial sector, ii) households are differentiated according to the production factor they supply and trade with different financial holdings: while workers are assumed to hold only domestic assets, profit-earner households are allowed also to hold external financial assets. In the future, it will be evaluated if it makes sense to differentiate the monetary base, loans and deposits according to whether they are denominated in domestic or foreign currency. To assure SAM consistency, cross entropy procedure is applied, controlling for total GDP and aggregate demand components.

Other data

The evolution of foreign savings is taken from the Balance of Payments as informed by the National Direction of National Accounts (NDNA). Total labor supply is taken

⁹ This approach was suggested by my supervisor, Prof. Sherman Robinson.

from INDEC (National Institute of Statics and Census) and disaggregated by skill according to the Permanent Household Survey (PHS). World trade prices are calculated from CIIU rev 2 at 3 digit traded values and quantities by region. Nominal exchange rate is taken from Bloomberg (first working day of July of each year). Tax rates are taken from a private publication with detailed evolution of tax rates in Argentina, Errepar. Government expenditures are taken from the National Account System.

Most financial information is taken from Central Bank Balances and Consolidated Financial Statements. The required reserve ratio, rediscounts and the rate of interest over rediscounts are taken from information delivered as special request from the Central Bank. The world interest rate is the one given by U.S. government securities - treasury bills (secondary market), 6 month maturity, annualized¹⁰.

Results of Trade Liberalization in Argentina under different conceptualizations of the financial sphere

R-Model

The model is run from 1991 to 2006 without being shocked by trade liberalization, in what is called the 'BASE' simulation. Here, there is a single shock coming from imposing the evolution of the labour supplies of skilled and unskilled as observed in Argentina during the analyzed period (Table 1), the capital stock grows as derived from the endogenous gross investment levels (Table 2) –which are endogenous, as explained before- minus the exogenous depreciation rate, and the total factor productivity grows at a yearly rate of 2%. As expected, the value of output at constant

¹⁰ The one year maturity one was not used because it was discontinued during the analyzed period - <http://www.federalreserve.gov/releases/h15/data.htm>

prices grows (Table 3), together with domestic incomes (Table 4), absorption components (Table 5), and trade values (Table 6), all of them being essentially a function of the economy size. As incomes grow, the savings of the private sector (households and enterprises) grow offsetting the negative savings of the public sector and allowing for total savings and total investment to grow, too (Table 7). The increased capital stock shifts the demands for skilled and unskilled labour up, translating partly in price effects (average wages going up – Table 8) and partly in quantity effects (the employment levels going up, with the unemployment rates going down, as shown in Tables 9 and 10). In terms of the sector composition of output, the construction sector share increase (Table 11), due to the economy's investment share increasing over time (Table 5).

The model is then run shocked not only by the evolution of labour supply but also by trade liberalization, or more in general, by current account liberalization (CAL), taking account of the observed tariff and export tax rates in Argentina during the analyzed period (Tables 12 and 13). In practice, taxes on imports suffer a reduction during the first half of the nineties which is sustained over time: imports from Mercosur completely stop paying tariffs in 1995. Tariffs applied to primary goods imported from Extra-Zone are reduced significantly in 1992, and then stay in low levels, while those to industrial goods do not suffer much change during the period, remaining in the order of 5%-8%. On the export side, taxes to Mercosur are absent from the beginning of the period, and those to Extra-Zone exports become negative during the nineties (export reimbursements offset export taxes) and positive again in 2002. Overall, the main effect of the liberalization shock received by the economy does not come from the change in prices derived from the tax changes, but from the

reduction in the income of the government derived from reducing taxes on trade. With exogenous real public expenditures, the government increases its deficit. Given that only part of the additional available income of the public sector is actually saved by the private sector, while the public sector savings are reduced in the same amount that its tax income (note that public expenditures are exogenous, at least in real terms), the overall effect on domestic savings is negative. Overall, total savings decrease by around 10%, reducing in turn investment in new capital and the growth rates of the capital stock of the economy, GDP and domestic income. Private and public savings are reduced further through second-round effects. In terms of sector composition, and due to the higher remaining tariffs on industrial goods, the value and the share of industrial production increases over time, together with the share of workers in the industrial sector, which allows the overall employment level to increase and the unemployment rate to decrease in relation to the base scenario. Finally, it can be seen that the decrease in the price of imports is partially transmitted to the domestic consumer price index (Table 14).

RF-Model

This model is being coded at present.

RFP-Model

This model will be coded during April.

Conclusions

Modeling the effects of trade liberalization for Argentina does not seem to be enough to explain the evolution of the main economic variables in Argentina, including here real GDP, income distribution, employment levels, and the unemployment rates.

At present, I am defining the asset demand arguments and functional forms, as well as the determination of the rates of return, including the return on equity. To move forward, I am considering work by Adam and Bevan and articles published by the Bank of England. For the pricing of financial assets, the Capital Asset Pricing Model, as well as other tools present in (Brealey and Myers) and (Lumby and Jones 2003) are being considered.

I expect to see that when incorporating others shocks affecting the economy (changes in the tax rates, for example) and the financial dimension, the performance of the Argentinean economy will be better tracked. To compare the model performances, I will compare the models in terms of how close there endogenous variable values are from historical (observed) ones. For this, I plan to use the Theil's inequality coefficient, introduced in {Theil, 1961 #246, 30-37}, and discussed in {Theil, 1966 #247, 26-35}:

$$U = \frac{\sqrt{\frac{1}{T} \sum_{t=1}^T (Y_t^s - Y_t^a)^2}}{\sqrt{\frac{1}{T} \sum_{t=1}^T (Y_t^s)^2} + \sqrt{\frac{1}{T} \sum_{t=1}^T (Y_t^a)^2}}$$

Where Y is the value variable, s the simulated value, and a the actually observed value. The scaling of the denominator makes U to always fall between 0 and 1. If $U=0$, $Y_t^s = Y_t^a$ for all t and there is a perfect fit. If $U=1$, the predictive performance of the model is as bad as it possibly could be: simulated values are always 0 when actual values are nonzero, or nonzero predictions have been made when actual values are zero and hence easy to predict, or simulated values are positive (negative) when actual values are negative (positive).

The Theil inequality coefficient can be decomposed as follows:

$$\frac{1}{T} \sum (Y_t^s - Y_t^a)^2 = (\bar{Y}^s - \bar{Y}^a)^2 + (\sigma_s - \sigma_a)^2 + 2(1 - \rho)\sigma_s\sigma_a$$

Where $\bar{Y}^s, \bar{Y}^a, \sigma_s, \sigma_a$ are the means and standard deviation of the series Y_t^s and Y_t^a , respectively, and ρ is their correlation coefficient. We then define the *proportions of inequality* as

$$U^M = \frac{(\bar{Y}^s - \bar{Y}^a)^2}{(1/T) \sum (Y_t^s - Y_t^a)^2}$$

$$U^S = \frac{(\sigma_s - \sigma_a)^2}{(1/T) \sum (Y_t^s - Y_t^a)^2}$$

$$U^C = \frac{2(1 - \rho)\sigma_s\sigma_a}{(1/T) \sum (Y_t^s - Y_t^a)^2}$$

The proportions U^M, U^S, U^C are the so-called bias, variance, and covariance proportions, respectively, and they allow to break the simulation error down into its characteristic sources. I expect to finish with the work before the beginning of June.

Tables & Figures

Table 1

Labour supply

In millions of individuals

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled	1.5	1.4	1.7	1.7	2.0	2.0	2.1	2.2	2.4	2.3	2.4	2.4	2.5	2.6	2.6	2.7
Unskilled	11.9	12.6	13.0	13.1	13.4	13.8	13.9	14.2	14.4	14.2	14.0	13.7	14.8	15.1	15.2	15.5

Source: total economically active population informed by National Statistics Institute (INDEC), separated in skilled & unskilled with shares coming from Permanent Household Survey yearly waves microdata.

Table 2

Capital stock

In billions of current A\$

Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
R	BASE	329.7	342.8	354.4	377.3	405.0	439.2	479.2	524.0	573.3	626.3	683.1	744.5	819.5	901.8	990.6	1,078.4
R	CAL	329.7	342.8	352.7	373.0	397.5	428.0	464.2	504.9	549.8	597.9	649.6	705.8	776.3	854.7	939.4	1,022.7

Source: model simulation.

Table 3

Real Gross Domestic Product

In billions of 1993 USD

Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
R	BASE	190.5	199.2	215.2	229.4	250.3	269.8	290.8	313.0	337.4	354.6	373.0	388.4	429.0	458.9	486.3	517.5
R	CAL	190.5	199.9	215.9	229.3	249.4	267.6	287.6	308.8	332.4	348.7	366.4	381.0	420.8	450.3	477.4	508.2

Source: model simulation.

Table 4
Household income
In billions of current A\$

Household	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled	R	BASE	20.8	22.6	23.9	25.9	27.8	30.3	33.0	35.8	38.8	41.3	43.6	44.3	49.1	52.7	56.9	61.0
Skilled	R	CAL	20.8	22.3	23.2	24.8	26.3	28.5	31.0	33.6	36.3	38.6	40.6	40.9	45.1	48.4	52.3	56.0
Unskilled	R	BASE	105.6	114.9	114.0	120.0	131.2	141.7	153.2	166.0	181.4	191.6	202.0	207.6	233.4	250.3	271.3	290.2
Unskilled	R	CAL	105.6	113.6	111.1	115.0	124.2	133.8	144.2	155.8	169.9	179.2	188.4	191.9	215.0	230.4	250.1	267.5
Profit-Earner	R	BASE	52.2	54.9	59.9	63.5	69.9	75.5	80.7	86.0	91.6	94.6	97.9	102.7	113.2	119.5	123.8	130.0
Profit-Earner	R	CAL	52.2	54.1	58.2	60.8	66.1	71.4	76.2	81.0	86.2	89.1	92.1	96.1	105.5	111.3	115.4	121.2
Total	R	BASE	178.6	192.4	197.7	209.4	229.0	247.4	266.8	287.8	311.8	327.5	343.6	354.6	395.6	422.6	452.1	481.2
Total	R	CAL	178.6	190.0	192.5	200.5	216.6	233.8	251.3	270.3	292.5	306.9	321.1	328.8	365.6	390.2	417.9	444.7

Source: model simulation.

Table 5
Absorption component values (only final demand components)
In billions of current A\$

Component	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Private C	R	BASE	155.2	167.5	171.1	181.2	198.0	213.9	230.9	249.4	270.7	284.8	299.2	308.3	344.3	368.2	395.1	421.1
Private C	R	CAL	155.2	165.5	166.6	173.5	187.3	202.2	217.5	234.2	253.8	266.7	279.4	285.6	317.9	339.7	365.0	388.8
Private I	R	BASE	19.7	18.7	31.0	36.7	44.9	52.1	58.4	64.3	69.4	74.0	79.7	95.1	105.2	113.5	113.3	120.8
Private I	R	CAL	19.7	16.5	27.1	31.3	38.0	44.9	50.4	55.6	59.8	64.0	69.1	83.9	93.9	101.2	100.7	107.8
Public C	R	BASE	6.2	5.9	7.6	8.9	9.0	8.9	10.2	11.5	13.4	14.9	16.2	8.5	8.2	8.0	11.0	11.8
Public C	R	CAL	6.2	5.8	7.3	8.4	8.5	8.4	9.5	10.7	12.5	13.9	15.1	7.8	7.5	7.4	10.1	10.9
Public I	R	BASE	0.4	0.5	2.2	2.1	2.1	2.3	2.3	2.4	2.4	1.8	1.5	0.9	1.1	2.2	3.3	3.4
Public I	R	CAL	0.4	0.5	2.1	1.9	2.0	2.2	2.2	2.2	2.2	1.7	1.4	0.8	1.0	2.1	3.1	3.2

Source: model simulation.

Table 6
Trade values
In billions of current USD

Model	Account	Simul	Account	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
R	COA	BASE	Commerce	10.7	10.7	10.8	10.9	11.0	11.1	11.1	11.2	11.3	11.3	11.4	11.5	11.6	11.7	11.8	11.8
R	COA	CAL	Commerce	10.7	10.7	10.8	10.8	10.9	11.0	11.1	11.1	11.2	11.2	11.3	11.4	11.5	11.6	11.6	11.7
R	VEX	BASE	Exports fob	19.5	20.6	22.2	23.6	26.0	28.2	30.5	32.8	35.4	37.1	39.1	41.4	45.9	49.2	52.0	55.3
R	VEX	CAL	Exports fob	19.5	20.0	21.2	22.4	24.5	26.7	28.7	30.8	33.2	34.8	36.5	39.2	44.2	47.3	50.1	53.4
R	VIM	BASE	Imports fob	8.8	9.8	11.3	12.7	15.0	17.2	19.3	21.6	24.1	25.8	27.7	29.9	34.3	37.5	40.2	43.4
R	VIM	CAL	Imports fob	8.8	9.3	10.4	11.6	13.6	15.7	17.6	19.7	21.9	23.5	25.2	27.8	32.7	35.7	38.4	41.7

Source: model simulation.

Table 7
Savings by institution
In billions of current A\$

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled households	BASE	1.0	1.1	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0	2.1	2.1	2.3	2.5	2.7	2.9
Skilled households	CAL	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.3	2.5	2.7
Unskilled households	BASE	4.6	5.1	5.0	5.3	5.8	6.2	6.7	7.3	8.0	8.4	8.9	9.1	10.3	11.0	11.9	12.8
Unskilled households	CAL	4.6	5.0	4.9	5.1	5.5	5.9	6.3	6.9	7.5	7.9	8.3	8.4	9.5	10.1	11.0	11.8
Profit-Earner households	BASE	17.8	18.7	20.4	21.7	23.9	25.8	27.5	29.4	31.3	32.3	33.4	35.1	38.6	40.8	42.3	44.4
Profit-Earner households	CAL	17.8	18.5	19.9	20.8	22.6	24.4	26.0	27.7	29.4	30.4	31.5	32.8	36.0	38.0	39.4	41.4
Primary Sector	BASE	0.9	1.0	1.1	1.3	1.5	1.6	1.8	2.0	2.1	2.2	2.3	2.5	2.8	3.0	3.2	3.4
Primary Sector	CAL	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.8	1.9	2.0	2.1	2.2	2.5	2.7	2.8	3.0
Industrial Sector	BASE	3.8	4.1	4.5	4.8	5.4	5.9	6.4	6.9	7.4	7.7	8.1	8.5	9.5	10.1	10.6	11.2
Industrial Sector	CAL	3.8	4.1	4.4	4.7	5.2	5.7	6.2	6.6	7.1	7.4	7.7	8.0	8.9	9.5	10.0	10.5
Construction Sector	BASE	1.6	1.5	2.5	2.9	3.5	4.0	4.4	4.8	5.1	5.3	5.6	6.5	7.2	7.7	7.6	8.0
Construction Sector	CAL	1.6	1.4	2.2	2.5	3.0	3.5	3.9	4.2	4.5	4.7	4.9	5.8	6.5	6.9	6.9	7.3
Primate Services Sector	BASE	10.2	10.9	11.4	12.0	13.2	14.1	15.1	16.1	17.2	17.7	18.3	18.9	20.8	22.0	23.0	24.2
Primate Services Sector	CAL	10.2	10.7	11.1	11.5	12.5	13.4	14.3	15.2	16.2	16.7	17.3	17.7	19.5	20.5	21.5	22.6
Public Sector	BASE	-25.1	-28.3	-18.1	-15.6	-12.7	-9.8	-8.0	-6.6	-6.4	-5.0	-2.7	8.2	9.5	13.3	10.0	12.2
Public Sector	CAL	-25.1	-29.9	-20.8	-18.9	-16.6	-13.9	-12.4	-11.4	-11.6	-10.5	-8.5	2.6	4.7	7.9	4.6	6.6
Rest of the World	BASE	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Rest of the World	CAL	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Total	BASE	20.1	19.2	33.2	38.8	47.0	54.5	60.7	66.7	71.8	75.9	81.2	96.0	106.3	115.7	116.5	124.2
Total	CAL	20.1	17.0	29.2	33.3	40.0	47.1	52.6	57.8	62.0	65.7	70.5	84.8	94.9	103.2	103.8	111.0

Source: model simulation.

Table 8
Average factor wages after factor tax payments
In thousands of current A\$ per year for labour and rental rates for capital

	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled workers	R	BASE	14.7	17.0	15.3	16.3	15.1	15.9	16.6	17.2	17.3	18.5	18.8	19.5	20.0	21.1	22.5	23.6
Skilled workers	R	CAL	14.7	16.8	14.8	15.6	14.2	15.0	15.6	16.1	16.2	17.3	17.5	18.0	18.4	19.4	20.7	21.7
Formal unskilled workers	R	BASE	8.3	8.3	8.5	8.8	9.2	9.4	9.9	10.4	11.1	12.0	13.0	13.7	13.8	14.5	15.6	16.4
Formal unskilled workers	R	CAL	8.3	8.1	8.2	8.3	8.6	8.8	9.3	9.7	10.3	11.2	12.1	12.6	12.7	13.3	14.3	15.0
Informal unskilled workers	R	BASE	9.2	9.5	10.4	10.9	12.0	12.9	13.7	14.6	15.5	16.0	16.6	17.6	19.4	20.4	21.1	22.2
Informal unskilled workers	R	CAL	9.2	9.4	10.0	10.4	11.2	12.0	12.8	13.5	14.3	14.8	15.4	16.1	17.7	18.7	19.3	20.3
Capital	R	BASE	20%	20%	22%	22%	23%	23%	22%	22%	22%	20%	19%	19%	19%	18%	17%	17%
Capital	R	CAL	20%	20%	21%	21%	22%	22%	22%	21%	21%	20%	19%	18%	19%	18%	17%	16%

Source: model simulation.

Table 9

Factor use

Labour in millions of workers, capital in billions of current A\$

	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled labour	R	BASE	1.4	1.3	1.6	1.6	1.9	1.9	2.0	2.1	2.3	2.2	2.3	2.3	2.5	2.5	2.5	2.6
Skilled labour	R	CAL	1.4	1.3	1.6	1.6	1.9	1.9	2.0	2.1	2.3	2.2	2.3	2.3	2.5	2.5	2.5	2.6
ormal unskilled labo	R	BASE	7.3	7.6	8.1	8.4	8.9	9.3	9.7	10.0	10.3	10.2	10.0	9.7	10.6	10.8	10.9	11.1
ormal unskilled labo	R	CAL	7.3	7.7	8.2	8.5	8.9	9.4	9.7	10.0	10.3	10.2	10.1	9.7	10.6	10.9	10.9	11.2
ormal unskilled labo	R	BASE	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.4	3.5	3.6	3.6	3.7	3.8	3.9	4.0	4.0
ormal unskilled labo	R	CAL	2.9	2.9	3.0	3.1	3.2	3.3	3.3	3.4	3.5	3.6	3.6	3.7	3.8	3.9	3.9	4.0
Capital	R	BASE	329.7	342.8	354.4	377.3	405.0	439.2	479.2	524.0	573.3	626.3	683.1	744.5	819.5	901.8	990.6	1,078.4
Capital	R	CAL	329.7	342.8	352.7	373.0	397.5	428.0	464.2	504.9	549.8	597.9	649.6	705.8	776.3	854.7	939.4	1,022.7

Source: model simulation.

Table 10

Unemployment rates in the formal sector

In percentages

Factor	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Skilled labour	R	BASE	7.0%	4.1%	6.5%	5.0%	8.0%	6.2%	5.3%	4.7%	4.7%	3.9%	3.8%	3.5%	3.4%	3.3%	3.1%	3.1%
Skilled labour	R	CAL	7.0%	3.9%	6.0%	4.7%	7.6%	6.1%	5.2%	4.7%	4.7%	3.9%	3.8%	3.6%	3.5%	3.3%	3.2%	3.1%
Unskilled labour	R	BASE	19.6%	20.8%	19.1%	16.0%	12.7%	11.0%	8.4%	6.4%	4.9%	3.9%	3.4%	3.2%	3.2%	3.1%	3.1%	3.0%
Unskilled labour	R	CAL	19.6%	20.1%	18.2%	15.2%	12.2%	10.8%	8.3%	6.4%	5.0%	4.0%	3.4%	3.3%	3.3%	3.2%	3.1%	3.1%

Source: model simulation.

Table 11

Value added sector shares

Sector	Model	Simul	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Primary	R	BASE	10.8%	10.8%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.2%	10.2%	10.2%	10.3%	10.2%	10.2%	10.1%	10.0%
Primary	R	CAL	10.8%	10.8%	10.7%	10.7%	10.5%	10.4%	10.3%	10.2%	10.1%	10.1%	10.1%	10.2%	10.0%	9.9%	9.9%	9.8%
Industry	R	BASE	21.5%	21.6%	21.3%	21.2%	21.3%	21.4%	21.4%	21.3%	21.3%	21.2%	21.2%	21.5%	21.6%	21.7%	21.6%	21.6%
Industry	R	CAL	21.5%	22.0%	21.9%	21.8%	21.9%	22.0%	21.9%	21.9%	21.8%	21.8%	21.7%	22.0%	22.1%	22.1%	22.0%	22.0%
Construction	R	BASE	5.4%	5.0%	7.2%	7.7%	8.4%	8.9%	9.1%	9.3%	9.4%	9.6%	9.9%	11.2%	11.2%	11.4%	11.1%	11.2%
Construction	R	CAL	5.4%	4.6%	6.6%	7.1%	7.6%	8.2%	8.5%	8.7%	8.7%	8.9%	9.2%	10.7%	10.8%	11.0%	10.7%	10.8%
Private Services	R	BASE	57.5%	58.1%	55.7%	55.0%	54.7%	54.5%	54.2%	54.0%	54.0%	53.9%	53.7%	53.7%	53.9%	53.9%	54.1%	54.1%
Private Services	R	CAL	57.5%	58.1%	55.7%	55.1%	54.7%	54.6%	54.3%	54.2%	54.1%	54.0%	53.8%	53.9%	54.1%	54.0%	54.2%	54.2%
Public Services	R	BASE	4.9%	4.5%	5.1%	5.4%	5.1%	4.8%	4.9%	4.9%	5.1%	5.1%	5.1%	3.2%	3.0%	2.9%	3.2%	3.1%
Public Services	R	CAL	4.9%	4.5%	5.1%	5.4%	5.2%	4.8%	4.9%	5.0%	5.2%	5.2%	5.1%	3.3%	3.1%	2.9%	3.2%	3.2%
Total	R	BASE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Total	R	CAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: model simulation.

Table 12

Rate of tax on imports by sector and region

In percentages

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Primary goods	Mercosur	16.1%	12.1%	8.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Primary goods	Extra-Zone	16.1%	12.1%	8.0%	4.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial goods	Mercosur	16.1%	4.5%	4.1%	5.8%	1.9%	2.3%	2.3%	2.3%	2.3%	2.5%	2.3%	1.5%	1.9%	1.7%	1.7%	1.7%
Industrial goods	Extra-Zone	16.1%	4.5%	4.1%	5.8%	1.9%	2.3%	2.3%	2.3%	2.3%	2.5%	2.3%	1.5%	1.9%	1.7%	1.7%	1.7%

Source: own construction based on Berlinski, J El sistema de incentivos en Argentina (page 24), Berlinski, J, Kume, H & Vaillant, M (2006, page 32), Berlinski (2008, page 47) and Treaty of Asuncion.

Table 13

Rate of tax (net of reimbursements) on exports by sector and region

In percentages

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Primary goods	Mercosur	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Primary goods	Extra-Zone	5.3%	-1.0%	-4.2%	-3.7%	-2.9%	-1.5%	-1.5%	-1.2%	-1.6%	-1.3%	-1.0%	12.4%	29.5%	29.6%	30.4%	32.8%
Industrial goods	Mercosur	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial goods	Extra-Zone	11.0%	-2.7%	-9.8%	-9.4%	-7.8%	-4.9%	-4.5%	-3.7%	-4.3%	-4.0%	-3.4%	1.2%	2.2%	1.4%	1.4%	1.4%

Source: own construction based on Berlinski, J El sistema de incentivos en Argentina (page 24), Berlinski, J, Kume, H & Vaillant, M (2006, page 32) and Treaty of Asuncion.

Table 14

Consumer Price Index

1 for year 1991

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
R	BASE	1.00	1.01	1.03	1.04	1.05	1.06	1.07	1.07	1.08	1.08	1.09	1.09	1.09	1.09	1.10	1.10
R	CAL	1.00	0.99	0.98	0.98	0.98	0.99	1.00	1.01	1.01	1.02	1.02	1.02	1.02	1.02	1.02	1.02

Source: model simulation.

Figure 1. Functional Form of the Model's Production Sphere

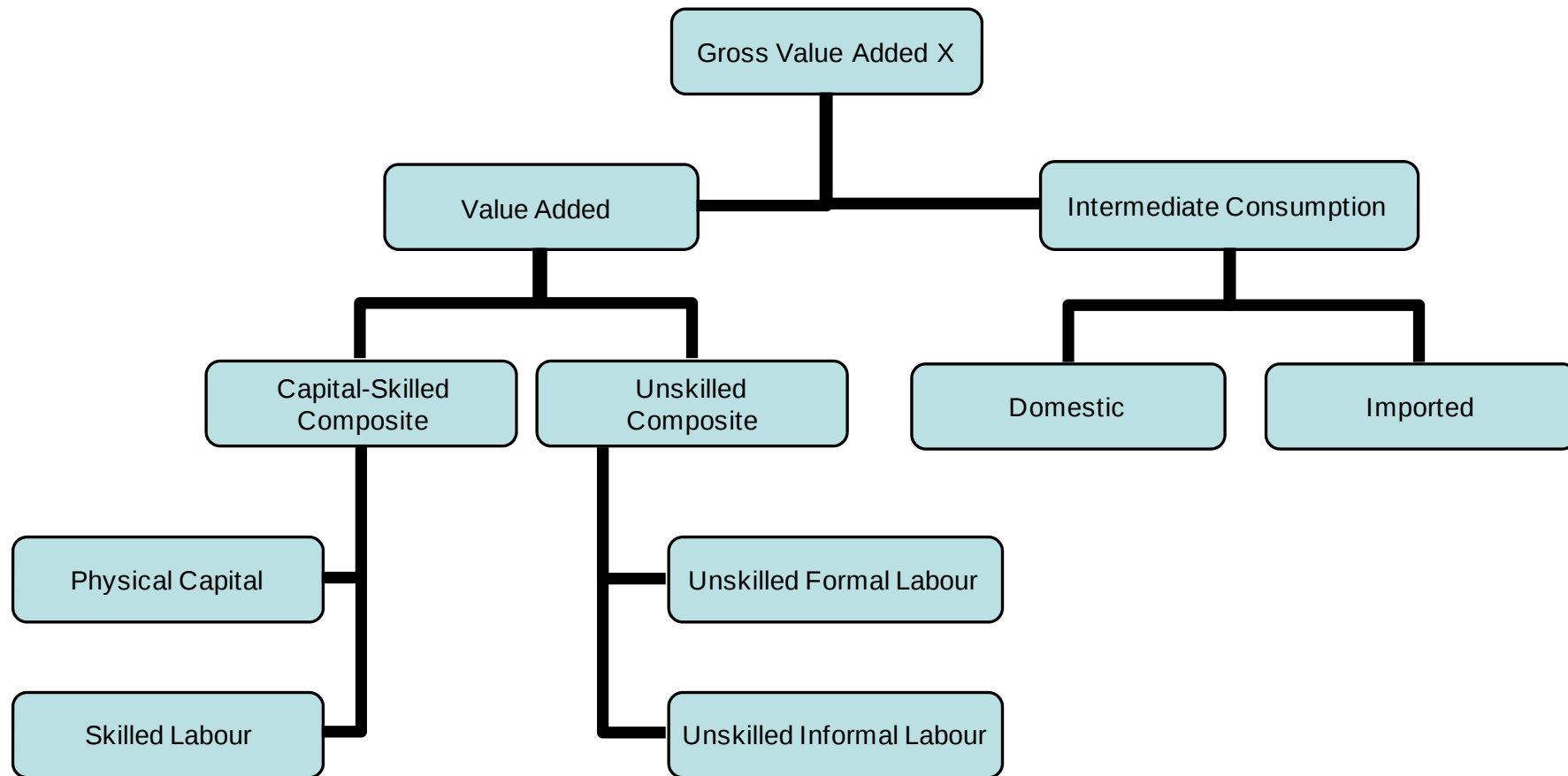


Figure 2. Financial Assets and Liabilities by Institution

Households	
Assets	Liabilities
Domestic equity	Domestic borrowing
Public bonds	Financial wealth
Deposits at domestic banks	
Deposits abroad	
Cash holdings	

Firms	
Assets	Liabilities
Deposits at domestic banks	Domestic equity
	Foreign equity
	Domestic borrowing
	Financial wealth

Government	
Assets	Liabilities
----	Public bonds
	Financial wealth

Commercial Banks	
Assets	Liabilities
Loans to households	Deposits at domestic banks
Loans to domestic firms	Rediscounts
Public bonds	Financial wealth
Reserve requirements	
Deposits abroad	

Central Bank	
Assets	Liabilities
Public bonds	Cash in circulation
International reserves	Reserve requirements
Rediscounts	Central Bank's debt with non-residents
	Financial wealth

Figure 3. Conceptual Social Accounting Matrix

		CURRENT ACCOUNTS										CAPITAL ACCOUNTS						
		Activities	Commodities	Factors	Households	Enterprises	Government	Rest of the World	Banks	Central Bank	Households	Enterprises	Government	Rest of the World	Banks	Central Bank	TOTAL	
CURRENT ACCOUNTS	Activities		Supply matrix															
	Commodities	Intermediate Consumption			Private Consumption		Public Consumption	Exports				Private Investment	Public Investment					
	Factors	Value added at factor cost																
	Households			Factor income to households		Profits distributed by enterprises to households	Interests paid by government on hh's holdings of gov bonds & Gov transfers to hhs	Interests paid by non-residents on household deposits abroad	Interests paid by domestic banks on household's deposits									
	Enterprises			Factor income to enterprises			Government transfers to enterprises		Interests paid by domestic banks on enterprises deposits & Transfer of profits									
	Government	Taxes on value added	Taxes on imports and exports	Taxes on labor		Taxes on profits				Transfer of profits from Central Bank to gov								
	Rest of the World		Imports			Profits distributed by enterprises to non-residents	Interests paid by government on non-residents' holdings of gov bonds		Interests paid by domestic banks on non-resident deposits	Interests paid by Central Bank on Central Bank's foreign debt								
	Banks				Interests paid by households on bank loans	Interests paid by enterprises on bank loans	Interests paid by government on domestic banks' holdings of gov bonds	Interests paid by non-residents on domestic banks deposits abroad										
	Central Bank						Interests paid by government on central bank' holdings of gov bonds	Interests paid by non-residents on Central Bank foreign reserves	Interests paid by domestic banks on rediscounts									
CAPITAL ACCOUNTS	Households				Household savings										Variation in loans by domestic banks to households			
	Enterprises					Enterprise savings					Variation in property of enterprises by households			Variation in property of enterprises by non residents	Variation in loans by domestic banks to firms			
	Government						Public Savings				Variation in household's holdings of public bonds			Variation in non-residents' holdings of public bonds	Variation in domestic banks' holdings of public bonds	Variation in Central Bank's holdings of public bonds		
	Rest of the World							Foreign savings			Variation in household's deposits abroad				Variation in domestic banks' deposits abroad	Variation in Central Bank's foreign reserves		
	Banks										Variation in households' deposits at domestic banks	Variation in firms' deposits at domestic banks		Variation in non-residents' deposits at domestic banks		Variation in rediscounts		
	Central Bank										Variation in household's cash holdings			Variation in Central Bank's foreign debt	Variation in banks' reserve requirements			
	TOTAL										Variation in households financial assets	Variation in Firms financial assets		Variation in Foreign financial assets	Variation in Domestic banks' financial assets	Variation in Central Bank's financial assets		

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