

Poverty &  
Economic Policy  
Research Network



Réseau de recherche sur  
les politiques économiques  
et la pauvreté

# 8th PEP GENERAL MEETING Dakar, Senegal - June 2010

**Assessing the Impact of the Global Financial and  
Economic Crisis in Developing Countries. The Case of  
Uruguay**

Cecilia Llambi

AusAID-IFPRI-PEP Workshop on the Impacts and Policy  
Responses to the Global Crisis



# Assessing the impact of the global financial and economic crisis in developing countries. The case of Uruguay

Cecilia Llambí \*

Inés Terra<sup>^</sup>

Carmen Estrades

## Second Draft - Preliminary

### 1. Introduction

For the past five years, after the strong 2002 recession, the Uruguayan economy has shown a strong recovery, averaging 6.7% growth rate for real gross domestic product (GDP). However, during the first quarter of 2009 GDP showed the first decrease in six years (-2.9%). Although GDP immediately recovered during the second quarter of 2009, there was a substantial slowdown of GDP growth rate for 2009 (Figure 1).

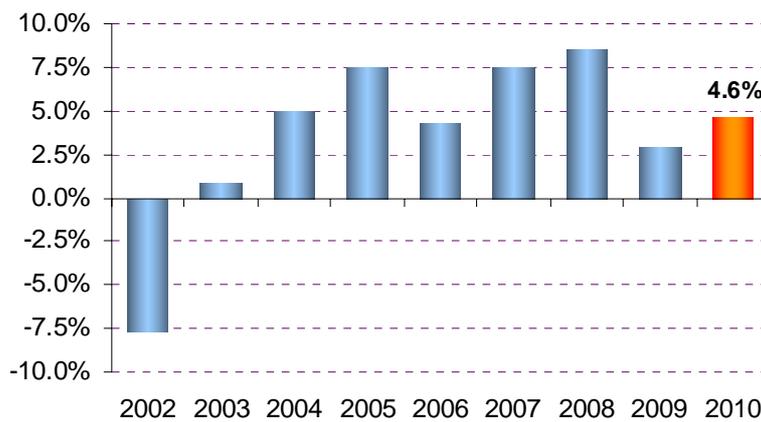
After the deepening of the crisis, macroeconomic forecasts of GDP, prices and manufacturing growth in Argentina and Brazil were significantly revised downwards. To the extent that Uruguayan economic growth is very closely linked to that of the two main partners (Argentina and Brazil), downward revisions in forecasts of these economies implied similar reductions in forecasts for the country's economic growth, and in particular for the manufacturing sector, where there is a strong trade link with the MERCOSUR area. Indeed, the manufacturing sector experienced a decline of 3.8% in 2009, after six years of impressive growth, averaging 13%.

---

\* CINVE – Centro de Investigaciones Económicas

<sup>^</sup> Departamento de Economía, Facultad de Ciencias Sociales, Universidad de la República

**Figure 1. Uruguay: Real GDP growth (% annual)**



Source: BCU, forecasts by CINVE.

As a consequence of the reversal of the economic cycle, in the first months of 2009 government revenues have shown a shortfall and the fiscal deficit has significantly expanded. While government projections before the beginning of the crisis situated the fiscal deficit in -0.4% of GDP for 2009, the fiscal deficit finally reached 2.1% of GDP

The declining growth has potential negative implications for incomes, employment and investment. This study uses a computable general equilibrium (CGE) model to analyze the impact of the financial and economic crisis in Uruguay and alternative policy options.

Up to now we have worked in discussing and defining the relevant scenarios and estimating the shocks to the model (crisis and policy respond shocks); and in introducing unemployment and calibrating the model. We are now working on running the simulations. This draft mainly intends to present our discussions and definitions of data and simulations, and does not present results yet.

This second draft is divided into the following sections. Section 2 describes the channels of transmission of the global crisis in Uruguay. Section 3 presents some possible crisis scenarios for Uruguay. Section 4 describes possible simulations of policy responses to the crisis. Section 5 briefly describes the model and data set, and the simulations carried out. Section 6 presents some first results and section 7 concludes.

## 2. Main channels of transmission of the global crisis

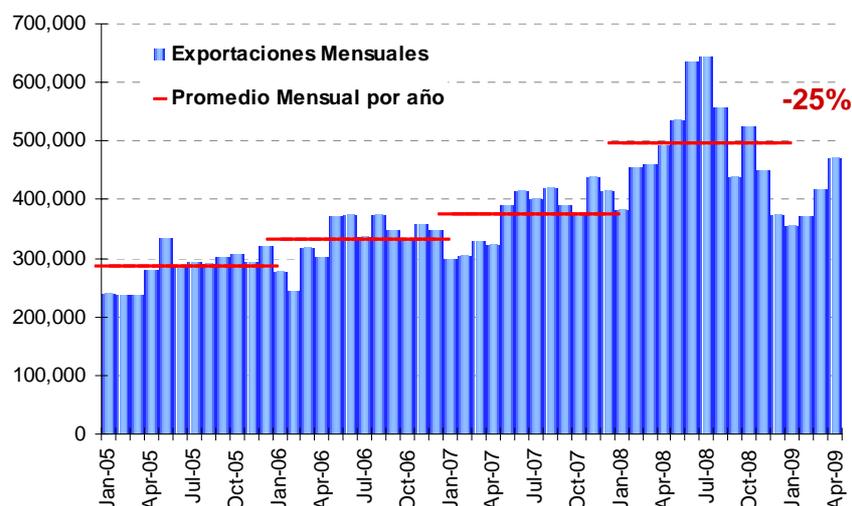
The most relevant channels through which the effects of the international crisis were transmitted to the Uruguayan economy can be divided into two groups: those related to the trade sector; and those associated with the flows of external financing (FDI and portfolio investment).

### *2.1 Trade Sector*

The first channel of transmission of the crisis to our economy is that related to the effects on exports, via a decline in global demand and via the reduction of prices of key export commodities.

Although 2008 ended up with the highest records of exports of goods, the upward trend of Uruguayan exports since the beginning of 2003 (first driven by the real depreciation of 2002 and then by increasing international commodity prices) reversed sharply during the second half of 2008. With the deepening of the international crisis, the decrease in world and regional demand and the fall of commodity prices had a strong impact on Uruguayan exports. Between July and December 2008, commodity prices fell by 32%, while in the same period Uruguayan exports fell by 18% (in US dollars) and 8% (in volume). The decrease in the value of exports reached 25% between July 2008 and April 2009 (see Figure 2).

**Figure 2. Exports (monthly values and annual averages in US dollars)**



Source: CINVE, based on data of the Uruguay Central Bank (BCU).

Regarding the trade sector, Uruguay is a small open economy with relatively low protection levels and integrated to MERCOSUR (see Table 1). The country has strong comparative advantages in agriculture and food products and is highly dependent on imports of intermediate inputs.

Before the 2002 financial crisis that followed de sharp currency devaluation in Brazil and Argentina and led the Uruguayan economy into a strong recession, almost half of Uruguayan exports were concentrated into the MERCOSUR area. That situation strongly reversed after the 2002 crisis, and by 2008, MERCOSUR concentrated 36% of exports (Figure 3). The other important partner is the European Union (EU), with more than 20% of exports. It is important to notice, however, that although MERCOSUR has strongly decreased its importance, it continues being the main trade partner of the economy. Moreover, exports of services (which averaged 25% of total exports in the last six years, and include mainly tourism and logistic services) are very highly concentrated in Argentina and Brazil.

On the other hand, Uruguayan exports are highly concentrated in agriculture and food products. Meat, cereals (rice and wheat), dairy products, wood and vegetable oils concentrate more than half of the total value of exports of goods. Almost 70% of total exports are concentrated in primary products, including, apart from the above mentioned, barley, leather, fish and wool.

While the low income elasticity of our exports (mainly primary and food products) would "ensure" a lower impact on the reduction of world demand on export volumes, there are two indirect associated effects that could result in larger real impacts: first, the impacts of the crisis in the MERCOSUR region - particularly Brazil, the main destination of our exports, and second, the consequences of the crisis on global trade policy decisions in the developed economies. Given the importance of the export sector in our economy, significant reductions in exports would generate a negative impact on the level of activity and employment.

## ***2.2 External Financing (FDI and portfolio investment)***

In the case of external financing, the "flight to quality," behaviour, the reconstruction of global financial institutions and the increasing country risk of emerging economies during the crisis have resulted in significant reversals of financial capital flows into emerging economies, causing severe decreases in portfolio investment, the most volatile category of the capital account of the balance of payments. Furthermore, the recession in the main economies with a consequent fall in aggregate world demand along with the increasing difficulties in access to financing, adversely affected the inflow of capital through foreign direct investment, FDI (most of the Uruguayan capital account).

Table 2 describes the Uruguayan balance of payments. Two relevant aspects can be noted regarding the capital account. First, the significant reversal of portfolio investment recorded since 2008, which shows the quick reaction of these flows to changes in economic and financial conditions. Second, while FDI had shown an impressive growth between 2005 and 2008 (it represented 2.4% of GDP in 2004 and increased up to 5.7% of GDP in 2008), and became one of the most important sources of growth in the last few years, the worsening of financial problems and its transmission to the real sector affected the decisions of FDI, causing stagnation in FDI flows into Uruguay. In 2009, the ratio FDI/GDP declined up to 3.5%.

Decline in FDI would not only be due to the deterioration of the expected rate of return, derived from the fall in aggregate world demand, but also in response to difficulties in access to funding. In this case, the margin of national economic policy would be very limited, being confined to maintain incentives to investment and improve the institutional framework.

In sum, one main negative shock derived from the global crisis is the fall in demand for our exports, and the decline of international prices of key export commodities. The other main negative impact derives from the decline of FDI flows and portfolio investment into our country, which could generate not only

a problem of external financing but would also mean a fall in investment levels that could affect the potential long run growth rate of the economy.

### **3. Scenarios on the magnitude of the change in the trend due to the global crisis**

With the aim of analyzing the effects of the world economic and financial crisis in Uruguay we simulate the two main channels through which the crisis has affected the Uruguayan economy: the trade and the external financing channel.

In order to analyze how the financial crisis affected exports and the economy in Uruguay, we first identified the main export sectors. They are 19 sectors, which account for 87 percent of exports at the benchmark. Three of these sectors are services. Between the first half of 2008 and the first half of 2009, exports of most of these sectors experienced a decline. In some of them the decline was very important –such as leather products, wood products, textiles, meat or refined oil-.

The fall in exports measured in current prices can be explained by two phenomena: a fall in prices or a fall in quantities (demand). In order to disentangle these two effects, we analyzed the evolution of prices during this time period. In the case of commodities, we took the price variation reported by the IMF; while in the case of industrial goods, we took the exports price index reported by the Uruguay Chamber of Industry (CIU). Dairy food prices were taken from USDA.

IMF reports prices at a disaggregated level, while some of the sectors included in our SAM are composed by several different products. In these cases, in order to compute the price change for the whole sector, we estimated the weighted average price change of the different products that are included in each sector.

As expected, most commodity prices fell during the period of analysis. However, for some sectors even though exports fell, prices actually increased. Therefore, we may expect a quantity shock in this case. This is the case of most industrial sectors. Last, given the specific nature of service sector, there are no estimations of export prices of services. In order to estimate the negative shock on service sectors due to the financial crisis, we assume the adjusted by real exchange rate variation in exports reported in the balance of payments is mainly a quantity variation.

In sum, we simulate the export transmission channel of the crisis on 19 sectors of the economy. While in some sectors we will simulate a negative export price shock, in others we will simulate a negative demand shock. Given that the ratio between exports and final global demand experienced only a minor change between 2005 (our base year) and 2008, we did not rescale the shocks.<sup>1</sup> Table 3 shows the specific variable variation in each sector.

However, not only did the main world prices of export product fell during the crisis, but also world price of some of the most important imported products by Uruguay, such as oil. Therefore, in this first trade shock scenario, we also simulated a fall in import prices in 9 sectors, presented in table 4. Data was taken from IMF and Bureau of Labor Statistics (US).

Regarding the external financing channel, we simulate the shock in FDI and portfolio investment via a negative shock in the rest of the world's savings. The magnitude of the shock is estimated in proportion to total investment. Table 5 shows the ratio between external financing and total investment between 2005 and 2009. In 2005 (our base dataset year) external financing represented a low proportion of total investment (1.4%). However, up to 2008, external savings financed a high proportion of investment, reaching 25%. After the crisis Uruguay faced restrictions in external financing, resulting in a current account surplus (or negative external savings), that represented 4.6% of total investment in 2009. Foreign direct investment (the most important and structural part of capital

---

<sup>1</sup> The ratio Exports/Final Demand was 23.6% and 21.4% in 2005 and 2008, respectively.

inflows) declined in 48% between June 2008 and June 2009. We choose to simulate this shock via an equivalent reduction on foreign savings.

#### **4. Policy response simulations in Uruguay**

The main constraint for policy response lies in the fiscal balance and the financial government program for the short and medium run. Despite the deterioration of fiscal performance in the last two years, the financial situation of the public sector does not appear as a significant source of vulnerability in the short term. The ratio gross public debt to GDP has decreased considerably in the last four years, now being around 50% (in 2002 it was 100% of GDP). A proper management of the public debt in recent years has helped clear the concentration of maturities in the short term, so for the next two years the government has nearly covered its financing needs. So, in practice, the government has allowed an increase in public deficit rather than cutting government spending (which would have implied a pro cyclical response).

Some policy responses that have been considered in the Uruguayan case include very specific trade and sectoral measures.

Regarding trade policy, the main policy measure was to provide extra funding and support for exporters, and increase tax payments in advance for imports. These measures mainly implied some short run financial benefits/restrictions (for exports and imports, respectively), and we did not include them in our policy response scenario<sup>2</sup>.

The main response was to allow an increase in government spending, allowing a broader fiscal deficit. Public consumption and investment increased 11% and 20% respectively, implying a clear countercyclical movement. Fiscal specific

---

<sup>2</sup> Some of the measures were: a) Implementation of payments in advance of the IRAE for imports, and an increase from 4% to 8% of the this payment for importers of certain consumer goods such as clothing and footwear.; b) Increase from 1.78% to 2.78% of the rate of pre-financing of exports. Preferential rates were maintained for pre-financing of exports of textiles, and extended to the leather factory sector and the vehicles sector.

measures included tax benefits, specially directed to protect investment in some particular economic activities, and some to compensate for general profit fall (see CEPAL, 2009)<sup>3</sup>. So regarding fiscal policy, we choose to simulate a scenario contemplating an increase in public spending allowing a broader fiscal deficit.

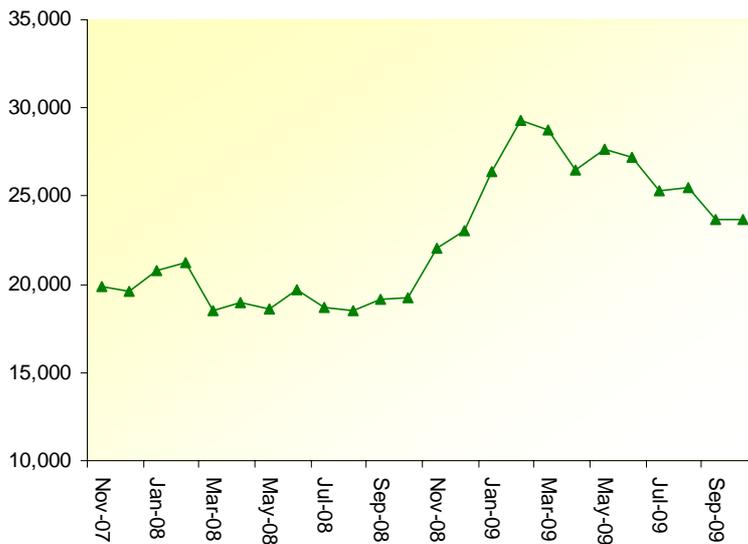
Finally, it has to be mentioned that since 2005, Uruguay has re installed a system of collective wage bargaining. Wage negotiations are achieved between workers and enterprises of each sector of activity, with the government acting as a moderator. This system introduces some wage rigidity that has to be accounted for in the model.

In addition, some “automatic devices” are turned on in downward economic cycles, as unemployment insurance. Although most up to 2005 studies indicate a relatively low coverage of unemployment insurance in Uruguay, formal employment has increased considerably during the last four years, mainly due to the re installation of collective wage bargaining. So, reasonably, unemployment coverage is expected to act as a compensatory policy for a larger proportion of workers than it did in past years. Furthermore, as a compensatory policy to the crisis, the government temporarily extended the period of coverage of the unemployment insurance. The observed facts for Uruguay indicate a rise in unemployment insurance requests and in unemployment coverage during the crisis climax (September, 2008 – March, 2009). Up to the end of 2009, the number of workers covered by the unemployment insurance was still higher than prior to the crisis (See Figure 3).

---

<sup>3</sup> The main adopted measures were the following: a) exemption of the Direct Income Tax on the Economic Activities (IRAE) for energy equipment manufacturing; b) expenses related to innovation projects were allowed to be deducted for one and a half times their actual value, for the effects of the payment of IRAE and c) Implementation of VAT rebates on imported inputs for equipment manufacturing and VAT exemption for national purchases of that equipment. These measures would affect a very small proportion of global economic activity.

**Figure 3. Workers covered by unemployment insurance.**



Source: BPS, Uruguay

In order to capture the effect of the unemployment insurance in the model, it is necessary to separate specific unemployment insurance transfers (from global government transfers) and to calibrate the share of the total unemployed (by type of household) that effectively receive the transfer with data from the National Household Survey. We would have to introduce modifications in government spending and household income equations, changing and recalibrating the model. As in the context of this work we are using the standard version of the PEP Model by Decaluwe et al (2009) (introducing some changes listed below) we did not introduce this fact in the model, but could be an extension in future work.

## **5. Model and dataset**

We will use a 2005 SAM based on the last recently published Tables of Supply and Use (2005). The SAM has 55 activities, 3 types of labour according to formal education, and capital. We consider agricultural labour to be sector-specific (in the three categories of formal education). Households are disaggregated into five types according to quintiles of household income. The main sources of data are the tables of supply and use 2005 (BCU), National Household Survey (NHS -INE) and the last Income and Consumption Survey (2006). The

dissaggregation of the SAM allows us to introduce specific price and demand shocks in the main export oriented goods and service sectors, as described in the previous section. We adapted the 2005 SAM to the model requirements, mainly simplifying some accounts (as taxes).

We use the PEP standard model (Decaluwé et al (2009)), introducing a modification in order to consider some rigidity in the labour market. We introduced unemployment on each labour market, using the concept of the wage curve developed by Blanchflower and Oswald, 1995. Wage elasticities to unemployment are taken from Bucheli and Gonzalez (2007) who provide empirical estimates for Uruguay. Estimates indicate that there is not a significant effect of unemployment on wages for skilled workers (estimated elasticity is -0,034). However, a similar wage curve relation exists for unskilled and semiskilled workers. The estimated elasticity is a little higher for unskilled workers (-0,145) than the one estimated for semiskilled workers (-0,139).

Regarding factor substitutability, we assume producers have a low flexibility to adjust to the shock by changing the composition of their labour force in the very short term, due to adjustment costs. Therefore, we are using low values of elasticities of substitution between different types of labour and capital. We take estimations of elasticities of substitution between labour and capital for Uruguay from Cassoni (1998). The range of variation of this elasticity is estimated in 0.3 -1, and we are taking a value close to the lower bound (0.5). We assume capital is sector specific and labour is mobile across sectors.

Armington elasticities are taken from Flores (2008), and household income elasticities are taken from González (2003). We further intend to do sensitivity analysis regarding trade elasticities and elasticities of substitution between factors.

Regarding the savings and investment balance a savings driven closure was adopted. Real investment is endogenous and follows available savings. The trade balance is exogenous and the real exchange rate is the equilibrating variable. Finally, regarding government balance, we assume real government

consumption and tax rates are fixed, so savings equilibrate government accounts. This implies a change to the PEP model, as we assumed government consumption of each commodity in real terms is fixed, instead of taking total government spending as fixed.

Taking into account the relevant scenarios for Uruguay, we carried out the following simulations:

<i>Name scenario</i>	<i>Scenario</i>	<i>Variable</i>
<i>Crisis shocks</i>		
1. Trade	Export price or export demand reduction in 19 export sectors	PWX or EXD
	Import price fall in 9 importing sectors	PWM
2. Finance (External financing restriction)	48% reduction in external financing	CAB
3. Crisis	The two above combined	
<i>Policy respond shocks</i>		
Crisis + Pub Spend	11% increase in real public consumption of commodities	CG

## **6. First Results**

Table 6 shows the results obtained for the main macroeconomic aggregates, in all the simulations carried out. The full crisis scenario gives a one percent decrease of real GDP, entirely explained because of exports decline. When we allow an increase of 11% in real government consumption GDP falls by 0.7% in real terms, implying more consumption and less real investment and exports. In the crisis and the crisis + public spending scenarios the nominal share of exports and imports in terms of GDP falls between 4.5-5 percentage points. In these scenarios real consumption and investment increase, due to fall in prices. As expected, exports fall significantly in the trade and the full crisis simulation in all export oriented sectors (Tables 7 and 8). Most affected exports in the full crisis scenario are dairy products (-32%): beverages from barley and wood (-29% each); textiles (-22%) electronic machinery (-19%) and passenger transport and cargo shipping (-19%). Obviously these are the most affected sectors in terms of production (Tables 9 and 10).

As a consequence in the full crisis simulation labour demand falls in all aggregate sectors of activity except those oriented primarily to the domestic market (electricity, gas and water; manufactures other than food; and social services, table 11). When we allow government spending to increase, labour demand obviously shows a significant growth in public and social services and little variation in the case of primary and food manufactures sectors (respect to the crisis scenario). In contrast, labour demand increases much less in construction and electricity and other manufactures, because of the fall in government savings and its consequent impact on investment.

Labour demand falls in unskilled and semiskilled labour, but unskilled labour in agriculture is the most affected by the full crisis. This feature is not reverted by the countercyclical fiscal policy. Wage rates (in terms of nominal exchange rate) fall in all types of labour in the crisis scenario especially agriculture and skilled non agriculture labour (Table 12). Countercyclical fiscal policy does revert the fall in skilled labour wages. In the crisis + public spending scenario, skilled non agriculture wages increase nearly 5%. In this way, countercyclical fiscal policy (increasing government consumption) clearly benefits urban, skilled labour, as government services are skilled biased.

Unemployment also increases in semi skilled and unskilled types of labour, but unskilled labour in agriculture is the most affected. In the crisis scenario an increase in 4.7 percentage points in the specific unemployment rate is estimated, and remains practically unchanged in the public spending scenario. In contrast, the countercyclical policy lowers the increase in unemployment rates between semi skilled non agriculture workers in one percentage point, with respect to the crisis scenario.

In spite of the increase in unemployment and the fall in wages (in terms of nominal exchange rate), real consumption increases in all types of households in the crisis scenario (Table 13). This is due to the sharp fall in consumption prices. This result is influenced to the way the simulated export and import price shocks are translated into domestic prices, which in turn depends on the way

we are modeling export and import demand (and elasticities used). In the next section we make some considerations at this respect.

## **7. Conclusions and further steps**

Our simulation results show the crisis would have had mild effects on GDP, basically explained by the export reduction. The policy response to the crisis based on increasing government consumption would have a modest impact in GDP reduction, and would primarily benefit skilled urban workers. Note that we are not considering up to now an increase in transfers, fact that could modify this results.

Also, our simulations give rise to a very large shock in domestic prices. Although the export and import price shock was indeed large, the transmission to domestic prices is influenced by the modeling of export and import demand and elasticities used. Other simulations changing some assumptions and sensitivity analysis of demand elasticities yet need to be done.

Even though the scenarios simulated provide a first insight of the effects of the global crisis on the Uruguayan economy, there are some improvements that could be introduced in the model and in the simulation strategy in order to better capture the effects and to distinguish between short term and long term impacts. All these following facts are currently being incorporated to the model / simulations and will be reported in the final version of the paper.

1. Scenarios simulated. The shocks simulated are based on real variations in international prices and foreign demand, but they could be considered a short term shock. We can introduce a "medium term" shock allowing these changes to be milder, for example, by reducing them to half.
2. Closure of the model. In the current version, the current account balance is fixed. However, this could be considered a long (or medium) term closure for the model. If we want to evaluate the crisis shock in the short run, we could change the closure, fixing the real exchange rate and allowing imbalances in the current account (as it actually happened).

3. Small country assumption. In the model, we consider CET functions for export supply and import demand. This hypothesis may be valid for some Uruguayan products, however, for some other sectors it would be better to assume a infinitely elastic export demand from the rest of the world (small country assumption).
4. Capital mobility across sectors. In this version of the model, capital is specific to sectors. In order to simulate a long term effects of the financial crisis on the economy, we should let capital be mobile across sectors, to allow a reallocation of the factor and a stronger sectoral restructure. Also, factor substitution elasticities may be increased when simulating a medium or long term response to the shock.

## **8. References**

- Blanchflower, D. and A. Oswald (1995). *An introduction to the Wage Curve*. The Journal of Economic Perspectives. Volume 9, Issue 3 pp. 153-167.
- Bucheli M. and C. González (2007) *An Estimation of the Wage Curve for Uruguay*, Departamento de Economía de la Facultad de Ciencias Sociales,
- Cassoni, A. (1998) Estimaciones econométricas de elasticidades de sustitución entre factores de producción. En: Impacto de la Apertura Comercial del MERCOSUR sobre el mercado de trabajo uruguayo. Documento N° 4. CINVE - GEOPS
- CEPAL (2009): *La reacción de los gobiernos de las Américas frente a la crisis internacional: una presentación sintética de las medidas de política anunciadas hasta el 31 de agosto de 2009*.
- Decaluwe B. Lemelin, A. Maissonave, H. Robichaud, V. (2009): *PEP-1-1 Standard Model Single Country, Static Version (Revised Edition)*.
- Flores, M (2008). *Elasticidades de Armington: Discusión teórico-metodológica y estimaciones para Uruguay*. (Licenciatura en Economía), UDELAR - Universidad de la República - Facultad de Ciencias Económicas.
- González, V. (2003). *La expansión del mercado interno vía la redistribución de los ingresos: un ejercicio de simulación para la economía uruguaya*. Licenciatura en Economía), UDELAR - Universidad de la República - Facultad de Ciencias Económicas

## Annex- Tables

Table 1. Uruguay. Trade and openness indicators

	1991	1995	1999	2001	2005	2008
Real Trade Openness [1] (%)	58,5	75,4	82,1	81,4	91,7	101,6
Intra-MERCOSUR average tariff protection	12,9	2,0	0,5	0,0	0,1	0,1
Extra-MERCOSUR average tariff protection	21,4	9,5	11,9	11,9	9,2	9,1
% Intra Mercosur trade in total trade	39,2	46,3	44,1	42,8	33,0	36,2

[1](Exports + Imports)/GDP (in real terms)

Source: dEcon, based on BCU, Secretaría del MERCOSUR and ALADI

Table 2. Uruguay: Balance of payments and GDP (in millions of USD)

	2004	2005	2006	2007	2008	2009
<b>Current Account</b>	3	42	-392	-220	-1510	259
Exports	4257	5085	5787	6933	9294	8551
Goods (FOB)	3145	3774	4400	5100	7083	6389
Services	1112	1311	1387	1833	2210	2162
Imports	3778	4693	5877	6775	10227	7755
Goods (FOB)	2992	3753	4898	5645	8811	6664
Services	786	939	979	1130	1415	1091
Net Rent and Transfers	-475	-350	-302	-378	-576	-537
<b>Capital Account</b>	72	752	528	1505	2816	1529
Foreign Direct Investment	315	811	1495	1240	1839	1126
Portfolio Investment	-422	806	1686	1151	-574	-738
Other Investment	180	-865	-2653	-885	1551	1141
<b>Errors &amp; Omissions</b>	379	-174	-152	-279	926	-199
<b>Reserves</b>	-454	-620	15	-1005	-2232	-1588
<b>GDP</b>	13268	17398	20064	24302	32193	32146
<b>Ratio CA/GDP</b>	0.0%	0.2%	-2.0%	-0.9%	-4.7%	0.8%
<b>Ratio FDI/GDP</b>	2.4%	4.7%	7.4%	5.1%	5.7%	3.5%

Source: BCU

**Table 3. Export variation, share in total exports and simulated shock for the 19 most important export sectors.**

SAM Sector (CIU Rev 3)	Description	Share in total exports at benchmark	Var exports, Jan-June 2008/Jan- June 2009 (in %)	Shock (percentage variation)	Type of shock
D.1511.0	Meat processing	19.23	-28.53	-3.1	Price
I.RRTT.0	Passenger transport and cargo shipping	9.80	n/d	-9.8 (1)	Quantity
D.23TT.0	Oil refinery	6.41	-46.18	-52.2	Price
D.191T.0	Leather products	5.24	-41.77	-15.9	Price
D.1520.0	Dairy products	5.23	-19.42	-51.9	Price
D.154S.0	Other food industry	4.99	44.32	-8.2	Price
J.TTTT.0	Financial services	4.77	n/d	-9.8 (1)	Quantity
D.1531.1	Rice processing	4.24	35.75	-19.6	Price
D.171T.0	Textiles	3.88	-34.72	-38.9	Price
A.0111.9	Cereals and other primary	3.24	18.09	-29.3	Price
D.25TT.0	Rubber and plastic	2.97	-12.86	-7.7	Quantity
D.1512.0	Fish products	2.91	3.34	-6.7	Price
D.RRTT.0	Metal products and machinery	2.82	-18.36	-17.0	Quantity
D.24UT.0	Basic Chemicals	2.81	-26.86	-22.5	Quantity
K.RRTT.0	Services to enterprises	2.41	n/d	-9.8 (1)	Quantity
D.20TT.0	Wood products	1.83	-48.49	-51.4	Quantity
D.SSTT.0	Electronic machinery	1.64	-34.70	-38.0	Quantity
D.1553.0	Barley	1.59	17.54	-46.0	Price
A.0113.0	Fruit	1.50	-8.75	-31.2	Price

Source: Base on data from IMF; UNDSA; CIU; BCU.

**Table 4. Share in total imports and simulated shock for the 9 most important import sectors**

SAM sector	Description	Share of imports at benchmark, in percentage	Shock (percentage variation)	Type of shock
C.TTTT.0	Crude petroleum and natural gas	18.03	-49.3	Price
D.23TT.0	Coke, refined petroleum products and nuclear fuel	4.2	-52.3	Price
D.24RT.0	fertilizers and nitrogen compounds	3.34	-15.1	Price
D.24ST.0	pharmaceuticals, medicinal chemicals and botanical products	2.3	-15.1	Price
D.24UT.0	Basic chemicals	11.34	-15.1	Price
D.25TT.0	Rubber and plastic products	2.81	-46.3	Price
D.RRTT.0	Metal products; machinery and equipment	19.1	-45.8	Price
I.RRTT.0	Other transport	5.67	-0.3	Price
D.SSTT.0	Motor vehicles	6.18	-52.3	Price

Source: Based on data from IMF; BLS.

**Table 5 Total investment and external savings**

	2005	2006	2007	2008	2009
Total Investment (mill USD)	3079	3840	4648	7082	5650
Rest of the World's Savings (-CAB)	42	392	220	1510	-259
Ratio SROW/Investment	1.4%	10.2%	4.7%	21.3%	-4.6%

Source: BCU

**Table 6. Results: Macro aggregates**

	Scenarios				
	Base	Trade	Finance	Crisis	Crisis + PubSpend
	<i>% change w.r.t. base (real)</i>				
GDP		-0.8	-2.6	-1.0	-0.7
Private Consumption		3.5	-3.1	3.2	3.5
Fixed Investment		14.6	-10.4	12.9	7.0
Government Consumption		0.0	0.0	0.0	11.0
Exports		-4.7	1.3	-4.5	-5.0
Imports		14.5	-7.0	13.8	13.4
	<i>p.p. change w.r.t base (nominal share of GDP)</i>				
Private Consumption	71.7	0.1	0.4	0.1	0.0
Fixed Investment	16.5	0.1	-0.9	-0.1	-1.3
Government Consumption	10.9	-0.1	0.3	-0.1	1.3
Exports	26.9	-4.7	1.3	-4.5	-5.0
Imports	27.2	-4.6	1.1	-4.6	-5.1

**Table 7. Exports. % change w.r.t base (volume)- Aggregated Sectors**

Sectors	Scenarios			
	Trade	Finance	Crisis	Crisis + PubSpend
Primary	-5.5	1.1	-5.5	-5.8
Manufactures-Food	-4.2	2.2	-4.0	-4.4
Manufactures-Others	-7.6	-3.2	-7.4	-8.2
Electricity & Construction	2.9	3.5	3.2	2.1
Transport & Services	-9.4	-10.4	-9.1	-10.3

**Table 8. Exports change w.r.t base (volume) - All export Sectors**

Sector	Trade	Finance	Crisis	Crisis + PubSpend
Rice	6.7	1.2	6.8	6.5
Other cereals	-8.9	0.8	-8.9	-9.3
Vegatables	11.7	-5.1	11.3	12.8
Fruit	-13.7	0.6	-13.6	-13.7
Livestock	2.6	1.3	2.7	2.5
Poultry	3.7	0.8	3.8	3.9
Forestry	4.0	2.2	4.1	3.8
Fishing	5.8	3.4	6.1	5.4
Mining	8.0	2.4	8.3	7.8
Meat processing	2.2	2.0	2.4	2.0
Fish products	-0.2	3.2	0.1	-0.5
Other food industry	4.0	2.3	4.2	3.7
Vegetable oils	6.5	1.5	6.7	6.6
Dairy products	-32.9	2.4	-32.7	-33.0
Rice processing	-5.4	2.5	-5.1	-5.7
Mills	7.6	0.6	7.8	8.5
Animal food	4.2	1.8	4.4	4.6
Bread and pasta	5.1	0.7	5.2	5.3
Sugar	-1.2	1.7	-1.1	-1.5
Wine	3.4	0.5	3.6	3.5
Beverages from barley	-29.1	3.5	-28.8	-29.2
Other beverages	4.7	1.5	4.8	4.3
Tobacco	7.0	1.9	7.2	6.7
Basic textiles	-22.0	3.0	-21.9	-22.5
Other textiles	8.7	1.7	8.9	8.0
Clothing	2.1	1.5	2.3	1.9
Leather products	-10.1	4.8	-9.7	-10.7
Footwear	6.1	-7.9	5.6	7.8
Wood	-29.2	-31.2	-29.1	-29.9
Paper	7.3	2.7	7.6	6.9
Press	2.5	1.7	2.7	2.0
Oil refinery	-9.7	-0.4	-9.6	-10.1
Plaguicides	11.4	-0.4	11.5	11.0
Laboratories	8.9	3.7	9.3	7.9
Basic Chemicals	-4.3	-11.7	-4.1	-5.0
Rubber and plastic	-0.2	-2.6	0.0	-1.0
Mineral products	18.8	-1.8	18.6	15.9
Metal products and machinery	4.0	-8.2	4.0	2.5
Electronic machinery	-18.0	-27.1	-17.8	-19.0
Other manufactures	8.7	-1.4	8.7	7.9
Electricity, gas and water	2.9	3.5	3.2	2.1
Commerce	1.5	1.5	1.6	0.7
Hotels and restaurants	2.2	0.8	2.3	2.1
Other transport	7.7	0.7	7.8	7.5
Passenger transport and cargo shipping	-18.7	-21.6	-18.5	-19.3
Comunications	1.7	3.3	1.9	0.8
Financial Services	-0.9	1.9	-0.6	-2.0
Real estate	0.4	6.3	0.8	-0.1
Services to enterprises	0.0	1.3	0.2	-2.5
Public services	1.6	3.1	1.8	5.8
Other services	2.2	1.7	2.4	1.8

**Table 9. Production % change w.r.t base (volumes). Aggregated Sectors**

Sectors	Scenarios			
	Trade	Finance	Crisis	Crisis + PubSpend
Primary	-1.5	-0.7	-1.6	-1.5
Manufactures-Food	-1.8	0.4	-1.7	-1.6
Manufactures-Others	2.0	-4.6	1.9	1.2
Electricity & Construction	4.7	-6.1	3.8	0.8
Transport & Services	-2.5	-2.4	-2.6	-3.0
Public Services	0.1	-0.7	0.0	8.1
Social Services	1.2	-2.0	1.1	4.4

**Table 10. Production % change w.r.t base (volumes) – All Sectors**

	Trade	Finance	Crisis	Crisis + PubSpend
Rice	-3.0	1.4	-2.9	-3.2
Other cereals	-1.3	-1.6	-1.5	-2.2
Vegatables	13.5	-11.0	12.6	15.8
Fruit	-5.8	-1.7	-6.0	-5.6
Dairy	-16.6	-0.3	-16.7	-16.5
Livestock	0.6	0.4	0.6	0.5
Poultry	2.2	-1.6	2.1	2.8
Forestry	1.7	-1.1	1.7	1.7
Fishing	2.0	2.0	2.2	1.7
Mining	-6.8	0.1	-6.8	-7.2
Meat processing	2.2	0.7	2.3	2.2
Fish products	0.1	2.5	0.3	-0.1
Other food industry	3.4	-0.6	3.5	3.7
Vegetable oils	6.7	-1.6	6.7	7.5
Dairy products	-19.6	0.5	-19.6	-19.5
Rice processing	-4.5	2.0	-4.3	-4.8
Mills	5.8	-2.8	5.7	7.1
Animal food	1.4	-0.9	1.4	2.2
Bread and pasta	4.0	-3.1	3.8	4.8
Sugar	-0.5	0.7	-0.5	-0.6
Wine	2.9	-3.9	2.7	3.6
Beverages from barley	-24.4	2.6	-24.2	-24.3
Other beverages	3.9	-3.0	3.7	4.1
Tobacco	6.9	-1.1	6.9	7.0
Basic textiles	-16.8	2.1	-16.7	-17.2
Other textiles	9.8	-0.6	9.8	9.2
Clothing	1.6	-1.8	1.5	1.9
Leather products	-9.6	4.5	-9.2	-10.2
Footwear	7.1	-15.1	6.0	10.4
Wood	-16.1	-21.7	-16.3	-17.5
Paper	6.8	0.9	7.0	6.8
Press	0.6	-2.0	0.5	0.8
Oil refinery	7.2	-3.3	7.1	7.0
Plaguicides	9.2	-3.0	9.1	9.0
Laboratories	9.0	1.7	9.2	8.7
Basic Chemicals	0.6	-9.3	0.7	0.0
Rubber and plastic	-2.9	-3.0	-2.8	-3.6
Mineral products	17.4	-6.7	16.4	12.7
Metal products and machinery	9.3	-7.9	8.7	6.6
Electronic machinery	-10.7	-24.5	-10.8	-12.1
Other manufactures	8.8	-5.3	8.5	7.9
Electricity, gas and water	1.3	-1.6	1.2	1.6
Construction	5.8	-7.7	4.6	0.6
Commerce	-6.6	-0.7	-6.8	-7.9
Hotels and restaurants	1.4	-3.7	1.2	1.8
Other transport	6.5	-3.1	6.3	6.7
Passenger transport and cargo shipping	-15.9	-14.2	-15.8	-16.4
Comunications	0.6	-1.9	0.4	0.5
Financial Services	-0.1	-1.2	-0.2	-0.3
Real estate	0.1	-0.3	0.0	0.1
Services to enterprises	-0.3	-2.3	-0.5	-2.3
Public services	0.1	-0.7	0.0	8.1
Education	0.5	-0.9	0.4	7.1
Health	1.7	-1.8	1.6	5.0
Other services	1.1	-2.9	0.9	1.5
Services to households	0.7	-5.1	0.4	1.5

**Table 11. Labour demand by sector and skill % change w.r.t base (real)**

	Trade	Finance	Crisis	Crisis + PubSpend
<b>Primary</b>	<b>-2.9</b>	<b>-1.1</b>	<b>-3.1</b>	<b>-2.8</b>
Skilled labor, agriculture	0.0	0.0	0.0	0.0
Semi-skilled labor, agriculture	-1.3	-1.7	-1.5	-1.1
Unskilled labor, agriculture	-4.0	-1.3	-4.2	-3.9
Skilled labor, non agriculture	-1.4	8.1	-0.8	-4.6
Semi-skilled labor, non agriculture	-2.5	2.6	-2.3	-3.1
Unskilled labor, non agriculture	-4.6	2.3	-4.3	-4.7
<b>Manufactures-Food</b>	<b>-5.3</b>	<b>0.7</b>	<b>-5.3</b>	<b>-5.0</b>
Skilled labor	-6.5	5.2	-6.2	-8.7
Semi-skilled labor	-6.5	0.5	-6.5	-6.2
Unskilled labor	-3.5	0.2	-3.5	-2.8
<b>Manufactures-Others</b>	<b>3.50</b>	<b>-9.82</b>	<b>3.10</b>	<b>1.54</b>
Skilled labor	5.55	-4.91	5.51	1.56
Semi-skilled labor	3.74	-10.22	3.28	2.06
Unskilled labor	1.84	-11.66	1.39	0.42
<b>Electricity &amp; Construction</b>	<b>8.2</b>	<b>-10.5</b>	<b>6.7</b>	<b>1.6</b>
Skilled labor	7.7	-5.3	6.7	0.2
Semi-skilled labor	8.5	-10.8	6.9	2.1
Unskilled labor	8.1	-11.4	6.5	1.4
<b>Transport &amp; Services</b>	<b>-4.4</b>	<b>-3.7</b>	<b>-4.7</b>	<b>-5.5</b>
Skilled labor	-2.9	-0.2	-2.9	-6.0
Semi-skilled labor	-4.9	-4.9	-5.2	-5.5
Unskilled labor	-4.8	-4.1	-5.1	-5.1
<b>Public Services</b>	<b>0.1</b>	<b>-0.7</b>	<b>0.0</b>	<b>8.2</b>
Skilled labor	0.2	3.1	0.4	6.1
Semi-skilled labor	0.3	-2.1	0.1	9.1
Unskilled labor	-0.4	-2.2	-0.5	8.9
<b>Social Services</b>	<b>1.4</b>	<b>-2.5</b>	<b>1.2</b>	<b>5.2</b>
Skilled labor	1.4	0.6	1.5	4.8
Semi-skilled labor	1.5	-4.7	1.2	6.2
Unskilled labor	0.8	-5.1	0.5	3.7

**Table 12. Results: Labour market indicators**

Type of labour	Scenarios			
	Trade	Finance	Crisis	Crisis + PubSpend
	<i>Labor demand (% change w.r.t base)</i>			
Semi-skilled labor, agriculture	-1.32	-1.74	-1.47	-1.14
Unskilled labor, agriculture	-4.04	-1.29	-4.18	-3.91
Semi-skilled labor, non agriculture	-1.41	-5.44	-1.81	-0.87
Unskilled labor, non agriculture	-0.23	-6.06	-0.76	-0.57
	<i>Wage rate (% change w.r.t base)</i>			
Skilled labor, agriculture	-2.71	-4.00	-3.08	-2.94
Semi-skilled labor, agriculture	-1.58	-2.06	-1.76	-1.38
Unskilled labor, agriculture	-5.43	-2.03	-5.58	-5.29
Skilled labor, non agriculture	-1.36	-14.38	-2.49	4.87
Semi-skilled labor, non agriculture	-1.51	-5.09	-1.92	-0.96
Unskilled labor, non agriculture	-0.22	-4.74	-0.71	-0.54
	<i>Unemployment rate (p.p change w.r.t base)</i>			
Semi-skilled labor, agriculture	1.5	2.0	1.7	1.3
Unskilled labor, agriculture	4.5	1.4	4.7	4.4
Semi-skilled labor, non agriculture	1.6	6.6	2.1	1.0
Unskilled labor, non agriculture	0.3	7.3	0.9	0.6

Note: The nominal exchange rate is the numeraire

**Table 13. Results: Private Consumption by type of household**

	Scenarios			
	Trade	Finance	Crisis	Crisis + PubSpend
HOG1	1.6	-1.9	1.4	1.2
HOG2	2.5	-2.5	2.3	2.2
HOG3	3.0	-2.6	2.8	2.8
HOG4	3.2	-3.0	3.0	3.2
HOG5	4.4	-3.7	4.2	4.7