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URUGUAY

Selected Issues

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I. URUGUAY: ESTIMATING POTENTIAL OUTPUT AND THE OUTPUT GAP AND THE SPILLOVERS FROM AGRICULTURE[1]

A. Introduction

1.   **Potential output and the output gap are unobservable economic variables, yet they are critical for macroeconomic policymaking.** In the case of fiscal policy, adequate estimates over the magnitude of the output gap help assess the structural fiscal policy stance, and make timely decisions to apply neutral or contra-cyclical policies as needed to ensure sustainable growth and help limit inflation pressures. In the case of monetary policy under inflation targeting regime frameworks, output gaps often feed the central bank's implicit Taylor rules—helping determine the size of the needed adjustment to the monetary policy rate to keep inflation and inflation expectations on track.

2.   **This paper provides estimates of both potential output and the output gap for Uruguay based on a wide range of methods.** The objective of the paper is to provide the authorities with an extensive set of estimates that can help them guide policy implementation, as well as a sense of how robust these are. The paper also presents estimates of the impact of the agricultural activity—a leading sector—on the rest of the economy.

3.   **The main findings of this study are as follows.** First, there is a high degree of consistency among the different techniques applied in terms of the size and direction of the output gap. Second, the results based on univariate filters show some sensitivity to the length of the cycle assumed. Third, following the 2002/03 domestic financial crisis, Uruguay's economy has undergone a substantial transformation, growth has accelerated, and it seems Uruguay is at a higher level of potential output. Four, despite the caveats discussed in the paper about the estimates, the consistency of the results across the different methods could contribute to guide the policy decision making process. Fifth, it seems that the spillovers from the agriculture sector to the rest of the economy are relatively moderate in most cases.

4.   **The rest of this paper is organized as follows:** Section B discusses estimates of potential output and the output gap for Uruguay applying univariate filters. Section C introduces additional economic information and theory to estimate potential output, shedding some light into the discussion of current monetary and fiscal policies. The objective is to take advantage of economic data to disentangle the most recent economic performance by introducing multivariate techniques such as the Kalman filter, the production function, and a Structural Vector Auto-regressive Model. Section D analyses the spillover effects from agriculture to the rest of the economy. Section E concludes with some relevant inputs for policy analysis and decision making.

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[1] Prepared by Manuel Rosales Torres.

B. Potential Output and the Output Gap: Estimates with Univariate Methods

5.   **Policy makers and researches alike measure the position of a country's economy in the business cycle based on estimates of potential output.** Policy advice and decision making tend to rely heavily on unobserved measures of potential output and the output gap. Potential or trend output can be thought as the level of GDP if prices were fully flexible while the output gap represents the cyclical component of actual GDP compared to potential GDP. Potential GDP can also be thought as the level when the economy is at full employment. Furthermore, potential output can be thought as the level of GDP at its long term trend.

6.   **The different univariate techniques presented here rely on GDP time series to estimate the long term or permanent component (potential GDP) and its cyclical portion (the output gap) of the economy rate of growth**. Two types of methods are discussed in this section: i) univariate filters, which include: a) the Hodrick-Prescott filter, b) the Baxter and King filter, and c) the Christiano-Fitzgerald filter; and ii) the piece-wise linear de-trending (Box 1).

7.   **The univariate filters presented here can be classified as two-sided filters.** They are called two-sided because they use historical data as well as GDP estimates. The latter information is included to reduce the well known "*end of the period bias*"—a common statistical caveat of this approach, as estimates of potential output are heavily pulled by the most recent observations in the sample. The data used for this paper is quarterly GDP and the period covered is from Q1 1977 to Q4 2010. To reduce the end of period bias, quarterly projections based on Fund's staff estimates for 2011-2016 are used; the projections are very much in line with consensus for this year and the medium term.

8.   **Results from these methods suggest that Uruguay's potential output is in the range of 2.7 percent and 2.8 percent for the whole sample period.** In addition, all methods suggest that Uruguay has a positive output gap for both 2010 and 2011, where actual output exceeds potential by 0.9 percent and 0.7 percent of potential GDP, respectively. Table 1 summarizes the result of the different methods applied:

- *The HP filter estimates* potential output growth at 6.3 percent and 5.8 percent for 2010 and 2011, respectively. The output gap, which was positive up to 2008, turned negative in 2009 reflecting the spillovers from the global economic recession. With the strong growth recorded in 2010, the output gap became positive once again and for 2011 is estimated at 1.0 percent of potential GDP.

- *The Baxter-King filter,* which yields the highest estimate of potential output among the univariated methods, suggests that trend growth was 6.5 percent and 6.3 percent for 2010 and 2011, respectively. For 2010, the estimated output gap was 0.6 percent and nearly closed by the end of 2011.

- *Under the Christiano-Fitzgerald filter*, trend output growth averaged 6.1 percent for 2010-2011 with a positive output gap close to 1.0 percent in 2010 but, similar to the Baxter –King estimate, starting to close in 2011.

Box 1. Methods to Estimate Potential Output and the Output Gap

There is a wide range of methods to estimate potential output and the output gap. These include: a) univariate methods; b) multivariate methods; and c) economic models such as structural vector autoregressive models. This box describes the basic features of univariate and multivariate filters.

Univariate methods:

- *The Hodrick-Prescott filter* is the most widely used technique to estimate potential output. This method estimates the trend component minimizing the deviations of actual GDP from its trend level. This is achieved imposing a trade-off between the fit of the sample data and the degree of smoothness of the estimated trend output series. In line with the standard practice for quarterly observations, λ is set at 1,600. The higher the penalty λ, the smoother the trend series become as λ reflects the maximum in change allowed in potential growth in two consecutive periods.

- *The Baxter and King filter* is classified as a band pass filter, which removes the slow moving components (trend growth) as well as the high frequency (cyclical) elements while keeping the intermediate components (business cycle) of the GDP series. In this case, the duration of the cycle has to be defined. The standard is to assume that the cycle last between 1.5 and 8 years. If using quarterly data, then the required parameters have to be set at 6 and 32.

- *The Christiano-Fitzgerald* filter is also a band pass filter. In the same way to the Baxter and King filter, it adjusts the business cycle for different frequencies of the cycle over the sample data of actual GDP. In this method, the business cycle is thought as fluctuations of a certain frequency.

- *The piece-wise linear de-trending method* is a technique that can be applied to data than includes structural breaks points in the sample period. The advantage of this technique is that it considers different trends in different subsamples within the time series. In this case, it fits a linear trend through the logs of the quarterly GDP series, which has to be tested for structural breaks applying the Chow breakpoint test and the Quandt-Andrews test

Multivariate methods

The four Kalman filters presented in this paper have an advantage over univariate filters as they incorporate additional economic variables to decompose the permanent and cyclical component (state variables which are not observable) of the actual rate of growth. The Kalman filters estimate trend output and the output gap that are most consistent with observed variables such as inflation, the monetary policy rate, and the rate of unemployment.

Table 1. Uruguay: Potential Output and the Output Gap

	Potential GDP Growth Rate					Output gap	
Univariate Filters	77Q1-11Q1	77Q1-02Q4	03Q1-11Q1	2010	2011	2010	2011
Hodrick-Prescott	2.7	2.2	4.8	6.3	5.8	0.8	1.0
Piece-wise linear de–trending	2.8	2.6	5.9	5.9	5.9	1.2	1.3
Baxter and King	2.8	2.4	5.3	6.5	6.3	0.6	0.2
Christiano-Fitzgerald (1)	2.7	2.2	5.1	5.6	6.5	0.9	0.4
Average univariate filters	**2.8**	**2.3**	**5.3**	**6.1**	**6.1**	**0.9**	**0.7**
	90Q1-11Q1	90Q1-02Q4	03Q1-11Q1	2010	2011	2010	2011
Multivariare Filters							
Kalman & HP	3.2	2.4	4.8	6.2	na	0.9	1.0
Kalman HP & PC	3.3	2.7	4.9	6.8	na	0.5	na
Kalman HP & OL	3.3	2.7	4.6	6.5	na	1.3	na
Kalman HP & IS	3.3	2.7	4.8	6.5	na	0.6	na
Average Kalman filters	**3.3**	**2.6**	**4.8**	**6.5**	**na**	**0.9**	**na**
Structural VAR (B & Q method)	3.4	2.6	5.4	8.0	na	0.2	na
Production Function Approach	1997-2010	1997-2002	2003-2010	2010	2011	2010	2011
Growth accounting	1.9	-2.0	4.3	5.7	5.4	4.9	5.5
VECM	2.3	-1.8	4.9	6.2	5.8	0.8	1.0
Average Production Function:	**2.1**	**-1.9**	**4.6**	**6.0**	**5.6**	**2.8**	**3.2**

Source: IMF staff calculations.

9.   **Changing the sample period does seem to affect slightly the estimates of potential output.** Comparisons are presented here only for the HP filter, but all the methods yield similar results. Compared to the larger sample, estimates using a subsample covering Q1 1987 to Q4 2010 –that is excluding 40 observations, generates estimates of potential output slightly lower. For 2010, potential growth was estimated at 6.1 percent while the output gap was estimated at 0.8 percent.

10.   **Applying a piece-wise linear de-trending method (PWLD) to measure Uruguay's potential output is important given the impact of the 2002 financial crisis on economic activity.** Its advantage over the three previous methods is that the PWLD method considers different trends in different subsamples within the GDP series. The Chow breakpoint test and the Quandt-Andrews test detect a structural breakpoint in Q 2 2002—in line with Uruguay's financial crisis. The PWLD method indicates that before this breakpoint, the economy was growing at a potential annual average of 2.6 percent. After the crisis, potential growth has increased to an annual average of 5.9 percent. Similar to the other methods described above, there was a positive output gap in 2010, which for this method was estimated at 1.2 percent.

Figure 1. Uruguay: Potential Output and the Output Gap, 1977 Q1 – 2011 Q1

Hodric-Prescott Filter
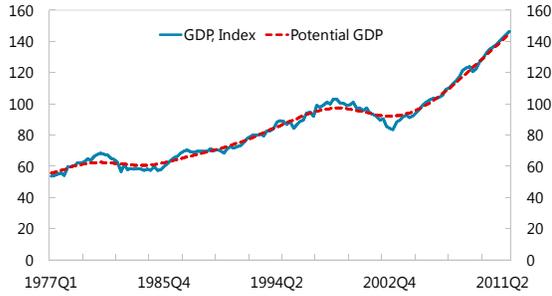
Baxter and King Filter
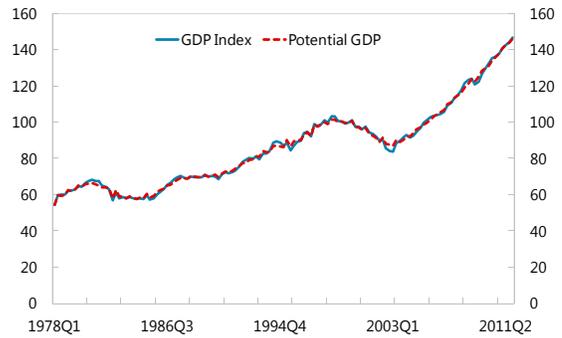
Christiano-Fitzgerald Filter
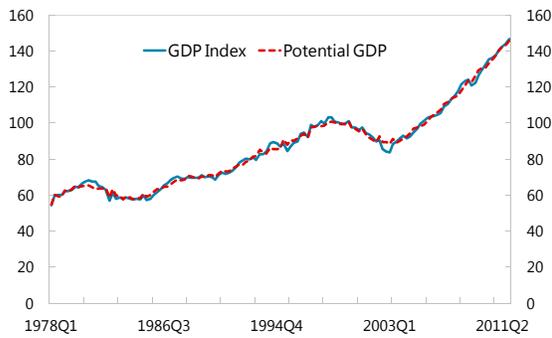
Piece-Wise Linear Detrending
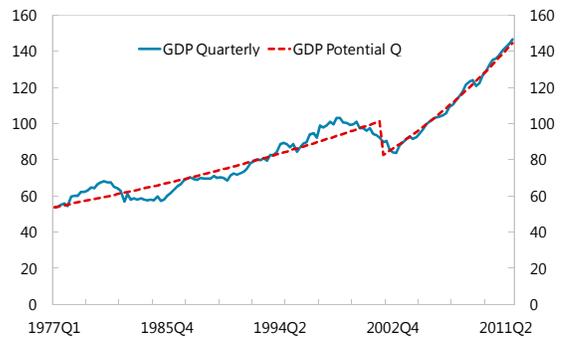
Output Gap: HP Filter and Piece-Wise Linear Detrending
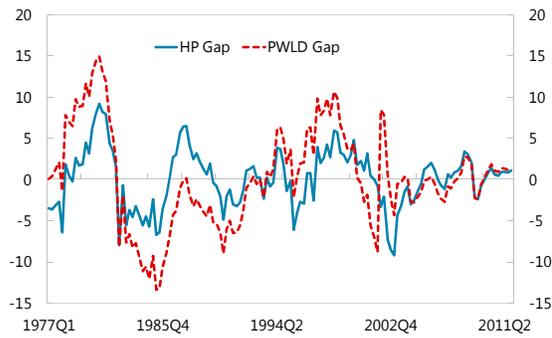
Output Gap: Baxter and King, and Christiano-Fitzgerald Filters
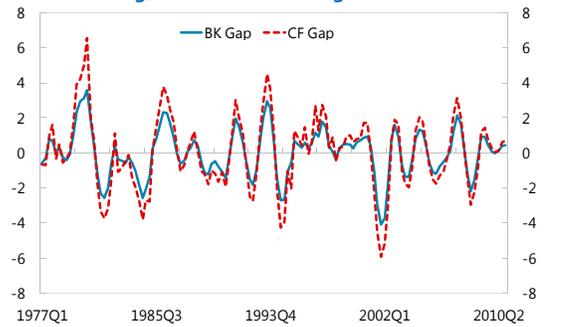
Source: IMF staff calculations.

C. Measuring Potential Output and the Output Gap with Economic Procedures

11.   **Policy advice and decision making based only on statistics methods should be taken with caution given the limitations of such techniques**. The main weakness of the univariate methods is that their estimates of potential output are based solely on the observed GDP series.

12.   **Economic theory can help to overcome such limitations.** Theory tells us that there is a relationship between the output gap and trends in inflation, as well as between the output gap and unemployment. Thus, estimates of potential output and the output gap can be enhanced applying economic procedures which incorporate additional economic variables to decompose the permanent and cyclical component of the actual rate of growth. The economic methods discussed in this section include: i) the Kalman filter, which builds on Fuentes et al (2007), and estimates potential output under four different models; ii) the production function; and iii) an structural vector autoregressive model based on the Blanchard and Quah method. Results are summarized in Table 1.

Kalman Filter-based models

13.   **Potential output and the output gap, under the Kalman filter, are estimated applying four alternative models**.

a.   *Quarterly GDP HP Model.* Model one is a state-space-form model based on the quarterly GDP series which approximates the HP filter. In this case, for 2010, potential output growth was 6.2 percent with an output gap of 0.9 percent, very close to the standard HP filter.

b.   *Phillips Curve.* Model two is based on the Phillips curve. In this case, potential output will be estimated including in the model the observed GDP and the inflation target set by the monetary authority. If there is a positive output gap, then the observed inflation will be above the official inflation target. One caveat in the case of Uruguay is that the inflation target regime started only in 2008, so the number of observations limits the estimates. To deal with this shortcoming, we use as a proxy of the official targets, which corresponds to the inflation rates indicated in the BCU's communiqués when the monetary authority started following the monetary aggregates back in September 2004. In this case, potential output growth in 2010 was estimated at 6.8 percent and the output gap at 0.5 percent.

c.   *Okun Law.* Model three is based on Okun's Law. Given the theoretical relationship between output and unemployment, we should expect a decline in the unemployment level beyond the natural rate of unemployment—defined here as the non accelerating inflation rate of unemployment (NAIRU), if the economy is operating above potential growth. On the contrary, we should expect an unemployment level above the NAIRU

if the output gap is negative. Under this approach, in 2010 potential output grew
6.5 percent and the output gap was 1.3 percent.

Figure 2. Uruguay: Potential Output and the Output Gap, 1990 Q1 – 2011 Q1
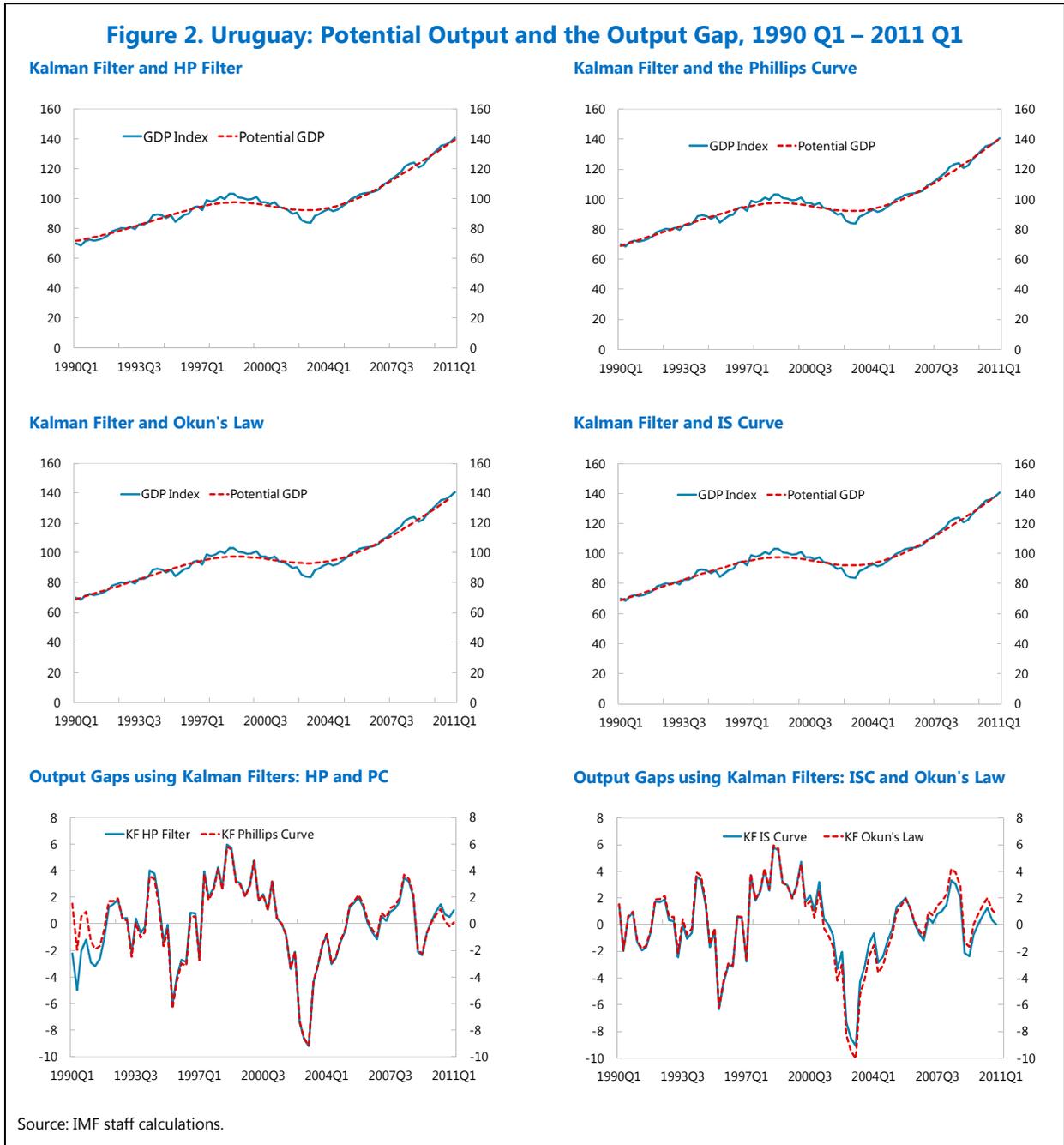
d.   *IS Curve.* Model four is based on the IS curve. According to economic theory, there
       is relationship between the output gap and the monetary policy rate. We could expect
       a negative output gap when the monetary policy rate is above the equilibrium interest
       rate. This method suggests that for 2010, trend output growth was 6.5 percent while
       the output gap was 0.6 percent.

Production function-based model

14.   **An aggregate production function is estimated based on a standard growth accounting technique as well as through a vector-error-correction model (VECM).** In this case, potential output or GDP is related to its inputs: capital, labor, and technology through the Cobb-Douglas production function as follows:

$$Y_t = AK^\propto L^{(1-\propto)} \ (1)$$

Where Y_t is total output, K is the capital stock, L is labor, A is the technology parameter or total factor productivity (TFP), and α is the share of capital in total output. TFP is calculated as a residual from the contribution of labor and capital to real GDP growth. The latter labor and capital shares are estimated through the VECM model.

Standard growth accounting technique

15.   **In the standard growth accounting approach, to estimate potential output, the HP filter is applied to each series.** As in the previous estimates presented in the paper, we use indices, in this case for labor, capital, and total factor productivity. Once the series have been detrended, we estimate potential output substituting trend variables in the production function and applying their contribution to growth.[2] Given the limited availability of historical data on labor, the sample period covers from 1997 to 2010 and includes the Fund's staff projections on GDP, labor, and capital.

16.   **This approach gives an average growth rate of potential output equal to 4.3 percent for 2003-2010.** According to the estimates, potential growth in 2010 reached 5.7 percent and for 2011 is estimated at 5.4 percent. The estimated output gap for 2010 and 2011, though much larger compared to the other methods, still support the view that the economy is growing above its potential. One possible explanation for the larger rate of growth in potential output at the end of the sample period may be related to the important gains in productivity associated with FDI.[3]

The VEC Model

17.   **The VECM approach helps to overcome data constraints related to the share of capital in total output.** Its advantage compared to the standard growth accounting technique

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[2] Following Bucacos (2001) who found a capital participation equivalent to 0.32 and Theoduloz who estimates capital participation at 0.27, in the paper we assume an α equal to 0.3 percent. Labor force data comes from the Instituto Nacional de Estadistica de Uruguay while data on capital comes from national accounts.

[3] In addition, the increase in the TFP may be capturing some of the impact from the positive commodity export prices in some key sectors that are not reflected in the stock of physical and human capital, and that generate incentives for increased productivity.

is that potential output can be estimated more straightforward since potential GDP is a function of capital and labor, such that at least one cointegration relationship may exists between Y, K and/or L.

18.   **Data series meet the time-series properties to estimate a VEC model for the production function.** In this case, the null hypothesis for the presence of a unit root could not be rejected for any of the three series, while the Johansen–Juselius cointegration test indicates the presence of at least one cointegrating relationship between output and the capital stock series.

19.   **Estimation of potential output growth from the VEC model is a two-step process**. First, the estimated parameters for the cointegrated, long-term relationship equation between Y, K and L are substituted into (1) to obtain an actual series for the ln(A). Then, the ln(A), ln(L) and ln(K) series are smoothed out using the HP filter, and can be reintroduced in the equation to compute a final estimate for the (log) of potential output.

20.   **The estimated VEC Model generates similar results to the other methods for potential output growth and the output gap.** Potential output growth was estimated at 6.2 percent in 2010 and 5.8 percent in 2011. The VEC Model suggests that actual output is growing above potential, at around 1.0 percent in 2011, with the gap closing by 2013.

Structural Vector Auto Regression (SVAR) approach

21.   **Based on the approach developed by Blanchard and Quah, potential output can be estimated with aggregate supply shocks (changes in productivity) while the output gap can be estimated through aggregate demand shocks (temporary effects).** In this case, after the series have been detrended with the piece-wise linear method, a vector auto regression is estimated on GDP growth and unemployment (in levels). The impulse response generated by the VAR and the residuals are decomposed into the supply and demand shocks.

22.   **This is achieved imposing a "zero" long run effect from the demand side shock.** Consequently, potential output is estimated by restricting the demand shock to zero while allowing the supply shocks to operate. Considering there was a structural break following the 2002 crisis, the piece wise linear detrending method is applied to separate observations (sample) before and after the crisis (Q2 2002) and two different means are thus used for the two sub-periods.

23.   **The structural VAR yields relatively different results to the univariate filters and the economic methods.** The estimations of potential output applying the SVAR show that potential output grew on an annual average of 2.6 percent before the crisis and jumped to an annual average of 5.3 percent after the crisis. For 2010, estimated potential growth exceeded all the other methods estimates; however, the output gap was nearly closed. In addition, as Figure 4 shows, there is an increasing tightness in the labor market as the actual unemployment rate is very close to its long term trend level.

Figure 3. Uruguay: Structural VAR: Output Gap, 1991 Q1 - 2010 Q4
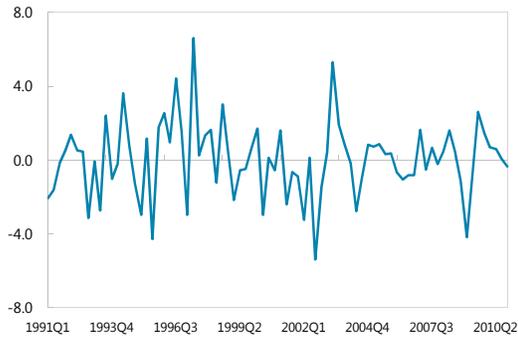
Figure 4. Uruguay: Labor Market: Slackness/Tightness
(Actual minus NAIRU or trend unemployment rate)

Source: IMF staff calculations.
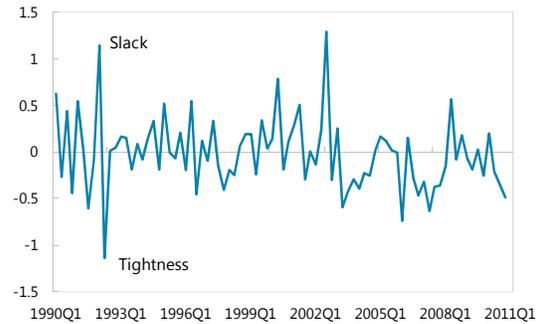
24.   **In addition to the caveats already mentioned in the paper, estimates of potential output for Uruguay should be treated with caution given the 2002 financial crisis.** The end of period bias in the case of univariate filters and few observations to estimate potential output using the Kalman filter and the Phillips curve are the main caveats previously mentioned in this paper. More importantly in the case of Uruguay is the impact from the 2002 financial crisis on the economy. The financial crisis caused a sharp fall in output which has been followed by seven years of very strong growth.

25.   **The methods applied here capture a large part of the 2002 drop in actual GDP as a fall in potential GDP followed by strong growth in potential GDP.** As indicated by Rosales (2011), it is likely that the recession and the banking crisis caused a fall in potential output; however, a lot of uncertainty about their magnitude remains. One effect of the crisis and the rapid recovery is that potential growth was estimated at about 6.0 percent in 2010 when applying almost all the methods, a rate that few observers believe is Uruguay's long-term potential growth rate.

26.   **Thus, in spite of the consistency in the estimates across the battery of methods, estimates of potential output should be treated with prudence.** All methods indicate that the economy is growing above potential; furthermore, the continuous outperformance of consumption over GDP, the level of inflation persistently above the official target, and the tightness in the labor market, all support the estimate of a positive output gap for 2010-11. To further test the robustness of the estimates, future work could focus on calculating potential output growth in real time as in Flores and Vazquez-Ahued (2011). Caution should be exercised even in this case as data revisions usually have an important effect on the estimates.

D.   Spillovers from the Agriculture Sector to the Rest of the Economy

27.   **Following the 2002 crisis and supported by favorable prices in the international markets, agriculture production has increased by an annual average of nearly 3 percent.** Soya production in Uruguay has tripled since 2005 with the cultivated area

increasing from around 300 thousand hectares in 2005 to around 1 million hectares in 2010 making this one of the most dynamic sectors of the economy. Spillovers from agriculture to the rest of the economy will be assessed through a Vector Auto Regressive (VAR) model. Impact from agriculture to the other sectors will be tested through impulse response functions (IRF) and a forecast error variance decomposition analysis. The impact from agriculture to the rest of the sectors is modeled following the work by Acosta (2011). In this case, we assume the following model:

$$Y_t = A(L)Y_{t-1} + B(L)X_t + U_t$$

where *A(L)* and *B(L)* are a *n* x *n* and a *n* x *k* polynomial matrices in the lag operator *L*, respectively, *Yt* is a *n* x *1* vector of endogenous variables, *Xt* is a *k* x *1* vector of exogenous variables, and *Ut* is a *n* x *1* vector of estimated residuals.

28.   **The VAR model is specified with agriculture (Agriculture$_t$) as the most exogenous sector.** It is then followed by the industrial (Industry$_t$), construction (Construction$_t$), and services sectors (Services$_t$). This order seeks to show that a shock to the agricultural sector at period t have a contemporaneous effect on the rest of the sectors included in the model; on the other hand, a shock at time t to the other sectors will affect the rest of the sectors included in the model only with a lag. As in the case of Acosta (2011), the Dummy$_t$ variable in vector X$_t$ controls for the severe drought that affected the economy, especially agriculture, during 2009. The model is specified as follows:

$$Y_t = [Agriculture_t \ Industry_t \ Construction_t \ Services_t]$$
and
$$X_t = [Dummy_t]$$

29.   **The sample period included in the VAR model is from 1997Q1 to 2011 Q1.** The economic sectors data included in Y$_t$ is at constant prices, is seasonally adjusted, and is expressed in logs. Following the standard techniques and building on Acosta's work, to estimate the VAR model, the paper uses 2 lags.

30.   **The results from the VAR exercise seem to indicate that the spillovers from agriculture to the other sectors of the economy are relatively limited.** The impulse-response functions presented in Figure 5 indicate that a 10 percent increase in agriculture activity affects the service sector by around 1 percent, but its effect fades away almost after two quarters. In the case of industrial production, it increases near 2 percent, but its effect turns negative after the first quarter and with some positive impact again after the fourth quarter. In the case of construction, there is a temporary increase in the sectors' activity also close to 2 percent, but its effect turns negative after one quarter more than offsetting the initial positive impact, but such negative performance vanishes after the fourth quarter.

Figure 5. Uruguay: Impulse-Response Functions to a 10 Percent Increase in Agricultural Output
(In percent)

Source: IMF staff calculations.
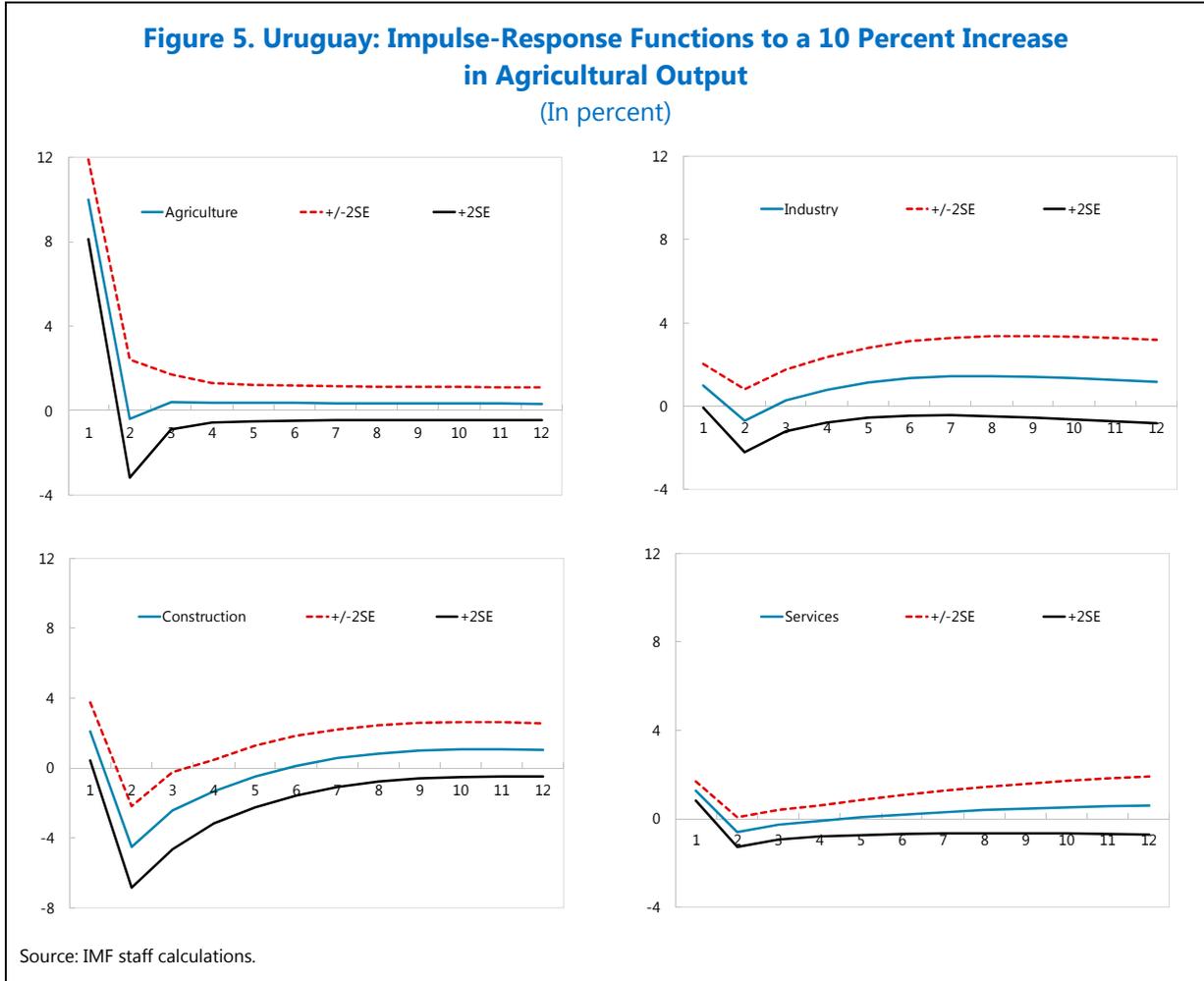
31.   **The forecast error decomposition analysis indicates that agriculture has some medium impact on the other sectors of the economy.** This analysis yields information about the relative importance of an agriculture shock into the rest of the economic sectors. In the most extreme case, a shock to agriculture explains more than 50 percent of the change in activity in the services sector, but as Table 2 shows, its effects fades away faster than in the other sectors. In the case of industrial production, a shock to agriculture seems to explain one quarter of the sector's changes in economic activity. Though its effects is also short lived, it fades away slower compared to the services sector.

Table 2. Forecast Error Variace Decomposition Due to an Agricultural Sector Shock

(In percent)

Quarters	Industry	Construction	Services
1	25.7	34.9	53.5
4	15.1	27.9	22.8
8	12.6	23.8	17.7
10	11.5	22.2	16.1

Source: IMF staff calculations.

32.   **To supplement the previous VAR analysis, a set of individual regressions are estimated.** These regressions can be depicted in the following form:

$$Y_{j,t} = c(1) + c(2)Y_{j,t-1} + c(3)A_t + c(4)A_{t-1} + c(5)Dummy_t + E_{j,t}$$

where each sector's output –other than agriculture, is represented by $Y_{j,t}$; A_t is agricultural output, and $Dummy_t$ is the dummy variable, as in the VAR analysis, that controls for the 2009 drought that negatively affected Uruguay, especially agriculture. Quarterly data, seasonally adjusted, and in logs terms is used, and the sample period included is from 1997Q1 to 2011Q1. In these regressions, the short-run impact of agriculture on the other sectors is given by $c(3)$ and the long-run impact by $\frac{c(3)+c(4)}{1-c(2)}$.

Table 3. OLS Estimation of Spillover Effects From the Agricultural Sector

	c(1)	c(2)	c(5)	c(4)	c(3)	Short-run effect	Long-run effect	R-squared
Industry	1.02	-0.95	0.13	0.14	-0.02	0.13	0.14	0.90
t-Statistic	0.81	-15.69	2.22	0.06	-0.49			
Construction	5.61	-0.82	0.34	0.57	-0.03	0.34	0.50	0.74
t-Statistic	2.72	-10.19	3.60	5.18	-0.68			
Services	0.02	-1.03	0.14	0.18	0.02	0.14	0.16	0.97
t-Statistic	0.04	-29.72	6.67	7.81	0.04			

Source: IMF staff calculations.

33.   **The individual OLS regressions confirm there are moderate spillovers effects from agriculture to the rest of the economy.** Similar to the impulse response functions, industry and services reflect the smallest impact from agriculture; meanwhile, agriculture's impact on construction is as much as twice that of industry and services.

34.   **In addition to the VAR and the OLS regressions, we estimate a set of rolling VARs to assess the impact over time of agriculture to the rest of the economy.** In this case, the set of rolling VARs includes 29-window period, which begins in 1997Q1. The impulse response functions to one standard deviation shock to the agriculture sector are

estimated and their corresponding one-quarter response of each sector is stored. For each subsequent sample, one quarter is added to the previous sample and the earliest observation is dropped. The last sample goes from 2004Q2 to 2011Q1. Figure 6 shows the one-quarter responses from each sector. As previously indicated, all the sectors show somehow similar sensitivities to the agricultural sector.

Figure 6. Uruguay: Rolling VARs
(In percent)

Agriculture

Industry

Construction

Services

Source: IMF staff calculations.
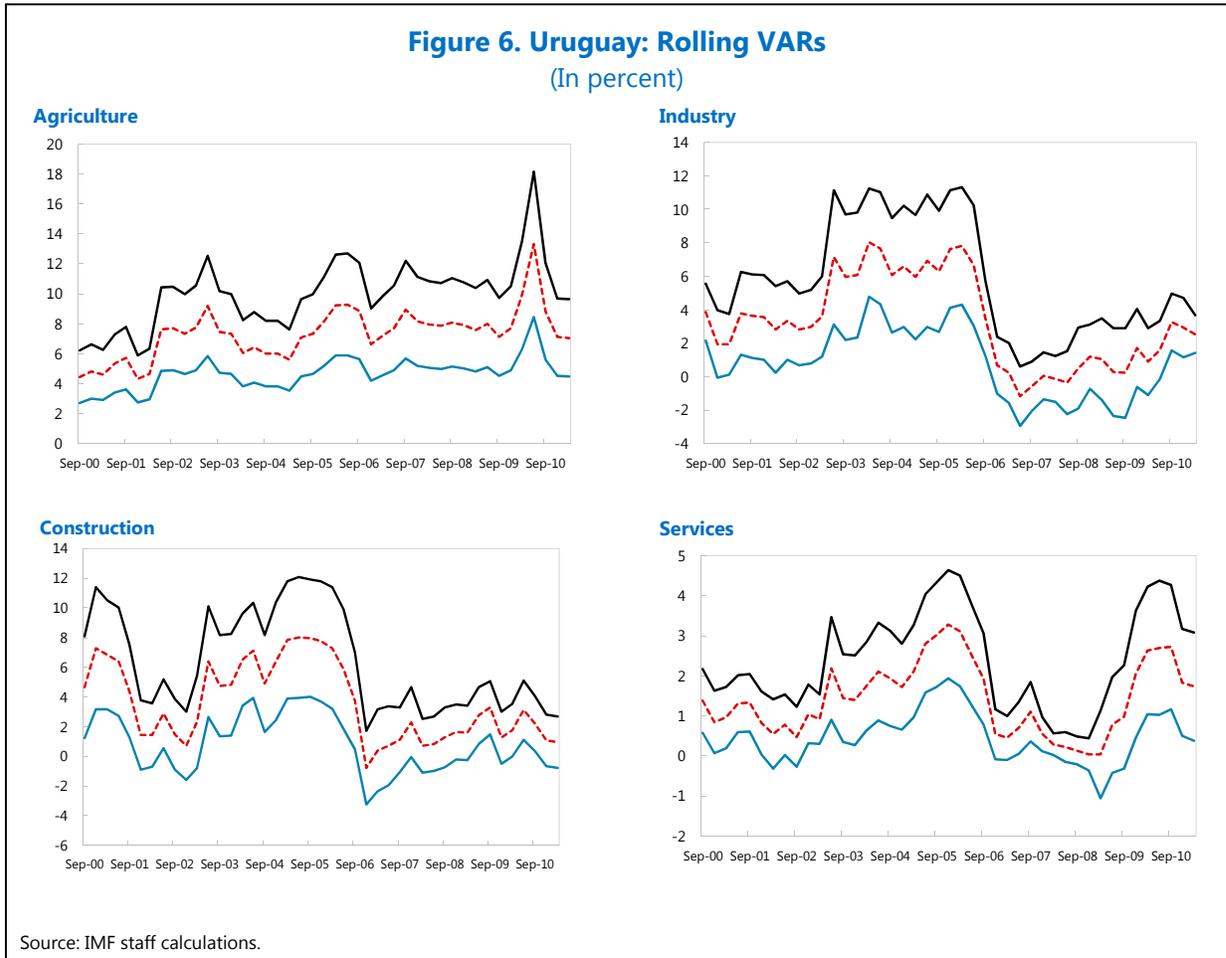
E. Conclusions

35. **Potential output and the output are two key variables for fiscal and monetary policy.** However, prudence should be exercised upon relying on a single approach to estimate potential growth as there are particular limitations to certain methods; thus individual results should be treated with some caution. Future work to improve potential output calculations could focus on real time estimates.

36. **This paper covered a wide range of methods to estimate potential output.** All of the methods indicate that potential output has accelerated following Uruguay's 2002 financial crisis rising at an annual average of 5 percent for all the methods presented with the

four Kalman Filters estimating that potential output averaged around 4.8 percent after the 2002 crisis. Among the several methods presented here, the Christiano-Fitzgerald filter and the Production Function based on a growth accounting technique yield the lowest potential growth rate for 2010 equal to 5.6 and 5.7 percent, respectively.

37. **The positive output gaps that all methods generate seem to indicate that the economy remains growing above trend.** With inflation and inflation expectations above the official target range, with consumption outperforming economic growth, and unemployment at historical lows and tightness in some sectors of the economy, estimating potential output and the output gap remain critical for policy decision making.

38. **The spillovers from agriculture to the other sectors of the economy are moderate.** A 10 percent increase in agriculture output leads to relatively small increases in the other sectors with the effect fading mostly after two to four quarters.

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II. INVESTMENT GRADE FOR DOLLARIZED COUNTRIES: THE URUGUAYAN CASE[1]

A. Introduction

1.   **In recent years, Uruguay has taken firm strides towards regaining investment grade status—lost in the aftermath of the 2002/03 crisis.** The country's efforts have been supported by a record-high growth performance and a generally strong fiscal and monetary policy framework—which has helped entrench macroeconomic stability, reduce the debt level and significantly improve the perception by credit rating agencies of the country's credit worthiness, which is ranked just one notch below investment grade.

2.   **Uruguay's progress toward investment grade has been solid but gradual—in contrast with the marked reduction in spreads delivered by the market.** The gradual progress in credit ratings has been justified by the rating agencies based on pending tasks for Uruguay—including the need to further reduce public debt and to lessen both debt and financial dollarization. At the same time, Uruguay's low spread levels—which are now below the average for emerging markets with investment grade—seem to suggest that the market has implicitly awarded Uruguay such a status, ahead of the rating agencies.

3.   **This paper investigates the relationship between dollarization and investment grade status.** Specifically, a panel data study of 42 countries shows that the external public debt burden and a trend of public debt and financial de-dollarization are significant determinants of investment grade. It also suggests that Uruguay's efforts to reduce the public debt ratios and dollarization levels in recent years are well in line with those observed in other dollarized economies with investment grade status as they worked toward the upgrade.

4.   **The paper also analyzes the benefits that a dollarized country can expect when reaching investment grade.** In line with previous research, the panel study of 35 emerging markets suggests that countries with investment grade have spreads that are 80-85 percent lower than those of countries that are one-notch below investment grade. Dollarized countries, however, benefit from a lower reduction in spreads than their peers as they cross the investment grade threshold—facing "dollarization penalties" of up to 40 percent the spreads of a non-dollarized investment grade country. Thus, Uruguay's efforts to de-dollarize should help it not only reach investment grade, but achieve the full benefits of this status.

5.   **Finally, the paper studies what are the implications of trading "ahead of the rating", as Uruguay is.** In particular, it asks whether Uruguay can expect its spreads levels to remain within the "investment grade range" during periods of global stress. An event study suggests that that countries in the region trading ahead of their rating (once they are one

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[1] Prepared by María Gonzalez and Lulu Shui.

notch below investment grade) prior to crisis events generally tend to show resilience and remain in-group with investment grade countries through periods of stress.

6.   **The rest of the paper is organized as follows.** Section B presents some background on Uruguay's performance. Sections C to E present the empirical analyses on the questions of determinants and benefits of investment grade, as well as on the resilience of "trading ahead of the rating". Section F concludes.

B. Background

7.   **Sovereign credit ratings are assessments of the probability that a borrowing government will default on its obligations.** These assessments are elaborated by a number of rating agencies worldwide,[2] and summarize the perception of government risk in a series of categories that can be comprised into three main groups: "investment grade"—for the highest quality borrowers; "speculative grade"—for the lower quality borrowers that continue to serve their obligations—and "in default" (Table 1). The ratings are not only considered a key determinant of the borrowing costs faced by the sovereign, but also set a floor for the costs that private agents operating under that same sovereign will face in the global markets. Reaching specific ratings also opens the door to wider pools of investors, which may face legal restrictions to risk participation in their portfolios (Jaramillo, 2011).

8.   **Ratings are usually compiled based on a wide host of factors.** The main agencies tend to rely on a combination of quantitative models—which provide a measure of risk based on the borrower's key economic fundamentals—and the judgment of analysts who weigh a number of qualitative factors. The latter vary among rating agencies, and may range from political risk and institutional quality, to macroeconomic and debt management.

9.   **Uruguay's strong economic performance and policy framework of recent years has been recognized by the main credit rating agencies.** They have pointed to the sharp and sustained recovery in economic activity (with real growth averaging some 6½ percent in 2004-10), and the prudent macroeconomic framework, which has enhanced the economy's resilience to shocks. Falling debt levels, improvements in the debt structure (including on currency composition and amortization schedule), limited rollover risks, and a comfortable external reserve buffer have all been noted as strengths (Figure 1). Thus, the country has gradually risen through the ladder of sovereign credit ratings, to a level just one-notch below investment grade (Table 1).

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[2] The three major agencies are Fitch Ratings, Standard and Poor's (S&P), and Moody's Investor Services.

Figure 1. Uruguay: Recent Performance

Real GDP
1992=100

Investment Grade
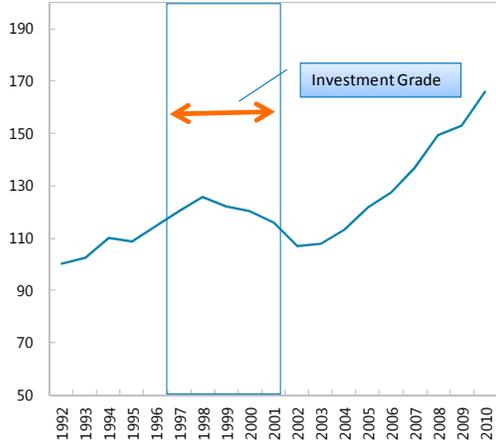
Sources: Uruguayan authorities and IMF .

Inflation
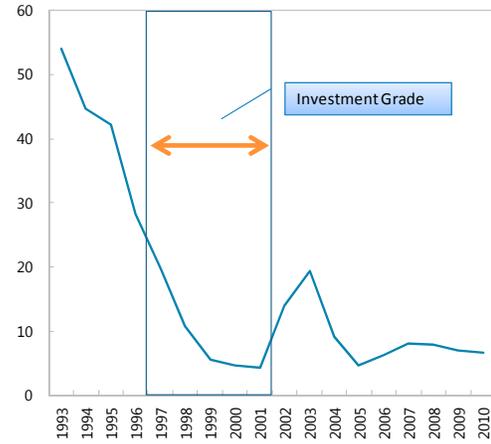
Investment Grade

Sources: Uruguayan authorities and IMF.

Public Debt
(as a share of GDP)

Foreign Currency
Local currency
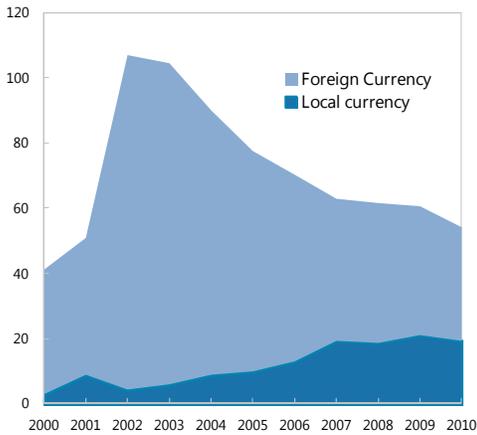
Sources: Uruguayan authorities and IMF.

Spreads (EMBIG, in bps)

EMBIG-URY
EMBIG-Latam
EMBI Global
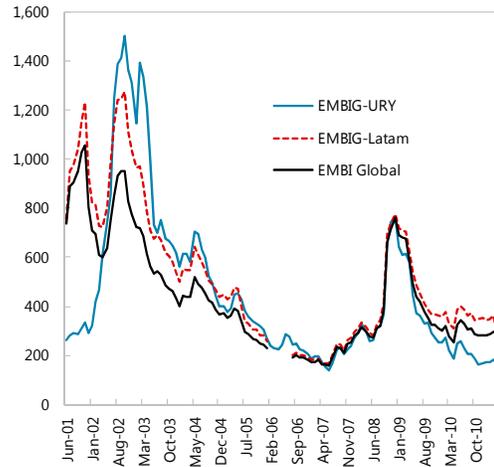
Source: Bloomberg.

Table 1. Uruguay: Description of Credit Ratings 1/

Grade	Moody's	S&P	Fitch	Description
Investment	Aaa	AAA	AAA	Highest quality, reliable, stable
	Aa1	AA+	AA+	High quality, some more risk
	Aa2	AA	AA	
	Aa3	AA-	AA-	
	A1	A+	A+	The economic situation can affect the sovereign finances
	A2	A	A	
	A3	A-	A-	
	Baa1	BBB+	BBB+	First step to investment grade
	Baa2	BBB	BBB	
	Baa3	BBB-	BBB-	
Speculative	**Ba1**	**BB+**	**BB+**	Sensitive to changes in the economic situation
	Ba2	BB	BB	
	Ba3	BB-	BB-	
	B1	B+	B+	The financial conditions of the sovereign can vary significantly with economic conditions
	B2	B	B	
	B3	B-	B-	
	Caa1	CCC+		Vulnerable, reliant on the economic situation to repay
	Caa2	CCC	CCC	Very vulnerable and speculative
	Caa3	CCC-		
	Ca	CC		
	C	C		Close to default, may be in arrears
In Default		D	DDD	Defaulted on its obligations
			DD	
			D	

Source: Jaramillo (2010) and Wikipedia.
1/ Uruguay's ratings as of July 30, 2011 are marked in bold red.

10.   The improvement in Uruguay's ratings has gone hand-in-hand with a reduction in market spreads. Uruguay's EMBIG spreads are both below the EMBIG-Global and the EMBIG for Latin America.[3] The market has "moved ahead" of the rating agencies, as Uruguay's spreads in January-April of 2011 were under the average observed in emerging market peers that were already at the first step of investment grade status (Figure 2).

Figure 2. Uruguay: Market vs. Ratings

Country Ratings and Average EMBIG per rating (2011, in basis points)

Rating Uruguay Actual (BB)

Uruguay Spread (2011)
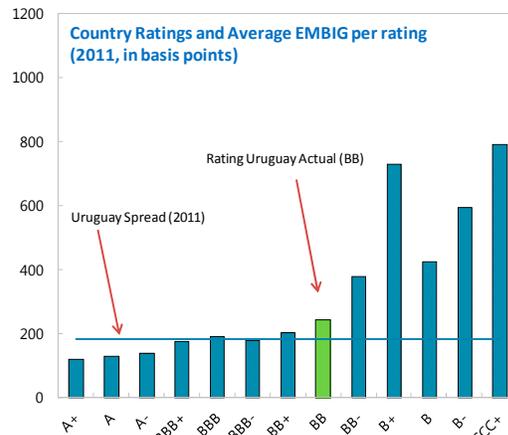
Source: Bloomberg, for a sample of 35 emerging markets, in January-April 2011.

C. How Important is Dollarization as a Determinant for Credit Ratings?

11.   Several studies have sought to identify the key determinants of sovereign credit ratings, but very few have focused on dollarization. These studies have identified three sets of variables that are critical in the determination of the ratings (Appendix 1). These relate to: (1) *economic performance and development* (e.g., real growth, GDP per capita);

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[3] CDS spreads for Uruguay are not available.

(2) ***macroeconomic stability and vulnerability*** (e.g., inflation, debt- and debt-service ratios, international reserve levels), and (3) ***institutional factors and political risk*** (e.g., default history, corruption). Very few studies have explicitly considered the relative impact of high debt and/or financial dollarization on the ratings, although these are often raised as critical issues to be addressed by dollarized countries when assessed by the rating agencies. Most recently, Borraz et al (2011) have taken a look at the impact of dollarization concluding that it can affect the ratings—including through a cyclical channel through which it can impact on the country's fundamentals.

12. **This section examines whether the debt and financial dollarization levels are significant determinants in the credit agencies' decisions.** We use two alternative approaches. First, we follow Afonso et al (2007), and run an *ordered Probit* model (estimated through maximum likelihood with robust standard errors) to verify whether debt and financial dollarization impact the definition of general credit ratings. The model is:

(1) $$R^*_{it} = \alpha + \beta X_{it} + \lambda Z_{it} + \mu_{it}, \qquad i = 1,...N; \quad t = 1,...T$$

where X_{it} is a vector of explanatory variables, Z_{it} is a vector of time-invariant variables (including regional and default dummies), and μ_{it} is a random error. R^*_{it} is an unobserved latent variable embodying the country's credit worthiness that is captured by the rating agencies through n cutoff points, defining the boundaries of each category:

$$R_{it} = \begin{cases} AAA \ if \ R^* > c_n \\ AA + if \ c_n > R^* > c_{n-1} \\ AA \ if \ c_{n-1} > R^* > c_{n-2} \\ \quad ... \\ CCC + \ if \ c_1 > R^* \end{cases}$$

Second, we extend the model developed by Jaramillo (2010) on the determinants of investment grade. We use both a *binomial Probit* and a *binomial Logit* specification:

(2) $$IG_{it} = \alpha + \beta X_{it} + \lambda Z_{it} + a_i + \mu_{it}, \qquad i = 1,...N; \quad t = 1,...T$$

where IG_{it} is a binomial variable equal to 1 when a country has investment grade by at least two of the three main agencies and zero otherwise, X_{it} is a vector of explanatory variables, Z_{it} is a vector of time-invariant variables (including regional and default dummies), a_i is a vector of individual country effects and μ_{it} is a random error. The model was estimated in a simple *pooled* version and with *random effects*.[4]

13. **The set of explanatory variables builds from previous research to account for dollarization.** We follow Jaramillo (2010) in testing the determinants identified consistently

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[4] The sample did not have enough variability of the dependent variable to allow for a *fixed-effects* estimation.

by earlier research. Aside from indicators on the external and domestic debt ratios (relative to GDP), the novelty is to include an explicit indicator of debt dollarization (the ratio of external public debt over total) and an indicator of financial dollarization (defined as the share of foreign currency deposits over total deposits in the banking system) as potential determinants. The dataset includes an (unbalanced) panel of annual data for 42 countries in the period 1993-2010 (Appendix 2, Table 1).

Table 2: Uruguay: Explanatory Variables and Expected Sign

Macro variables		Public Sector	
GDP per capita	+	Primary balance/GDP	+
Real GDP growth	+	External public debt/GDP	-
Potential GDP growth	+	Domestic public debt/GDP	-
Inflation	-		
Unemployment	-	**Financial Sector**	
External Sector		M2/GDP	+
Exports/GDP	+	**Dollarization**	
Current Account/GDP	+		
Private External Debt/GDP	-	External public debt/Total public debt	-
International Reserves/GDP	+	FX bank deposits/Total bank deposits	-
Other			
Political Risk Index	+		
Dummy on Default History	-		

Sources: IMF (WEO, IFS), World Bank's WDI, ICRG, and country authorities.

Data analysis and estimation results

14. **Data analysis confirms that investment grade and speculative grade countries significantly differ in most key economic fundamentals—including their dollarization levels.** Tests of equality of means and medians across the sample indicate that investment grade countries generally grow more, have lower inflation and unemployment, a stronger export performance and greater financial depth than speculative grade countries (Table 3). There are also significant differences with regard to the public external and domestic debt-to-GDP ratios, as well as on the degree of public debt dollarization (with a difference of some 15 percentage points on average) and of financial dollarization (greater in speculative grade countries by 18 percentage points).

15. **Econometric estimates confirm the relevance of the public external debt ratios in the determination of both credit rating in general and investment grade status in particular.** Table 4 summarizes the results of all models. In each case, a first estimation was completed including all variables of the initial set of determinants, plus the dollarization indicators; a second estimation excludes the variables with little explanatory power on the basis of Wald tests, while maintaining the dollarization indicators. The results strongly confirm that the public debt-to-GDP is a highly significant determinant of both credit ratings and investment grade status—in contrast with the level of domestic public debt-to-GDP,

which is statistically insignificant in most of the estimations, suggesting a lower-risk perception by the rating agencies on this type of debt.

	Mean			Median		
Variable	Investment Grade	Speculative Grade	Welch test	Investment Grade	Speculative Grade	Wilcoxon test
Macroconomic Variables						
GDP per capita (US$)	9,037	3,537	***	5,684	2,905	***
Real GDP growth	4.6	3.9	**	5.0	4.3	***
Potential growth	4.5	3.8	***	4.3	3.9	***
Inflation	5.5	20.1	***	4.1	7.6	***
Unemployment	8.3	10.5	***	7.5	9.8	***
External Sector						
Exports/GDP	45.8	32.3	***	40.3	29.9	***
Current Account/GDP	(2.5)	(2.3)		(2.4)	(2.3)	
Private External Debt/GDP	43.5	19.3	***	32.0	15.0	***
NIR/GDP	19.5	14.8	***	18.4	11.6	***
Public Sector						
Primary Balance/GDP	(0.2)	0.3		(0.3)	0.5	*
Public External Debt/GDP	13.3	30.0	***	11.0	25.0	***
Public Domestic Debt/GDP	22.8	27.1	***	16.0	20.0	**
Financial System						
M2/GDP	70.5	64.9	***	56.0	41.0	***
Dollarization						
Debt Dollarization	40.5	55.0	***	35.0	59.0	***
Financial Dollarization	20.2	38.2	***	13.0	34.0	***
Institutional						
ICRG political risk index (+ lower risk)	72.5	64.9	***	74.0	66.0	***

Table 3. Uruguay: Characteristics of the Sample

*** Stands for significance at 1 percent level, ** stands for significance at 5 percent, and * at 10 percent.

16.   **Results also suggest that a trend of public debt and financial de-dollarization are significant determinants of investment grade.** In particular, an increasing trend in the debt dollarization ratio tends to reduce the probability of reaching investment grade, even if there seems to be a positive relation between a higher debt dollarization level and investment grade, *other things equal*.[5,6] Estimates also show that financial dollarization levels—and their trends—are both variables that seem to matter as credit ratings issue their opinions on a specific country level of risk.

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[5] This last result may be explained by the higher degree of access that investment grade countries have to international capital markets. It is not inconsistent with the tests of means and medians presented in Table 3, as the latter only compares the absolute levels of dollarization between investment and speculative grade countries, without taking into account the differences and similarities in other fundamentals and institutional variables.

[6] It has been suggested by some observers that this type of result may obey to the use of "external debt" rather than "foreign currency denominated debt" in the regressions. Indeed, emerging markets gaining greater access to the international capital markets have been able to issue external debt in domestic currency. This is not the case here, as we concentrate on foreign currency denominated public debt from the WEO database.

Table 4. Uruguay: Results: Model on Determinants of Sovereign Credit Ratings 1/

Variables	ORDERED PROBIT - All Rating Categories — Pooled Unrestricted	Restricted 2/	SIMPLE PROBIT - Investment Grade — Pooled Unrestricted	Restricted 2/	Random Effects Unrestricted	Restricted 2/	LOGIT - Investment Grade — Pooled Unrestricted	Restricted 2/	Random Effects Unrestricted	Restricted 2/
Log (GDP per capita)	0.99 *** (0.14)	0.89 *** (0.11)	4.66 *** (0.70)	2.17 *** (0.42)	11.81 * (4.97)		8.29 *** (1.99)	4.38 *** (0.97)	27.81 ** (10.12)	
Potential GDP growth	0.10 * (0.05)	0.13 ** (0.04)	0.27 (0.16)	0.21 * (0.09)	1.02 (0.85)		0.54 (0.39)	0.47 * (0.19)	2.46 (1.52)	
Inflation	-0.07 *** (0.01)	-0.09 *** (0.01)	-0.26 *** (0.07)	-0.20 *** (0.04)	-0.59 * (0.26)		-0.46 ** (0.16)	-0.39 *** (0.08)	-1.33 ** (0.48)	
Unemployment	-0.01 (0.02)	-0.02 (0.01)	0.19 *** (0.05)	0.03 (0.03)	0.52 (0.32)		0.33 ** (0.11)	0.06 (0.07)	1.22 * (0.61)	
Exports/GDP	0.00 (0.00)		0.04 (0.03)		0.05 (0.09)		0.08 (0.07)		0.13 (0.20)	
Current Account/GDP	0.00 (0.01)		0.17 *** (0.03)		0.41 * (0.18)	0.11 (0.13)	0.29 *** (0.06)		0.93 * (0.38)	0.12 (0.19)
Private External Debt/GDP	-0.01 (0.00)		0.01 (0.01)		0.05 (0.06)		0.01 (0.04)		0.09 (0.14)	0.12 (0.14)
Net International Resvs/GDP	0.02 (0.01)		0.06 (0.04)		0.09 (0.15)	0.07 (0.08)	0.09 (0.10)		0.13 (0.29)	
Primary Balance/GDP	-0.03 (0.02)		0.14 * (0.07)		0.47 (0.29)		0.26 (0.18)		1.13 (0.61)	
Pub Ext Debt/GDP	-0.05 *** (0.01)	-0.03 *** (0.00)	-0.16 *** (0.03)	-0.06 *** (0.02)	-0.57 * (0.26)	-0.67 *** (0.14)	-0.27 *** (0.07)	-0.13 ** (0.04)	-1.33 ** (0.46)	-0.92 *** (0.22)
Pub Dom Debt/GDP	0.01 (0.01)	0.00 (0.00)	-0.01 (0.02)	-0.03 * (0.01)	0.02 (0.09)	-0.20 ** (0.06)	-0.02 (0.05)	-0.06 * (0.03)	0.02 (0.20)	-0.20 * (0.08)
M2/GDP	0.00 (0.00)	0.05 *** (0.01)	0.03 * (0.02)		0.19 (0.09)	0.16 (0.04)	0.05 (0.04)		0.48 ** (0.18)	0.18 *** (0.05)
Political Risk Index	0.05 *** (0.01)	-0.89 *** (0.16)	0.19 *** (0.05)	0.08 *** (0.02)	0.28 (0.16)	0.36 (0.13)	0.34 *** (0.10)	0.16 ** (0.05)	0.62 (0.32)	0.52 *** (0.15)
América Latina y el Caribe	-0.94 *** (0.27)		0.86 (0.80)	-0.97 *** (0.28)	2.13 (4.49)		1.50 (1.46)	-1.89 *** (0.53)	5.69 (8.91)	
Europa	-0.25 (0.28)		1.06 (0.69)		3.72 (3.81)		1.92 (1.33)		10.30 (7.97)	
Asia del Este	-0.14 (0.30)		3.53 *** (1.03)		4.66 (5.18)		6.16 ** (1.90)		11.14 (10.76)	
Default History	-1.94 *** (0.30)	-1.91 *** (0.29)	-4.13 *** (0.90)	-2.10 *** (0.59)	-8.43 (5.20)	-10.15 *** (2.45)	-7.16 ** (2.25)	-3.94 ** (1.21)	-17.13 (10.75)	-14.78 *** (3.78)
Pub Debt Dollarization	0.02 * (0.01)	0.00 (0.00)	0.07 * (0.03)	0.01 (0.01)	0.32 (0.17)	0.18 ** (0.06)	0.12 (0.07)	0.01 (0.02)	0.79 ** (0.27)	0.24 ** (0.09)
Pub Debt Dollariz (Change)	-0.01 (0.01)	0.00 (0.01)	-0.09 ** (0.03)	-0.04 (0.02)	-0.34 * (0.17)	-0.21 * (0.09)	-0.15 * (0.06)	-0.09 (0.06)	-0.81 ** (0.29)	-0.28 * (0.14)
Financial Dollarization	0.00 (0.00)	-0.01 * (0.00)	-0.02 (0.02)	-0.02 * (0.01)	-0.05 (0.07)	-0.13 *** (0.04)	-0.05 (0.05)	-0.04 * (0.02)	-0.13 (0.19)	-0.10 (0.07)
Financial Dollariz (Change)	0.03 (0.02)	0.03 (0.02)	-0.05 * (0.02)	0.00 (0.01)	-0.13 (0.10)	0.05 (0.14)	-0.09 * (0.04)	0.00 (0.03)	-0.31 (0.25)	0.06 (0.21)
Constant			-58.23 *** (8.81)	-21.17 *** (4.24)	-145.13 (59.54)	-21.78 * (9.71)	-103.45 (22.72)	-43.21 *** (9.95)	-341.80 ** (111.91)	-36.11 *** (10.64)
R squared	0.32	0.31	0.85	0.76	...	...	0.84	0.77	...	...
Number of observations	307	322	307	322	307	360	307	322	307	360
Number of countries	37	39	37	39	37	42	37	39	37	42

1/ *** stands for significance at 1 percent level, ** stands for significance at 5 percent, and * at 10 percent.
2/ The restricted model includes all variables, while the unrestricted excludes variables without explicative power based on Wald Tests.

17.   **Data suggests that progress toward investment grade status has been supported by external public debt reduction and financial de-dollarization in our sample.**
Inspection of six countries that were granted investment grade during the sample period shows particular progress in reducing the external public debt-to-GDP burden, as well as on financial dollarization in the five years prior to the upgrade (Figure 3). In all of the cases, efforts to reduce the domestic public debt burden and, in particular, debt dollarization, were somewhat less pronounced.[7]

Figure 3. Uruguay: Fundamentals at Time of IG Upgrade and Five Years Earlier

Source: Author's calculations, based on WEO and IFS data.

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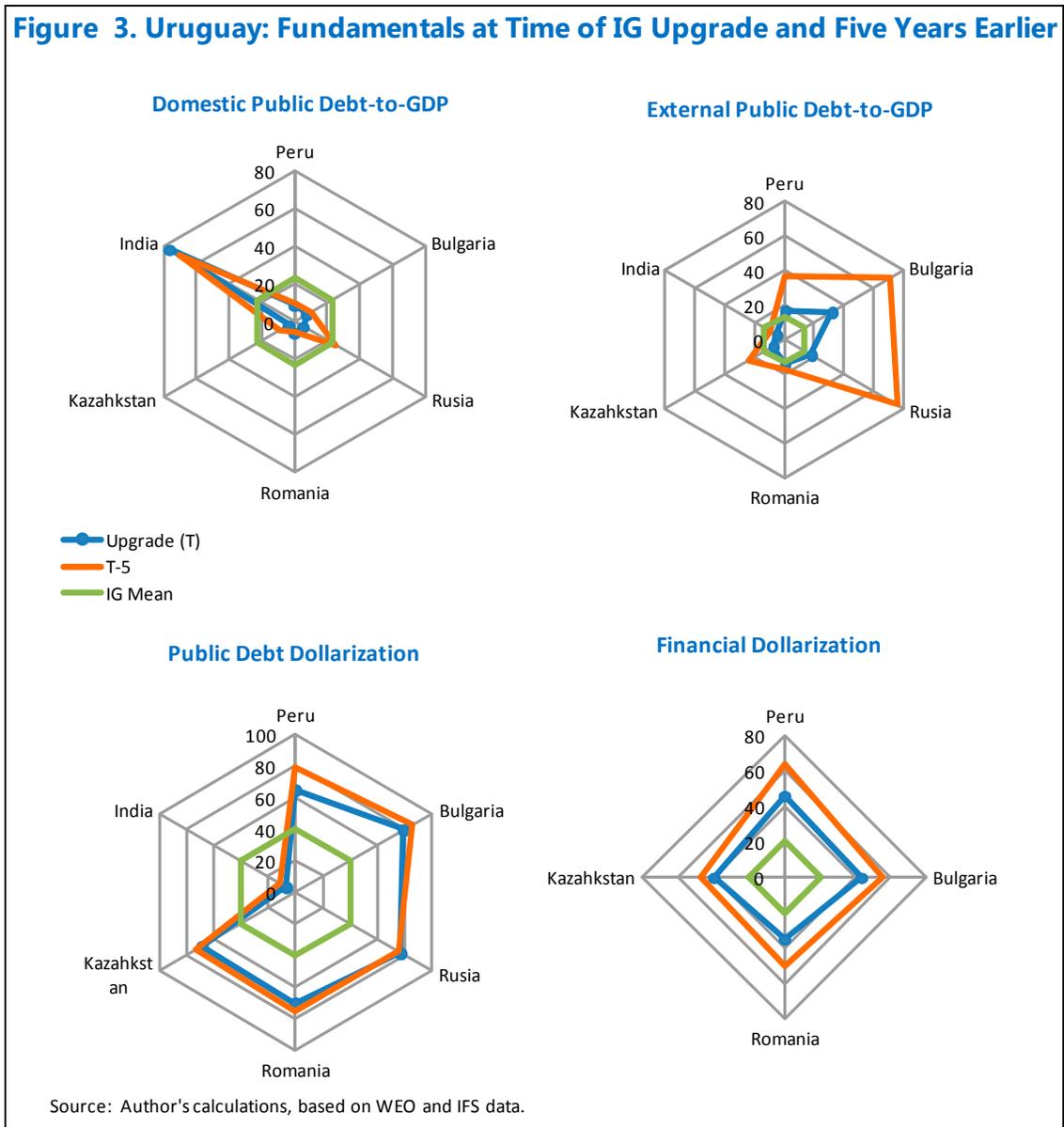
[7] This result (based on a *stock* comparison) seems in line with the observation in our estimated model (Table 4), which suggests that greater access to international capital markets by investment grade countries may in fact counterbalance debt dollarization efforts, unless the country can issue internationally in local currency.

18.   **Uruguay's fundamentals fare well in many respects relative to countries with investment grade status, including those that are highly dollarized.** A comparison of the key determinants of investment grade (presented as an average for 2005-10) suggests that most indicators of Uruguay's macroeconomic performance are broadly in line with those of peers that are more highly ranked by credit agencies. From this perspective, pending challenges would appear to be the debt-to-GDP ratios and dollarization levels.[8] At the same time, progress in this area over the last five years seems broadly in line with that observed in investment grade countries in the years preceding their own upgrade—albeit from a somewhat higher starting point (Figure 4). Against this background, Uruguay appears well placed to achieve investment grade, as it continues to lower its external debt and dollarization vulnerabilities, while sustaining its other key fundamentals.

Figure 4. Uruguay: Comparative Key Fundamentals, Average 2005-10 1/ 2/
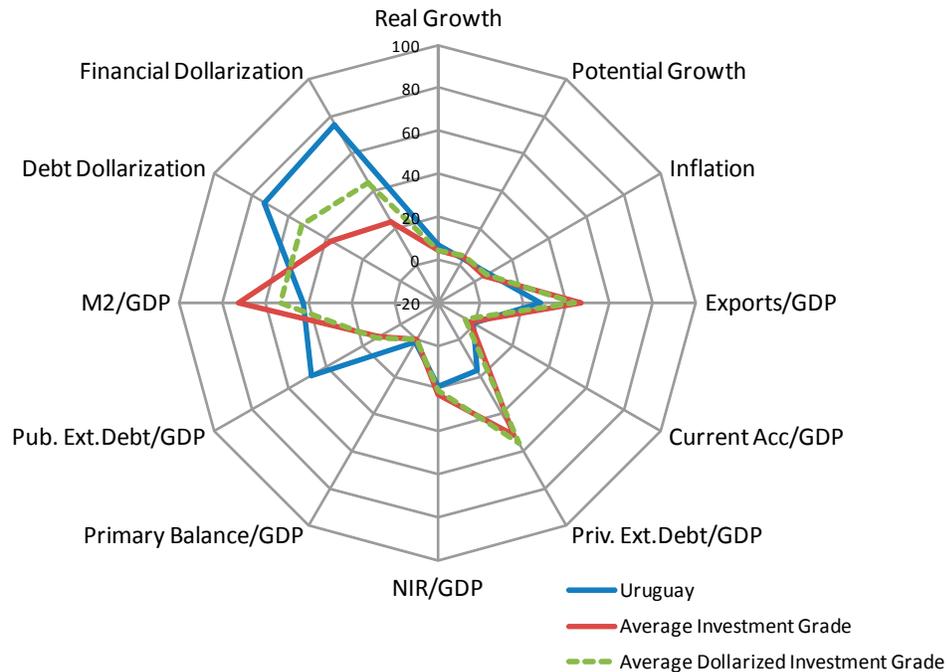
Sources: Authors' calculations based on data from WEO, IFS and rating agencies.
1/ For countries that were Investment Grade in 2010.
2/ Cutoff of financial dollarization chosen at 30 percent of deposits denominated in foreign currency.

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[8] The comparison also suggests that Uruguay could deepen its financial system, although the measure of Broad Money/GDP was not significant in our assessment of determinants of investment grade status.

D. What Are the Benefits of Achieving Investment Grade?

19. **Available evidence suggests that moving up the credit rating ladder tends to lower sovereign borrowing costs.** The literature generally assesses whether a change in credit ratings conveys any additional information about the risk of a sovereign to the market, beyond what can be extracted from global financial conditions (and varying risk appetite) and the country's economic fundamentals (Appendix 1, Table 2). Most studies find that rating upgrades tend to lower spreads (see, for instance, Cantor and Packer (1996), Kaminsky and Smuckler (2002) and Jaramillo and Tejada (2011)). Some others, however, have found ratings to be largely endogenous to changes in spreads, and note that credit rating agencies appear to follow the market (Levy Yeyati and Gonzalez Rozada, 2008).

20. **This section expands the model developed by Jaramillo and Tejada (2010) to examine the impact of reaching investment grade on spreads, and whether this is the same regardless of a country's dollarization level.** The model relies on a simple specification for a fixed effects panel regression with robust standard errors:[9]

$$(2) \qquad sov_{it} = \alpha + \beta rating_{it-n} + \lambda X_{it} + \delta_{it} + \eta_{it} \qquad\qquad i = 1,...N; \qquad t = 1,...T$$

where sov_{it} reflects the log of sovereign spreads, $rating_{it-n}$ denotes a set of dummy variables matching the scale of credit ratings (lagged one period, to control for possible endogeneity of ratings to spreads)[10], X_{it} is a set of explanatory variables (including global conditions and the country's specific fundamentals), δ_{it} stands for the vector of fixed effects and η_{it} is a random error.

21. **The set of explanatory variables in the model includes a relevant subset of the usual determinants of credit ratings.** This includes the most significant determinants in the literature, particularly indicators of economic performance (real GDP growth), and vulnerabilities (reserve buffer, and external and domestic public debt burden). This paper also adds the indices of public debt and financial dollarization as relevant determinants (Table 5). The left-hand side variable is the (log) EMBIG. Monthly data is

Table 5. Uruguay: Explanatory Variables and Expected Sign

Rating Dummies		Global Variables	
A+ to CC-	**+, -**	VIX	+
		Federal Funds Rate	-
Macroeconomic Variables			
Real GDP Growth	-	External Public Debt/GDP	+
Reserves/GDP	-	Domestic Public Debt/GDP	+
		Public Debt Dollarization	+
		Financial Dollarization	+

Sources: Rating agencies, Bloomberg, IMF (WEO and IFS), World Bank (WDI), ICRG, and country authorities.

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[9] Standard errors are clustered by country.

[10] We run alternative estimations with lags at 3 months, confirming that the results are robust.

gathered for a sample of 35 countries with varying periods in the time span 1997:01-2011:04 (Appendix 2, Table 2).

Data analysis and estimation results

22.   **Estimates show a significant effect on spreads as countries cross the investment grade threshold (Table 6a-b, Figure 5).** The model is estimated sequentially. We first verify whether the results delivered by Jaramillo and Tejada (2010) hold in our expanded sample (Model A), and after controlling for the levels of debt and financial dollarization as additional determinants of the spreads (Model B). We then estimate whether there is a "penalty" imposed by the market against dollarized countries as they moved through the credit rating ladder, measured by the coefficients of the credit rating dummies interacted with the public debt dollarization ratio and the financial dollarization levels (Models C-E).

Figure 5. Uruguay: Impact of Achieving Investment Grade

Source: Authors' own calculations.

23.   **Results confirm that, on average, movements through the credit rating ladder still have a significant impact of spreads (Model B).** All coefficients for the ranking BB and above are negative and significant; with sovereigns in this credit rating category benefiting from spreads that are some 80-85 percent lower than those in the BB category. Further, for all countries on average, the upgrade to investment grade (the move from BB+ to BBB-) generates a pronounced reduction in spreads (of about 80 percent) that is more pronounced than that arising from additional rating upgrades within such an asset class (Panel A).[11]

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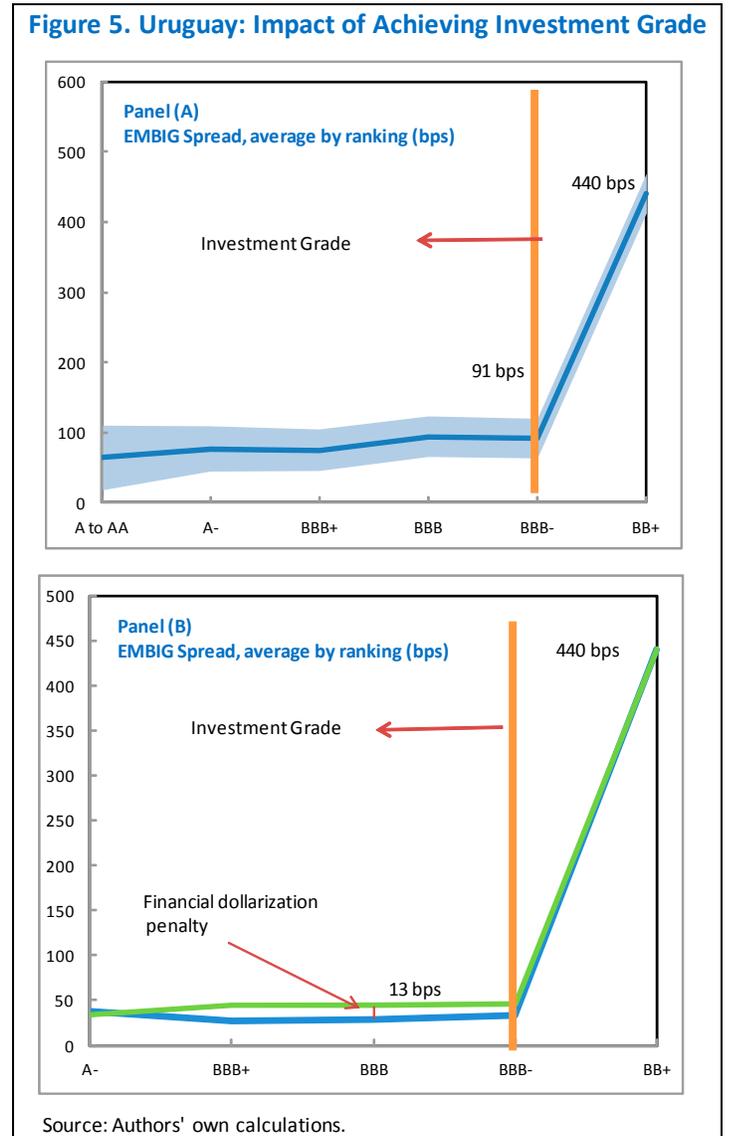
[11] Jaramillo and Tejada (2010) note that Wald tests show that the coefficients A- to A+ are not statistically different from one another (although the AAA grades are statistically different from the BBB grades).

Table 6a. Results: Model on Impact of Credit Rating Upgrades 1/

Variables	(A) Original	(B) Debt and Financial	(C) Debt Dollariz. * Rating	(D) Financial Dollariz. *	(E) Debt and Financial Dollariz. * Rating
Rating Impact					
AA+, A+ and A	-2.28 ***	-1.93 **	-3.08 *	-1.61 **	-0.24
	(0.49)	(0.62)	(1.28)	(0.45)	(0.81)
A-	-2.21 ***	-1.74 ***	-2.64 *	-2.44 ***	-0.67
	(0.36)	(0.39)	(1.21)	(0.47)	(0.79)
BBB+	-2.09 ***	-1.77 ***	-3.02 *	-2.78 ***	-1.60 *
	(0.34)	(0.35)	(1.23)	(0.38)	(0.76)
BBB	-1.85 ***	-1.54 ***	-2.63 *	-2.72 ***	-1.38
	(0.33)	(0.34)	(1.20)	(0.35)	(0.76)
BBB-	**-1.80 *****	**-1.57 *****	**-2.79 ***	**-2.59 *****	**-1.41**
	(0.33)	**(0.33)**	**(1.20)**	**(0.34)**	**(0.74)**
BB+	**-1.73 *****	**-1.52 *****	**-2.91 ***	**-2.61 *****	**-1.37**
	(0.33)	**(0.33)**	**(1.23)**	**(0.38)**	**(0.74)**
BB	-1.44 ***	-1.18 ***	-2.36	-2.06 ***	-1.06
	(0.30)	(0.31)	(1.21)	(0.37)	(0.74)
BB-	-1.41 ***	-1.15 ***	-2.02	-1.91 ***	-0.72
	(0.28)	(0.28)	(1.23)	(0.34)	(0.76)
B+	-1.11 ***	-0.91 ***	-1.61	-1.63 ***	-0.39
	(0.26)	(0.25)	(1.18)	(0.30)	(0.70)
B	-1.05 ***	-0.87 ***	-1.77	-1.68 ***	-0.39
	(0.24)	(0.23)	(1.11)	(0.29)	(0.61)
B-	-0.83 ***	-0.74 **	-1.52	-1.42 ***	-0.16
	(0.23)	(0.22)	(1.13)	(0.28)	(0.67)
CCC+	-0.46	-0.52 *	-1.13	-1.18 ***	0.16
	(0.26)	(0.25)	(1.21)	(0.28)	(0.92)
CCC	-0.43	-0.40	-0.81	-0.49	0.22
	(0.28)	(0.31)	(1.37)	(0.29)	(0.89)
CCC-	-1.13 ***	-0.85 **	-1.60	-1.35 ***	-0.16
	(0.25)	(0.25)	(1.10)	(0.23)	(0.96)
Rating * Debt Dollarization					
AA+, A+ and A * Debt Dollarization			0.02		-0.02
			(0.02)		(0.02)
A- * Debt Dollarization			0.01		-0.04 *
			(0.02)		(0.02)
BBB+ * Debt Dollarization			0.02		-0.02
			(0.02)		(0.02)
BBB * Debt Dollarization			0.02		-0.02
			(0.02)		(0.02)
BBB- * Debt Dollarization			**0.02**		**-0.02**
			(0.02)		**(0.02)**
BB+ * Debt Dollarization			**0.02**		**-0.02**
			(0.02)		**(0.02)**
BB * Debt Dollarization			0.02		-0.02
			(0.02)		(0.02)
BB- * Debt Dollarization			0.02		-0.02
			(0.02)		(0.02)
B+ * Debt Dollarization			0.01		-0.02
			(0.02)		(0.01)
B * Debt Dollarization			0.02		-0.03
			(0.02)		(0.01)
B- * Debt Dollarization			0.01		-0.03
			(0.02)		(0.01)
CCC+ * Debt Dollarization			0.01		-0.03
			(0.02)		(0.02)
CCC * Debt Dollarization			0.01		0.00
			(0.02)		(0.03)
CCC- * Debt Dollarization			0.01		-0.02
			(0.02)		(0.02)

1/ *** stands for significance at 1 percent level, ** stands for significance at 5 percent, and * at 10 percent.

Table 6b. Results: Model on Impact of Credit Rating Upgrades 1/

Variables	(A) Original	(B) Debt and Financial	(C) Debt Dollariz. * Rating	(D) Financial Dollariz. *	(E) Debt and Financial Dollariz. * Rating
Rating * Financial Dollarization					
AA+, A+ and A * Financial Dollarization				-0.13 ***	-0.15 ***
				(0.03)	(0.03)
A- * Financial Dollarization				-0.01	-0.03
				(0.02)	(0.02)
BBB+ * Financial Dollarization				0.04 ***	0.04 ***
				(0.01)	(0.01)
BBB * Financial Dollarization				0.04 ***	0.04 ***
				(0.01)	(0.01)
BBB- * Financial Dollarization				**0.03 *****	**0.03 ****
				(0.01)	**(0.01)**
BB+ * Financial Dollarization				**0.03 *****	**0.03 *****
				(0.01)	**(0.01)**
BB * Financial Dollarization				0.02 ***	0.03 **
				(0.01)	(0.01)
BB- * Financial Dollarization				0.02 ***	0.03 **
				(0.00)	(0.01)
B+ * Financial Dollarization				0.02 ***	0.03 **
				(0.01)	(0.01)
B * Financial Dollarization				0.02 ***	0.03 ***
				(0.00)	(0.01)
B- * Financial Dollarization				0.02 ***	0.03 **
				(0.00)	(0.01)
CCC+ * Financial Dollarization				0.02 ***	0.02 *
				(0.00)	(0.01)
CCC * Financial Dollarization				0.01 **	0.001
				(0.00)	(0.02)
CCC- * Financial Dollarization				0.02 ***	0.03 ***
				(0.01)	(0.01)
Global Variables					
VIX	0.03 ***	0.03 ***	0.03 ***	0.03 ***	0.03 ***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Federal Funds Rate	-0.04 **	-0.08 ***	-0.08 ***	-0.08 ***	-0.08 ***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Fundamentals					
Pub ext debt/GDP	0.01 **	0.02 ***	0.02 ***	0.02 ***	0.02 ***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
Pub dom debt/GDP	0.00	0.00	0.00	-0.01	-0.01
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
Reserves/GDP	0.00	0.00	0.00	-0.01 **	-0.01 *
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)
Real GDP growth	-0.03 ***	-0.02 **	-0.02 **	-0.02 **	-0.02 **
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Crisis Dummy	0.50 ***	0.72 ***	0.65 ***	0.65 ***	0.67 ***
	(0.10)	(0.12)	(0.13)	(0.10)	(0.11)
Lehmann Dummy	-0.22				
	(0.13)				
Public Debt Dollarization		0.00	-0.02	-0.01 *	0.01
		(0.00)	(0.02)	(0.00)	(0.02)
Financial Dollarization		0.01	0.01 *	-0.01	-0.01
		(0.00)	(0.00)	(0.00)	(0.01)
Constant	6.80 ***	6.33 ***	7.11 ***	7.75 ***	6.57 ***
	(0.43)	(0.74)	(1.40)	(0.59)	(0.92)
R Squared	0.79	0.79	0.80	0.83	0.84
Number of observations	4222	3043	3043	3043	3043
Number of countries	35	33	33	33	33

1/ *** stands for significance at 1 percent level, ** stands for significance at 5 percent, and * at 10 percent.

24.   **Estimates also suggest that the benefits of achieving investment grade are not the same for countries regardless of their dollarization level.** Models C - E estimate the "penalties" imposed by the markets on countries as they cross the threshold toward investment grade. In both cases, the coefficients for the credit rating dummies that are not interacted can be considered those applying to countries when dollarization equals zero, while the additional impact from the interacted credit rating provides the impact when there is full dollarization. While the estimation results cannot confirm the presence of a statistically significant penalty on debt dollarization, they suggest that there is a significant penalty by the markets to financial dollarization. Figure 4 depicts the "average" impact of achieving investment grade (Panel A): a non-dollarized country with a spread of, say, 440 bps at BB+ would see its spreads reduced to just under 100 bps when reaching BBB-. However, a country with a very highly dollarized financial system could see spreads some 40 percent (10-15 bps in the example) above those of non-dollarized countries (Panel B).

E.   What Are the Implications of "Trading Ahead of the Rating"?

25.   **What happens to countries that "trade ahead of their rating" during periods of stress in international capital markets?** To answer this question, this paper prepares an event study by looking at a sample of 35 emerging markets with daily data from January 1997 to October 2011. Specifically, the methodology is as follows:

- *Identify stress episodes.* These correspond to periods in which the VIX is greater than the VIX trend (obtained through a Hodrick-Prescott filter) plus a quarter of its standard deviation. A total of 14 episodes are identified during the period under analysis.

- *Identify the "frontier group countries."* These are the countries in the sample that were, at any point in time, ranked at one notch below investment grade by at least two rating agencies. Focus is set on Uruguay's regional peers (Brazil, Colombia, Mexico, Panama and Peru) and on Uruguay itself.

- *Identify the "investment grade benchmark spread."* For this purpose: (i) all countries that are ranked at investment grade or above by at least two rating agencies are identified; (ii) the daily average spread for those countries in the "benchmark group" are calculated; (iii) two bands are constructed around this average: (a) +/- one standard deviation, or (b) +/- half a standard deviation.

26.   **Results show that markets are frequently ahead of the ratings.** The regional "frontier group" often had days in which spreads were within the "investment grade range"; Brazil, Colombia and Uruguay have been the three countries that remained within the investment grade band for the longest time for the whole period in which they were in the "frontier group", that is, at one notch below investment grade granted by at least two rating

agencies. In particular, Uruguay has traded at investment grade spreads for some 60 percent of the days since it became a "frontier" country (Table 7).

27.   **Results also suggest that countries that trade ahead of the rating tend to stay within the benchmark investment grade group during stress episodes.** Of the total 25 country/episode pairs identified, only during 6 were countries in the "frontier group" outside the benchmark range of the emerging market spreads. Importantly, in 100 percent of these cases, the country in the frontier group had not been trading at emerging market spreads prior to the episode. In contrast, every single episode in which the frontier countries remained within group together at investment grade spread levels, they were also trading in group prior to the episode. Uruguay has clearly remained within group throughout all the relevant episodes.

Table 7: Evidence from Event Study

	Brazil	Colombia	Mexico	Panama	Peru	Uruguay
Days ranked by at least two agencies at Pre IG2 in total 1/	271	1,032	444	3,234	357	111
of which: Days trading at IG level	145	923	14	979	167	67
Percent	*54*	*89*	*3*	*30*	*47*	*60*
Test 1: Break Out at one Standard Deviation						
Days ranked by at least two agencies at Pre IG2 during episode	10	123	24	170	10	28
Days with EMBIG at IG2 or more	8	123	1	124	10	28
Percent	*80*	*100*	*4*	*73*	*100*	*100*
Test 2: Break Out at half a Standard Deviation						
Days ranked by at least two agencies at Pre IG2 during episode	10	125	24	170	10	28
Days with EMBIG at IG2 or more	0	109	0	114	5	28
Percent	*0*	*87*	*0*	*67*	*50*	*100*
Detailed Episodes - Average Effect 2/ 3/						
	-	-	-	In Group	-	-
A. 08/03/98 - 10/21/98	-	-	Out of Group	Out of Group	-	-
B. 10/12/00 -10/25/00	-	-	Out of Group	Out of Group	-	-
C. 09/17/01 - 10/04/01	-	-	-	Out of Group	-	-
D. 07/23/02 - 08/06/02	-	-	-	Out of Group	-	-
E. 09/03/02 - 09/17/02	In Group	In Group	-	In Group	In Group	-
F.11/12/07 - 11/23/07	-	In Group	-	In Group	-	-
G. 09/29/08 - 11/11/08	-	In Group	-	In Group	-	-
H. 11/19/08 -12/12/08	-	In Group	-	In Group	-	-
I. 01/20/09 -02/05/09	-	In Group	-	In Group	-	-
J. 05/16/10 - 06/18/10	-	In Group	-	In Group	-	-
K. 06/30/10 - 07/13/10	-	In Group	-	-	-	-
L. 03/16/11 - 03/29/11	-	In Group	-	-	-	-
M. 08/10/11 - 09/02/11	-	-	-	-	-	In Group
N. 10/03/11 -10/14/11	-	-	-	-	-	In Group

1/ Ranked by at least two rating agencies one notch down below Investment Grade

2/ From the test at one or more standard deviation from the IG group

3/ In all cases in which the spread was Out of Group during the episode, it was also Out of Group preceding the episode

28.   **These results seem to indicate that countries trading ahead of their rating can be resilient to market volatility, especially as they become closer to investment grade.** While it is not possible to generalize the result and conclude that countries in the frontier group trading at investment grade level cannot separate during events of stress, it is also true that the results suggests that this may be caused more by idiosyncratic factors (specific to the country's policies or fundamentals, that trigger an reclassification by the market) than by the credit rating per se.

F.   Final Remarks

29.   **Empirical evidence shows that dollarization can be key determinant of sovereign credit ratings.** In particular, the public external debt burden, and the trends observed in public debt and financial dollarization seem to "matter" as credit rating agencies assess whether a country's creditworthiness is at investment grade level.

30.   **Reaching investment grade generally reduces the sovereign's borrowing cost sharply, but this benefit can be reduced somewhat for highly dollarized countries.** Estimates show that penalties for high financial dollarization can amount to an excess market spreads of 40 percent over those of non-dollarized countries, as they gain investment grade status.

31.   **The findings suggest that Uruguay is well placed to reach investment grade, and could benefit from such an upgrade in terms of further spread reductions.** They also imply that ongoing efforts to reduce debt and financial dollarization would help it exploit such benefits more fully. Finally, the results suggests that as long as Uruguay sustains a strong set of policies, it will be likely to maintain its trading ahead of the rating—even if uncertain global conditions were to continue and bouts of volatility were to emerge.

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Appendix I. Summary of Relevant Literature

Table 1: Summary of Empirical Literature on Determinants of Credit Ratings

Authors	Method	Sample	Explanatory variables
Afonso (2003)	OLS	81 countries, June 2001	GDP per capita (+), Real GDP growth (+), Inflation (-), External debt ratios (-), Economic Development (+), Default (-)
Afonso, Gomes, Rother (2007)	Ordered Probit Ordered Probit RE	130 countries, 1970-2005 Moody's, S&P, Fitch	GDP per capita (+), Real GDP growth (+), Inflation (-), External debt ratios (-), International Reserves (+), Default (-), Government effectiveness (+), EU (+)
Archer et al (2007)	OLS Panel Corrected SE	50 developing countries 1987-2003 Moody's, S&P, Fitch	Trade (+), Inflation (-), Real GDP growth (+), Default (-)
Cantor and Packer (1996)	OLS	49 countries,Sept 1995, Moody's Moody's and S&P	GDP per capita (+), Real GDP growth (+), Inflation (-), External debt ratios (-), Economic Development (+), Default (-)
Jaramillo (2010)	Binomial Logit RE	49 countries Moody's, S&P, Fitch	GDP per capita (+), Exports/GDP (+), Ratio de External Debt (-), Domestic Debt Ratio (-), M1/GDP (+), Political Risk (-), Default (-)
Gaillard (2009)	Ordered Probit	100 subnational governments Moody's, S&P, Fitch	GDP per capita (+), Default (-), Debt/Operational Revenue (-), Interest/Operational Revenue (-)
Mellios and Paget-Blanc (2006)	Ordered logistic	86 countries, December 2003 Moody's, S&P, Fitch	GDP per capita (+), Public revenue (+), Real Exchange Rate Change (+), Inflation (-), Default (-), Corruption (-)
Mulder and Perrelli (2001)	Pooled OLS Feasible GLS	25 emerging market countries, 1987-2003 Moody's and S&P	Debt/Exports (-), Default (-), Fiscal balance (+), Real GDP growth (+), Inflation (-), Investment/GDP (+)
Nolland (2005)	OLS	44 countries, PEW survey Moody's	GDP per capita (+), Inflation (-), External Debt/International Reserves (-), Dolarizacion Financiera (-), Investment/GDP (+),
Powell and Martinez	Panel with FE, RE	43 countries Moody's and S&P	GDP per capita (+), Debt publica/GDP (-), External Debt/Exports (-), Default (-), Current Account (+), Tax Revenue/Debt (+), Volatilidad TCR (-), US Treasury (+)
Rowland (2004)	OLS	50 developing countries, July 2003 Moody's and S&P	GDP per capita (+), Real GDP growth (+), Inflation (-), External debt ratios (-), International Reserves (+), Openness (+)
Rowland and Torres (2004)	GLS RE	16 emerging market countries, 1987-2001 Moody's and S&P	Real GDP growth (+), Inflation (-), External debt ratios (-), International Reserves (+), Default (-)

Sources: Jaramillo (2010) and own preparation.

Table 2: Summary of Empirical Literature on the Impact of Credit Rating Changes on Spreads

Authors	Method	Muestra	Explanatory Variables
Cantor and Packer (1996)	OLS	49 countries,Sept 1995, Moody's Moody's and S&P	Rating (-), External Debt (-),Economic Development (-), Default (+)
Cavallo, Powell, Rigobon (2010)	OLS, ECM	32 emerging markets, 1998:01-2007:05 Moody's, S&P, Fitch, daily data	Investment Grade (-)
Jaramillo and Tejada (2011)	FE with Robust SE	35 countries, monthly, 1997:01-2010:03 Moody's, S&P, Fitch	Investment Grade (-), VIX(-), External Debt/GDP (+), International Reserves/GDP (-), Real GDP growth (-)
Gonzalez Rozada and Levy Yeyati (2008)	OLS with dummies	33 emerging markets, monthly, weekly, daily varying period per country, S&P	Ratings are endogenous, they reflect spreads rather than anticipate them
Kaminsky and Smucker (2002)	Panel	16 emerging markets, 1990:01-2000:06 Moody's, S&P, Fitch, daily data	Investment Grade (-)
Powell and Martinez (2007)	Factor Analysis OLS	43 countries Moody's and S&P	Rating (-), VIX (-), Global Factors

Source: Prepared by the authors.

Appendix II. Data

Table 1. Model of Determinants of Investment Grade: Country Sample

Algeria	Czech Rep.	Indonesia	Mexico	South Africa
Argentina	Dominican Rep.	Israel	Morocco	Sri Lanka
Bosnia-Herz.	Ecuador	Jamaica	Pakistan	Thailand
Brazil	Egypt	Jordania	Panama	Tunisia
Bulgaria	El Salvador	Kazakhstan	Peru	Turkey
Chile	Estonia	Korea	Philippines	Ukraine
China	Guatemala	Latvia	Poland	Uruguay
Colombia	Hungary	Lebanon	Romania	Venezuela
Costa Rica	Iceland	Lithuania	Russia	Vietnam
Croacia	India	Malaysia	Serbia	

Table 2. Model of Impact of Ratings on Spreads: Country Sample

Argentina	Dominican Rep.	Kazakhstan	Panama	Sri Lanka
Brazil	Ecuador	Lebanon	Peru	Thailand
Bulgaria	Egypt	Lithuania	Philippines	Tunisia
Chile	El Salvador	Malaysia	Poland	Turkey
China	Hungary	México	Rusia	Ukraine
Colombia	Indonesia	Morocco	Serbia	Uruguay
Croacia	Jamaica	Pakistan	South Africa	Venezuela

III. THE URUGUAYAN LABOR MARKET[1]

A. Introduction

1.   **The Uruguayan labor market has undergone significant changes in recent years.** First, against the backdrop of the strong economic recovery after the 2002 economic crisis, Uruguay has experienced a sharp reduction in the unemployment rate amid rising labor force participation and a considerable increase in real wages. Second, there have been several important changes to the labor market regulatory framework and the social security system. The collective bargaining framework was restored in 2005, and further revamped in 2009 through a new wage negotiation law. In 2010, the government suggested indexation formulas that sought to align real wage increases with productivity growth in each sector. While such an alignment has yet to take place in full, the real wage has been shielded against reductions through inflation indexation; in the 2010/11 wage round more than 90 percent of agreements included clauses with ex-post corrections for deviation between actual and expected inflation.

2.   **This paper seeks to understand better these changes as well as their implications.** To this end, it delves into its recent performance and regulatory changes, and includes an empirical analysis that attempts to gauge how the degree of labor market flexibility has evolved over time—in line with the different regulatory regimes that have characterized Uruguay in the last few decades. While in practice the degree of regulation and the character of any labor market regime constitute a social and political choice particular to each country and may vary over time, it is important for policymakers to have clarity on how these regimes and their key features interact with other macroeconomic variables and affect an economy's mechanisms of adjustment to shocks.

3.   **The first part of this paper reviews the key features of Uruguay's labor market.** It includes a brief review of developments in unemployment and wages, including by looking into the evolution and role of the minimum wage and changes in the regulatory framework. It finds—in line with recent studies on the topic—that minimum salaries, though rising markedly in recent years, are not yet binding in the determination of other salaries in the economy. It also suggests that the reforms to the wage bargaining process and to social security have intensified the degree of labor market regulations.[2]

4.   **The second part of the paper undertakes an empirical study of labor market flexibility in Uruguay and comparator countries.** Its results suggest that wage indexation on inflation and employment flexibility declined during the period of weaker collective bargaining (1994-2005), although both indexation and employment flexibility have generally

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[1] Prepared by Natalia Melgar and Jiri Podpiera, with input from Harold Zavarce on an earlier draft.

[2] For fuller reviews of Uruguay's labor market, see e.g., Alaimo and Rucci (2009), Amarante and Arim (2009), Amarante and Espino (2007), Furtado (2006), Lederman et al. (2011) and Pages (2005).

remained above those observed in comparator countries for the last few decades. The results also indicate that the greater wage indexation to inflation in recent collective wage agreements would imply greater fluctuations in employment in response to economic shocks.

B. Key Features of the Labor Market

Recent Developments

5.   **Uruguay's economic recovery since the country's crisis in 2002 has led to a significant improvement in labor market conditions.** The unemployment rate has fallen sharply, reaching record lows.[3] However, youth unemployment (of those aged 25 years or below) has fallen somewhat less and remains high at 19.7 percent (2010 average). Unemployment among unskilled workers also remains relatively high.[4] *Real* wages

contracted during the 2002 crisis, but have since experienced a sustained improvement and now are about 9 percent higher than in 2000. This increase in real wages has gone hand in hand with substantial gains in labor productivity. Since 2004, series labor productivity has risen by 5 percent a year on average— according to data from the International Labor Organization's (ILO).

Figure 1. Uruguay: Labor Market Indicators
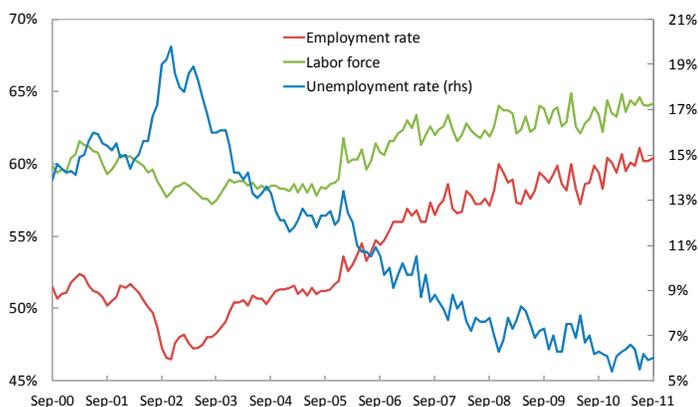
Source: Instituto Nacional de Estadistica.

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[3] The unemployment rate is also much lower than the natural rate of unemployment—estimated at 10.5 percent by Tubio and Borraz (2010). However, as this figure is difficult to accurately measure, it should be taken with caution.

[4] The labor market data is based on the household surveys and covers both the formal and informal sectors.

Figure 2. Uruguay: Selected Labor Market Indicators

Labor Force and Employment
(In thousands)

- Labor force
- Employment

Labor Force Participation Rate
(In percent of working-age-people, 14 years or more)

Unemployment Rate
(In percent, under 25 years old)

Unemployment Rate
Percent of labor force

- 2006
- 2007
- 2008
- 2009
- 2010

Uruguay, Argentina, Brazil, Chile, Paraguay, Colombia, Peru, Australia, New Zealand, Thailand

Unionization
(In percent)

- Public
- Private

Real Wage and Labor Productivity
Annual percentage changes

- Real wage
- Labor productivity

Sources: Banco Central del Uruguay, Instituto Nacional de Estadistica, National Bureau of Statistics, World Bank, Alaimo and Rucci (2009), Botero et al. (2004) and IMF staff calculations.

C. Minimum Wage Recovery

6.   **The minimum wage has been increased several times since 2005.** The minimum wage was established by law in 1969. Its adjustment is not linked to a specific formula or price index, but determined by the government. During 2000-04, the nominal minimum wage reached a historical low level,[5] and inflation eroded its real value. Starting in 2005, the government adopted an explicit policy to ensure its recovery, and the frequency of the adjustments has been increased to twice a year. The minimum wage was raised from UR$ 1,310 in January 2005 to UR$ 6,000 in January 2011. These increases translate into a 19 percent a year real increase in the minimum wage in 2005–11 (or 27 percent in nominal terms in the same period).

Figure 3. Uruguay: Minimum Wage Indexes (2005=100)

Source: Instituto Nacional de Estadística.

7.   **The minimum wage appears to remain non-binding in the determination of other salaries.** Bucheli (1998) and Furtado (2006) examined the potential impact of minimum wage increases in Uruguay, concluding that it was not relevant even in the cases of unskilled and young workers. There is no clear empirical evidence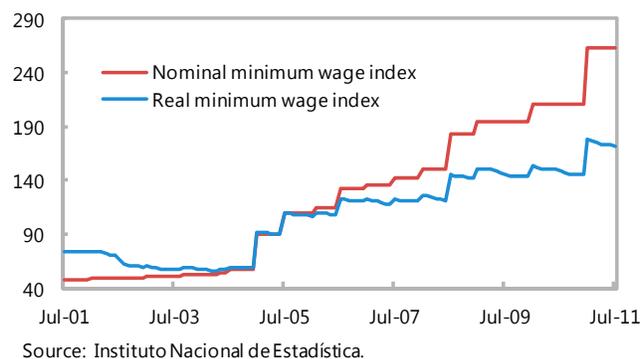 suggesting that there is a significant causal link between the minimum wage and wage setting. More recently, Borraz and González (2011) have shown that the increases in the minimum wage in Uruguay have played no role in improving income-distribution.

8.   **Uruguay's minimum wage does not appear high compared with other countries in the region**. In fact, when measured in purchasing power terms or in relation to GDP per labor force member, Uruguay's minimum wage is the lowest among selected countries in Latin America and much lower than in the United States and France—albeit higher than in Thailand and Malaysia. Cunningham (2007) finds that the share of the labor force that earns the minimum wage in Uruguay is the lowest in Latin American and the Caribbean.[6]

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[5] These studies also argue that this fact distinguished Uruguay from the region (Furtado, 2006). Kristensen and Cunningham (2006) show that while in 1986, almost 30 percent of the workers earned the minimum wage; this ratio was only about 3 percent in 2003.

[6] Though, as Cunningham (2007) also states, a low proportion of minimum wage earners does not necessarily mean that the minimum wage is irrelevant; it is still likely to affect wage distribution. However, Borraz and González (2011) showed that in the case of Uruguay the minimum wage has had a non-significant impact on wage inequality.

Table 1. Uruguay: Minimum Wage in Uruguay and Selected Countries, 2010

		Mimimum wage	Gross annual minimum wage (1)	Gross annual minimum wage (2)	Gross domestic product per labor force member (3)	Percentage of gross domestic product per labor force member (2)/(3)
	Frequency	National Currency	National Currency	Purchasing-power-parity (PPP) valuation	Purchasing-power-parity (PPP) valuation	%
Latin America						
Uruguay[1]	Monthly	4,799	57,588	3,209	26,737	12.0
Chile[2]	Monthly	172,000	2,064,000	6,240	31,646	19.7
Peru[3]	Monthly	600	7,200	4,540	18,482	24.6
Colombia[3]	Monthly	515,000	6,180,000	4,827	21,379	22.6
Argentina[3]	Monthly	1,500	18,000	7,934	30,034	26.4
Brazil	Monthly	510	6,120	3,897	19,823	19.7
Others Countries						
Thailand[3]	Daily	179	46,410	2,700	14,186	19.0
Malaysia[3]	Monthly	350	4,200	2,092	32,740	6.4
Advanced Economies						
United States	Hourly	7.3	15,080	15,080	90,162	16.7
France	Hourly	8.9	18,429	20,036	74,460	26.9

Note: Annual wages were calculated by multiplying monthly wages by 12, weekly wages by 52, daily wages by 5x52 and hourly wages by Wx52, where W is the legal maximum workweek length in hours.

Sources: National Authorities, United State Department of State, IMF and IMF staff calculations.

1/2008 Country Reports on Human Rights Practices, United States Department of State.

2/Chilean Law 20,359.

3/2009 Country Reports on Human Rights Practices, United States Department of State.

D.   Recent Regulatory Reforms

9.   **There have been important institutional and regulatory reforms to the labor market in recent years.** Starting in 2005, restore the collective bargaining system and enhance unemployment insurance and the social security regime more generally (Annex 1).

10.   **Uruguay has a long-standing tradition of collective bargaining.** Wage negotiations first started in 1943 (Law 10,449) through the creation of a tripartite wage negotiation mechanism reliant on wage councils whose main task was fixing minimum wages for each sector of activity. In 1993, this mechanism was suspended (except for some sectors such as health, public transport, and construction). In 2005, through the Decree 105, the wage councils were restored and a Tripartite Superior Council created. The latter was comprised by nine government representatives, six private sector employer representatives and six worker representatives. Agreements were "homologated" by decree in order to ensure that they became legally binding.[7]

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[7] To homologate means the granting of official approval of the agreement by the government in order to make it compulsory. Hence, there is only one table of minimum wages per sector and a minimum of wage adjustments given by the agreement.

11.   **In 2009, a new wage negotiation law was approved.** The law (number 18,566) establishes that negotiations between employers and employees are compulsory, while the government would only intervene if requested by either party. The law also establishes that negotiations can take place within one firm or—at the other extreme—can comprise a whole sector. When done at the sector level, all elements of the agreement (minimum wage, percentage of salary adjustment, etc.) apply to all firms in the sector, involving all employees (irrespective of whether they belong to the union or not). However, a firm can sign a different agreement with its employees provided that it includes better terms for the employees than in the sector-wide agreement. Exceptionally, a firm can request a waiver (from the Labor Ministry) from fulfilling the agreement (*"descuelgue")* if it provides proof that the agreement would entail a large negative impact on the firm. All clauses of an existing agreement are valid until a new agreement supersedes the previous one ("ultra-activity").

12.   **There are ongoing discussions about further modifications to the collective bargaining framework.** In 2009, the private sector requested the ILO to review the new law and its compliance with ILO conventions.[8] The main points being reviewed by the ILO are presented in Annex 2.

13.   **Data suggest that the new labor framework has had an impact on wage determination.** In particular, the wage adjustment that followed from the 2010 wage negotiation round is based on three key guidelines provided by the Finance Ministry: (i) expected inflation; (ii) a weighted average between expected productivity growth at macroeconomic level and expected productivity growth at sector level and (iii) ex-post corrections of actual CPI inflation minus the expected inflation included in the previous agreement. The wage adjustment is annual or biannual; the agreements, in general, last between one and five years.[9]

14.   **The vast majority of the agreements under the 2010 wage negotiation round included inflation indexation, but only few embedded productivity growth.** During this round, more than 80 percent of the activity groups negotiated a new agreement. In general, all agreements have set wages taking into account expected inflation (in general, it is the mid-point of the official target range of 4-6 percent, or an average between this figure and the

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[8] ILO has suggested a change in Uruguayan labor legislation because it contradicts ILO's Conventions 98 and 154 regarding free negotiations between employers and employees. The claim is that the current legislation should respect the labor rights of those workers who disagree with occupying the working place and cannot work due to such an occupation. It should also respect the property rights of the entrepreneurs who cannot access their property (such as the building or the machinery). Report available at: http://webfusion.ilo.org/public/db/standards/normes/appl/appl-displaycomment.cfm?hdroff=1&ctry=0620&year=2010&type=O&conv=C098&lang=En

[9] The 2010 round is finished with 88 percent of the sub-groups have signed a new agreement. The remaining 12 percent has finalized discussions with agreements still to be signed or the agreement signed in a previous round continues to be valid.

median inflation expectation that results from the Central Bank survey). Also, almost all agreements include clauses for ex-post corrections (the difference between the actual inflation and the one in the agreement).

15.   **Since 2006, there have been other several important changes to the labor framework, which aim at strengthening employees' rights (Annex 1).** For example, law 17,940 grants immunity to union members, law 18,065 regulates the conditions of those working in domestic services, while laws 18,099 and 18,251 provide protection for workers which could be affected by the decentralization.

16.   **Reforms in recent years have also involved changes to the social security system and unemployment benefits.** In 2008, a reform was adopted (law 18,395) which allows workers to retire with contributions to the system for 30 years or more (instead of 35 years) and gives special benefits to women (for example, each child is considered as one year of service). Law 18,399 establishes that the maximum coverage for unemployment insurance is six months (as before but in some cases, exemptions have been approved in order to extend its duration). It also establishes that the unemployment insurance equals the average value of the last six months' wages with a gradually decreasing percentage (66, 57, 50, 45, 42 and 40 percent),[10] in contrast with the previous law, which established that the insurance would equal 50 percent of the average value of the last six months wages.[11] The law also creates a new legal concept "partial unemployment insurance" that is paid when the usual working day is reduced by 25 percent or more. This change helps enhance labor flexibility while keeping workers connected to work-key for maintaining skills. As Casanova (2009) shows, this measure has been applied since the 2008

Figure 4. Number of People Receiving the Unemployment Insurance
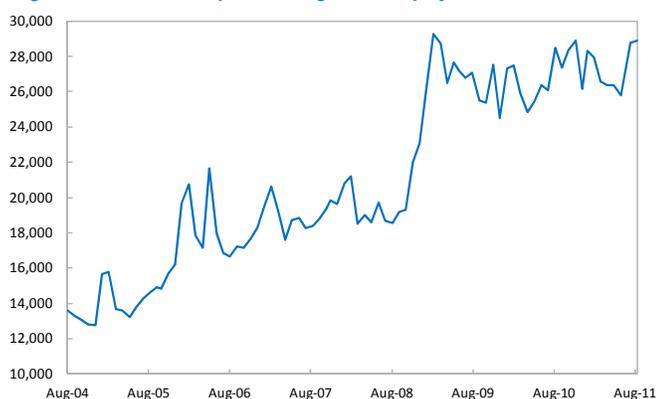
Source: Banco de Prevision Social (BPS)

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[10] The Executive could extend the period to 8 months in case of a recession.

[11] The law also establishes the minimum and the maximum of the insurance (1 and 11 Base de Prestaciones y Contribuciones, BPC), the previous maximum was 8 minimum wages. In 2004, a new law (17,856) creates a new unit, BPC, which is used to determine the income tax (IRPF) brackets among other things.

global crisis especially by those sectors which registered a deep fall in demand (such as car-parts, and tanneries).[12]

17.   **The authorities are also putting in place strategies to enhance the country's labor skills.** These respond to the rising skill gap in the labor market. In 2008, a new institute was created, the National Institute of Employment and Training ("Instituto Nacional de Empleo y Formación Profesional", INEFOP) which is responsible for enhancing skilled labor through designing and implementing training courses.

Labor regulation index

18.   **The implications of recent changes to labor regulations can be assessed by updating the index developed by Botero et al. (2004).**[13] One conclusion of Botero et al. (2004) is that heavier regulation of labor market may have adverse consequences for labor force participation and unemployment, especially for the young workers. Their "Labor Regulation Index" ranges from 0 to 1, and a number closer to one implies a heavy degree of regulation in the labor market. The index encompasses: (i) employment laws; (ii) collective relations laws, and (iii) social security laws. The sub-index of employment laws reflects the incremental cost to the employer of deviating from a hypothetical contract, in which the conditions of a job are specified and a worker cannot be fired. The second sub-index measures the protection of workers from employers through collective action. The third sub-index addresses the generosity of benefits by measuring the percentage of the net previous salary covered. According to the study, in 1997, the maximum value of the index was 0.75 for Russia and the minimum was 0.14 and corresponds to Malawi. Uruguay's index was below the median and average (Table 2).

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[12] Despite the fall registered in unemployment, the number of unemployment insurance requests has risen. This is due to a sharp increase in formalization in the labor sector, which has improved access to the available unemployment instruments.

[13] The information in Uruguay comes from the relevant laws and regulations and the ILO's Conditions of Work Digest (2010) and The Economist Intelligence Unit's Country Commerce Report (2010, 2011).

Table 2. Uruguay: Index of Labor Regulation and Subindices

	Employment Laws	Collective Relations Laws	Social Security Laws	Overall Labor Regulation 1/
1997				
Min	0.15	0.19	0.00	0.14
Max	0.83	0.71	0.87	0.75
Average	0.49	0.45	0.57	0.50
Median	0.47	0.46	0.68	0.51
Argentina	0.34	0.58	0.72	0.55
Brazil	0.57	0.38	0.55	0.50
Chile	0.47	0.38	0.69	0.51
Uruguay	0.15	0.29	0.11	0.18
2010				
Uruguay	0.28	0.69	0.74	0.57

Sources: Botero et al. (2004) and IMF staff calculations.

1/ Average of the subindices.

19.   **According to the update, recent changes appear to have made the labor regulations somewhat heavier in Uruguay**. The biggest increase in the overall index comes from the change in the sub-index for collective relations laws, which in turns is explained by the new mechanisms of collective bargaining (Annex 2).

20.   **The changes to the social security regime have also contributed to a relatively heavier regulation.** The increase in the social security regulation sub-index corresponds to the change in how to compute the years of contribution needed to retire (law 18,395) and the increase in the unemployment insurance coverage in time and amount (law 18,399).

E. Assessing Labor Market Flexibility

Background

21.   **Recent reforms to the Uruguay's labor market framework might have implications for labor market flexibility, as the available literature on Uruguay suggests**. Allen et al. (1994) and Lederman et al. (2011) document that the Uruguayan collective bargaining system of 1985-93 and changes in unionization during 1997-2000 influenced labor market flexibility in the past. Against the backdrop of the recent restoration of the collective bargaining agreements and the new guidelines for wage determination based on inflation and productivity, this section provides empirical stylized facts about the macroeconomic labor market flexibility in Uruguay, relative to regional peers and selected countries of Asia, using the wage Philips curve and a quarterly VAR model.

22.   **The degree of labor market flexibility prevailing in a country influences its response to macroeconomic shocks.** A flexible labor market allows for adjustment in real wages along the business cycle. When a strong downward real wage rigidity is present (particularly during the economic downturns), it tends to exacerbate the initial negative economic shock through employment flexibility. Intuitively, this is because companies

cannot adjust the rigid real wages of their employees and thus respond through layoffs and substituting the most expensive workers with cheaper hires (employment flexibility) to adjust labor costs. This can prolong the adjustment process and makes it more costly in terms of output loss and often for workers as well.[14]

23.   **A higher real wage rigidity is usually associated with higher employment fluctuations.** Based on evidence from 12 European Union countries, Babecky et al. (2010) show that companies tend to use cheaper hires (by laying off high-wage employees and hiring low-wage ones), to lower labor costs, and that such practice is statistically significantly positively related to the degree of nominal wage rigidity existing in the country. Lederman et al. (2011) show that the volatility of wages of those employees who "move" is higher than that of those who "stay"—implying that, in practice, the greater wage rigidity may not only turn out in greater employment shifts—but also that those workers who move will be affected by a greater change in their salaries as they transition through new posts.

24.   **The degree of labor market flexibility influences both the business cycle and the design of stabilization policies that address it.** For example, as shown by Jadresic (1996) and Herrera (2002), how wage contracts are specified affects the magnitude of the economic downturn and cost of disinflation, that is, the sacrifice ratio. The slower the adjustment in real wages, the slower and more costly is the disinflation process. Thus, nominal wage indexation on inflation increases the rigidity in real wages and the time and cost of disinflation. This is in line with recent evidence for a variety of countries. To illustrate, according to Marczak and Beissinger (2010), Germany's real wages tend to adjust to the economic cycle with a lag due to nominal wage stickiness (which implies a real wage rigidity). Therefore, macroeconomic stabilization may entail a deeper decline in employment and output and takes longer than under more flexible wages (Gomes, 2002).

Wage Philips Curve

25.   **The wage Philips curve estimation provides macroeconomic evidence on the degree of wage flexibility.** The specification of the modern wage Philips curve goes back to Friedman (1968), who expressed the relationship between the expected real wage, productivity, and unemployment as follows: [15]

$$w_t - p_t^e = w_{t-1} - p_{t-1} + \Delta x_t + \alpha - \beta u_t,$$

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[14] In practice, real wage rigidities can appear due to contractual, institutional or legal restrictions to modify wages both at the real or nominal levels. Ultimately, however, it is the real wage flexibility that serves as a determinant of the overall degree of wage flexibility in each specific labor market.

[15] Since the relation is between the expected real wage and the change in labor productivity, the change in labor productivity is assumed to be exogenous to the expected real wage. This has been a common practice—for a recent example, see Babecky et al. (2010) and Allen et al. (1994).

where *w, p,* and *x* are logs of the nominal wage and price levels and labor productivity, and *u* denotes the unemployment rate. Under the assumption of backward-looking inflation expectations, the wage curve can be rewritten as follows: [16]

$$\Delta w_{i,t} = \alpha_i - \beta u_{i,t} + \gamma \Delta p_{i,t-1} + \delta \Delta x_{i,t} + \varepsilon_t \,,$$

which is the underlying regression specification for a particular country *i*, and where *α, β, γ,* and *δ* are parameters to be estimated and ε_t denotes an i.i.d. error term. In addition, for Uruguay, we control for the dynamics of minimum wage—an exogenous factor, which might affect wage dynamics.

26.   **The analysis utilizes four basic time series per country at annual frequency, of varying available time spans per country, over the period 1983 and 2010:**

- *Nominal wage index*, derived from the real wage index (from EIU) using the *consumer price index* (IMF).

- *Minimum wage* (Haver database).

- *Consumer price index* (IMF).

- *Labor productivity* is the GDP per employed person in prices of 1990 in purchasing power parity (PPP) measured in US dollars (IMF and ILO).

- *Unemployment rate* (IMF).

27.   **The sample includes countries in Latin America as well as selected peers in Asia.** The sample of Latin American countries consists of Chile, Colombia, Brazil, Mexico, Peru (LA5), Argentina, and Uruguay (Region 1). In addition, the sample (Region 2) includes Australia and New Zealand because these countries have similar production structure, compete in the same product markets, and thus could serve as good out-of-the-region comparators.

28.   **Nominal wages in Latin America exhibit large sensitivity to unemployment, and Uruguay is not an exception.** A percentage change in the unemployment rate affects nominal wage dynamics by roughly a percentage point (Table 3). Uruguay seems to be aligned with the region since the Uruguay-specific effect of the unemployment rate on nominal wage dynamics is statistically insignificant (see results for Region 1).

29.   **Country specific constants (fixed effects) suggest the presence of stable differences among countries.** The reported Hausman specification test (see Table 3)

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[16] The specification nests alternative hypotheses about inflation expectations, including random walk.

confirms that there are stable differences among countries in the panel. These fixed effects capture, for instance, the extent of the informal economy and other country-specific labor market characteristics.

	Nominal Wage (Δw_t)		Real Wage ($\Delta w_t - \Delta p_t$) 1/	
Table 3. Uruguay: Results for Fixed-Effects Regression				
	Region 1	Region 2	Region 1	Region 2
const	0.16***	0.12***	0.11***	0.08***
	(0.15)	(0.01)	(0.02)	(0.01)
Δp_{t-1}	0.43***	0.44***	-	-
	(0.06)	(0.056)	-	-
Δx_t	0.18*	0.23***	0.2	0.25**
	(0.1)	(0.09)	(0.14)	(0.1)
u_t	-1.11***	-0.99***	-1***	-0.88***
	(0.14)	(0.12)	(0.19)	(0.1)
D(URY)*Δp_{t-1}	0.32***	0.31***	-	-
	(0.08)	(0.08)	-	-
D(URY)*Δx_t	-0.63***	-0.68***	-0.14	-0.18
	(0.2)	(0.2)	(0.3)	(0.2)
D(URY)*u_t	-0.36	-0.48	-0.3	-0.47
	(0.31)	(0.31)	(0.4)	(0.3)
R^2 / within / between	0.56 / 0.84 / 0.04	0.33 / 0.77 / 0.02	0.1 / 0.33 / 0.04	0.05 / 0.04 / 0.33
Hausman test	χ^2 = 26.97	χ^2 = 52.89	χ^2 = 19.02	χ^2 = 30.3
	(0.00)	(0.00)	(0.00)	(0.00)
Nobs / countries	105 / 7	159 / 10	105 / 7	159 / 10
Min / avg / max	9 / 15 / 18	9 / 15.9 / 18	9 / 15 / 18	9 / 15.9 / 18

Note: 1/ The regression specification is as follows: $\Delta w_t - \Delta p_t = \theta \Delta x_t + \lambda u_t + \Delta x t*D(URY) + \delta u t*D(URY) + \chi_t$. Region 1 includes AL5 (Chile, Colombia, Brazil, Mexico, and Peru), Argentina, and Uruguay; Region 2 includes countries in Region 1 and Australia and New Zealand. The longest time period spans over 1993-2010 and the shortest over 2002-2010. D(URY) is a dummy varibale and equals one for Uruguay and zero otherwise. Stars denote significance as follows: *** at 1, ** at 5, and * at 10 percent level.

30.   **Wage indexation on inflation in Uruguay is relatively higher than the Latin American average.** The average coefficient on past inflation in the region of 0.43 is well below the one (0.75) for Uruguay (see results for Region 1). Nominal wages in the other countries of the region seem to be more tightly linked to productivity, with the coefficient of 0.18. However, in Uruguay, the link significantly differs and, in fact, productivity appears to correlate weakly negatively with nominal wage dynamics. This could be a consequence of a high degree of indexation on past inflation, when nominal wages of incumbent employees have not been compensated for the increase in productivity over the sample period.

31.   **The extended country sample shows a similar picture.** Extending the sample for Australia and New Zealand affects the results only minimally (see the results for Region 2). The nominal wage response to unemployment is slightly lower, while the relation to productivity is slightly higher. The wage Philips curve fits the data well.

32.   **Real wages respond to unemployment and productivity in a similar way as nominal wages.** The response of real wages to unemployment and productivity is only marginally lower than the response of nominal wages (see Table 3). It follows that, as expected, adjustments in real wages take place mostly through nominal wages both in the region and in Uruguay as well—the Uruguay-specific effect is not statistically significant.

33.   **Regarding the volatility of employment and output, Uruguay stands out compared to its peer countries.**
Uruguay's relatively higher volatility of output and employment might be due to larger shocks to its GDP or a lengthy economic adjustment to shocks. Nevertheless, the positive correlation of output and employment volatility suggests that employment flexibility may be part of the labor market adjustment mechanism to macroeconomic shocks.

Figure 5. Output and Employment Volatility
(Standard deviation from trend, in percent; 1980-2010)
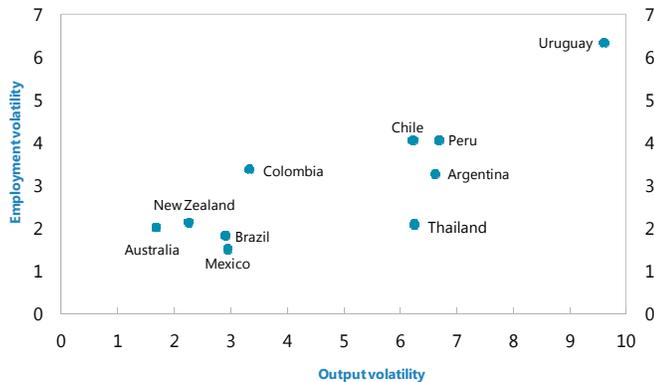
Source: International Labor Organization, Haver, and IMF staff calculations.

34.   **Focusing on Uruguay alone, the results suggest that the degree of wage indexation to past inflation declined during the period in which collective wage bargaining was suspended (see Table 4).** While for the entire sample (1983-2010) the wage indexation to past inflation is nearly 100 percent, the indexation for the period without collective bargaining (1994-2005) is somewhat lower.[17] During the most recent round of wage bargaining, the degree of indexation on inflation further increased (see Section I.C).

35.   **The wage response to unemployment is also relatively high overall, but somewhat lower in the subsample 1994-2005.** An increase in unemployment by one percent lowers nominal and real wages by 1.34 and 1 percent, respectively, depending on the sample. The elasticity of wages to unemployment is lower in the period of weaker collective bargaining (1994-2005), which is consistent with the observation of lower indexation on inflation in that period. The minimum wage ($\Delta minw_t$), which is statistically insignificant, appears to be non-binding for nominal wage dynamics and hereby confirming the evidence of Amarante et al. (2008), reviewed in Part II. B.

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[17] A caveat must be made on the results for the period 1994-2005, which are based on a very small number of observations.

Table 4. Uruguay: Wage Philips Curve for Uruguay

	Parsimonious		Sensitivity to minimal wage	
	1983-2010	1994-2005	1983-2010	1994-2005
const	0.18*	0.12**	0.2**	0.12**
	(0.09)	(0.05)	(0.09)	(0.05)
Δp_{t-1}	0.92***	0.81***	0.82***	0.8***
	(0.09)	(0.05)	(0.11)	(0.07)
Δx_t	-0.72**	-0.41***	-0.81**	-0.41***
	(0.32)	(0.12)	(0.32)	(0.12)
u_t	-1.34*	-0.99***	-1.44*	-1.0***
	(0.7)	(0.3)	(0.7)	(0.3)
$\Delta minw_t$			0.08	0.01
			(0.05)	(0.02)
R^2 - adj.	0.84	0.98	0.84	0.98
D.W.	1.8	2	1.8	1.9
Nobs	28	12	28	12

Note: Stars denote significance as follows: *** at 1, ** at 5, and * at 10 percent level.

36.   **Nominal wages increases seem to have been inversely related to productivity, which might be a result of their high indexation and the response to higher unemployment during the low parts of the cycle.** A higher negative relation is found for the longer sample than the more recent one—likely explained by the changes implied by the collective bargaining agreements. As it follows from the comparison of the two different time spans, higher wage indexation to past inflation is consistent with a larger wage response to unemployment and also a higher negative relation between wages and labor productivity. Drawing on this observation, even though it might be somewhat eroded by the small number of observations in the period 1994-2005, the recent changes to collective bargaining, may have lead to an increase in nominal and real wage rigidities and could increase employment fluctuations in response to negative shocks compared to the period 1994-2005.

Vector Autoregression

37.   **This section reports results for an unrestricted quarterly VAR model.** The model contains four variables: nominal wages, unemployment rate, real GDP, and CPI on a quarterly frequency, from the Haver database. The VAR is based on year-on-year dynamics, while impulse responses are constructed with respect to unitary shocks, based on reduced form residuals, in selected variables.[18] The same VAR specification has been run for two sample periods. The first period extends over 1988q1-2011q1, which represents the overall

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[18] These results are based on unitary shocks based on a reduced-form VAR system, for easiness of comparison across sub-periods, and thus do not depend on a particular ordering of variables. The Impulse Response Functions using Cholesky decomposition based on one standard deviation shock to the structural innovations yields similar results.

benchmark, and the second is a sub-period 1994q1-2005q4, which is a period characterized by weakened wage bargaining. The results are as follows.

38.   **VAR results for the overall sample period (1988-2011) show a relatively high wage rigidity and employment flexibility to GDP shocks.** We report the four most relevant impulse responses. First, the response of the unemployment rate to a negative shock in real GDP growth (Figure 6.1). The negative output shock gradually increases unemployment for about two years. Such a response implies a fairly high labor flexibility. Second, the nominal wage reacts to a negative output shock slowly and its duration is lower than the effect on unemployment (Figure 6.2). Therefore the adjustment in nominal wages is delayed and takes place through the response to increasing unemployment level (Figure 6.3), however with a lag of about one year. This finding appears to support the results of high employment flexibility in the wage Philips curve estimation.

39.   **Further, there is evidence of a high transmission of inflationary shocks into nominal wages, confirming the presence of a relatively high wage indexation.** A unitary shock into CPI inflation transmits into nominal wages rather strongly over subsequent year or so (Figure 6.4, solid line). Such a high response of nominal wages to inflationary shocks is consistent with a high degree of wage indexation on inflation, found in the wage Philips curve.

40.   **The differences between the overall results and results for the period of weakened wage bargaining suggest a tradeoff between wage indexation and employment flexibility.** During the period of suspended collective wage bargaining (1994-2005), most of the impulse responses to shocks became less dynamic, compared to the overall period.[19] The unemployment rate responds more slowly and by a smaller magnitude (Figure 6.1, dashed line), nominal wages respond less to unemployment shocks (Figure 6.3, dashed line), and inflationary shocks are transmitted much less to nominal wages. At the same time, nominal wages react faster and stronger to the economic downturn during the weakened-wage-bargaining period. Since nominal wages adjust more and faster to real GDP shocks and inflation is transmitted much less, the real adjustment of the economy is takes place more rapidly, and unemployment rises by less (lower employment flexibility). The comparison of the weakened-wage-bargaining period to the overall sample thus points to a tradeoff between degree of wage indexation and employment flexibility. It is also consistent with the findings using the wage Philips curve.

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[19] Although the impulse responses between the two studied periods are not statistically significantly different due to high confidence intervals, it can still provide at least partial evidence for differences between periods.

Figure 6. Uruguay: Impulse Response Functions

Figure 6.1. Unemployment response to GDP shock
Unitary decline in real GDP growth
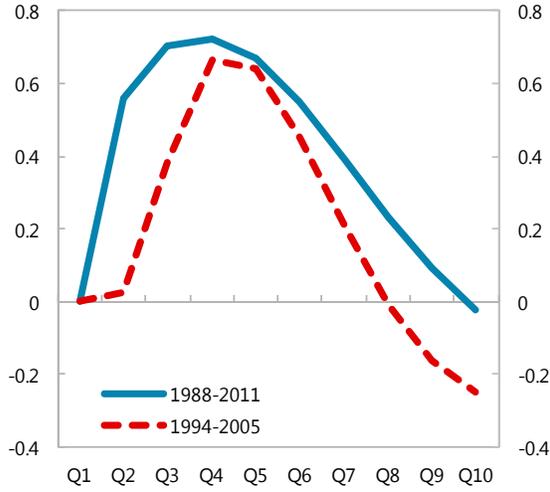
Figure 6.2. Nominal wage response to GDP shock
Unitary decline in real GDP growth
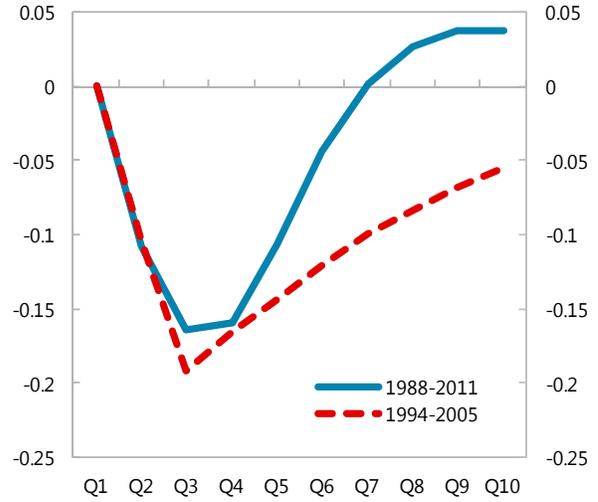
Figure 6.3. Nominal wage response to unemployment
Unitary increase in unemployment rate

Figure 6.4. Nominal wage response to CPI
Unitary shock in CPI inflation
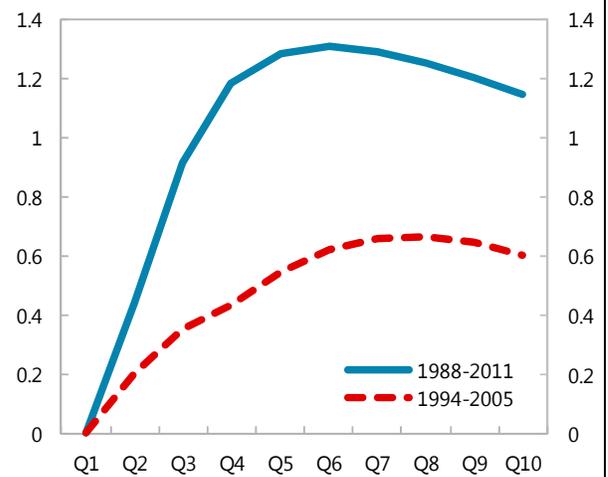
Source: IMF staff calculations.

F. Concluding Remarks

41.   **One of the great success stories in the Uruguayan economy in recent years is the sharp reduction in unemployment (amid rising labor force participation) and the substantial increase in real wages.** These developments have also come together with greater income equality.

42.   **The paper looks at recent regulatory changes in the labor market, and it finds that:**

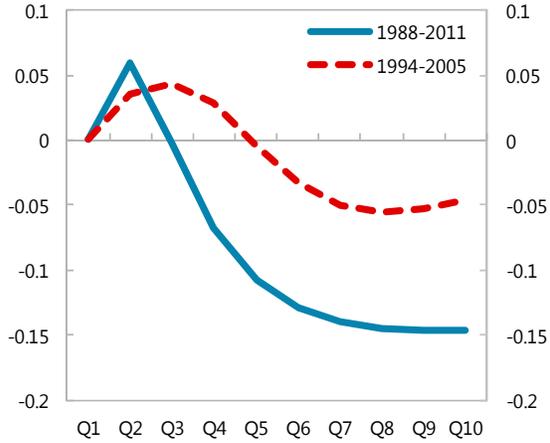- The minimum wage, though rising rapidly in recent years, does not yet seem to be binding for wage dynamics and is not very high compared with other countries in Latin America and the Caribbean, or even outside the region.

- The reforms to the wage bargaining process and to social security have led to an intensification of labor market regulations in recent years.

- The degree of wage indexation with respect to inflation and employment flexibility has typically been higher than in comparator countries.

- Wage-indexation to inflation has risen in recent collective wage agreements.

- Higher inflation indexation of wages appears to imply greater fluctuations in employment and unemployment in response to shocks.

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Appendix I. Regulatory Changes

Table 1. Regulatory Changes	
Law 17,940 (January 2006)	It grants immunity to union members. It states that if there is evidence of repression of a union member, the employer must reinstate the worker, who has a right to receive the remuneration withheld from him during the period he was suspended from his job. This law also overrode the decree which authorized the police to evacuate a workplace being occupied by employees.
Law 18,065 (and decree 224/007) (November 2006)	It regulates the working conditions of those working in domestic services.
Law 18,091 (December 2006)	It extends to five years (from two years) the time that workers have to claim for their rights in the Labor Ministry after the end of the labor relationship with the employer.
Law 18,098 (December 2006)	It regulates the way in which the State could hire third party enterprises and protects workers hired by these enterprises.
Law 18,099 and Law 18,251 (December 2006 and January 2008)	These laws provide protection for workers which could be affected by the decentralization process. They regulate the triangular relations generated by the use of brokering, outsourcing or recruitment companies. By law, the enterprise in which the employee works is responsible for fulfilling labor norms and workers hired through a recruitment company should have the same rights and benefits as those workers directly hired by the enterprise.
Law 18,345 (September 2008)	It regulates extraordinary leave in the private sector. Until this moment, it was regulated by agreements made directly with the employer or depending on each firm or activity sector (it includes for example, 18 days for study leave and 3 days off for men at the birth or adoption of a child).
Law 18,395 (November 2008)	It allows workers to retire sooner (age 60 with contributions to the system for 30 years or more). This law also gives special benefits to women (for example, each child is considered as one year of contributions).
Law 18,399 (November 2008)	It changes the benefits granted to unemployed people regarding the duration of the benefit and the conditions. Unemployed people would receive the benefit for a period of six months. The benefit is a percentage of the salary which decreases depending on the month (66, 57, 50, 45, 42, and 40 percent respectively).
Law 18,406 (November 2008)	It creates the National Institute of Employment and Training ("Instituto Nacional de Empleo y Formación Profesional") which would be responsible for designing and implementing training courses. It is a non-governmental community interest company. Moreover, the law establishes that decisions should be taken by majority. Funding is mainly obtained from a tax on wages (0.25 percent paid in equal parts by employers and employees, Fondo de Reconversión Laboral).
Law 18,441 (December 2008)	It regulates rural activities and establishes that the working day could not be more than 8 hours or 48 hours per week.
Law 18,566 (September 2009)	It establishes the new mechanism of the wage bargaining process: 1) negotiations are compulsory between employers and employees, 2) negotiations can be limited to one enterprise, or can comprise a whole trade sector, 3) all clauses are valid until a new agreement supersedes the previous one ("ultra-activity") and 4) new variables could be taken into account in order to establish the wage adjustment (such as GDP, sales, employment, productivity, etc.)
Sources: Mazzuchi (2009) and IMF staff elaboration.	

Appendix II. Factors Under Review

Table 1. Factors Under Review	
Obligation to negotiate	Pagés (2005) assures that there was no obligation to negotiate. ILO recommends negotiating and agrees with the promotion of negotiations by the government. However, according to ILO, negotiations should not be compulsory. However, the new law establishes that the parts have the obligation to negotiate (article 4). Moreover, the parts should share information in order to facilitate the negotiation. Entrepreneurs agree with the freedom of negotiation and disagree with sharing confidential information.
Intervention of the Government	Entrepreneurs strongly criticized that the Executive could unilaterally resolve wage adjustments when there is no agreement between employers and employees.
Superior Tripartite Council	The composition of this council is unbalanced. The government has nine members and employers and employees have six each. Hence, when the council convenes, the power of the government is higher than the parts and its views will prevail.
Level of negotiation	The law establishes that further negotiations could take place at further disaggregated levels but these agreements could not contradict the agreement reached by the specific sub-group, the wage adjustments approved in these agreements should be considered as a minimum. Entrepreneurs argue that this rigidity could affect small and medium enterprises and suggest that the size of the firm should be taken into account.
End date of the agreement	All agreements include a commencement date and the end-date. The law also establishes that, no matter the end-date, all clauses will continue to be valid until a new agreement is reached. This is called ultra-activity.
Occupations	Since 2006, (decree 165) the occupation of the working place is considered as a part of the right to strike and it is not a barrier to negotiate. The law approved in 2009 did not change this option and the decree continues to be valid. Entrepreneurs argue that the occupations are against the property owner's rights. ILO agrees with this view and also added that occupations were against the right of the workers who disagreed with the measure.
Other issues	Entrepreneurs also said that they were in clear disadvantage. Firstly, because the government has power and FA governments were in line with workers views. Secondly, the law establishes several rights of the workers but it does not establish obligations. Thirdly, the law does not establish the rights of employers.

IV.   URUGUAY: SOME ASPECTS OF FINANCIAL INTERMEDIATION[1]

A.   Introduction

1.   **Uruguay's financial system has changed profoundly since the crisis in 2002.**
Several of these changes stand out. First, the level of financial intermediation declined
significantly as a result of the crisis, and is low by regional and historical standards: the
private-sector-credit-to-GDP ratio fell from 29 percent in 1998 (closely matching the LA5
average of 30 percent) to 19 percent in 2010 (below the LA5 average of 33 percent).[2,3]
Although credit to households has increased in recent years (the ratio of household credit to
private consumption nearly doubled, rising from 9.8 in 2006 to 18.2 percent in 2010), the
ratio of corporate credit to gross fixed capital formation declined from 86 to 83 percent.
Second, the system is very robust: banks are liquid, well capitalized, and have a low share of
non-performing loans (NPLs), although deposit and credit dollarization remain relatively
high, at 74 and 68 percent of total deposits and credit, respectively. Third, Uruguay has a
peculiar market structure in which a state-bank holds roughly half of the market and
11 subsidiaries of foreign banks hold the other half.

2.   **To help promote the greater use of financial services, the government has
formulated a broad strategy on *"bancarización e inclusión financiera".*** A major focus is
on improving access to finance for low-income families and small companies, raise financial
awareness, promote savings and a greater use of financial services, and strengthen consumer
protection. Greater financial literacy is expected to enhance and widen the access of the
population to financial services while at the same time promote their responsible use and
healthy growth.

3.   **This paper looks at two aspects of Uruguay's banking system that are also
relevant to the issue of financial intermediation: market structure and profitability.**

- *Market structure*. Available studies (e.g., Claessens and Laeven, 2004) suggest that
  competition in the banking sector is associated with greater financial intermediation
  and economic growth. In Uruguay, the 2002 crisis led to an increase in the
  concentration in the banking sector that has remained throughout the last decade. This
  paper finds that the financial system in Uruguay is more concentrated and has a
  somewhat lower degree of competition than those of peer countries. The findings on
  market competition in Uruguay are in line with those of Gelos and Piñón (2008).

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[1] Prepared by Jiri Podpiera and Torsten Wezel.

[2] The private-sector-credit-to-GDP ratio is influenced by exchange rate movements due to high credit
dollarization.

[3] Simple average for Brazil, Chile, Colombia, Mexico, and Peru.

- ***Profitability.*** The profitability of Uruguayan banks is slightly below the regional average according to the official data, and there are big differences across banks. This paper looks at three aspects and their influence on profits. First, ***the role of the market structure***—and it finds that a bank's market share matters for its profitability. Second, the ***differences in accounting*** between Uruguay and other countries—and it finds that the inflation adjustment used in Uruguay affects reported profitability. Third, the ***provisioning system*** in Uruguay—and it finds that Uruguay's pioneering (in Latin America) dynamic provisioning framework might have led to over provisioning in some banks, which might have negative effects on profits.

B. Market Structure

4.   Uruguay's banking sector became more concentrated in the aftermath of the 2002 crisis and has remained concentrated since then. There were 17 banks back in 2003 and, after a modest number of entries and acquisitions, 13 banks operated by mid-2011. Although the sector's concentration, measured by the Herfindahl-Hirschman index (HHI), decreased somewhat from 2,600 in 2003 to 2,403 in mid-2011 (see Figure 1), it remains high by the standards of the Horizontal Merger Guideline (2010). [4,5] Banking concentration also remains above the regional average of 1,500 (Chortareas et al., 2010) and exceeds its pre-crisis level of 1,226 in 2000. The increase in concentration during the 2002 crisis was significant (1,300 points) and had the potential to adversely affect market competition.[6]

5.   **The market structure has changed only moderately since 2003, despite several mergers.** The largest bank—Banco de la República Oriental del Uruguay (BROU), a state-owned bank—has maintained its market share of almost half the total banking assets. Banco Santander S.A. became the second largest bank in 2008 when it acquired ABN Amro Bank N.V, and it now has close to one-fifth of total banking assets. The rest of the market has remained fragmented, even though some mergers have taken place, with only three banks having a market share over five percent (BBVA, Itau, and, Nuevo Banco Comercial).[7]

6.   **The number and total size of non-banking financial institutions is not negligible.** The non-banking sector consists of regulated and non-regulated lenders. Non-banks are regulated as long as they operate with borrowed money or are credit card providers; these are

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[4] The HHI is computed as the sum of squared market shares of all banks (and multiplied by 10).[4] The index ranges from a low of 0, indicating perfect competition, to a high of 10,000 for a complete monopoly.

[5] In this paper Banco Hipotecario del Uruguay (BHU), a state-owned, mortgage-specialized bank, is excluded unless otherwise noted.

[6] Agencies that asses market effects of proposed mergers and acquisitions also follow general standards for changes in concentration based on the HHI.

[7] BBVA acquired Credit Uruguay in 2011.

called *administradoras de crédito*. According to the report by AEBU (2011), there are 13 regulated non-banks, with total loans equal to eight percent of total banking sector's loans. This segment has been recently very dynamic and concentrates on consumer loans. The non-regulated part represents private money lenders. Several non-banks—particularly the largest—have been acquired by banks (e.g., OCA, Pronto, and Creditel) and sell all or part of their loan portfolio to them.[8]
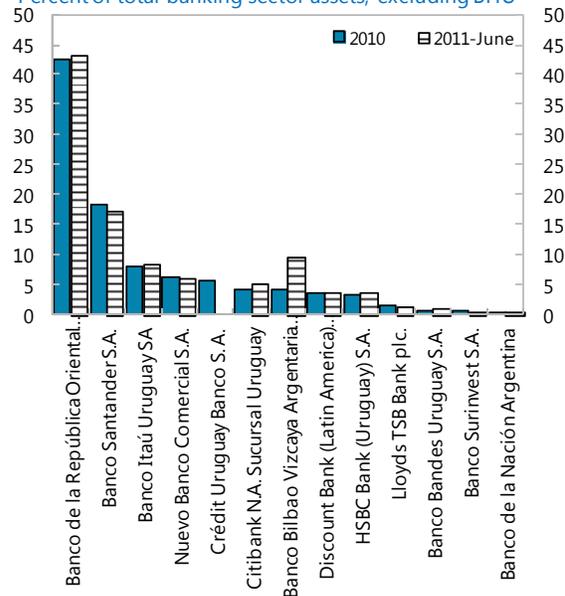
Figure 1. Uruguay: Herfindahl-Hirschman Index
Using total banking sector assets, excluding BHU
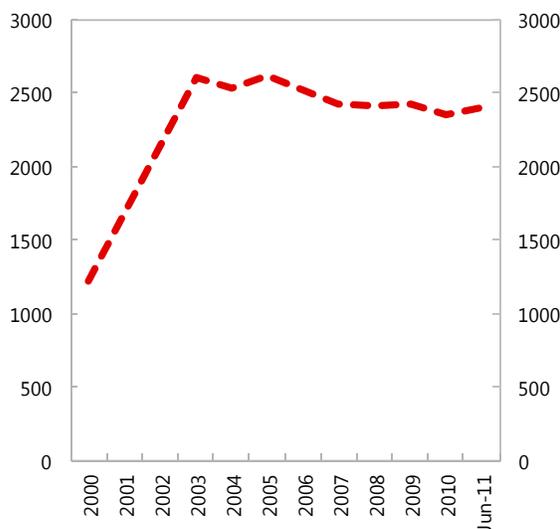
Figure 2. Uruguay: Market Shares
Percent of total banking sector assets, excluding BHU

Sources: Banco Central del Uruguay and IMF staff calculations.

7.   **A measure of market structure suggests the presence of monopolistic competition in the banking market.** A standard yardstick for the degree of market competition is the H-statistic, which follows from the Panzar-Rosse (1987) methodology (Box 1) and the empirical specification by Claessens and Laeven (2004). It is obtained by estimating the following reduced revenue equation:

$$r_{it} = \alpha_i + \beta cof_{it} + \gamma col_{it} + \delta copc_{it} + \theta lta_{it} + \rho capta_{it} + \lambda ta_{it} + \varepsilon_{it},$$

where *r* is log of total revenues (from interest and services), *cof* is log of cost of funds (interest expenses over total borrowing), *col* is log of wage (wages over total assets), *copc* is log of cost of physical capital (other operating expenses over total assets), *lta* is the share of loans in total assets, *capta* is the ratio of equity capital over total assets, and *ta* is log of total assets. Parameters α, *β, γ, δ, θ, ρ*, and *λ* are to be estimated.

[8] The portfolio, once allocated to the banks, is subject to the standard degree of bank supervision.

Box 1. Determining Market Structure

The model of Panzar-Rosse (1987) identifies the market structure type by focusing on the degree of transmission of costs shocks to revenues in long-run equilibrium.

- *Under perfect competition*, an increase in input prices increases marginal costs and total revenues by the size of the costs increase; i.e., the transmission is full and the elasticity of revenues to marginal costs is unitary (H-statistic equals one).

- *Under monopolistic conditions,* an increase in input prices increases marginal costs, reduces equilibrium output, and reduces total revenues. Hence, the H-statistic is less than zero.

- *Between these two extremes* (0 < H-statistic < 1) *is the monopolistic competition*.

However, in order to interpret results of the model, long-run market equilibrium should be tested and confirmed.

Figure 3. Uruguay: Loans to Total Assets Ratio
(In percent)
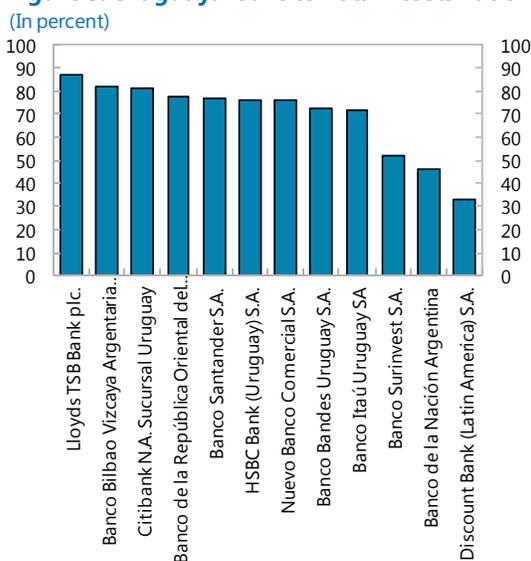
Sources: Banco Central del Uruguay and IMF staff calculations.

Table 1. Uruguay: Banks' Profitability
(In percent)

	Return on assets (ROA)	Return on equity (ROE)
Public Bank		
B.R.O.U	1.4	12.5
Private Banks		
N.B. comercial	-0.1	-1.0
Banco Itau	-0.4	-7.1
Banco Santander	0.7	7.3
Credit Uruguay	0.8	11.3
B.B.V.A.	-1.2	-12.5
Citibank	1.0	14.3
Discount Bank	-0.2	-2.1
Lloyds TBS	-0.6	-7.3
HSBC Bank	-2.1	-37.7
Bandes Uruguay	-14.5	-83.6
Banco Surinvest	-2.0	-14.5
Bco. Nacion Argentina	-1.7	-9.6

Source: BCU; First half of 2011.

8.   **The H-statistic is computed as the sum of β, γ, and δ and conceptually measures the response of revenues to changes in input prices.** The results, shown in Table 2, represent estimates for the period 2003-10. The H-statistics of 0.66 suggests monopolistic competition. The insignificant E-statistics confirm the validity of the Panzar-Rosse model.[9] The size of the H-statistic estimated here is broadly in line with previous studies on market

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[9] A sum of the coefficients of the costs of production factors in the (1+ROA) regression (analogically to H-statistics computation).

competition in Uruguay. For example, Gelos and Piñón (2008) found a decline of the H-statistic from 0.75 to 0.5 between 2003 and 2006.[10]

9.   **Excluding the largest bank (BROU) and other possible outliers from the panel regressions does not change the results.** Several banks could be considered outliers due to the fact that they have different business models. BROU is a state bank and might thus exhibit different behavior from that of private banks. There are also three small private banks—Banco Surinvest, Banco de la Nacion Argentina, and Discount bank—that have unique business models, in the sense that they are significantly less focused on loans. Excluding these banks does not change the results of the degree of competition (Table 2).

Table 2. Uruguay: Market Structure

	ln total revenues / total assets)		
	full sample	excl. BROU	excl. BROU, Bco. Surinvest, Bco. Nacion Argentina, and Discount bank
const	0.17	0.31	-0.33
	(1.01)	(1.02)	(1.01)
ln(wages / total assets)	0.31***	0.3***	0.31***
	(0.11)	(0.11)	(0.11)
ln(interest expenses / total borrowings)	0.16***	0.16***	0.18***
	(0.04)	(0.04)	(0.05)
ln(other operating expenses / total assets)	0.19**	0.19**	0.16*
	(0.1)	(0.1)	(0.1)
loans / total assets	-0.07	-0.05	0.55*
	(0.22)	(0.23)	(0.33)
equity capital / total assets	-0.36	-0.45	-0.65
	(0.57)	(0.59)	(0.92)
ln(total assets)	-0.01	-0.02	-0.01
	(0.07)	(0.07)	(0.06)
R^2	0.43	0.41	0.43
Nobs / banks	107 / 17	99 / 16	75 / 13
H-statistic	**0.66***	**0.65***	**0.65***
	(0.13)	(0.13)	(0.12)
E-statistic	**-0.03**	**-0.025**	**-0.007**
	(0.02)	(0.02)	(0.02)

Note: Yearly data spans over 2003-10. Stars denote significance level as follows: *** at 1, ** at 5, and * at 10 percent level.
Data source: Banco Central del Uruguay.

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[10] There might be a difference in the degree of competition between currency market segments. Mello Costa (2006) found, using Lerner indexes, that competition is higher in foreign currency loans than in the local currency segment.

10.   **Banking competition in Uruguay appears to be somewhat lower than the regional average.** According to the estimates by Anzoategui et al. (2010), using exactly the same specification of variables as above, the average H-statistic for Latin America equals 0.77 (during 2002-08).[11] Thus, the Uruguayan banking market, with H-statistic of 0.66, exhibits a competition level that is somewhat below the regional average, although the difference is not statistically significant.

C. Profitability

11.   **Bank profitability is slightly below the regional average.** The average of the reported banking sector's ROA is 1.4 percent (2006-2010 average, weighted by total assets). However, as discussed in the next section, profitability is not directly comparable across countries due to differences in accounting standards. Uruguay applies a less frequently used version of the International Financial Reporting Standards (IFRS), see Section B. Once accounting adjustments are made to Uruguay's ROA so that it can be compared internationally, this would increase to about 1.7 percent, which is still below the average (2.4 percent) of the regional distribution of ROAs.[12]

12.   **There are sizable differences in profitability across banks.** Over the last five years, the standard deviation of the distribution of ROA across banks was 3.8 percentage points (using official data). The highest ROA attained was 4.1 percent and the lowest -20.9 percent (Table 1 presents a cross-section of bank profitability in the first half of 2011). While some banks consistently report positive profits—usually the largest banks—several small banks (and some of them persistently) operate with losses.

Profits and market structure

13.   **This section analyzes the effects of the market structure on banking sector's profitability.**[13] In particular, it tests the two hypotheses, described in Box 2, for the ROA's positive relationship with market structure and a cost efficient structure.

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[11] The only difference is inclusion of yearly dummies by Anzoategui et al. (2010). Including time dummies reduces the significance of the parameters in small samples and therefore they were not included here. For completeness, however, the H-statistic, computed using the model with time dummies, equals 0.6*** (0.137).

[12] Chile (ROA = 1.4 percent), Ecuador (1.8), Panama (1.8), Argentina (2), Mexico (2), Costa Rica (2.1), Peru (2.4), Dominican Republic (2.5), Brazil (2.7), Paraguay (3.5), and Colombia (3.8).

[13] The analysis uses officially reported data on ROA. ROA cleaned for the inflation adjustment would produce similar results due to independence of the inflationary adjustment on banks' size.

Box 2. Profitability and Market Structure

Findings of a positive statistical relationship between profitability and market share could be interpreted in two different (although not mutually exclusive) ways (Berger, 1995). Extra profits of larger banks could stem either from using their market position *vis a vis* consumers or from their higher efficiency.

The relative-market power hypothesis (RMP) asserts that only firms with large market shares and well-differentiated products are able to exercise market power and earn super normal profits. A greater market power due to increasing market shares might lead to a price setting that is less favorable to consumers (lower deposit rates and higher loan rates) in more concentrated markets.

In addition to the market-power theory, there are efficiency explanations of the positive relationship between profits and market shares. *Under the efficient-structure hypothesis (ES),* firms with superior management or production technologies have lower costs and therefore higher market share and profits.

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14. **There is a statistically significant profit premium for market share in Uruguay, after controlling for differences in cost efficiency.** A panel regression of the log of (1+ROA) on the log of market shares, and controlling for the effect of NPLs and the efficiency ratio (ratio of operating costs to revenues), reveals a robust relationship between the return and market share.[14] As shown in Table 3, the profitability increased with the size of the market share with an elasticity of 0.02, which lends support to the RMP hypothesis.[15] This finding is consistent with the measures of market concentration and competition (HHI and H-statistic), which suggest relatively higher concentration and lower competition in Uruguay vis-à-vis peer countries.

15. **Cost efficiency and loan book quality play important roles as determinants of bank profitability.** The estimates in Table 3 show that a higher ratio of operating expenses over revenues (a proxy for cost efficiency) lowers profitability—thereby providing support for the efficient-structure hypothesis (ES). This is consistent with the findings of a previous analysis of banking profitability by Wezel (2011) and findings of economies of scale by Mello Costa (2009). The share of NPLs in total loans or net provisioning costs over total assets (a proxy for the loan book quality) is also an important factor for profitability (see also Section C). Excluding outliers (BROU, Banco Surinvest, Banco de la Nacion Argentina, and Discount bank) does not change the results for the RMP and ES hypotheses.

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[14] A similar specification has been used in other studies, for instance Chortareas et al. (2010) and Berger (1995).

[15] The estimated coefficient of 0.02 suggests that banks with a relatively higher market share tend to earn a higher ROA. A bank with market share 42 (18) percent is estimated to have a higher ROA by 0.7 (0.2) percentage points than the average bank (market share of 8 percent).

16.   **The higher profitability of the largest bank (BROU) appears to be based on a high loan book quality, high collections, and a large market share.** BROU leads the market in profitability by a difference of 1.5 percentage points of reported ROA on average over 2003-10. The bank has two specifics compared with other banks in Uruguay: it is charged with channeling salaries to public employees and it has preferred creditor status.[16]

17.   **The estimation also suggests that BROU may have higher fixed costs than other banks.** In particular, the fixed effect for BROU in the regressions in Table 3 is lower (by 0.03) than the average and the difference is statistically significant at the five percent confidence level. This suggests that there might be high fixed costs for BROU that could stem from its unique operations (e.g., from administrating disbursement of public sector salaries, from operating a large branch network, etc.). At the same time, the large market share, the automatic deduction of installments from debtor's salaries, and the preferred creditor status, generate benefits that seem to outweigh these costs. In the preparation of the government's *bancarización* project, it is envisaged that the right to automatically deduct installments from debtor's salaries will be granted to all commercial banks, hereby making the playing field more equal.

Table 3. Uruguay: Market Power and Efficient Structure

	ln(1+ROA)		
	full sample	excl. BROU	excl. BROU, Bco. Surinvest, Bco. Nacion Argentina, and Discount bank
const	0.08**	0.08**	0.12***
	(0.03)	(0.04)	(0.03)
ln(mkts)	0.02**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)
ln(nonperforming loans / total loans)	-0.003**	-0.003**	
	(0.002)	(0.002)	
operating costs / revenues	-0.05***	-0.056***	-0.07***
	(0.01)	(0.02)	(0.02)
net provisioning / total assets			-0.67***
			(0.25)
R^2	0.41	0.43	0.62
Nobs	100 / 17	92 / 16	75 / 13

Note: Yearly data spans over 2003-2010. Stars denote significance level as follows: *** at 1, ** at 5, and * at 10 percent level.
Data source: Banco Central del Uruguay.

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[16] According to the Law 18.358, claims by BROU on debtors have a legal priority ranked just below that of the social security authority and the tax directorate. At the same time, BROU's claims have higher priority than those by other commercial banks.

Profit and Loss (P&L) accounting specifics

18.   **Officially recorded bank profits in Uruguay are affected by a particular accounting treatment for inflation.** The IFRS allows for the use of inflation adjustments in high-inflation environments.[17] Uruguay allows for such an adjustment, whereas most low inflation countries use a version of the IFRS based on nominal accounting. To make the Uruguayan P&L comparable with the more commonly used IFRS, inflation adjustments need to be removed from the reported P&L in Uruguay.

19.   **The inflation adjustments can overstate expenses, although their effect has not been consistent over time.** For example, in some years, the adjustment did not have an impact (as in 2007-08) or even overestimated profits (2005). In recent years, however, the adjustment led to an overstatement of expenses and an understatement of profits. Foreign bank subsidiaries report P&L to their parent banks without inflation adjustments. For instance, banks Santander and Itau reported ROA of 1.99 and 0.95 percent in 2010 to their respective groups under the most commonly used, non-hyperinflation IFRS, while under Uruguay's official accounting their reported ROA is lower by 0.44 and 0.31 percentage points.[18] The difference is entirely due to inflation adjustments.

20.   **Thus, in recent years, internationally comparable profitability has been somewhat higher than what is reported under local accounting standards.** Uruguayan banking P&L accounting standards prescribe to adjust assets and liabilities for inflation if annual inflation exceeds 12 percent or if accumulated inflation over three years exceeds 25 percent.[19] In 2009, the overall sector's ROA would have been 0.9 percentage points higher than reported without the inflation adjustment. Similarly, in 2010, the ROA would have been 1.6 instead of the reported 1.1 percent.

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[17] International Financial Reporting Standards (IFRS) and principal-based Standards, Interpretations, and Framework (1989), adopted by the International Accounting Standards Board http://www.ifrs.org/IFRSs/IFRs.htm prescribe Constant Purchasing Power Accounting (CPPA) during hyperinflation. They authorize using both CPPA and Constant Item Purchasing Power Accounting (CIPPA) during low inflation and deflation. CPPA is not authorized under U.S. GAAP.

[18] See Grupo Santander Annual Report 2010 and Itau Unibanco Holding S.A. 2010 quarterly reports.

[19] Prior 2010, the inflation adjustment was mandatory if annual inflation exceeded eight percent.

Figure 4. Uruguay: Inflation Adjustment
Net expenses on inflation as percent of total assets
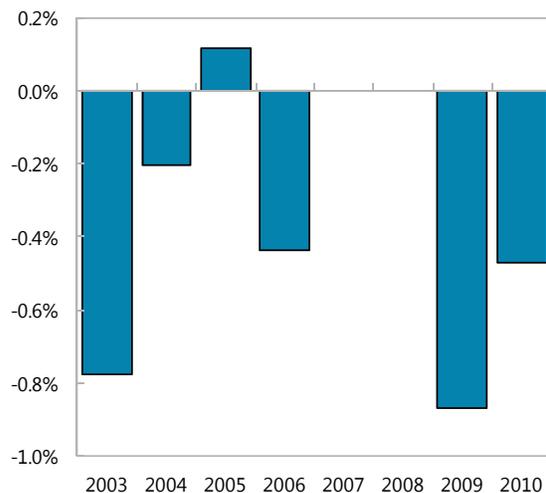
Figure 5. Uruguay: Return on Assets
Adjustments to align ROA with usual IFRS

Sources: Banco Central del Uruguay and IMF staff calculations.

Provisioning

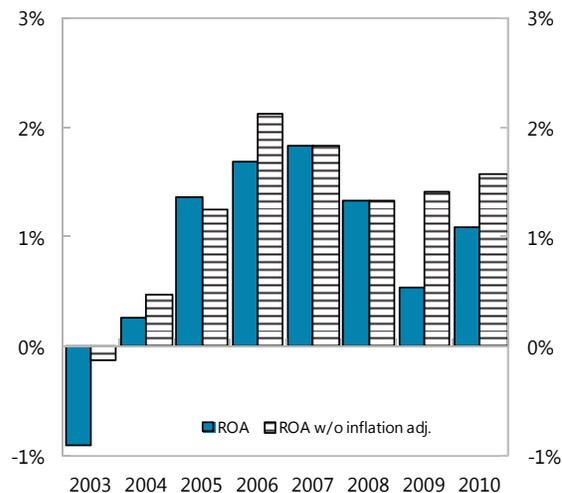21. **Uruguayan banks have accumulated an ample cushion of loan loss provisions, presently amounted to about six times non-performing loans (NPL).**[20] There are two main reasons for such high coverage: First, NPLs have been on a long-term downward trend after the 2002 financial crisis, not least thanks to a stronger economy leading to better loan portfolio quality and considerable improvements in bank regulation and supervision. Second, dynamic provisioning (DP), which Uruguay pioneered in Latin America a decade ago, has yielded a large reserve buffer, which turned out to be much higher than the loan defaults during the economic slowdown of 2008-09. More specifically, the accumulation of dynamic reserves until late 2008, an equivalent of US$100 million (2.6 percent of total loans), greatly exceeded the maximum drawdown of such reserves recorded by February 2010 (US$12 million or 0.4 percent of total loans).

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[20] Non-performing loans to the non-financial sector.

Box 3: Dynamic Provisioning in Uruguay

Dynamic provisioning (DP) requires banks to build reserves for anticipated, but not yet realized, loan losses. Based on the loss expericence of the past credit cycle and the pioneering Spanish model, Uruguayan banks in 2001 began constituting general provisions for current loan portfolios as well as new loans. During the upswing, which lasted until 2007, banks continuously put aside the difference between the average monthly specific provisions, as recorded during the previous cycle, and the lower actual provisions of the curent period. Subsequently, in the downturn of 2008-09, banks tapped these general loan loss reserves by using that difference to cover the cost of rising loan delinquencies.

The system of specific and dynamic provisions will be modified in mid-2012 in response to the average loan defaults during 1999-2007, which notwithstanding the 2002-03 crisis were lower than in the former reference period of the 1990s. In particular, the dynamic provisions will no longer be applied to non-performing loans—which are already covered by specific provisions—and the contribution rates will be set in line with updated default expectations for high-quality loans in the upper three classification categories (including "special mention" loans). In addition, dynamic provisions will also be made on the increment in loan volumes in these categories. Specifically, the modified regulation requires banks to contribute to their individual dynamic provisioning funds, DP_t, the difference between the monthly statistical net losses on higher-quality loans to the non-financial private sector and the realized net loan loss in that month:

$$\Delta DP_t = \left[\sum_{i=1}^{n} \frac{1}{12}\alpha_i \Delta C_{i,t} + \frac{1}{12}\beta_i C_{i,t}\right] - \sum_{i=1}^{m}\left(\Delta E_{i,t} - R_t\right)$$

These statistical losses are derived by multiplying 1/12 of the expected annual rates of loss (β_i and α_i, with $\alpha_i > \beta_i$) of three upper loan categories (n) by the respective loan volumes, $C_{i,t}$ and their increment $\Delta C_{i,t}$. The net loan loss is calculated as the total cost of additional specific provisions $\Delta E_{i,t}$ in all loan categories (m) net of recoveries of written-off loans, R_t. Lastly, the current maximum limit to banks' DP funds of 3 percent of loans will be replaced by a bank-specific limit that is determined by the product of the share of loans in each of the three categories and their respective expected delinquency rates. The BCU has estimated that, based on May 2011 data, the average fund size will drop to about 2.1 percent of total loans (from an actual 2.3 percent in that month).

This forward-looking approach of loss recognition has the important merit of smoothing provisioning costs over the cycle but it also has a flipside. During the 2008-09 downturn, banks' income statements were largely shielded from the (moderate) deterioration in their loan exposures and thus were in a good position to keep granting credit and support the economy. Yet, the correct calibration of the DP parameters is not easy, as it by necessity relies on past information, and any future change in expected loss on account of economic and regulatory factors is likely to lead to suboptimal provisioning.

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22.   **In view of the muted loan losses during the downturn, it might be argued that the system as a whole, and some banks in particular, have accumulated excess loan loss reserves.** Considering that provisions should cover expected losses (and capital unexpected losses), Uruguayan banks could currently sustain a multiple of the loan losses incurred during

the relatively mild dowturn of 2008-09. Typically, the expected loss (EL) is defined as the exposure at default (EAD) multiplied by the probability of default (PD) over one year and the loss given default (LGD). As the PD and LGD were not available to the authors, the EL is proxied by the net provisioning flow (NPF) during a 12-month period. Specifically:

Net provisioning flow = Δ stock of specific provisions + loan writeoffs – loan recoveries.

The NPF is then set in relation to the stock of dynamic provisions (DP/NPF), see Table 4.

Table 4. Uruguay: Provisions Coverage of Expected Loss

(In percent)

Bank	Downturn DP/ Downturn NPF	Current DP/ Downturn NPF	Total Current Provisions/ Downturn NPF
1	103	110	370
2	n/a	n/a	n/a
3	n/a	n/a	n/a
4	1726	1625	2733
5	610	554	1062
6	99	364	633
7	1953	1796	3170
8	60	227	387
9	334	795	5458
10	n/a	n/a	n/a
11	n/a	n/a	n/a
12	n/a	n/a	n/a
13	488	326	655
Average	**672**	**725**	**1809**

23.   **During the downturn the un-weighted average coverage was more than six times the net provisioning flow.** [21,22] This number has increased slightly since then, due to the still-growing DP funds. The total provisions coverage (i.e., dynamic, specific, and other general provisions) currently amounts to 18 times downturn losses in 2008-09. During the downturn, three banks had insufficient or barely sufficient coverage by dynamic provisions (second column), but even these banks now show coverage ratios of between 110 and 364 percent of downturn NPF (third column) and their total provisions coverage ranges between 370 and

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[21] The impact of the downturn on the banking sector extended into 2010 due to lags in making specific provisions. One bank experienced its maximum net provisioning flow already in 2007 on the account of idiosyncratic factors.

[22] Five banks did not record any positive NPF during 2006-10 on account of releases of provisions and loan recoveries and are thus excluded from the calculation of averages.

633 percent (fourth column). Five banks did not record any positive NPF during 2006-10 on account of releases of provisions and loan recoveries and are consequently excluded from the calculation of averages.

24.   **Generally, there is a large dispersion of DP coverage ratios, ranging from about 100 percent to around 20 times expected loss.** This is because the statutory rates for accumulating dynamic provisions follows an approach based on uniform (average) rates for all banks, regardless of their diverging risk profiles of loan portfolios. For some banks showing lower coverage ratios, the statutory DP rates were about adequate, while for safer banks with a lower expected loss, these rates seem to have been larger than needed and led to high coverage ratios.

25.   **Owing to the divergence of actual loan losses from expected losses, there has been a net cost of dynamic provisioning through the cycle.** During 2006-09, encompassing both upswing and downturn years, the pre-tax return on assets (ROA) of private banks (i.e., the entire banking system, excluding BROU) would have been about one-fifth higher, if dynamic provisioning had not been in place (this assessment supposes that lending conditions would not have been different in the absence of DP). [23, 24] The high costs have also resulted from the fact that most banks had not reached the upper limit of 3 percent of loans and thus could not completely offset the cost of rising specific provisions during the downturn.

26.   **The authorities have recently announced changes to the provisioning system to align it with updated default expectations (see Box 3). [25]** Effective end-June 2012 the rates for specific provisions in the loan classification system will be adjusted as will be the classification criteria for certain loans. The dynamic provisioning system will undergo fundamental changes: banks will have to provision only for higher-quality loans, the dynamic provisioning formula will be modified in line with the most recent calculations of expected loss, and the limit of the DP funds will be become bank-specific and presumably decrease on average. Based on recent BCU calculations the average size of DP funds would intially drop by only about ¼ percentage point (with larger reductions for individual banks), but the changes to the contribution rates of the DP formula may allow a larger offset of loan losses in

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[23] That is, the cost of the increase in the dynamic provisioning funds of private banks relative to total pre-tax profits recorded in 2006-09, a period that includes the increase in specific provisions, and thus the gradual drawdown of dynamic provisions, during 2008Q4-2009Q3.

[24] It could be that in the absence of dynamic provisioning the lending rate would have been lower, spurring credit growth and thereby lowering the ROA due to the increase in assets.

[25] On the calculation of default probabilities see Cabrera and Bazerque (2010) who determine the one-year PD for each year during 1999-2009 based on loan-by-loan data gathered from the central loan registry. The recalibrated rates for the upper three loan classification categories reflect this research effort.

the non-expansionary phase of the credit cycle going forward. In sum, the regulatory changes are certainly a step in the right direction, although their overall effect remains to be seen.

D. Conclusions

27. **This paper analyzed market structure and provisioning framework as two aspects relevant for financial intermediation in Uruguay and found that:**

- **The market is more concentrated and competition is estimated to be somewhat weaker, compared to pre-2002-crisis levels and peer countries.** The concentration in the banking market increased in the aftermath of the 2002 crisis, which could have set a lower standard of market competition. In addition, there is some evidence that market power affects profits positively. Since research suggests that greater competition in the financial sector is associated with greater financial intermediation and economic growth (Claessens and Laeven, 2005), this situation warrants further analysis to understand challenges for achieving deeper financial intermediation in Uruguay.

- **Profits are also affected by the accounting treatment of inflation.** The accounting standards in Uruguay differ from the usual international practice under low inflation environments. While in some years this accounting practice may have no effect over recorded profits, in others it may overstate or understate banks' return on assets in international comparisons. To make accounting internationally comparable, the operating results need adjustments for net expenses on inflation. Once such an adjustment is made, Uruguay's banking sector profitability in the last two years improves.

- **Provisioning requirements are strict, and appear to have generated an ample cushion of loan loss reserves.** This cushion is a strength in turbulent times (especially under tail risks), but it is also costly. Setting appropriate parameters for the provisioning framework is not straightforward since the size of the future shocks is not known, and cannot always be inferred from the past, especially if large structural changes are taking place. That said, the recently-announced recalibration of the system's parameters is a welcome step in addressing the cost of very high reserve levels.

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V. URUGUAY'S PENSION SYSTEM: OVERVIEW[1]

1.   **Uruguay is a true pioneer in the introduction of social security systems in Latin America.** Many countries in the region introduced social security systems through the XX century—and by the 1960s had established defined benefit or Pay-As-You-Go (PAYGO) systems. Uruguay's social security system was one of the first and most comprehensive—its origins can be traced back to the 1800s and by 1920 had a significant coverage, which included not only teachers and public sector employees, but also private sector workers (Rothman and Carranza, 2005).

2.   **The system was established as a defined benefits or Pay-As-You-Go (PAYGO) model and included several pension schemes.** In a PAYGO system, active workers pay for the pensions obligations of retired workers. By 1990, Uruguay had several different pension arrangements providing differentiated benefits to their affiliates. The solidarity system was managed by the Banco de Prevision Social (BPS). While it had important positive features in its design (including its comprehensive coverage), the Uruguayan PAYGO system was not exempt of some of the problems that affected other similar systems in the region—including high operational costs, and increasing deficits and long-term imbalances, due in part to the country's aging population.

3.   **This paper presents an overview of Uruguay's pension system and the major reforms that have affected the system since 1996.** It describes the main elements of the pension system as a defined benefit/PAYGO system prior to the 1996 reform, which involved the introduction of the defined contribution component with individual capitalization accounts (ICAs). The paper also reviews on the key amendments following the 2007 tax reform and the 2008 law that fosters the access to pension benefits as well as their financial impact.

4.   **The main findings of the paper are that:** a) following the 1996 reform, Uruguay's already high coverage level by the PAYGO system has been increased further; most of the value pensions lost in the 1980's has been recovered; and its implicit debt was reduced b) after 15 years in place, the individual capitalization account component is widely accepted; c) the financial impact of the 2007 and 2009 reforms was limited by the combination of changes in contribution rates with a broader tax base, the remarkable formalization process, and the creation of thousands of new jobs as well as a result of the rationalization of the parameters that define the access to pension benefits.

5.   **The paper is organized as follows:** Section A provides a background of the PAYGO system before 1996. Section B describes the 1996 reform in terms of its key objectives: a) increase coverage, b) improve pension levels, and c) reduce the system's implicit debt. Section C analyzes the main reforms introduced since 2007, namely the tax reform and the law that made the access to pension benefits more flexible. Section D estimates the financial impact of these two reforms. Section E describes briefly the individual capitalization account system in terms of coverage, assets, and investment policies. Section F concludes.

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[1] Prepared by Manuel Rosales Torres.

A. Background

6.   **Uruguay has one of the oldest pension systems among emerging markets and its coverage is among the highest in Latin America.** While some of the elements of Uruguay's social security system can be traced back to 1829—prior to the first Constitution of the Republic, signed in 1830—the first retirement system, which covered teachers only, was introduced in 1896. The system was broadened to all public sector employees in 1904 and to workers from the private sector in 1919. Rofman and Carranza (2005) found that in 1995, Uruguay ranked third in Latin America in terms of coverage rate, measured as the number of contributors to the pension system relative to the economic active population (14 + years old).

7.   **The system was established as a defined benefits or Pay-As-You-Go (PAYGO) model and included several pension schemes.** In Uruguay's PAYGO system, active workers, employers, and the government pay for the pension obligations of retired workers. By 1990, Uruguay had several different pension arrangements providing differentiated benefits to their affiliates. These other programs included, among others, the military and police pension systems, the lawyers, and the professionals that work at universities in Uruguay. The solidarity system was managed by the Banco de Previsión Social (BPS).

8.   **The system ran into large deficits which peaked at 3.3 percent of GDP in 1995.** These deficits were the result of the generosity of the programs, the aging of the population, the reduction in the rate between active and passive population, evasion of contributions, and other inefficiencies.[2].

B. Main Components and Effects of the 1996 Pension Reform

9.   **In 1996, Uruguay added a second pillar to the solidarity component managed by BPS.** The approval of the two pillar system was achieved as a result of the broad dialogue, which included the participation of workers and pensioners as well as on the role that the public sector would continue to play. Under the current system, BPS continues managing the intergenerational or solidarity component and collects the contributions for the whole pension system. The second pillar is managed by private pension funds, which run a defined contributions component with "individual capitalization accounts", where pensions depend upon the accumulated contributions and their rate of return.

10.   **The reform aimed to achieve both social and economic objectives.** In line with the reforms in the countries that preceded Uruguay's 1996 reform, the changes to the pension system aimed to maintain and further increase the high coverage level, improve pensions paid, and reduce its increasing deficits.

11.   **Several parametric changes accompanied the structural pension reform.** These included: a) increasing women's retirement age to 60 years to make it equal to that of men's;

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[2] Some measures were taken that enlarged the number of beneficiaries. For instance, in some cases, pensions may have been granted without proof of contributions but rather on witness' evidence.

b) increasing the required years of service from 30 to 35; c) increasing the number of years to compute the basic retirement wage; and d) reducing the replacement rates, among others (Table 1).

Table 1. Uruguay: Main Reforms to the Solidarity Pension System

Pension Reform Changes	1996 Law 16.713	2007 Law 18.083	2008-09 Law 18.395
Common retirement			
Retirement age	60 years; increased for women from 55 to 60		
Years of service	Increased from 30 to 35		Reduced from 35 to 30
Years of service, women	Increased from 30 to 35		Reduced from 35 to 30. Allows women to account 1 year of service per child up to 5
Replacement rate	50 percent plus 0.5 percent per year in excess of 35. If 60+ and 35+, (deferred retirement), 2 percent per year in excess of 35		45 percent plus 1 percent per year in excess of 30 up to 35. If 60+ and 30+, (deferred retirement), 2 percent per year in excess of 30
Basic retirement wage	Average increased from 3 to 10 years or best 20 years plus 5 percent		
Old pension requirements			
Age and years of service	70 and 15 years		70 and 15; 69 and 17; 68 and 19 years; 67 and 21; 66 and 23; and 65 and 25
Contributions			
Employers	From 14.5 percent to 12.5 percent	From 12.5 percent to 7.5 percent and broadens the base	
Employees	Up from 13 percent to 15 percent	Unchanged	
Other changes			
Allow the return of affiliates from AFAPs to BPS			Around 5,000 affiliates allowed to return to BPS

Source: IMF staff from official data.

Table 2. Uruguay: Coverage by the Solidarity System

	Population		
	Total	Age 14-60	60 + 1/
1996	28.7	48.0	64.4
2005	30.4	49.9	64.2
2006	32.7	53.5	63.2
2007	35.1	57.2	62.3
2008	37.5	60.8	62.2
2009	38.4	62.0	64.2

Sources: Banco de Prevision Social and IMF staff calculations.
1/ Percent of persons 60+ retired under BPS.

12.   **The 1996 reform has progressively achieved its objectives.** Zviniene and Packard (2004) estimated that, at the end of 2010, what is known as the "implicit debt"[3] of the old pension system had been reduced by over 60 percent of GDP down to 146 percent of GDP; a significant portion of these

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[3] The pension implicit debt is defined as the sum of future obligations, including guarantees of minimum pension, to current workers who are contributing to the pension system. Holzman et al (2005) indicate that "when establishing an unfunded (pay-as-you-go) pension scheme, mandating the payment of contributions to the current generation and promising to pay future pension benefits, the government makes commitment. To make comparable estimates of implicit debt for 35 countries, including Uruguay, Holzman at al make the estimates on the basis of "Accrued-to-date liabilities", which represent the present value of pensions to be paid in the future on the basis of accrued rights; neither future contributions, nor the accrual of new rights on the basis of these contributions are considered.

obligations remained in the solidarity system. Coverage, both in terms of total population as well as in terms of the working age population, has increased (Table 2) while pensions, on the other hand, remain below 1996 levels.

13.   **While the parametric changes reduced the deficit of the solidarity system, other measures also contributed.** These included administrative measures that helped to reduce evasion in social security contributions and some moderation in adjusting pension payments. In 2006, revenues reached 5.2 percent of GDP up from 4.2 percent in 2004 while expenditures reached 7.2 percent of GDP in 2008 down from 8 percent of GDP in 2004.

C. Recent Reforms to Foster Accessibility, Equity, and Reduce Employers' Burden

14.   **Since 2007, the Frente Amplio governments have introduced important reforms to the new pension system.** In tandem with the 2007 tax reform, the government has sought to reduce the burden on employers; it lowered the contribution rates from 12.5 percent to 7.5 percent for the industry, commerce, and domestic service sectors as well as certain public institutions. At the same time, the tax reform increased the contribution rate to the rural sector and eliminated many exemptions.

15.   **Law 18.395 made the benefits more accessible to future retires.** The main amendments, which were derived from the first national dialogue on the pension system[4], include: a) reducing the years of service from 35 to 30 years with a 45 percent replacement rate when retiring at age 60; b) making access more flexible to the older retirement age benefit for persons aged 65 + years by opening other gradual possibilities—aside from the traditional one to retire at age70 and 15 years of service. That is, for a 69 year old person applying for the old age pension benefit, the system requires 17 years of service; and c) granting one year of service to women per each child up to five children. The latter reflects the government's commitment to reduce gender inequality and recognize the role women play in raising a family's children.

16.   **In addition, the government allowed the return of more than 5,000 workers to BPS but its impact would be minor while would help to consolidate the two pillar system.** While we do not make estimates of the financial impact associated to disaffiliation of over 5,000 contributors from the private pension funds, the impact would be minor as they represent less than 1 percent of the active contributors to both pillars. On the other hand, allowing this group, which otherwise could have received lower pensions than in BPS, has increased the positive perception on the new system.

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[4] For approximately nine months in 2007, the government called a national dialogue on social security to assess with the main sectors of the society the performance of the pension system and to draw the inputs for the future adjustments. The dialogue was headed by the Comisión Sectorial de Seguridad Social with the assistance of the United Nations Development Program in Uruguay, the Spanish Agency for Cooperation, and the Universidad de la República. The public sector was represented by the Labor, Economy and Finance, Health, and Social Development Ministries as well as by the Budget Office and BPS.

D. Financial Impact from the 2007 and 2009 Reforms

17.   **The changes in the tax system and the more flexible conditions to access pension benefits have increased the pressure on the solidarity system.** The impact has been limited by the positive impact from a broader tax base and some rationalization in the parameters to define the access to common pensions and the early access to the old age pension benefit. The rationalization of these parameters aims to reign in on any potential abuse from the more favorable conditions to retire.

18.   **BPS's strong role in reducing tax evasion has also played a key role in limiting the additional financial needs.** BPS' measures include a set of public policies to increase formalization and reduce evasion. In the last six years, the response from firms and workers have entailed a significant increase in the formal work posts that contribute to social security of the order of 50 percent; over this period evasion was reduced from 40 percent in 2004 to 20 percent in 2010. In addition, the rapid expansion of the economy has also contributed to the creation of thousands of new jobs and thus to improve BPS's revenues. This has lead to an improvement in the system´s asset-to-liability ratio.

19.   **Revenues declined by 0.4 percent of GDP while the obligations of the solidarity system increased by 0.5 percent of GDP following the changes introduced by the 2007 and 2009 reforms.** The reduction in the employers' contributions rate lowered BPS revenues by 0.2 percent of GDP in both 2007 and 2008 (Table 3).

Table 3. Uruguay: Contributions to the Solidarity System
(Percent of GDP)

	After the 2007 Tax Reform			Before the 2007 Reform		
	Employers	Employees	Total	Employers	Employees	Impact
2004	2.4	1.8	4.2	2.4	1.8	NA
2005	2.5	2.2	4.7	2.5	2.2	NA
2006	2.7	2.5	5.2	2.7	2.5	NA
2007	2.5	2.3	4.8	2.7	2.3	-0.2
2008	2.2	2.6	4.8	2.4	2.6	-0.2
2009	2.5	2.6	5.2	2.5	2.6	NA

Sources: Banco de Prevision Social and IMF staff calculations.

20.   **From the expenditure side, the reforms increased the solidarity system's obligations by 0.5 percent of GDP**. Table 4 shows the increase in the number of retirees before and after the reform. Before 2008 —when workers needed 35 years of service to apply for retirement—the number of retirees was on a declining path. This trend reversed after the reforms. In 2009, there were 13,816 new retirees with women representing near 70 percent of the new retirees.

Figure 1. Uruguay: Retirees from the Solidarity System 1993-2009 (Thousands)
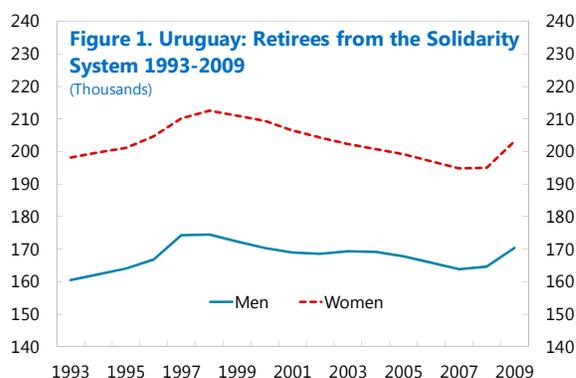
Sources: Banco de Prevision Social and IMF staff calculations.

Table 4. Uruguay: Trend in Number of Retirees

| | Annual change, number of retirees | | |
	Total	Men	Women
2000	–3,685	–2,099	–1,586
2001	–4,127	–1,263	–2,864
2002	–2,641	–525	–2,116
2003	–1,042	960	–2,002
2004	–1,808	–237	–1,571
2005	–3,081	–1,515	–1,566
2006	–4,102	–1,979	–2,123
2007	–4,046	–1,835	–2,211
2008	895	826	69
2009	13,816	5,713	8,103

Source: Banco de Prevision Social and IMF staff calculations.

21.   **Preliminary estimates suggest that the overall impact from both major reforms equals to 0.9 percent of GDP.[5]** The analysis that seeks to isolate the effects of the most important reforms suggests that their impact is equivalent to 80 percent of the estimated public sector deficits for the next five years. Figure 2 shows the change in trend in both revenues and expenditures following prior to and after the 1996 reform, as well as after the 2007 and 2009 reforms. Before 1996, the deficit was widening as revenues were declining and expenditures rising. Following the 1996 reform, the deficit was reduced slightly but increased once again as a result of the 2002 financial crisis. Lower spending levels and higher revenues contributed to cut the deficit before 2007, but the trend reversed slightly following the 2007 and 2009 reforms.

Figure 2. Uruguay: Performance of the Solidarity System 1993-2009 (Percent of GDP)
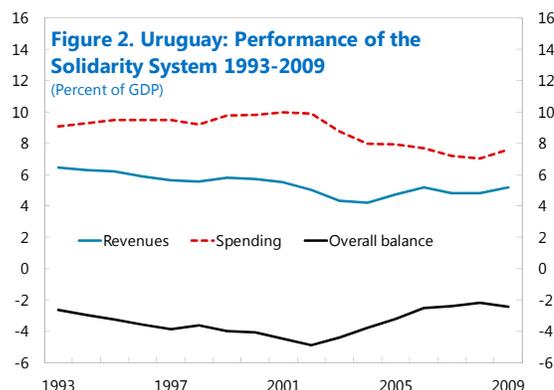
Sources: Banco de Prevision Social and IMF staff calculations.

E.   The Defined Contributions System with Individual Accounts

22.   **According to Banco Central del Uruguay, [6]as of October 2011, there were 1,065,164 individuals affiliated with the private pension system, which had accumulated US$7.9 billion in assets.** Since December 2010, the number of new affiliates to the individual account system has increased by 8.5 percent while the assets managed by the private pension funds increased by nearly US$1.1 billion.

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[5] To assess the complete impact of all the reforms, a more detailed analysis is warranted. Furthermore, international best practices set in article 71 of Convention 102 of the International Labor Organization, recommend to periodically performing actuarial studies to ensure the medium and long-run sustainability of any member country's pension systems.

[6] For more details see http://www3.bcu.gub.uy/a5585.html. AFAPs are supervised by the Superintendencia de Servicios Financieros.

23.   **There are now four private pension funds managing the assets.** The individual capitalization accounts, which started with six private managers, have consolidated into four pension funds. República AFAP, the largest of them, has a market share close to 40 percent of the affiliates and manages nearly 57 percent of the assets.

24.   **The government changed recently the investment limits (Law 18.673).** Starting in January 2011, the maximum investment level in public sector securities was reduced from 90 percent to 85 percent. This ceiling will be further reduced by 2.5 percent per year until it reaches 75 percent by 2016. The limit to invest the funds on private sector instruments was raised to 50 percent while the option to investment in highly rated sovereigns (including investment in multilateral papers) was increased to 15 percent. On the other hand, the ceiling to investment in foreign currency denominated assets was set at 30 percent.

25.   **Most of the US$7.9 billion in assets managed by the private pensions funds are currently invested in public sector debt.** The Banco Central del Uruguay reports that as of October 31, 2011, 81 percent of the funds were invested in public sector papers down from the 84 percent at the end of 2010. The remaining assets included: World Bank multilateral notes (6.3 percent), private sector debt (5.8 percent), and loans to individuals affiliated to the pension funds and others (7 percent).

F. Conclusions

26.   **The 1996 reform has achieved several of its key objectives.** Coverage, already high in Uruguay before the 1996 reform, has been further increased. The deficit of the solidarity system was reduced making the system more sustainable in the medium to long-term. Pensions have recovered but still remain below Uruguay's pre-crisis levels.

27.   **Preliminary estimates suggest that the 2007 and 2009 reforms may have increased the central government's burden, although this is moderated by an increase in revenues by BPS, including due to formalization.** The administrative measures implemented by BPS, have also contributed to an important formalization of the labor market and a reduction in the evasion of contributions. The additional financial need of the solidarity system is equivalent to nearly 80 percent of the projected public sector deficit for the next five years.

28.   **Despite a seemingly important concentration of assets and affiliates in the state owned private pension fund, the system is widely accepted.** As noted earlier in this paper, the broad participation of pensioners in the debate prior to the introduction of the two pillar system and during 2007 contributed to the large acceptance of the private pension funds.

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