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PARAGUAY

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PARAGUAY

SELECTED ISSUES

January 28, 2015

Approved By
The Western Hemisphere Department

Prepared By Alejandro Guerson, Camila Perez, Xin Xu (all WHD) and Mauricio Vargas (RES)

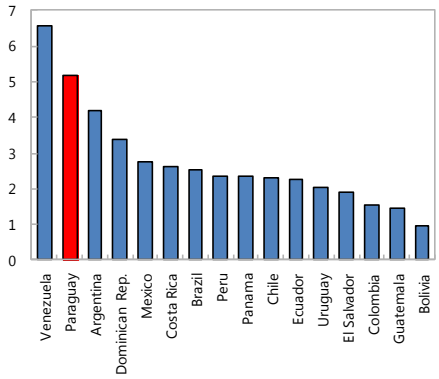
CONTENTS

GLOBAL AND REGIONAL SPILLOVERS: HOW IMPORTANT FOR PARAGUAY?[1]

A. Introduction

1. Paraguay has experienced high but volatile growth in the recent decade, amid large exposures to external shocks. Economic growth in Paraguay has averaged 4.8 percent p.a. since 2004, though this remarkable record has been accompanied by significant output volatility, the second-highest in the region. As a small open economy with a large primary sector, Paraguay faces various risks, including weather-related shocks, changes in global commodity and financial markets, and developments in its trading partners, including its large neighbors, Brazil and Argentina. At the current juncture, marked by falling commodity prices and subdued growth prospects for South America, it is particularly important to understand closely Paraguay's foreign linkages and assess its resilience to key external shocks.

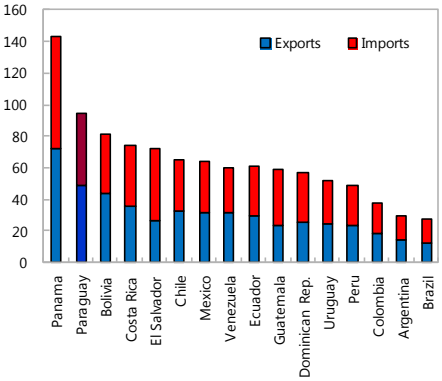
Growth Volatility in Latin America, 2004-13
(Standard deviation of real GDP growth, percent)



Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

2. This paper tries to analyze the spillover effects of key external shocks on Paraguay. Following an overview of Paraguay's major economic and financial linkages with the rest world, this paper quantifies the spillover effects of key external factors on the Paraguayan economy, using a vector autoregression (VAR) approach. The empirical results suggest that global shocks have a significant impact on Paraguay's growth rate. Output and exchange rate shocks stemming from Brazil and Argentina are also important, even after controlling for global factors.

Trade Openness in Latin America, 2013
(Imports and exports, in percent of GDP)



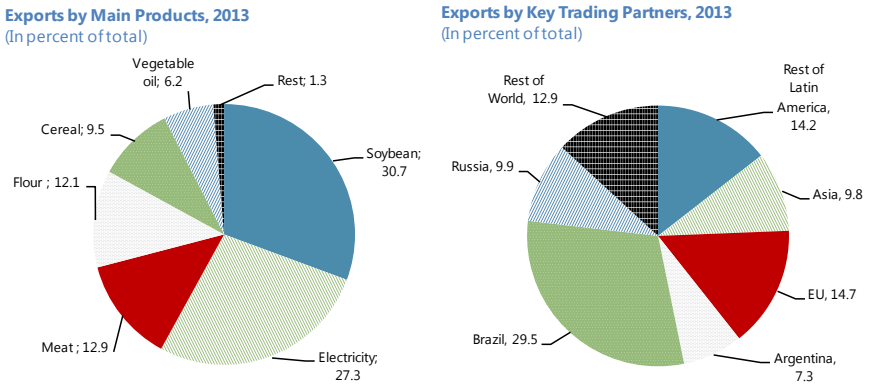
Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

B. Mapping the Linkages

3. Given Paraguay's high degree of trade openness, trade appears to be the primary channel for transmitting external shocks. Foreign trade has grown rapidly over the last decade, with total exports and imports at almost 95 percent of GDP in 2013, among the highest in the region. Trade is also highly concentrated, making the economy vulnerable to shocks from key trading partners and commodity markets. In that regard, developments in its

[1] Prepared by Xin Xu.

major export destinations (notably Brazil) and price changes for its major export products (especially soy, grains, and meat) are of particular importance.[2]



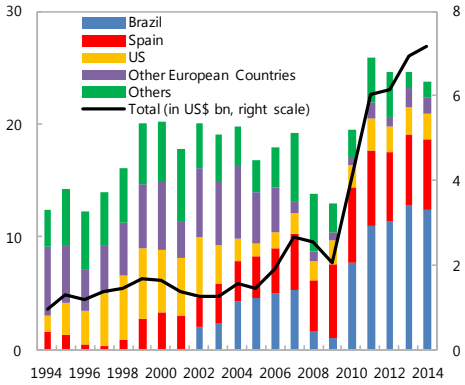
Sources: Haver; and IMF staff calculations.
Note: Date refer to registered exports only.

4. Although direct financial exposures are relatively limited, external financial shocks could conceivably affect Paraguay through foreign bank lending, dollarization, and FDI. Direct portfolio inflows into local financial markets are negligible, as there are virtually no investable assets, although the recent issuance of two large international sovereign bonds has created an opening for US$-denominated portfolio investment. Meanwhile, foreign banks (notably from Brazil and Spain) currently hold gross claims of almost 25 percent of GDP on Paraguay, the bulk of which through local subsidiaries with a domestic deposit funding base.[3] These claims (notably those linked to Brazilian banks) fluctuated considerably during the global financial crisis, indicating a potential role in transmitting external shocks. Paraguay's high level of financial dollarization creates an additional potential channel for spillovers, including from U.S. monetary shocks. Effects are likely to be muted, however, by the relatively large gap and weak correlation between local US$ interest rates and the U.S. equivalent, and by existing liquidity buffers, including reserve requirements. Lastly, FDI, though modest in scale, has also been affected by home-country developments in the recent past, as difficult economic conditions in Argentina and Brazil have reportedly fuelled investment flows into Paraguay.

[2] Electricity exports to Brazil are another important source of export revenue, but since these are governed by long-term contracts, they are less exposed to price volatility.

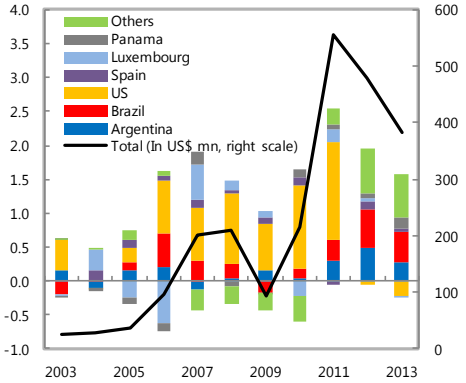
[3] Based on BIS reporting banks' consolidated gross claims on an immediate borrower basis.

International Banks' Claims on Paraguay
(In percent of GDP)



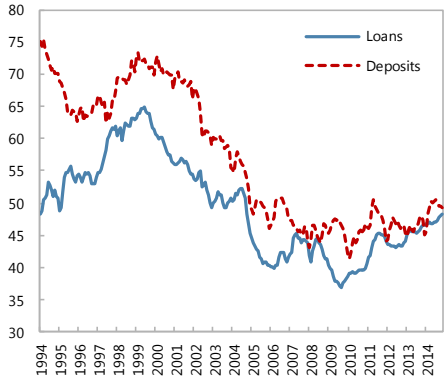
Sources: Bank for International Settlements; and IMF staff calculations.
Note: Consolidated gross foreign claims of BIS-reporting banks on immediate borrower basis by nationality of reporting bank.

FDI Inflows by Source Country
(In percent of GDP)



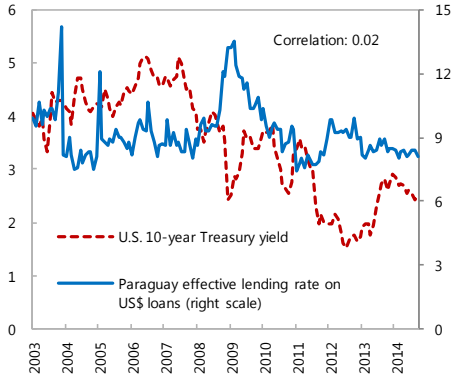
Sources: Central Bank of Paraguay; and IMF staff calculations.

Dollarization of Loans and Deposits
(In percent of total)



Sources: Central Bank of Paraguay; and IMF staff calculations.
Note: Computed at constant November 2014 exchange rate.

Paraguay FX Lending Rate vs. 10-Year U.S. Treasury Yield
(In percent)



Sources: Central Bank of Paraguay; and IMF staff calculations.

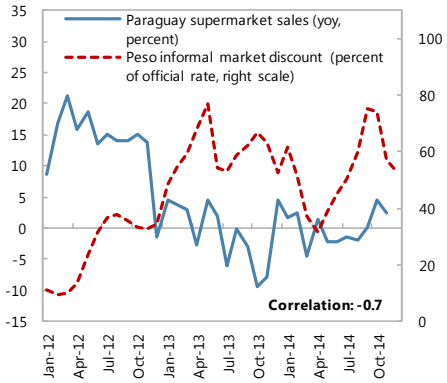
5. Overall, linkages with Brazil are particularly strong. Paraguay's output growth is highly correlated with Brazil, its largest trading partner, which accounts for 30 percent of registered exports and the bulk of re-exports. Recently, Brazil's weak growth and currency depreciation has dampened demand for re-exports, contributing to slower activity in Ciudad del Este, Paraguay's main hub for cross-border trading. Financial ties are also close, with the presence of a large Brazilian bank (Itau) accounting for about one-sixth of total bank credit. However, Paraguay has also been seen to benefit from weaker business confidence in Brazil, notably through rising FDI inflows into the fast-growing *maquila* industry, which attracts Brazilian companies with its relatively low cost base and favorable tax and regulatory regime.

Exports to Brazil and Brazil GDP Growth
(In percent, yoy)

Sources: Haver; and IMF staff estimates.

6. Recent spillovers from Argentina have mainly been transmitted through surging contraband imports. Argentina's export taxes and foreign exchange market controls have created strong incentives for contraband trade. Since mid-2012, contraband exports to Paraguay appear to have proliferated, alongside the widening gap between the official and informal market exchange rate of the peso. For the most part, the contraband (especially foodstuffs and household goods) displaces legal imports, as domestic production in Paraguay is limited. However, businesses involved in the formal distribution and retail chain have been negatively affected, while consumers have benefited from lower prices. Separately, anecdotal evidence suggests that Argentine capital flows to Paraguay have increased, notably into the real estate market.

Argentine Peso Exchange Rate Gap vs. Paraguay Supermarket Sales, 2012–14



Sources: National authorities; and IMF staff estimates.

C. Quantifying the Impact: A VAR Approach

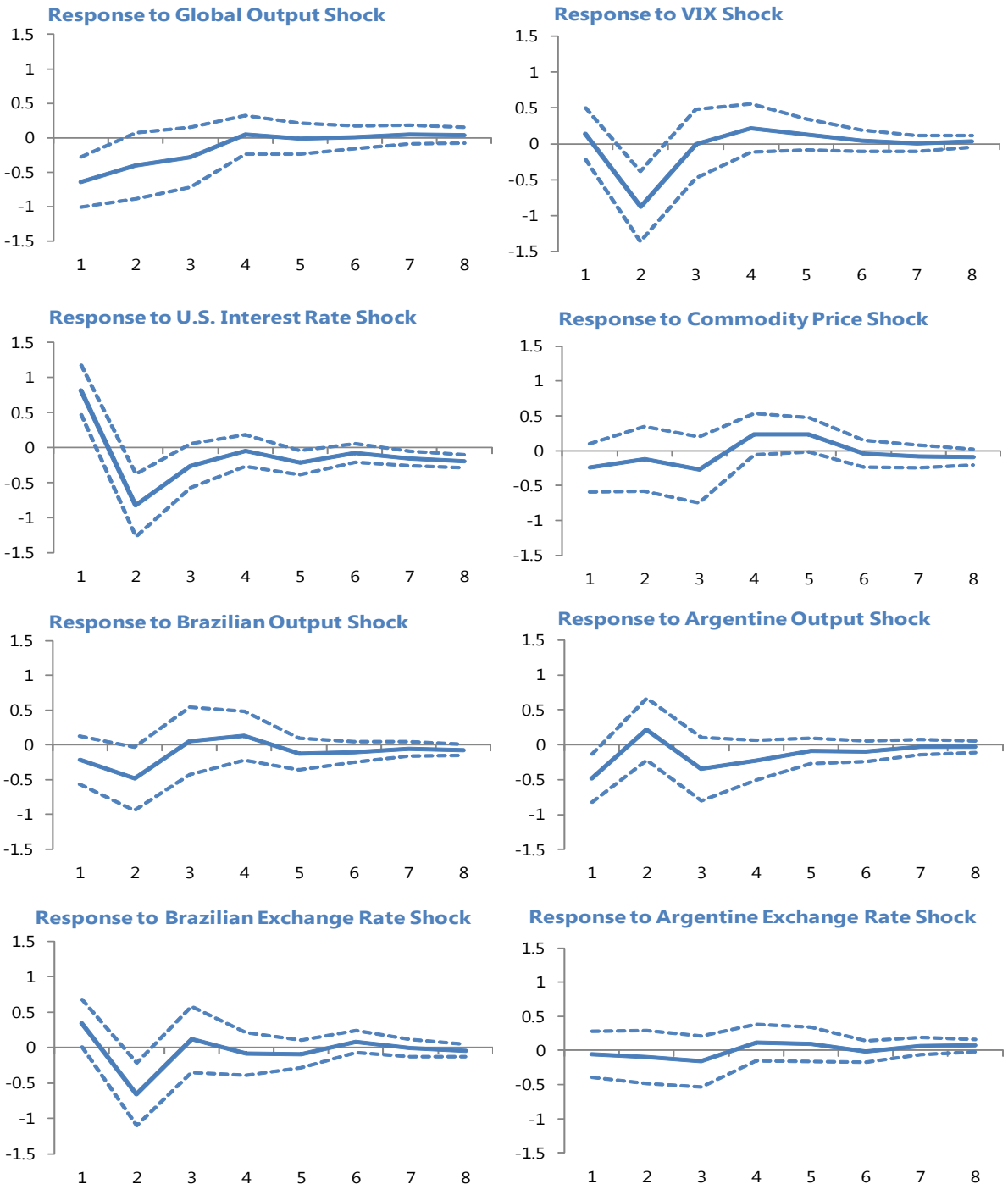
7. A standard VAR model is explored to quantify the spillover effects of major external shocks. This empirical approach allows one to identify the dynamic response of Paraguay's output to major shocks and determine the relative importance of different external factors. The model includes three main categories of exogenous variables: global, regional, and domestic factors. Global factors comprise: global demand, proxied by a weighted average of G7 and China real GDP; international financial conditions, measured by the VIX volatility index and the 10-year U.S. Treasury bond yield; and a Paraguay-specific net commodity price index as calculated in Gruss (2014). Regional factors include Brazil's and Argentina's real GDP as well as the bilateral *real* and peso (using the informal, or "blue", market rate) exchange rates against the guaraní. The relevant domestic variable is Paraguay's real GDP, though core GDP (i.e., GDP excluding the agricultural and electricity sectors) is considered as a robustness check. The model is estimated using quarterly data from 1997Q1 through 2014Q2, with two lags, and all variables expressed in quarter-on-quarter growth (seasonally adjusted for GDP), except for the VIX and U.S. interest rate, which are expressed in levels. The reduced form errors are orthogonalized by Choleski decomposition, with the ordering of the variables as listed above. This implies that global and regional factors do not respond instantly to changes in Paraguay's GDP, while the latter may be affected by contemporaneous changes in external conditions.

8. Global shocks appear to have significant effects on Paraguay's GDP growth. Figure 1 shows the dynamic response of Paraguay's GDP growth to a one-standard deviation shock to global factors. The main results are as follows:

- A global output shock has a relatively large and rapid impact on Paraguay's output, with the peak response occurring on impact and some persistence for about a year. As a "rule of thumb", a one percent drop in global GDP growth appears to reduce Paraguay's GDP growth by 1.1 percent within the same quarter.

Figure 1. Impulse Response of Paraguay's GDP to Global and Regional Shocks

(One-standard deviation adverse shock)

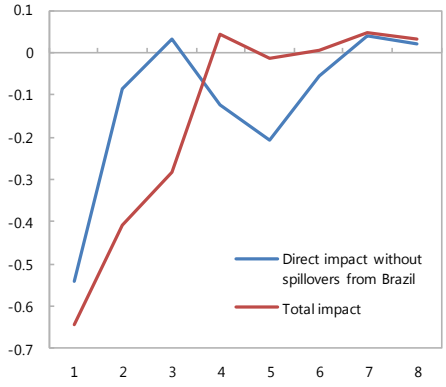


Note: GDP growth response (y-axis, in percent) to one-standard deviation adverse shock ± 1 standard errors. Time horizon in quarters. Adverse shock defined as lower trading partner growth, higher VIX and U.S. interest rates, lower commodity prices, and trading partner currency depreciation.

- Changes in global financial conditions also significantly affect Paraguay's economy, though the delayed response (one quarter after the shock) suggests that the transmission essentially runs through global output, rather than direct financial channels. A one-standard deviation shock to VIX (increase by 7.9 points) and the U.S. long term interest rate (increase by 1.3 percentage points) would cause a cumulative decline in Paraguay's growth of about 0.5 and 0.3 percentage points, respectively, over one year.
- The impact of commodity price shocks seems to be statistically weaker, but is still economically significant. Specifically, a 10 percent drop in Paraguay's net commodity price index is estimated to reduce GDP growth by 0.6 percentage points over one year.

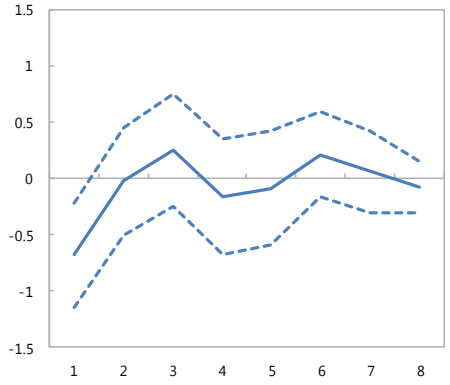
9. Brazil's economic importance is manifest both through direct spillovers from Brazil-specific shocks and through the transmission of global shocks. Idiosyncratic shocks to Brazil's GDP are found to have a significant impact on Paraguay's output even after controlling for global factors, with a one percentage point drop in Brazil's GDP growth leading to a 0.5 percentage points decline in Paraguay's GDP growth. Similarly, a 10 percent real depreciation of the Brazilian *real* against the guaraní would reduce Paraguay's growth by 0.4 percentage points within one year. Given Brazil's large economic size and high degree of financial integration with the world, its impact on Paraguay is not limited to such direct spillovers, but it also propagates and potentially amplifies the effect of global output and financial shocks. Following Adler and Sosa (2012), we identify such amplification effects by controlling for Brazil-specific factors as exogenous variables in the VAR. The estimation results confirm that Brazil indeed amplifies the impact of global shocks on Paraguay, especially during the initial periods after the shock.

Output Response to Global Output Shock
(One-standard deviation shock, 8 quarters)



10. Argentine output shocks also have significant effects on Paraguay's GDP, while peso exchange rate shocks appear to affect core GDP. A one percentage point Argentine output shock results in a 0.4 percentage points decline in Paraguay's GDP growth within one year, while the impact of peso exchange rate depreciation appears to be insignificant. However, the spillover effects of peso exchange rate shocks appear to be much larger on Paraguay's core GDP growth, which is found to decline by 0.6 percentage points in response to a 10 percent depreciation of the bilateral real exchange rate. This result is consistent with the fact that the recent sharp peso depreciation mainly affects the domestic retail service sector, a significant part of core GDP, through a surge in contraband imports.

Core GDP Response to Argentine Exchange Rate Depreciation Shock
(One-standard deviation shock)



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DEBT SUSTAINABILITY, CYCLICAL STABILIZATION, AND THE FISCAL RESPONSIBILITY LAW—A SIMULATION EXERCISE[1]

A. Introduction

1. This paper analyzes quantitatively the implications of conducting fiscal policy under Paraguay's new Fiscal Responsibility Law (FRL). It considers both medium-term fiscal priorities and cyclical stabilization goals. The analysis focuses on possible tensions between (i) the authorities' plan to scale up public investment over the medium term; (ii) a fiscal stabilization motive which calls for letting automatic stabilizers operate over the business cycle and avoiding procyclical discretionary measures;[2] and (iii) the constraints on the headline fiscal balance prescribed by the FRL. To preserve debt sustainability, the FRL establishes that the deficit of the central government must not exceed 1.5 percent of GDP in years with positive GDP growth, and up to 3.0 percent of GDP in years with negative growth. It also stipulates that the growth rate of the public sector's current primary expenditure must not exceed 4 percent in real terms.[3] Taking these constraints as given, this paper presents simulation-based results on a suitable fiscal buffer—in terms of a central government deficit slightly below the FRL's ceiling—to absorb negative shocks. Without such a buffer, adverse economic developments are likely to necessitate a costly fiscal retrenchment, whether in the form of capital spending cuts or other procyclical tightening measures.

B. Methodology

2. The paper's starting point is an empirical model of Paraguay's economy. The purpose of the model is to capture the behavior of the relevant fiscal and real economy indicators over the business cycle. To this end, a Vector Autoregression (VAR) is estimated, including the cyclical components of agricultural GDP (which comprises agriculture, livestock, and forestry) and non-agricultural GDP; government revenue; current primary expenditure; and capital expenditure.[4] The

[1] Prepared by Alejandro Guerson.

[2] Given the limited scope of social transfers, these automatic stabilizers are relatively small in Paraguay and mostly limited to tax revenue losses during economic downturns.

[3] The FRL establishes that the expenditure ceiling applies to the broader public sector, rather than just the central government. However, the simulations in this paper assume that the limit applies to the central government, whose expenditure (i) represents a large share of overall public sector expenditure; and (ii) is more directly under the authorities' control. The analysis also disregards the FRL requirement that the average fiscal deficit over three consecutive years must not exceed 1 percent, as this constraint only applies on an ex ante basis.

[4] The cyclical components used in the empirical model are calculated as the ratio of the variable to its estimated trend. The cyclical components of GDP are estimated using the Hodrick-Prescott filter on annual data for 1990–2014. All variables are transformed into real terms using the GDP deflator and expressed in logarithms. The identification of shocks is performed using the Choleski decomposition, according to the ordering presented above.

estimated model captures the cyclical properties of fiscal policy in Paraguay as observed during the 1990–2014 period.

3. The estimated model is used to generate a large number of simulated projections for different policy scenarios. Each projection consists of data for all five variables for the period 2015–2024. For each scenario, 1,000 simulations are run, each corresponding to a sequence of random shocks drawn from a probability density function estimated from the residuals in the historical data sample. This way, the simulations generate data that reflect historical patterns in terms of the volatility and correlation of individual series. The results are then used to compute probability density functions for each of the variables over the projection horizon. Values for each projected variable in percent of GDP are obtained by projecting a deterministic (and constant) trend growth rate for each. Tracking the overall balance and stock of public debt also requires a projection for interest expenditure. The assumed interest rate path is based on the *World Economic Outlook*. The debt stock corresponding to each simulation takes the initial maturity structure of debt into account and is computed according to the debt accumulation identity.[5]

4. The simulations are designed to analyze possible tensions between the planned rise in public investment, a cyclically appropriate fiscal stance, and compliance with the FRL. Starting in 2015, the simulations assume (i) a permanent increase in capital expenditure by 1.5 percentage points of GDP; (ii) an increase in current expenditure of 0.5 percentage points of GDP, meant to capture the cost of maintaining a larger stock of public infrastructure; (iii) an increase in revenue of 1 percentage point of GDP, perhaps achieved by way of improvements in tax administration; (iv) a decline in current primary expenditure of 1 percent of GDP, possibly obtained through civil service reform. Realistically, these reforms and the envisaged increase in investment will take more time to implement and are therefore unlikely to take effect all at once in 2015. However, this simplification is immaterial, given the intended focus on medium-term fiscal dynamics. Importantly, by assuming that the rise in infrastructure spending is fully covered by fiscal savings elsewhere, the simulations abstract from the practical challenge of ensuring a balanced rise in spending and revenue. This assumption serves to highlight the fiscal policy challenges looming even under a fiscally balanced rise in public capital spending.

5. Two alternative scenarios for fiscal policy behavior are considered to analyze debt sustainability and the role of the FRL. First, the u*nconstrained baseline* scenario assumes that all variables take the values simulated by the model, without imposing any of the constraints implied by the FRL. These results shed light on the fiscal sustainability risks that could materialize in the absence of the current fiscal rules. Second, the *FRL-constrained* scenario assumes that the variables are constrained by the expenditure ceiling mandated by the FRL. Specifically, government revenue is allowed to take the simulated values, but if simulated current primary expenditure grows by more

[5] The calculation of the implicit interest rate assumes that new debt issuance has the same maturity structure and sovereign and exchange rate risk premia as the existing debt stock at end-2013. This is a simplifying assumption, as interest rates are likely to be affected by the state of the cycle and debt dynamics.

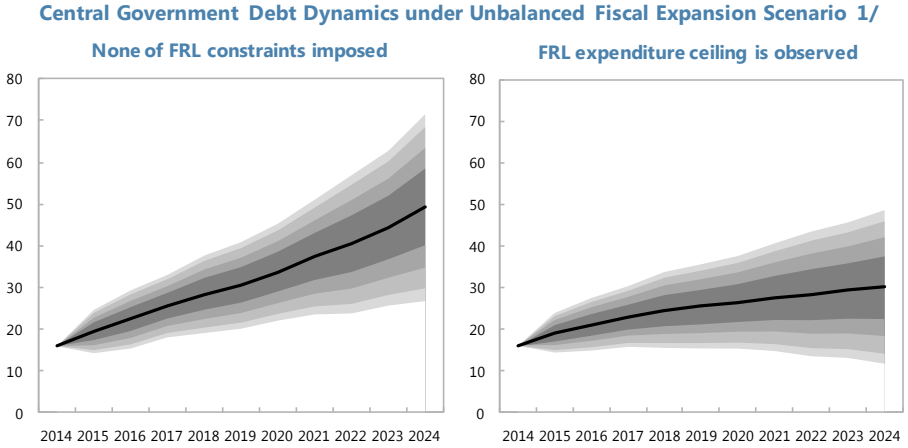
than 4 percent in real terms, its growth is capped at 4 percent. With the expenditure ceiling being enforced, the simulations are used to measure the probability and size of any additional fiscal adjustment required to also meet the deficit ceiling. This additional adjustment can be thought of as a forced slowdown in the execution of public investment.

6. Thus, the simulation exercise sheds light on the need for ad hoc fiscal consolidations to remain in compliance with the FRL. Compliance with the FRL is monitored over the entire projection horizon. In each simulation exercise two results are highlighted. First, there is the frequency of cases in which the deficit ceiling is breached, or, put differently, where ad hoc fiscal tightening would be needed to remain compliant. Second, particular attention is given to the frequency of cases in which the deficit ceiling becomes binding while non-agricultural GDP is below potential.[6] This measure is used to quantify the probability and scale of forced fiscal consolidations during the low phase of the economic cycle—a particularly problematic outcome, given the higher marginal value of fiscal spending during cyclical downturns from a stabilization perspective.

7. The paper also studies how the probability and size of forced fiscal consolidations depends on the targeted fiscal buffer, i.e., the margin between the programmed deficit and the hard FRL deficit ceiling. Intuitively, a fiscal buffer represents a form of insurance. The price of this insurance is determined by the cost associated with creating additional fiscal space, whether in the form of expenditure restraint or increased tax pressure. The benefit of the insurance can be viewed alternatively in terms of improved prospects for fiscal sustainability, or a lower probability of disrupting the execution of public investment as the FRL limits bind less frequently.

C. Results

8. To begin with, the simulation results underscore the need to create fiscal space for the intended increase in public investment, lest debt sustainability be compromised. Consider, as a starting point, a simulation that projects an increase in public investment by



Sources: Author's calculations.
1/ Scenario assumes permanent increase in public investment by 1.5 percentage points of GDP, coupled with an increase in current expenditure by 0.5 percentage points of GDP and no offsetting fiscal measures (except application of the FRL ceiling on overall primary current expenditure growth in the calculations underlying the right-hand chart).

[6] The focus on non-agricultural GDP captures the idea that this aggregate better reflects the economic welfare of the typical household than total GDP, given that agricultural income is highly concentrated among a small number of households and lightly taxed.

1.5 percentage points of GDP coupled with an increase in current expenditure of 0.5 percentage points of GDP but without any additional revenue and expenditure measures. This experiment can be thought of as an "unbalanced" fiscal expansion and is readily seen to be unsustainable. In fact, even if the FRL expenditure ceiling is imposed, public debt would follow an increasing trajectory in about 75 percent of the simulations. This point being established, all subsequent simulations will reinstate the assumption that the envisaged rise in public investment is fully covered by fiscal savings elsewhere.

9. Even with a balanced rise in spending and revenue, unfavorable shocks are likely to create fiscal sustainability problems. This is illustrated in Figure 1, which summarizes the results for simulations that incorporate additional permanent revenue of 1 percentage point of GDP and an equal amount of structural current expenditure consolidation measures. The charts in the left column correspond to the simulations which impose none of the FRL constraints, allowing revenue and expenditure to behave according to historical cyclical patterns. The results show that disregarding the FRL limits leads to a rising debt trajectory in around 75 percent of the simulations. Further, in more than half the simulations, ad hoc fiscal consolidation would become necessary to meet the FRL deficit ceiling. On average, these forced fiscal consolidations amount to slightly more than 2 percentage points of GDP. Moreover, a significant share of these forced consolidations would occur during economic downturns, i.e., when non-agricultural GDP is below potential.[7] Overall, the results underscore that, in the interest of securing debt sustainability, the FRL imposes constraints that turn out to be binding across a wide range of scenarios. In other words, simply following established fiscal policy patterns of the past would not ensure debt sustainability in a robust fashion, given the end-2014 starting point and the high volatility of Paraguay's economic environment.

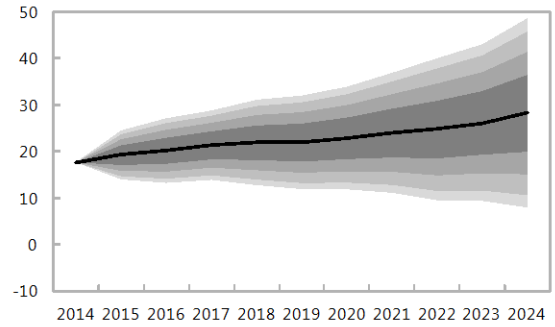
10. Compliance with the FRL expenditure ceiling would improve fiscal sustainability considerably, though adverse shocks continue to pose a challenge. The charts in the right column of Figure 1 assume that the FRL expenditure ceiling is respected. Adding this assumption implies that public debt would follow a stable or decreasing trajectory in about 75 percent of the simulations. Meanwhile, the probability of forced fiscal consolidations (plausibly involving disruptions to public investment execution) to comply with the FRL deficit ceiling declines to about 20 percent; and only in about 5 percent of cases, these forced consolidations occur during economic downturns. Despite these significant improvements relative to the scenario where the expenditure ceiling is not respected, the fiscal position still does not appear very resilient to negative shocks: not only do forced fiscal consolidations remain fairly common, but their average size is around 1 percent of GDP, implying a significant ad hoc tightening.

[7] The consistent finding that forced fiscal consolidations are relatively less likely during economic downturn may appear surprising. It is explained by two factors: (i) the FRL allows the deficit to widen to 3 percent of GDP when GDP growth is negative, which reduces the need for procyclical tightening during recessions; and (ii) government expenditure in the model is procyclical, reflecting the behavior of the series in historical data.

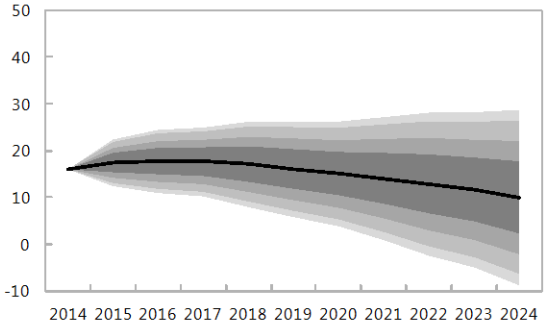
Figure 1. Fiscal Dynamics under Balanced Fiscal Expansion with Different Policy Assumptions 1/

Central government debt (in percent of GDP) 2/

None of FRL constraints imposed

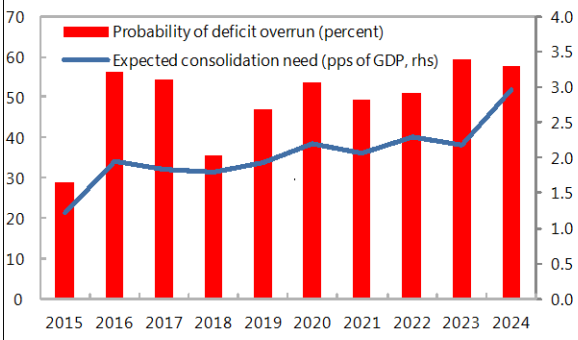


FRL expenditure ceiling is observed

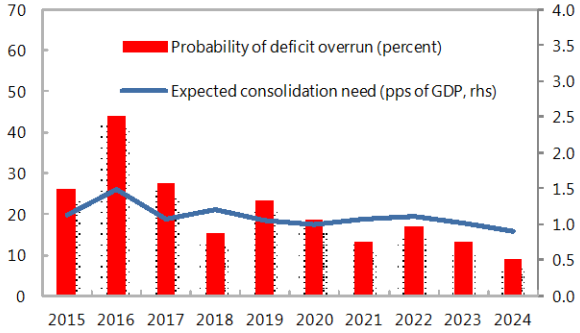


Probability of Exceeding the FRL Deficit Ceiling and Implied Consolidation Need

None of FRL constraints imposed

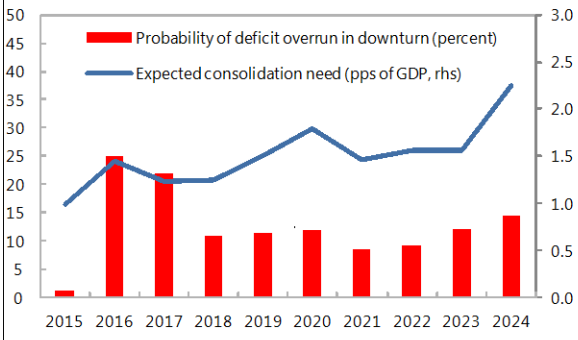


FRL expenditure ceiling is observed

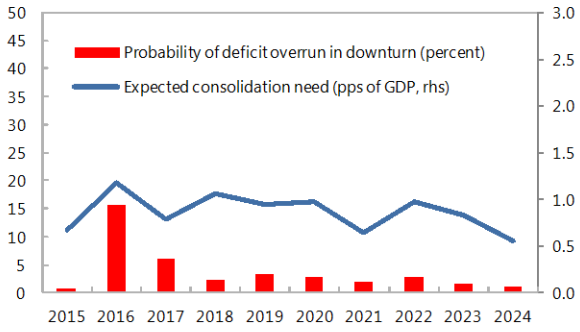


Probability of Exceeding the FRL Deficit Ceiling in an Economic Downturn and Implied Consolidation Need 3/

None of FRL constraints imposed



FRL expenditure ceiling is observed



Source: Author's calculations.

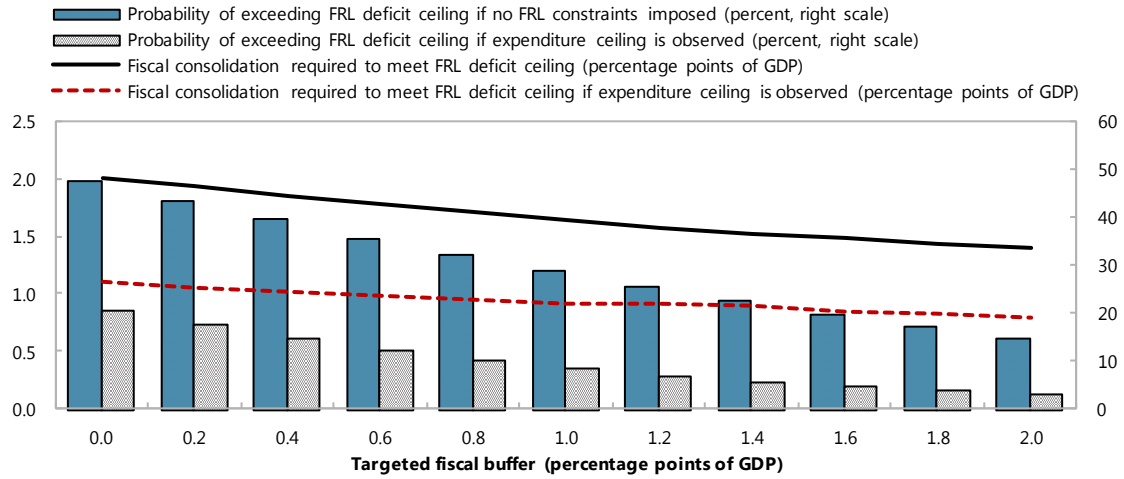
1/ Scenario assumes that the increase in public investment is fully offset by fiscal savings elsewhere. Assumed policy is "no FRL constraint imposed" (left side) and "FRL expenditure ceiling observed" (right side).

2/ Lines indicate expected trajectories of the simulated variables. Shade colors around expected trajectories indicate probability of ocurrence of 50, 75, 90 and 95 percent, respectively.

3/ Refers to unconditional probability of exceeding deficit ceiling and being in an economic downturn (defined as agricultural GDP below potential).

11. Targeting a somewhat stronger fiscal balance over time would facilitate compliance with the FRL in the business cycle without the need for frequent procyclical fiscal consolidations. Programming a small fiscal buffer—defined as a margin between the targeted deficit and the hard deficit ceiling of 1.5 percent of GDP—naturally makes the public finances more resilient; reduces the need for ad hoc consolidation to comply with the FRL in the face of adverse shocks; and thereby allows a smoother execution of the governments' investment plans. To investigate these features, the previous simulations are modified to incorporate specific amounts of assumed additional revenue. The extra revenue improves the overall fiscal balance relative to the scenario considered before. The following chart displays the probability and extent of fiscal consolidations required to comply with the FRL, as a function of the targeted fiscal buffer. Specifically, moving to the right along the x-axis implies incremental improvements to revenue and the overall balance. The simulations confirm that the probability and size of forced fiscal consolidations decline as the fiscal buffer increases.

Probability of Exceeding the FRL Deficit Ceiling and Implied Consolidation Need as a Function of the Targeted Fiscal Buffer



Source: Author's calculations.

12. A fiscal buffer on the order of 0.5–1.0 percent of GDP appears sufficient to reduce the risk of forced fiscal consolidations to around 10 percent if the FRL expenditure ceiling is observed. As seen from the above chart, the need for ad hoc fiscal tightening becomes relatively rare as the fiscal buffer approaches 1 percentage point of GDP, corresponding to an overall deficit target of 0.5 percent of GDP. Moreover, almost none of these episodes would be observed during economic downturns. As such, seeking even a moderate-size fiscal buffer could prove instrumental in securing debt sustainability—via compliance with the FRL—without the potential drawback of forced fiscal consolidations that could disrupt the envisaged build-up of public infrastructure.

INFORMALITY IN PARAGUAY: MACRO-MICRO EVIDENCE AND POLICY IMPLICATIONS[1]

A. Introduction

1. Paraguay's economy features a high degree of informality. Based on different estimation approaches, informal activity represents more than half of total employment, and only a slightly lower share of measured output. This degree of informality is elevated, and at least according to some metrics compares unfavorably to Paraguay's peers in Latin America and the Caribbean.

2. Informality has wide-ranging effects on the economy and may point to weaknesses in economic institutions or policies. This paper provides cross-country evidence suggesting that high degrees of informality are associated with characteristics typical of weaker, less advanced economies. Theoretical and empirical considerations support the notion that regulations, enforcement policies, and government effectiveness are the ultimate determinants of informality. However, the optimal combination of these policy tools to reduce informality is not straightforward and needs to reflect the specific circumstances and objectives of the country.

3. This paper is organized as follows. Section B briefly defines informality; Section C summarizes earlier work on the relative size of Paraguay's informal economy; Section D provides cross-country evidence on how informality correlates with other dimensions of economic performance, before Section E turns to micro-level data for Paraguay and describes the links between informal employment and other outcome variables; Section F proposes a theoretical model to assess the incentives influencing informal activity and derive some policy implications; and Section G concludes.

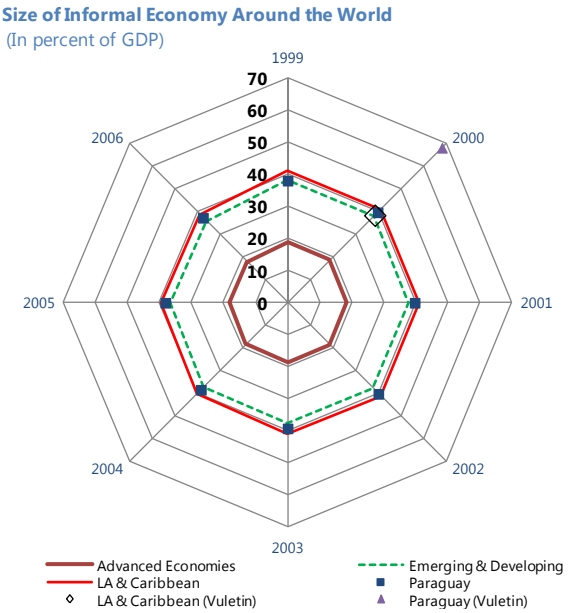
B. Defining Informality

4. Informality is a multi-faceted phenomenon that defies an unequivocal definition, but ultimately relates to incomplete compliance with government taxes and regulations. Definitions of the informal economy are usually motivated by the available data and the specific research interest at hand. A fairly general definition is found in Loayza (1997), who, based on earlier work by De Soto (1989), defines the informal sector as "the set of economic units that do not comply with government-imposed taxes and regulations." The International Conference of Labor Statisticians, in turn, has proposed a specific classification distinguishing informal enterprises and informal employment.

[1] Prepared by Mauricio Vargas.

C. Informality: Putting Paraguay on the Map

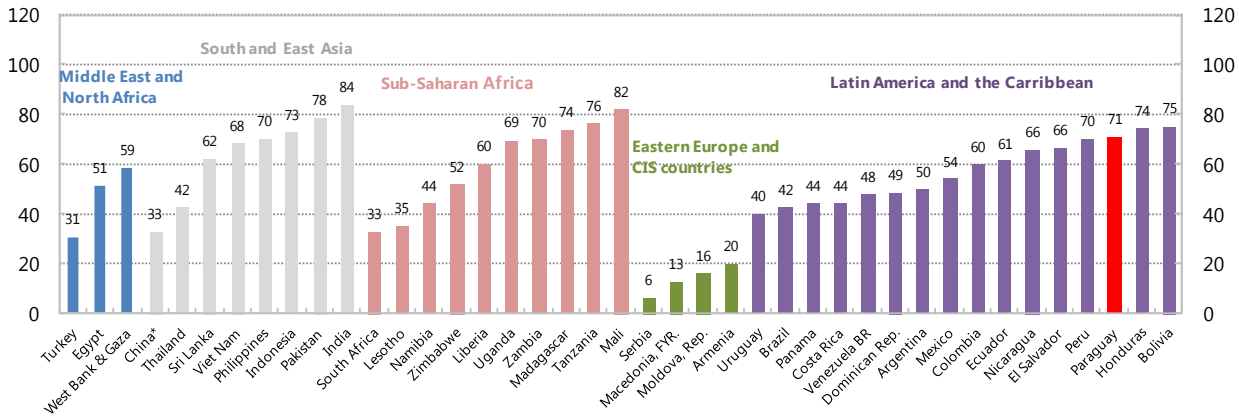
5. The proportion of informal economic activity in Paraguay matches the median of the group of Latin American and Caribbean (LAC) countries, although other estimates point to above-average informality in Paraguay. High informality is typically associated with emerging and developing economies. Indeed, the size of the informal economy (in percent of GDP) in advanced economies is roughly half that observed in poorer economies.



Source: Author's calculations based on Schneider (2013) and Vuletin (2008)
Data correspond to Schneider unless otherwise specified.

6. Employment data suggest an unusually high degree of informality in Paraguay. A recent International Labor Organization (2013) study compares employment in the informal sector across 47 developing and emerging economies. Paraguay ranks in the top 3 of LAC countries with the largest share of employment in the informal economy.

Employment in the Informal Economy
(In percent of total non-agricultural employment, latest year available)



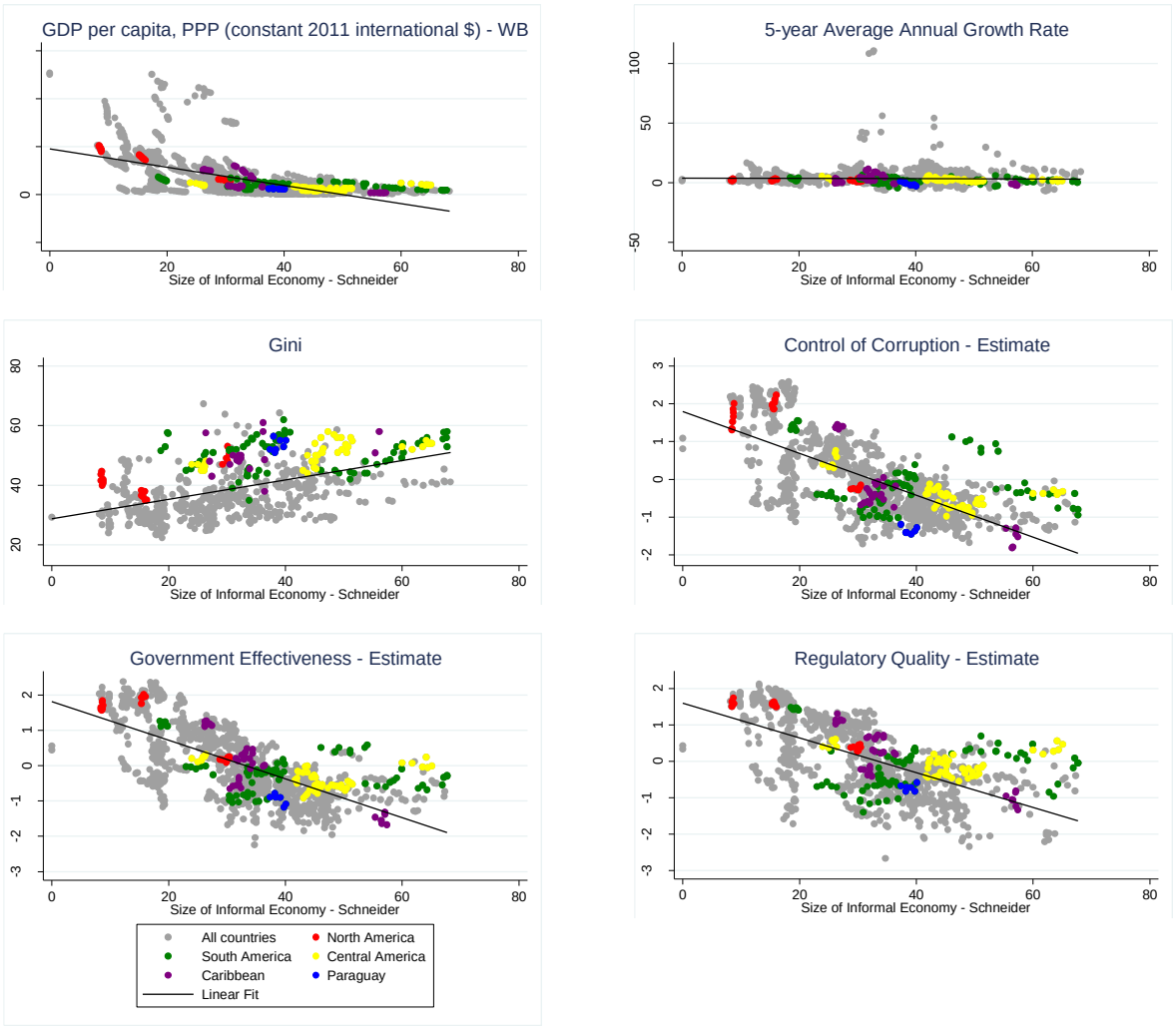
Source: Women and Men in the Informal Economy: A Statistical Picture, ILO, 2013.

D. Linkages with Growth, Inequality, and Institutions

7. From a cross-country perspective, high informality is associated with higher levels of inequality, greater corruption, and lower-quality economic institutions. The following charts link the size of the informal economy (in percent of GDP) with several other dimensions of economic performance. The bivariate associations shown in the charts are supplemented by panel data

regressions that include country-specific and time fixed effects.[2] The regression suggests that a large informal sector is associated with weaker economic institutions and higher levels of inequality, though the results do not necessarily establish a causal relationship.

Size of the Informal Economy vs. Growth, Income, and Institutions



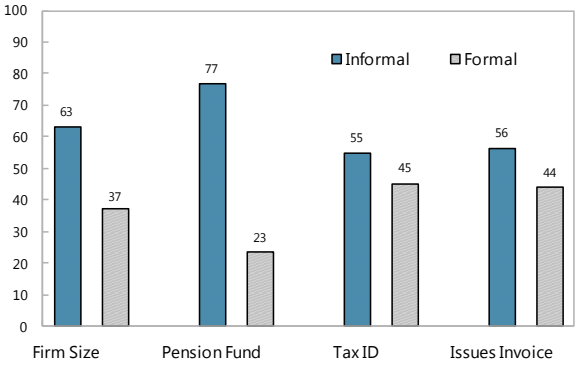
E. Informality, Labor, and Firms in Paraguay

8. The majority of employment in Paraguay is generated in the informal economy. Using the household survey "Encuesta Permanente de Hogares, 2013", we assess the size of the informal economy using several alternative and complementary measures. Specifically, we apply four different trigger conditions to identify the share of the workforce in the informal sector: a) firm size: considers that anybody working in a firm with five or less employees belongs to the informal sector;

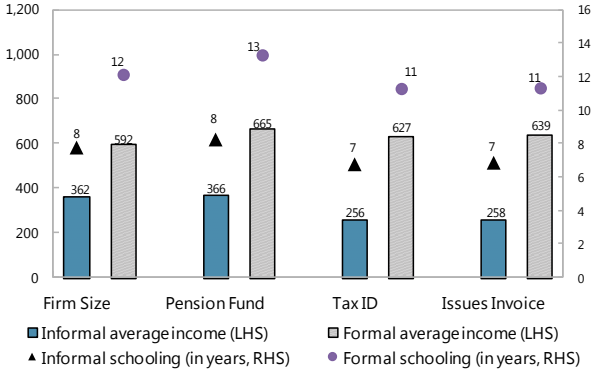
[2] To conserve space, details on the panel regression, and on other formal model results reported below, are relegated to a forthcoming IMF working paper.

b) pension fund participation: anybody contributing to a pension fund is considered part of the formal economy; c) tax ID: a worker whose firm has a tax ID belongs to the formal sector; and d) issuing invoices: a worker whose firm issues invoices/receipts on its sales is judged to be in the formal sector. According to these criteria, between 55 percent and 77 percent of the workforce is employed in the informal economy.

Alternative Measures of Informal Labor and Primary Income Generation
(In percent)



Informal vs. Formal Labor: Monthly Primary Income and Years of Schooling
(In U.S. dollars, unless otherwise stated)



Source: Author's calculation based on the "Encuesta Permanente de Hogares, 2013". Informal labor is measured in percent of working population.

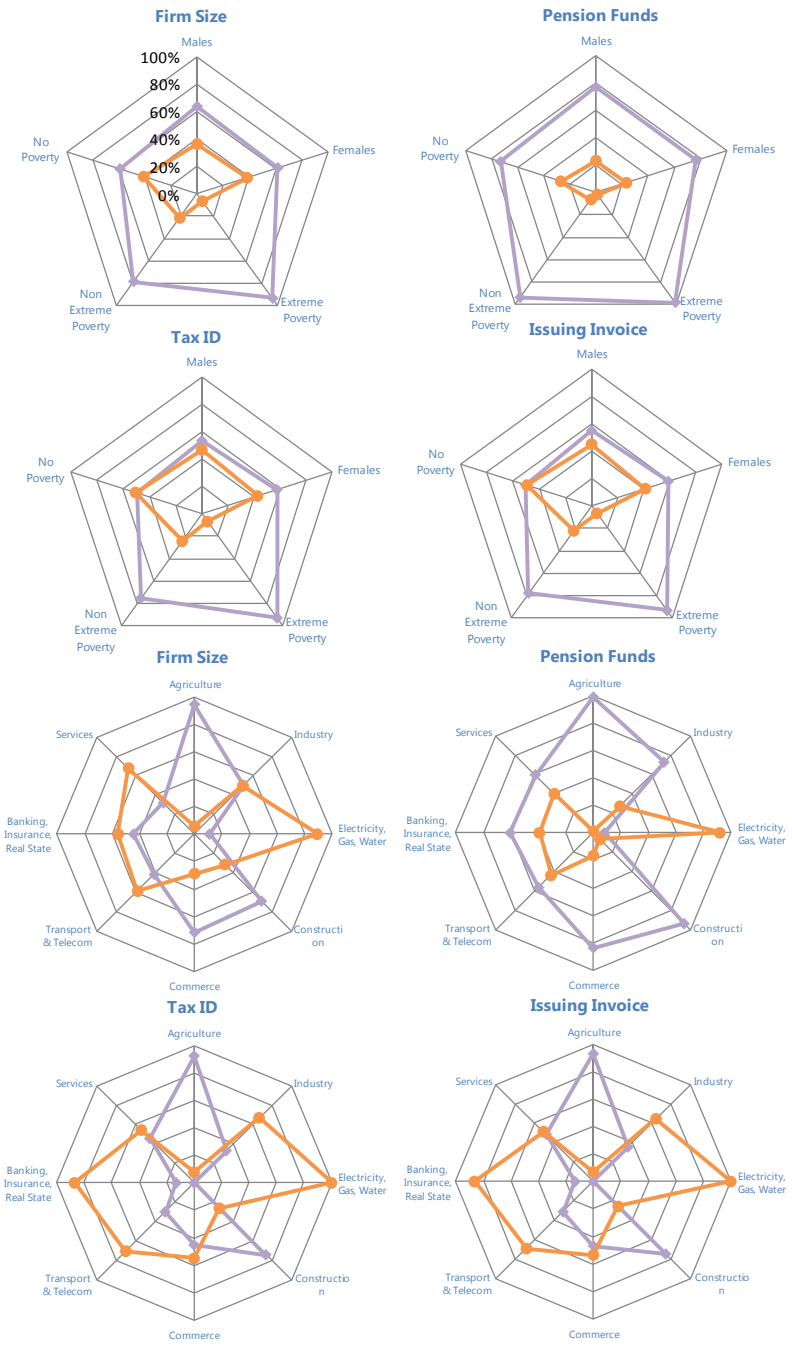
9. Workers in the informal sector are less well-paid than their peers in the formal sector—a difference that at least partly seems to reflect the constraints of informality. Monthly salaries in the formal sector are usually twice as large as those in the informal sector; and the workforce in the formal economy has, on average, four more years of education. Is this difference in terms of educational background sufficient to explain the large observed difference in salaries? To address this question, we estimate a Mincer equation for workers' income levels. The findings show that the average salary of an informal worker is still around 40 percent below that of a formal worker, after controlling for individual characteristics including education, age, experience, and gender. Accordingly, it appears that informal sector employment imposes a distinct constraint on income generation, perhaps related to lower productivity and less favorable conditions for growth.

10. Poor workers are employed almost exclusively in the informal economy, which is concentrated in agriculture, construction, commerce, and other services. Males and females are similarly distributed between informal and formal sectors, indicating no significant gender difference. With regard to poverty, however, extremely poor and poor workers are found almost exclusively in the informal sector. This provides further suggestive evidence that workers in the informal sector have lower productivity. From a sectoral perspective, informal workers are mostly concentrated in agriculture, construction, and commerce. In contrast, the "electricity, gas, and water" sector has the lowest share of informal employment.

11. Formal firms face negative spillovers from informal firms. The World Bank's `Enterprise Survey' for Paraguay (2010) provides evidence on what are perceived to be the biggest constraints on the operation of formal sector firms.[3] Almost 30 percent of respondents identify the `practices of competitors in the informal sector' as the biggest obstacle to their operations. Moreover, around three-quarters of formal firms in Paraguay report that they have to compete against unregistered or informal firms.

12. For many firms, the `practices of competitors in the informal sector' constitute a major or very severe obstacle. The World Bank's survey asks respondents to measure the strength of different obstacles. When asked about competition with informal sector firms, more than 40 percent of formal firms, and more than half of large formal firms, respond that they face major or very severe obstacles. Firms in the services and food sectors express the greatest obstacles posed by informal sector competitors.

Informal vs. Formal: Gender, Poverty Status, and Sector of Activity, 2013



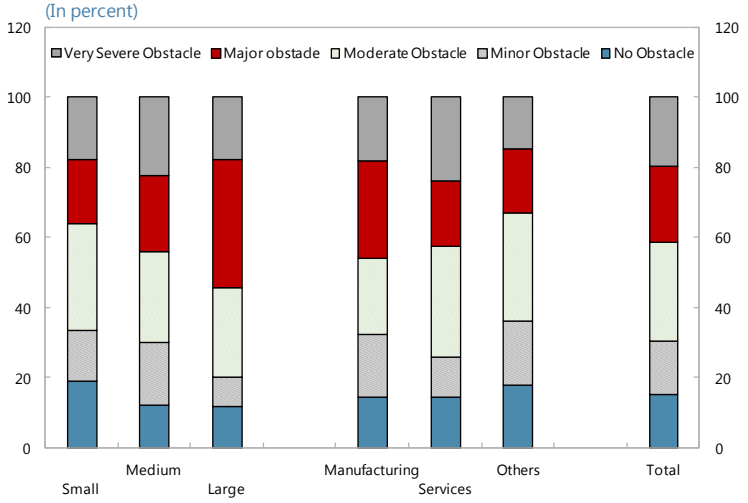
Source: Author's calculation based on the "Encuesta Permanente de Hogares, 2013".

[3] The Enterprise Survey for Paraguay is representative of the non-agricultural economy in Asuncion and the surrounding business area.

F. The Role of Public Policy

13. A model helps to illustrate how informality is determined by taxes, regulation, government effectiveness, and the penalties applied to illegal or informal activities. In order to formalize the rationale behind the choice of whether to operate in the formal or informal sector, we propose a dynamic general equilibrium model that encompasses the above elements. The model considers that regulations and taxes impose a cost on economic activity (captured by a tax on output, tauF), though this cost may be fully or partially circumvented, giving rise to the existence of informal markets. However, there is no free lunch on avoiding regulations, as three more elements interact in the model: the statutory penalty for tax evasion within the formal sector (s); a penalty for working in the informal sector (t); and government effectiveness (q), which determines the enforcement intensity through a probability of detection of informal activity. The outcome of this setup is a model where the informal sector, on the one hand, and tax evasion rates, on the other hand, are determined endogenously. The model is calibrated to the characteristics of a representative South American economy.

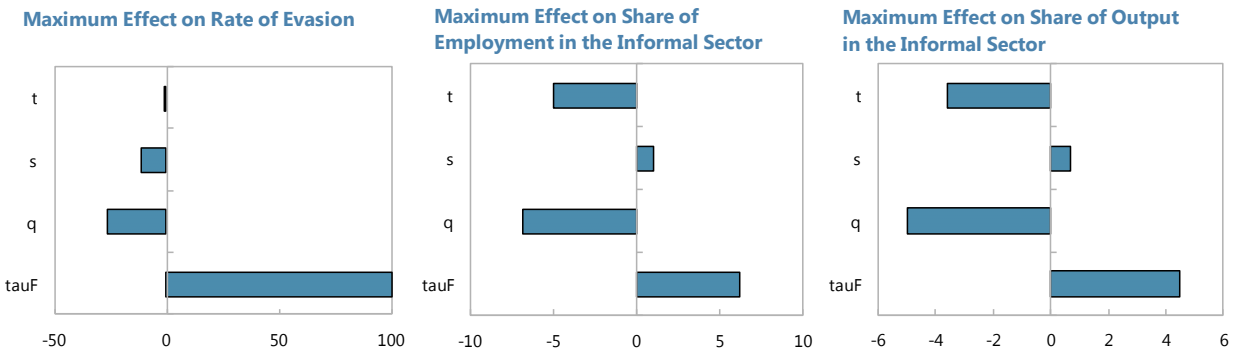
Do Practices of Competitors in Informal Sector Represent an Obstacle?
(In percent)



Souce: Author's calculations based on Enterprise Survey dataset (2010).

14. The various policy tools have different effects on the occurrence of evasion and informality, precluding a simple assessment of the optimal policy mix. Indeed, the model illustrates that not all the policy tools at hand are equally useful with respect to lowering evasion rates and informality, respectively. The chart below shows a simple measure of effectiveness for four alternative policies.

Effectiveness of Different Policy Tools to Reduce Evasion and Informality 1/
(In percentage points)



1/ Horizontal axis shows the change in the relevant informality measure implied by moving from the minimum to the maximum value of the respective policy tool.

15. However, raising government effectiveness produces favorable results in all dimensions. Improving the performance of the government increases the probability of detecting informal firms and workers, and moving them toward the formal sector. Similarly, it raises the likelihood of detecting tax evasion, enhancing compliance in the formal sector. Although government effectiveness is defined somewhat narrowly in these terms, the result has more general plausibility: a more effective government (whether as an enforcer of rules or a provider of public services) heightens the relative cost of staying outside of the formal and law-abiding sector.

16. Higher penalties for informal activities, unsurprisingly, assist the effort to discourage informal output and employment, whereas higher penalties on formal sector tax evasion may increase informality. Tax enforcement policies are usually aimed at monitoring and disciplining registered firms. In this regard, the model results suggest that focusing enforcement actions on formal firms can be costly, in terms of encouraging migration to the informal sector. A better strategy, therefore, needs to include elements to incentivize informal firms to formalize themselves. A higher penalty for informality (or a bigger subsidy for formalizing) can achieve this result, as can a reduction in (unnecessary) regulatory and tax burdens.

G. Conclusions

17. Informality in Paraguay is at least as pervasive as in other countries of the region, posing a significant policy challenge. Some indicators show Paraguay on par with its LAC peers, though the incidence of informal employment appears to be at the high end of the spectrum for the region. Cross-country data show that high informality is associated with other unfavorable attributes, notably high inequality, corruption, and weak institutions. From a microeconomic perspective, informality in Paraguay dominates among workers with abnormally low incomes, even after controlling for other demographic factors. Informal firms not only suffer from low productivity, but also appear to affect negatively the performance of formal firms and workers.

18. Designing a strategy to reduce informality is not straightforward, though a few key elements are likely to be instrumental:

- **Improvements in government effectiveness**, which raises the relative cost of staying outside of the formal sector. Civil service reform and related efforts to increase government efficiency and reduce corruption are critical in this regard.

- **Phasing out of unnecessarily onerous regulations**, which in the case of Paraguay may include certain licensing and registration requirements that may also foster corruption. By contrast, Paraguay's low tax rates are unlikely to be a major contributor to informality nor would tax reductions seem advisable from a broader macroeconomic perspective.

- **A suitable structure of penalties** for non-compliance, although consideration could also be given to providing positive incentives for formalization.

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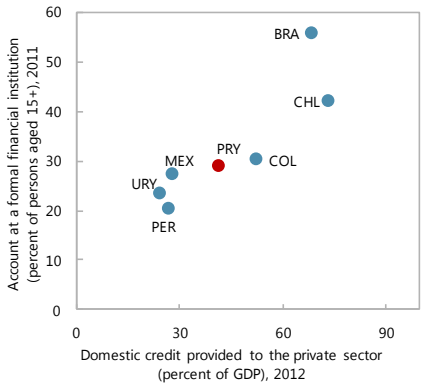
FINANCIAL DEEPENING, GROWTH, AND INEQUALITY[1]

A. Background

1. Paraguay's credit markets have deepened substantially over the past decade. Following a sharp contraction during the banking crisis of the early 2000s, real credit to the private sector began to recover in the second half of the decade, growing at an average rate of 11 percent after 2004, well above the regional average for the same period. At the end of 2013, credit reached 45 percent of GDP, in line with the average for the region.

Financial Inclusion and Credit

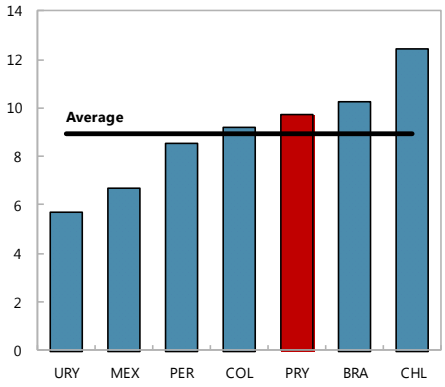


Sources: Central Bank of Paraguay, World Bank, *World Development Indicators;* and World Bank, *Global Findex*.

2. Financial inclusion has also improved, but at a slower pace. Despite the rapid growth in credit, large parts of the economy, notably lower-income households and small and medium enterprises still do not have access to loans or other financial services. According to Paraguay's 2013 Financial Inclusion Survey,[2] only 29 percent of adults had an account, and a mere 13 percent of adults had a loan with a financial institution. In addition, usage of bank accounts was low: only 10 percent of adults had actually saved at a financial institution over the previous year. Moreover, the penetration of financial services was still unequal across the population: only 20 percent of adults in the poorest quintile had a formal account, compared to 42 percent in the richest quintile. The same was true at the enterprise level, where only 54 percent of small companies had access to credit, compared to 73 percent of large companies.

Adults who Saved at a Financial Institution in the Past Year

(In percent of population age 15 and above)



Sources: World Bank, *Global Findex*.

3. Since 2011, the government has adopted certain regulations to improve access to finance. These include the regulation of non-banking correspondents (2011), i.e., agents providing basic financial services; the creation of a basic savings account (2013) with reduced requirements and lower fees, in line with FSAP recommendations; and the regulation on e-money accounts (2014),

[1] Prepared by Camila Perez. with valuable input from Era Dabla-Norris and D. Filiz Unsal (both SPR). Eva Van Leemput (University of Notre Dame) provided the model calibration in Section C.

[2] Paraguay's 2013 Financial Inclusion Survey. Technical Note. World Bank, October 2014. https://www.bcp.gov.py/estrategia-de-inclusion-financiera-i459

establishing requirements that must be met by entities providing non-bank transfers and electronic money using telecommunication services. Other initiatives to expand credit access for SMEs and promote sharing of credit information have also been enacted.

4. To extend these advances, Paraguay launched the National Strategy for Financial Inclusion in 2014. The initiative was established with the goal to "reduce poverty ratios and promote higher living standards, consolidate a robust and stable financial system, and reduce the gap between supply and demand of financial products." This strategy is part of the government's objective of reducing the still-high incidence of poverty in the country.

5. The potential effect of financial deepening[3] on growth and inequality has not yet been studied in the case of Paraguay. Building on a model developed by Dabla-Norris et al. (2014), this paper analyzes the macroeconomic effects of expanding financial services. The premise is that expanding the depth of financial markets increases growth by providing access to credit to financially constrained economic agents. To the extent that these changes favor the poor, financial development may also improve the income distribution and increase the efficiency of the capital allocation, boosting total factor productivity (TFP).

6. The paper is organized as follows. The next section describes the main financial frictions apparent in Paraguay. Section C includes a description of the model and a discussion of the results of the calibration for Paraguay, compared to those of other countries in the region. Finally, section D discusses the main policy implications.

B. Financial Constraints in Paraguay

7. The model focuses on three dimensions of financial deepening: *reach, depth*, and *efficiency*. The *reach* dimension (or *access* to credit) can be constrained by facts like physical distance to banks or ATMs and the documentation required for opening or maintaining an account or applying for a loan, which increases the cost of participating in the financial system. The *depth* dimension (or *amount* of credit) can be constrained by limited commitment, reflecting high default probabilities and poor contract enforceability, which will result in a high collateral requirement. Finally, *efficiency* relates to the fact that, due to asymmetric information, banks have to monitor their clients, which is costly. Limited competition can further increase inefficiencies, driving up the cost of intermediation.

8. Despite some recent improvements, access to financial services is still low in Paraguay. In the 2013 Financial Inclusion Survey, 24 percent of adults cited the lack of proper documentation as the main reason for not having an account. The cost and bureaucratic process involved in using

[3] This paper uses the particular definition of financial deepening as wider access to credit at the firm level as a result of reduced financial frictions.

financial services was the second most cited reason (19 percent). Only 4 percent mentioned physical distance to a financial service provider as a barrier.

9. Depth appears to be constrained by weaknesses in the legal framework and in enforcement. Paraguay scores only 2 (out of 12) in the Doing Business index for the strength of legal rights, which measures whether applicable collateral and bankruptcy laws include certain features that facilitate lending. Sound collateral laws enable businesses to use their assets as a security to obtain financing. The absence of a sound legal framework and poor contract enforcement constitute an important barrier for enterprises in obtaining credit.

10. Efficiency appears to be restricted by asymmetries of information. Biedermann et al. (2012) find that high information costs in the financial intermediation process and elevated operating costs were key factors behind the high interest rate margins in Paraguay. Limited competition may further contribute to the presence of high spreads. Ross and Garay (2014), in turn, report that the effective interest rate spreads for the banking system have been stable over the past decade, but conclude that the quality and sharing of credit information needs to be improved to reduce credit risk premiums. At present, there is one private credit bureau operating in Paraguay, alongside the BCP's public credit registry. Although their coverage appears to compare favorably to the region (45.5 percent of the population for the private bureau and 22.8 percent for the public registry), the breadth of the data being covered and frequency of publication have limitations.[4]

C. Model Calibration

11. The model used in this paper was developed by Dabla-Norris et.al (2014), to estimate the impact of financial deepening on growth and inequality. The micro-founded general equilibrium model has heterogeneous agents that are distinguished from each other by wealth and talent, and can choose to be either workers or entrepreneurs. Workers are paid the equilibrium wage, while entrepreneurs have access to a technology that uses capital and labor for production. In equilibrium, only talented individuals with a certain level of wealth choose to be entrepreneurs, while untalented individuals or those who are wealth-constrained choose to be workers.

12. The model has two regimes: one with credit (finance) and the other without (savings-only). As explained above, there are three dimensions of financial deepening: reach, depth, and efficiency. The first dimension relates to the fact that individuals need to pay a financial participation cost in order to move from the savings-only to the finance regime. The size of the participation cost determines the *reach* or inclusion of the financial markets. Second, individuals can obtain credit once they are in the finance regime, but borrowing is constrained by limited commitment, reflecting poor contract enforceability. This imposes credit rationing where entrepreneurs have to post collateral to borrow, and the size of collateral constrains the *depth* of the financial market. Third, there is

[4] The private bureau (Informconf, recently acquired by Equifax) does not report positive information. At the public credit registry, positive information is very limited, and data includes only financial institutions supervised by the BCP.

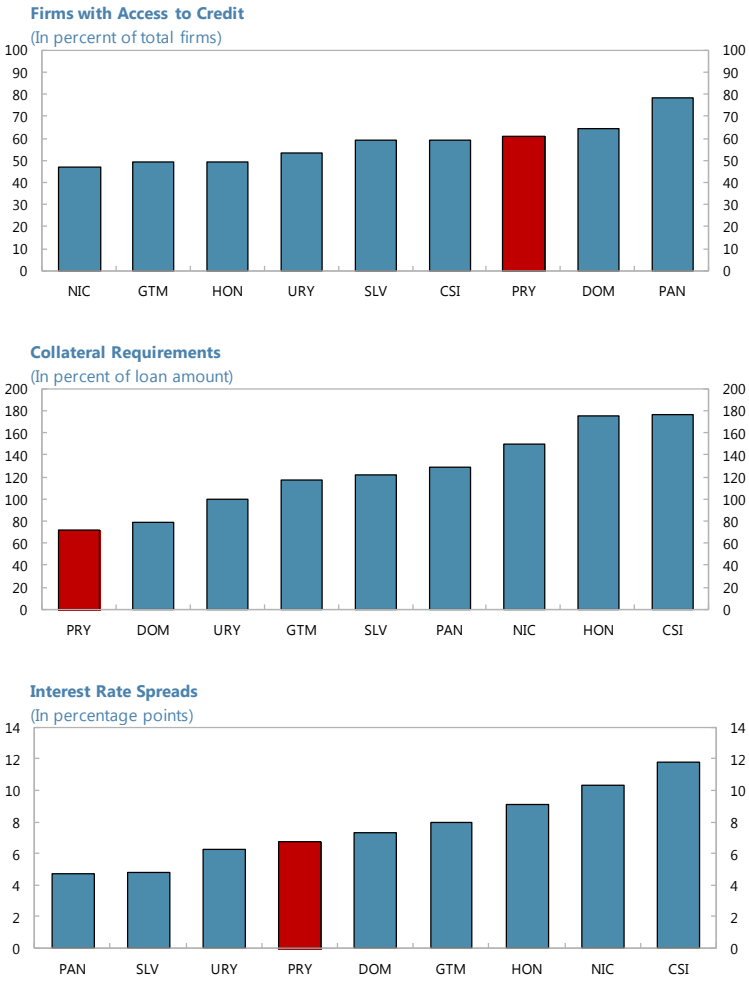
asymmetric information between banks and borrowers, and taking the default possibility and monitoring costs into account, banks charge a higher interest rate for highly leveraged firms. As more productive and poorer agents are more likely to leverage more, the higher cost of intermediation can be a source of financial market inefficiency and inequality.

13. In the model, financial deepening affects growth and inequality in three ways. First, a more developed financial market allows channeling more funds to entrepreneurs and increases their output. Second, more efficient financial contracts limit the resources wasted due to frictions and thereby boost growth. And third, more efficient allocation of funds increases TFP because talented agents increase the scale of production, causing a higher equilibrium wage and interest rate, and crowding out inefficient or untalented agents. However, financial deepening could also allow relatively untalented agents to become entrepreneurs, decreasing TFP. Therefore the impact of financial deepening on TFP and inequality is ambiguous.

14. The model is calibrated using macroeconomic and firm-level data for Paraguay. The saving rate, interest rate spread, and ratio of nonperforming loans (NPL) are taken from the World Bank's World Development Indicators (WDI) database. The average collateral ratio and share of firms with credit (broken down by firm size) comes from the Enterprise Survey of the World Bank. We use the results from two vintages (2006 and 2010) and compare them with other countries in the region.

15. Between 2006 and 2010, firm access to finance in Paraguay improved. The percentage of firms using credit to finance investments and/or working capital went up, while collateral requirements were reduced. In addition, the percentage of firms identifying access to finance as a major constraint declined, though mainly for large firms. Overall, the

Financial Access Indicators



Sources: World Bank, *Enterprise Survey* and *World Development Indicators*,.

variables used in the model for Paraguay appear to be in line with other countries in the region.

16. A few other parameters are estimated by matching the simulated moments to actual data. The gross saving rate is matched to estimate the bequest rate, ω; the average value of collateral is used to calibrate the degree of financial friction resulting from limited commitment, λ; while the financial participation cost, ψ, the intermediation cost, χ, the recovery rate, η the probability of failure, p, and the parameter for talent, ρ, are jointly estimated to match the moments of the percentage of firms with credit, NPL ratio, interest rate spread, and the employment share distribution. In the model, the share of firms with credit is endogenous and is affected by ψ, λ, and χ.

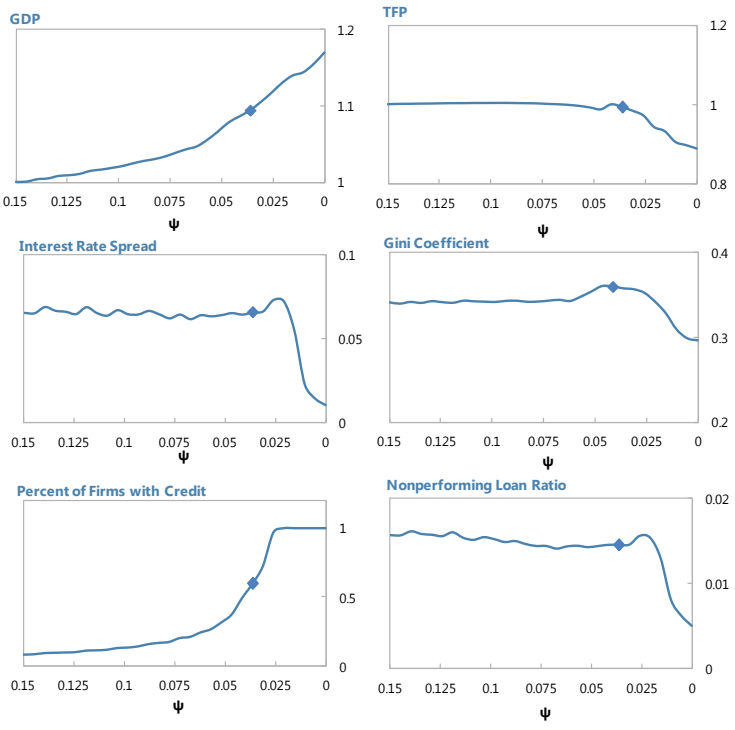
Model: Target Moments and Calibration

	Paraguay 2006				Paraguay 2010			
	Data	Model	Parameter		Data	Model	Parameter	
Savings (% of GDP)	18.4	18.4	ω	0.18	15.5	15.5	ω	0.16
Collateral (% of loan)	84	84	λ	2.19	72	72	λ	2.39
Firms with credit (%)	47.0	47.2			61.2	60.6		
NPL ratio (%)	3.3	3.3			1.3	1.4		
Top 5% empl. share	34.8	39.2	ψ	0.06	36.2	41.7	ψ	0.04
Top 10% empl. share	49.3	51.4	χ	0.92	51.4	54.5	χ	0.61
Top 20% empl. share	65.7	65.4	η	0.5	69.2	68.5	η	0.59
Top 40% empl. share	82.4	80.6	π	0.15	87.5	83.3	π	0.17
Interest rate spread	12.4	12.3	ρ	6.1	6.7	23.7	ρ	5.8

17. The results of the calibration suggest access to finance has increased in sync with a decline in asymmetric information problems, i.e., both ψ and χ are less of a constraint in 2010 compared to 2006. The next step is to analyze the economic implications of changes in the three dimensions of financial deepening:

- **Reducing the participation cost**. Lowering the participation cost, ψ, from 0.15 to 0 has a positive impact on GDP. This is the result of more firms having access to credit and more resources becoming available due to lower costs in contract negotiation. However, aggregate TFP declines, given that participation cost has a higher weight in small firms, and as they access financial services, productivity goes down. The impact on inequality is positive. A reduction in ψ benefits more constrained workers and entrepreneurs without access to credit, allowing them to invest capital into production and driving down the Gini coefficient.

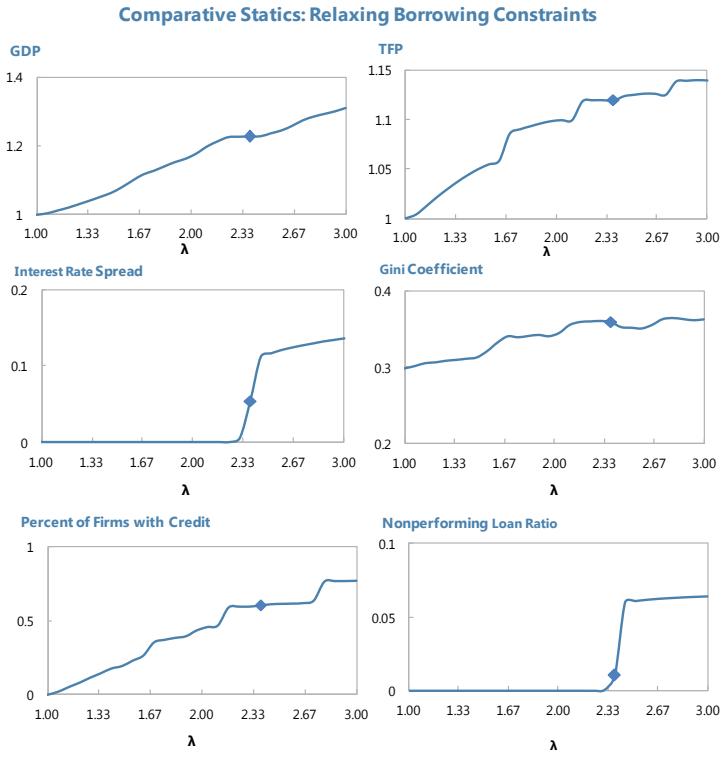
Comparative Statics: Reducing the Participation Cost



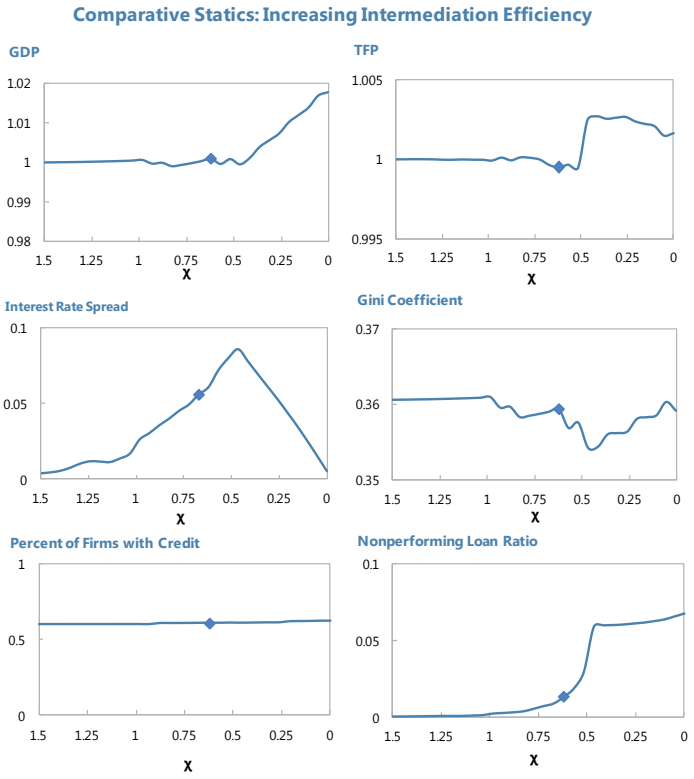
Note: Diamond marks current value in the model calibration for Paraguay.

- **Relaxing borrowing constraints**. Varying the parameter λ from 1 to 3 also has a positive impact on GDP. However, the effect on growth is less than in the case of reducing the participation cost. The effect on productivity is also positive, reflecting a more efficient allocation of resources, especially as the constraint parameter gets closer to 3. This is the result of talented entrepreneurs being able to operate firms at a larger scale than untalented ones. The effect on inequality is not very significant.

- **Increasing intermediation efficiency**. A reduction of the intermediation cost, χ, from 1.2 to 0 has a positive but small effect on GDP. Productivity also increases, but the effect is lower than the impact of relaxing the borrowing constraint. Interest rate spreads follow an inverted V-curve, as two opposing forces are in effect: first, the decline in the cost of borrowing induces entrepreneurs to leverage more, and the share of NPLs increases, driving up the spread. At the same time, a lower intermediation cost reduces the interest rate spread by definition. The effect on inequality is positive at the beginning, as leverage of small firms increases, but reverses after a certain point, as the general equilibrium effect on wages forces some marginal entrepreneurs out of business.



Note: Diamond marks current value in the model calibration for Paraguay.



Note: Diamond marks current value in the model calibration for Paraguay.

18. The results for Paraguay are in line with those for other comparable economies. In terms of growth, relaxing the borrowing constraint and the participation cost have the largest impact. However, the latter has the largest effect on reducing inequality, but affects TFP negatively, implying a trade-off between inequality and productivity growth.

Estimated Maximum Effect of Different Policy Interventions by Country
(In percent)

	Participation Cost ψ			Borrowing Constraints λ			Intermediation Cost χ		
	GDP	Gini	TFP	GDP	Gini	TFP	GDP	Gini	TFP
Costa Rica	2.0	-6.0	-6.0	20.0	-5.0	3.0	3.0	1.0	2.0
Dom. Republic	6.0	-16.0	-11.0	13.0	1.0	1.0	0.9	0.4	0.0
Panama	5.0	-15.0	-5.0	20.0	-4.0	0.0	0.8	0.1	0.0
El Salvador	5.0	-11.0	-7.0	22.0	3.0	1.0	0.6	0.5	2.0
Nicaragua	3.0	-6.0	-7.0	20.0	-1.0	0.4	3.0	3.0	2.0
Guatemala	3.0	-10.0	-11.0	17.0	1.0	5.0	1.0	0.1	0.2
Honduras	3.0	-4.0	-5.0	22.0	-1.0	6.0	2.0	1.0	3.0
Uruguay	4.0	-11.0	-12.0	15.0	1.0	4.0	1.0	0.8	0.2
Paraguay	**8.0**	**-18.0**	**-11.0**	**8.0**	**1.0**	**2.0**	**2.0**	**0.6**	**0.2**

Note: The table indicates the estimated maximum effect from completely eliminating participation cost, borrowing constraints, and intermediation cost, respectively, relative to the country-specific current starting point.

D. Conclusions

19. By promoting greater access to banking services, Paraguay's Financial Inclusion Strategy could affect growth and inequality. The calibrated model shows that policies to remove existing barriers to access the financial system can have different results in terms of growth and inequality. The results on productivity also vary.

20. Lowering the costs and documentation requirements for opening accounts and obtaining loans is a promising element of this strategy. The results of this paper suggest that progress in this area can significantly improve growth and lower inequality. Reducing borrowing constraints—by having better information and contract enforcement—will also have a positive impact on growth, although the benefits have to be weighed carefully against the risk of exposing financially inexperienced borrowers to potential indebtedness problems. Finally, reducing intermediation costs could also increase growth while bringing down the relatively high interest rate spreads in the country.

21. While financial inclusion is analyzed here from the point of view of easing access to credit for firms, the concept goes well beyond that definition. Thus, it is important and indeed encouraging that Paraguay's financial inclusion strategy pursues broader goals that also include financial education and wider access to financial services other than loans.

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