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PARAGUAY

SELECTED ISSUES

April 2019

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PARAGUAY

SELECTED ISSUES

March 29, 2019

Approved By
Western Hemisphere Department

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CONTENTS

WHAT CAUSED THE GROWTH ACCELERATION?

A. Introduction

1. Paraguay has experienced a growth acceleration over the past decade. GDP per capita grew at an average annualized rate of 3 percent, compared to 0.8 percent for the LAC region. In PPP-terms, growth was even more rapid.

2. This paper investigates the reasons for the growth pickup in Paraguay and explores the potential for sustainable future growth. It shows that the growth acceleration over the past 15 years is the combined result of a few factors: 1) a bounce back from the crisis in the late 1990s and the sub-par growth of the two decades prior; 2) a benevolent external environment, the commodity price boom in particular; 3) the improved macroeconomic stability. And in terms of its composition, growth in the past has largely been extensive, mostly coming from capital deepening and increasing labor inputs, rather than productivity increase, though TFP growth has played a bigger role in the most recent years.

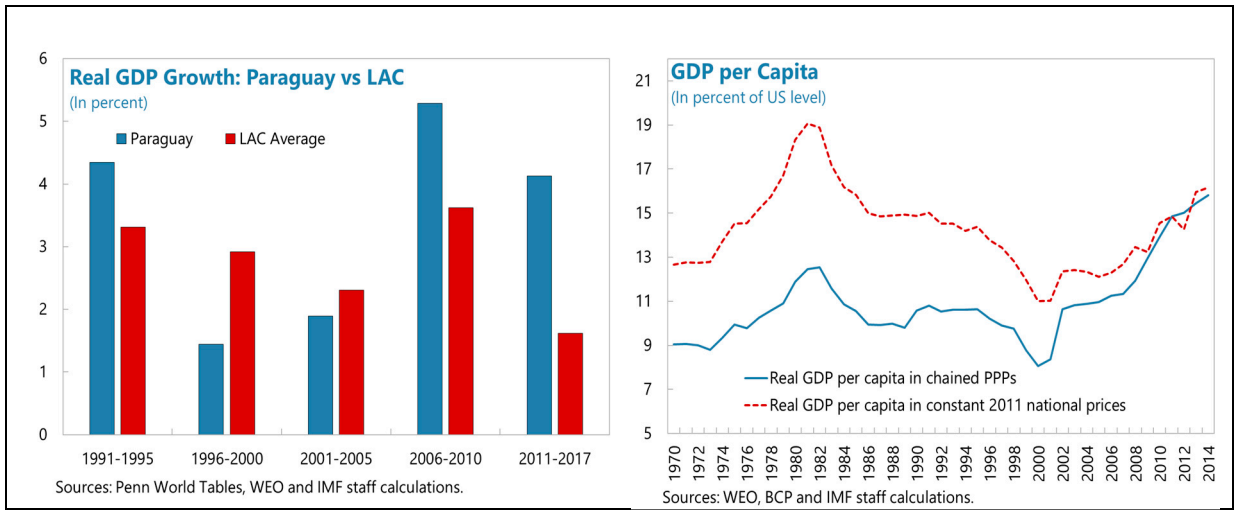
3. Going forward, the benign external environment that has facilitated growth may no longer be present. Sustainable growth needs to rely on higher productivity increase and faster development of the emerging non-agricultural, non-energy tradable sector.

B. Why Has Growth Picked up in Paraguay?

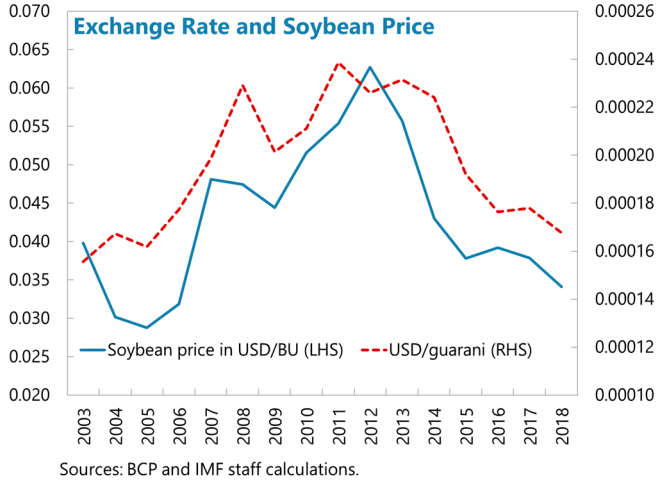
4. Over the past half century, the Paraguayan economy has gone through significant swings. The country experienced an economic boom during the 1970s, as the construction of the Itaipu dam and improved connectivity with Brazil stimulated the economy, and the price surge in soybean and cotton aided the agricultural sector.

5. Growth slowed down significantly during the 80s and 90s, after the completion of the Itaipu project. Declining agricultural prices during the period also dampened the income from commodity exports, which constituted around 70 percent of total exports. Growth performance was also affected by the economic slowdown in the neighboring region over the period, as the trade/investment tie between Paraguay and other countries in the region, especially Brazil and Argentina, was historically very strong.

6. Since 2003, growth has seen a major comeback, averaging over 4 percent annually. Remarkably, Paraguay has maintained its steady growth despite lackluster economic performances in Brazil and Argentina since 2010.



7. The pickup in growth is also reflected in the fact that Paraguay has experienced real convergence with advanced economies in recent years. GDP per capita has been catching up to the US level by 0.4 percentage point annually since 2011, reverting the trend of divergence over the two decades prior. Convergence in PPP terms was even greater during the 2000s, reflecting the purchasing power gain due to exchange rate appreciation associated with the agricultural commodity price boom.



8. The growth acceleration in the past decade and a half is the combined result of both internal and external factors, including positive commodity price shock, improved macroeconomic stability, and increased economic openness and diversification.

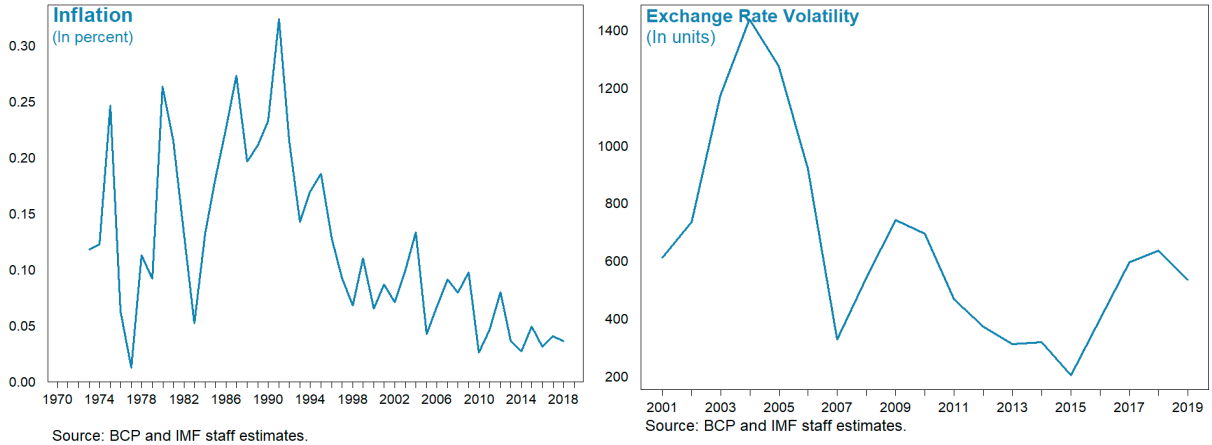
Improved Macro Stability Facilitated Growth

9. Paraguay experienced a severe banking crisis during the second half of the 1990s. The crisis was the result of rapid financial liberalization, combined with lax entry requirements for financial institutions and weak banking sector supervision.

10. The crisis cost over 12 percent of GDP in various rescue packages. Following the crisis, the nominal and real exchange rate plummeted, and the dollarization in the financial system increased. The fiscal deficit rose, as well as government debt. The loan delinquency ratio in the banking sector increased to over 20 percent. And real GDP per capita dropped by over 10 percent from 1995 to 2000.

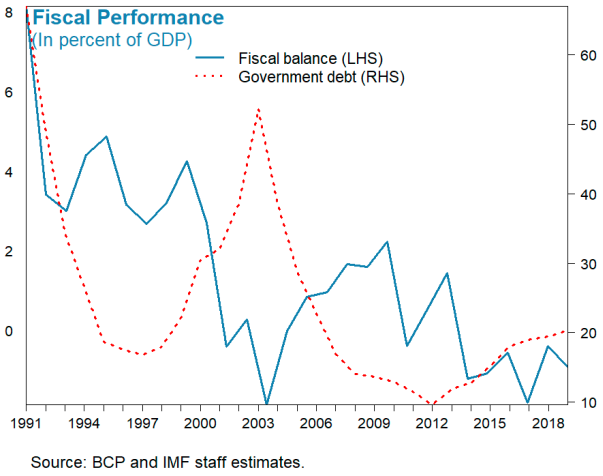
11. The economy started growing again in the early 2000s. Macroeconomic stability was restored in the context of several IMF-supported programs. During and after the crisis, the BCP implemented restrictive monetary policy, including the use of open market operations to absorb the liquidity injection into the financial system. The fiscal stance was also kept conservative. As a result, inflation came down. Inflation has averaged 6 percent since 2000, compared to 17.4 percent for the two decades before.

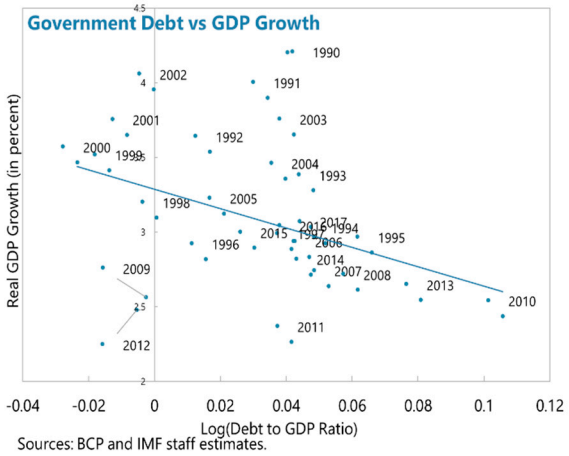
12. SThe BCP adopted an inflation targeting framework in 2011, which helped to further reduce inflation and price volatility. At the same time, exchange rate volatility[1] has also come down. The increased price stability had an enabling effect on trade, investment, and credit growth.



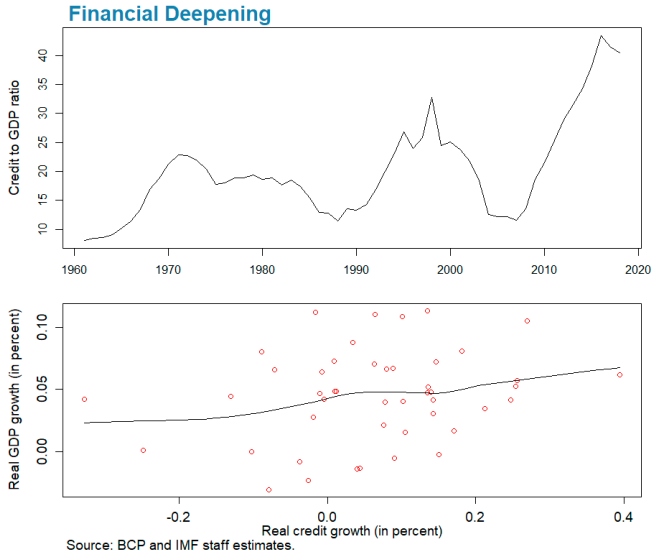
13. The public finances were put in order. Fiscal deficits, which had amounted to 8 percent in the early 1990s turned into fiscal surpluses. Government debt was reduced from over 65 percent of GDP in 1990 to around 20 percent in 2017. The fiscal responsibility law, put in effect in 2015, prescribed definitive rules for government spending and deficit, further safeguarding fiscal sustainability.

[1] Defined as the rolling standard deviation over five-year windows.

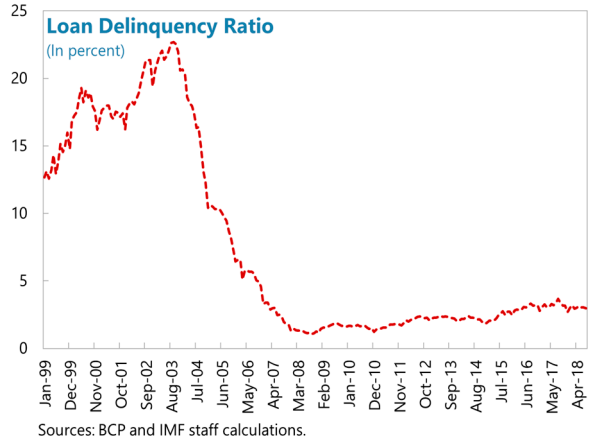




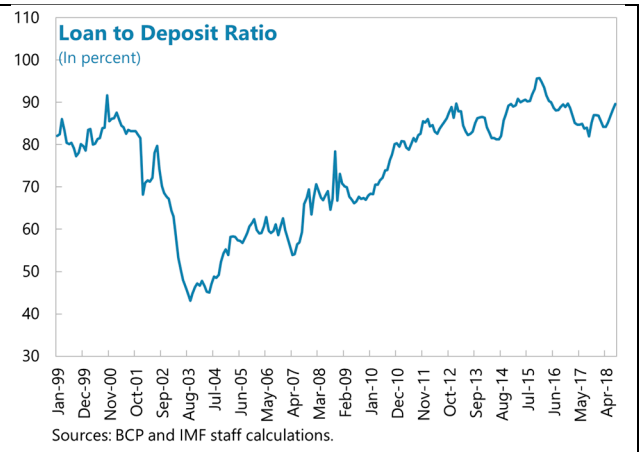
14. The health of the banking sector was restored. The NPL ratio came down from over 20 percent in 2003 to 2 percent in 2008, as problematic banks were forced to either close or significantly scale down, and the remaining banks took a more conservative approach in lending. Banking sector supervision was reformed in the aftermath of the banking crisis in the late 1990s, including a move towards risk-based supervision, strengthened prudential standards, and a more comprehensive legal framework. As a result, the financial soundness of the sector has greatly improved. The financial sector reforms were aided by the two IMF-supported programs from 2004 to 2007, which facilitated the implementation of new banking legislation and prudential regulations.



15. The improved macroeconomic management has helped Paraguay avoid the boom-bust cycle that has plagued some of its neighbors in recent years. And as a result, the economic performance of the country is increasingly decoupled from the rest of the region.



Sources: BCP and IMF staff calculations.



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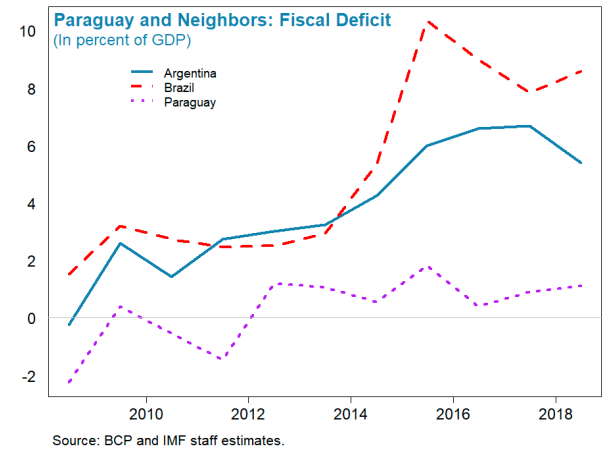
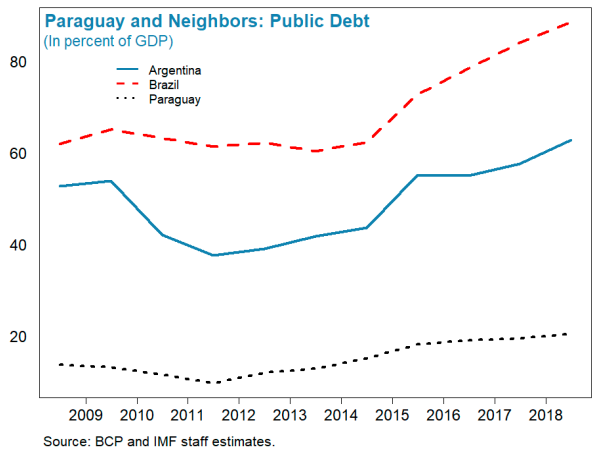


Source: BCP and IMF staff estimates.



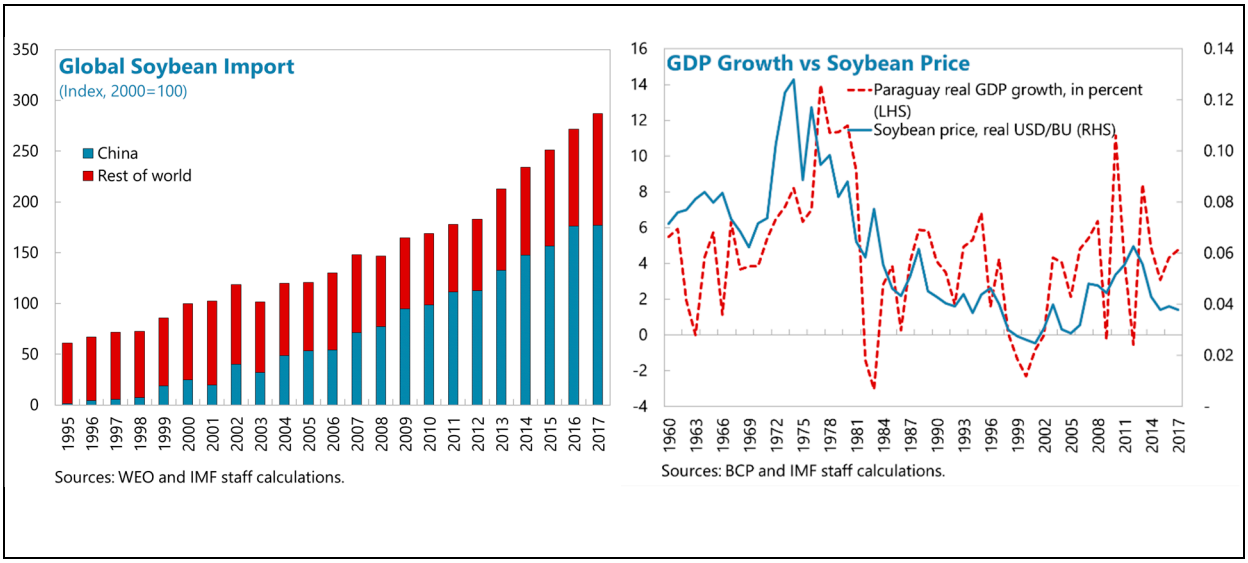
Source: BCP and IMF staff estimates.

The Agricultural Commodity Price Boom

16. The agriculture commodity price boom since the early 2000s has been a boon to growth. As the fourth largest exporter of soybeans in the world, growth in Paraguay has historically been closely correlated with soybean price fluctuations. The soybean export price in dollars tripled between 2003 and 2013, largely driven by the increasing demand from China, which imports over 60 percent of soybeans in the world. The increase in soybean price translated into a sharp increase in dollar exports. Soybean export values grew from $363 million in 2000 to $2.7 billion in 2013.

17. The price boom triggered a major increase in investment and production expansion in the agricultural sector. Sowing areas for major crops doubled Between 2003 and 2018.

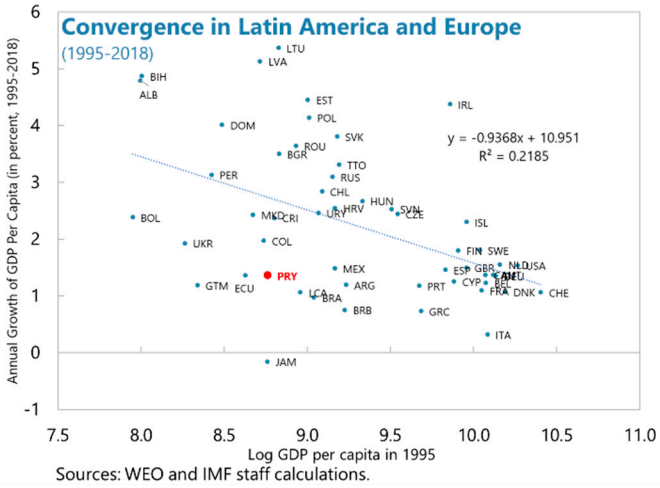
18. The agricultural commodity price boom also had positive spillovers into the non-tradable sector. As the exchange rate appreciated, wages and purchasing power in dollar terms grew, which translated into increasing domestic demand for the tertiary sector. The employment and output shares of construction, commerce and other services all increased (see section IV). The commodity price boom is also a major contributing factor to the rapid growth in credit to the private sector, which increased from 13 percent of GDP in 2003 to 40 percent in 2017, with credits to agriculture and services sectors being the main growth components.



C. How Sustainable is the Current Growth Path?

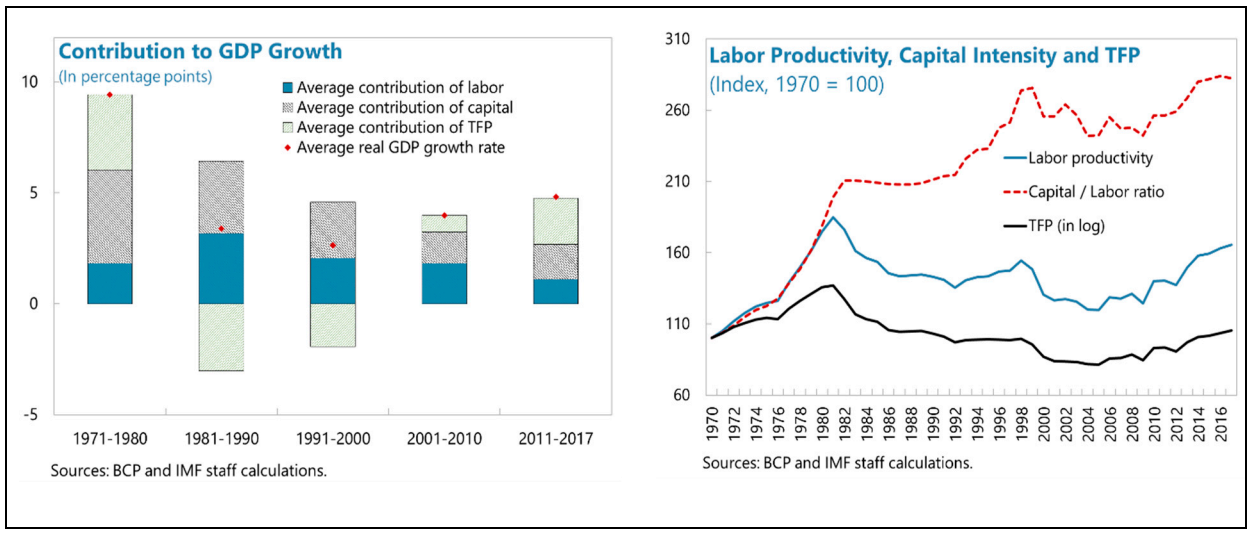
- **The recent growth resurgence started from a low base**

19. While Paraguay has grown rapidly over the past decade and a half, in a sense, the recent relatively high growth is a period of "normalization" from the sub-par economic performance of the period prior. Seen over a longer time period, growth has been less impressive. Real GDP per capita growth since 1995 has been modest. And GDP per capita as percentage of the US level, without PPP adjustment, is at par with that of the late 1970s.



- **Growth Has Been Accompanied by only Moderate TFP Increases**

20. A growth accounting exercise breaks down Paraguay's GDP growth into contributions from capital, labor, and total factor productivity (TFP)[2]. The result indicates that in the past, growth has been predominantly driven by capital deepening and labor input growth. Throughout the 1980s and 1990s, TFP growth was mostly negative, though there has been a reversal of this trend in the last decade or so, with TFP's contribution to growth outstripping those of capital and labor. Yet despite the more rapid increase in TFP in the recent period, long-term TFP level over the past half century has been largely flat.

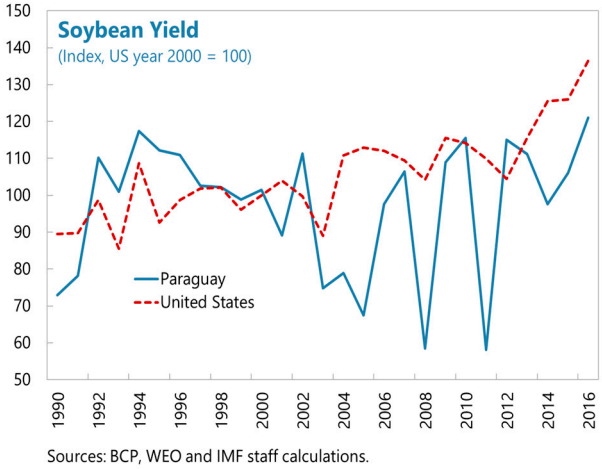


21. Output growth in the agricultural sector shows a similar pattern. Labor productivity growth in the sector has been mostly driven by capital deepening, and output growth largely fueled by expansion of agricultural land. Average yield growth for major crops, however, has been limited, partly due to agricultural production being increasingly expanded to more marginal land.

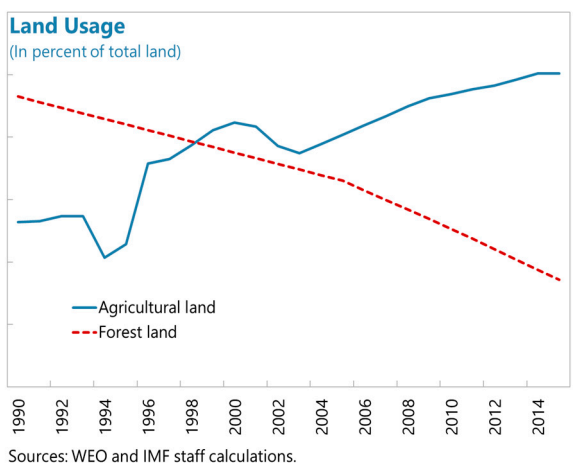
- **External conditions are less likely to benefit growth going forward**

22. The agricultural commodity price boom during the 2000s, notably in soybean price, has largely been driven by the growing demand from China. As the growth spree of China moderates, its demand increase is tapering off, as can be seen from the data for the past five years. Over the medium term, the growth benefit from external terms of trade is likely to be limited.

[2] TFP is imputed as $\ln(TFP)_t = \ln(Y)_t - \alpha \ln(L)_t - (1-\alpha)\ln(K)_t$, where *Y*, *L*, and *K* are real GDP, employed population, and capital stock respectively. α is the share of labor compensation in GDP. Capital stock is calculated as $K_t = (1-\delta)K_{t-1} + I_t$, where I_t is the real investment in year t. Both α and δ are taken from the Penn World Table.



Sources: BCP, WEO and IMF staff calculations.

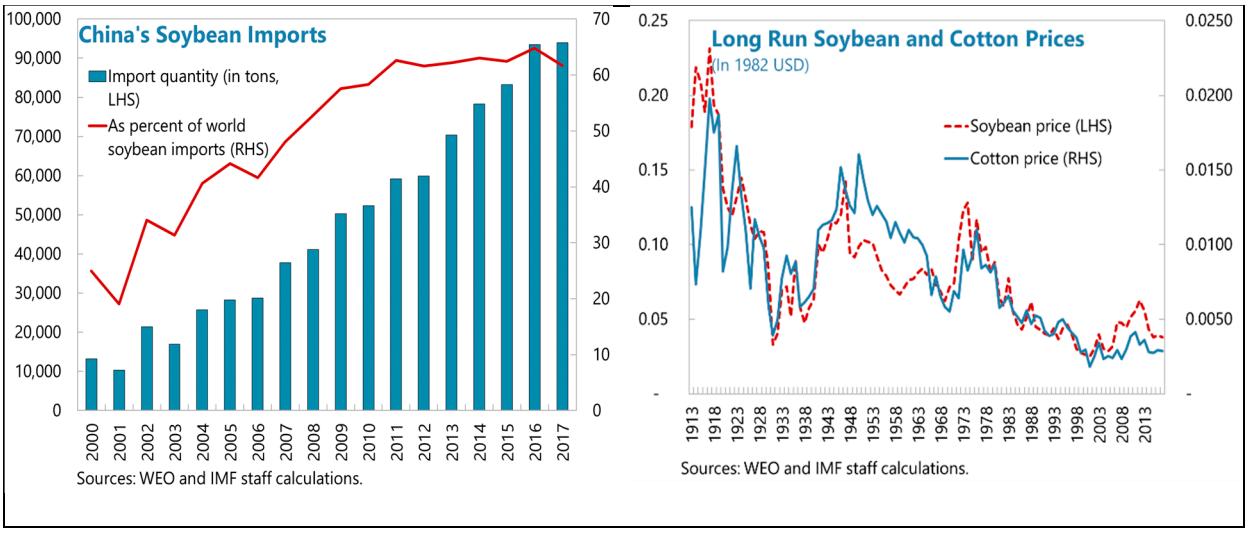


Sources: WEO and IMF staff calculations.

23. Moreover, despite going through large cyclical swings, agricultural commodity price displays a general trend decline, as the long-term data indicates. Although the industrial structure of Paraguay has been increasingly diversified over the years, GDP growth is still largely coupled with agricultural prices. The decline in the latter not only affects the agriculture sector, but will be felt in the rest of the economy as well. In particular, exchange depreciation associated with a commodity price drop will negatively impact the growth of the non-tradable sector through its effect on purchasing power.

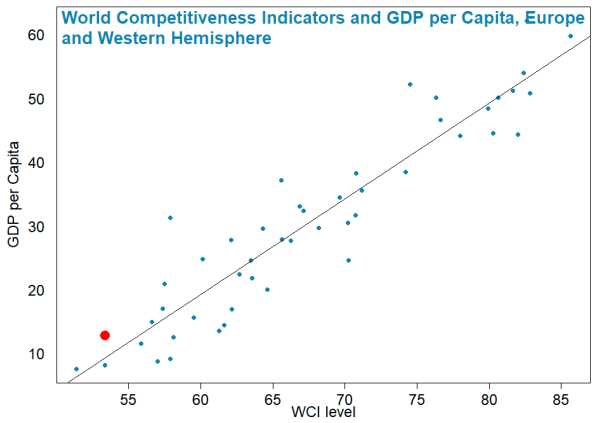
Sources: WEO and IMF staff calculations.

24. Meanwhile, growth prospects in the main trading and investment partners of Paraguay (e.g. Brazil, Argentina) are lower than in the decade before. And continued interest rate normalization in advanced economies is driving up the cost of capital and making investments more expensive. These external factors are potential detractors on growth. Though the impact of trade partners is likely to be less than in the past, given the increased decoupling of the Paraguayan economy from the rest of the region.



D. Conclusion

25. Despite strong growth in recent years, like most of the Latin America, seen over a longer period, Paraguay has not attained significant economic convergence with advanced economies. Historically, growth has been largely driven by increasing labor and capital inputs, though the contribution from TFP growth has picked up somewhat in recent years. Going forward, the conductive external environment that has facilitated growth over the past decade and half may not persist. Long-run convergence will need to come from higher labor productivity growth, which requires a combination of higher TFP growth and further capital deepening.



26. Empirical data shows a strong linkage between the GDP per capita of a country and its score in a composite structural indicator such as the World Competitiveness Index, which Paraguay ranked poorly on. Identifying and correcting Paraguay's structural deficiencies that may be hampering productivity growth and capital accumulation will be crucial for sustainable growth.

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REFORM PRIORITIES FOR ACHIEVING SUSTAINABLE GROWTH

A. Introduction

1. Since the mid-2000s, growth in Paraguay has been much faster than before. However, the growth acceleration has been largely extensive—driven by increased production inputs, rather than productivity gain.

2. This paper conducts an international comparison of Paraguay versus a group of middle-income countries that were once at a similar development stage and subsequently achieved sustained growth and convergence ("high-convergence club"). Compared to the high-converging peers, Paraguay lags behind in its industrialization progress, as indicated by lower product complexity of the export sector, slower development of the manufacturing sector, and disproportional reliance on agricultural commodities.

3. Sustainable growth going forward needs to rely on higher productivity increase, which in turn requires further transition from an agricultural- to industrial- economy and a more diversified export structure.

4. To accomplish this transition, structural reforms to facilitate productivity growth and greater dynamism in the private sector would be helpful. The paper identifies several priorities for structural reforms in Paraguay, based on estimated impact on growth of structural indicators, as well as survey results from private firms. The top reform areas identified are quality of transport infrastructure, quality of human capital, rule of law, and customs and trade regulations.

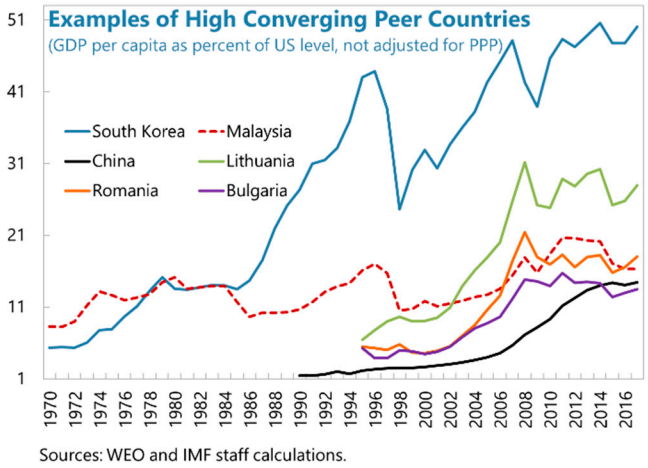
B. Characteristics of High-Converging Countries: An International Comparison

5. This section aims to answer the question "what does Paraguay need to achieve sustainable growth and convergence?". It compares Paraguay across different economic dimensions with countries that have been at a similar development level but have achieved (or have failed to achieve) significant convergence in the subsequent period.

Data and Variables

6. Countries that have been at a similar convergence stage as Paraguay are selected as the peer group. These include countries with a GDP per capita at 5 to 10 percent of the US level at any point in time since 1950.

7. Two sub-groups of the peer group are then selected as comparison sets: *high-converging peers* and *low-converging peers*. The high-converging peers are defined as the country-year combinations where the speed of the country's GDP convergence to the US level in the subsequent 10-year period is higher than 75 percent of the countries in the peer group. In addition, being included in the high-converging country group requires that there hasn't been any "relapse" in convergence, i.e., the country's convergence level at the end of the data sample (2017) is still higher than in the beginning of its high-converging period. In contrast, the low-converging peers consist of countries in the peer group that have had a 10-year convergence rate slower than 75 percent of the countries in the peer group.



Sources: WEO and IMF staff calculations.

8. The high-converging peer group largely consists of emerging Asian and European countries that have experienced rapid growth in the recent economic history. In contrast, the low-converging peer group is more geographically diverse. (See the appendix for a complete list of countries belonging to the two groups and their starting years.)

9. Paraguay is compared with the two sub groups across four dimensions: 1) macroeconomic fundamentals, 2) institutional quality, 3) business environment, and 4) industrial and export structure. The time periods for the data observations chosen for the high-converging (low-converging) peer groups are the years in which a country's superior (inferior) convergence performance started. And for Paraguay, the 2017 data (or data for the latest available year) is used.[1]

Results

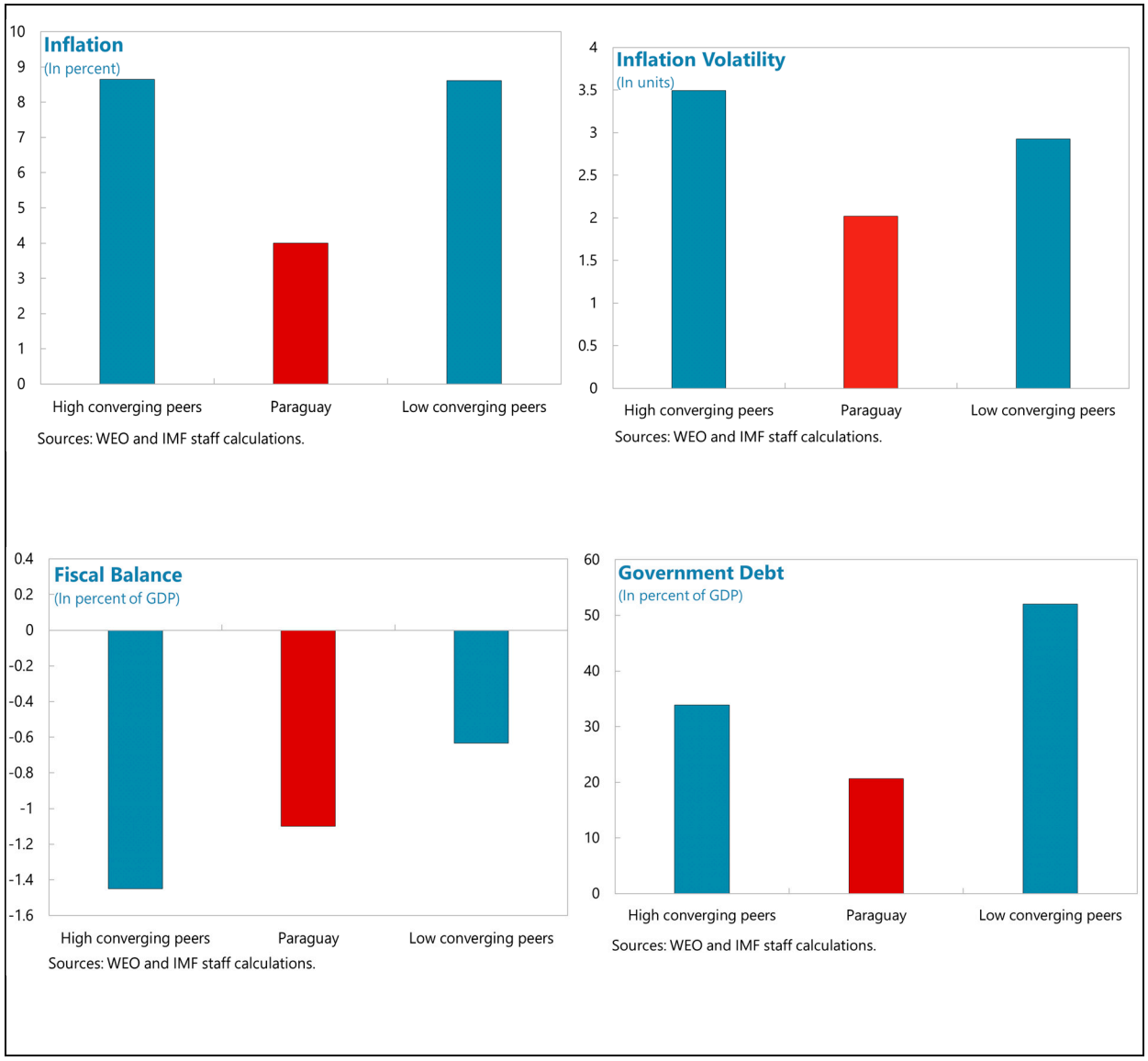
- **Paraguay compares favorably in macroeconomic management**

10. Macro stability in Paraguay fares better than that of both comparison groups, manifested as lower inflation,[2] more stable price level, and lower government debt. This is consistent with the fact that macroeconomic management in Paraguay has been strong over the past 15 years, which offered a boon to growth.

[1] In the case where data for a country / target year combination is not available, data of the closest subsequent period for that country is used.

[2] In the calculation of average inflation and inflation volatility for the two peer groups, outliners (higher than 75 percentile of the observations) were excluded. This is because several Eastern European countries had unusually high inflation during their transition period in the 1990s.

11. It's interesting to note the diverging trend in macro stability between the two peer groups. Although the macro stability indicators for the high-converging country group do not seem to be significantly better than those of the low-convergence group over during the starting years of their high-convergence episodes, the macro indicators improved for the high-converging group over the subsequent periods, while deteriorating for the second group. For example, the government debt to GDP ratio drops by an average of 2.4 percentage points over a 10-year high-converging period, while overall fiscal balance deteriorates by 2.3 percentage points over 10 years for the low-converging group.



- **Investment and FDI are lower compared to the high-converging countries**

12. At around 20 percent of GDP, the investment rate in Paraguay is low compared to the prevailing levels in both high-converging and low-converging peers, while the capital-output ratio is close to the average level of high-converging peers. The combination of high capital-output ratio and low investment level suggests that the marginal return on investment may be low due to subdued productivity growth, consistent with the data on the historical trajectory of TFP in Paraguay. The lower investment rate is also in line with lower levels of domestic saving rate and foreign direct investment (FDI), both lagging behind the high-converging peers.

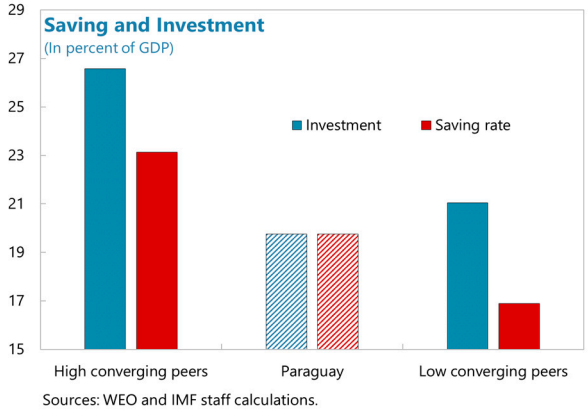
13. The high capital-output ratio of Paraguay is likely related to the relatively high capital intensity of the agriculture sector, which has reduced its labor input need in the recent decades thanks to increasing mechanization of the industry. To increase investment despite the already high capital stock, diversification into the more productive industrial sector is much needed (also see the next sub-section).

14. The subdued level of FDI in Paraguay is particularly striking. Since FDI is not only a component of investment, but also an important source of international production knowledge transfer, technology upgrade (and associated productivity increase), as well as a driver of export activities, measures to encourage foreign investments are likely to provide important leverage for growth going forward.

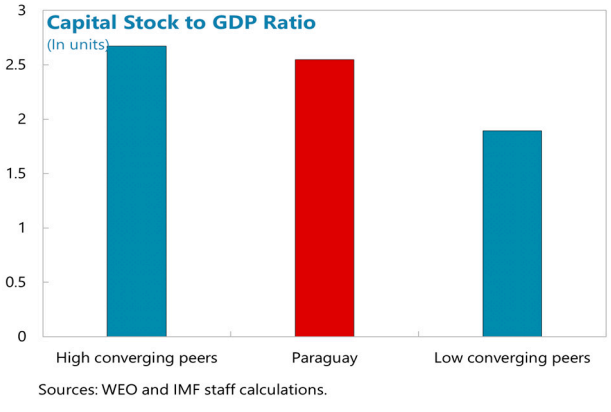
- **The industrialization level is low with export disproportionally concentrated in commodities**

15. Compared to the high-converging countries, the Paraguayan economy is much less industrialized. The sectoral structure is close to that of the low-converging peers, with a high share of the primary sector. The sectoral structure is reflected in the composition of Paraguay's exports as well, with agricultural commodities dominating the export basket and a low share of industrial exports. Although there has been a surge in growth of the labor-intensive, manufacturing export sector associated with FDIs (see Box 1), it started from a very low base and dwarfs in scale compared to the more traditional export sector.

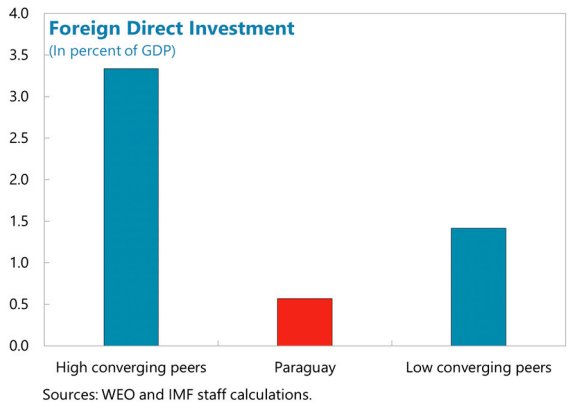
16. Significant sectoral structural change has taken place in the economy in recent years, with the labor share of agriculture going down significantly due to increased labor substitution. However, employment has mostly transitioned into the non-tradeable service sector, while the share of employment in the industrial sector actually declined since 2007. (The share of non-agriculture, non-energy export in total exports is only around 7 percent.) The non-tradeable sector is generally less productive than the tradeable, industrial sector, with lower productivity growth and technological progress. To boost the overall labor productivity of the economy, a higher level of industrialization and expansion of the more productive tradeable sector need to occur. Since low TFP growth likely contributes to low investment growth, development of the emerging export industries with higher TFP will also help increase investment level.



Sources: WEO and IMF staff calculations.



Sources: WEO and IMF staff calculations.



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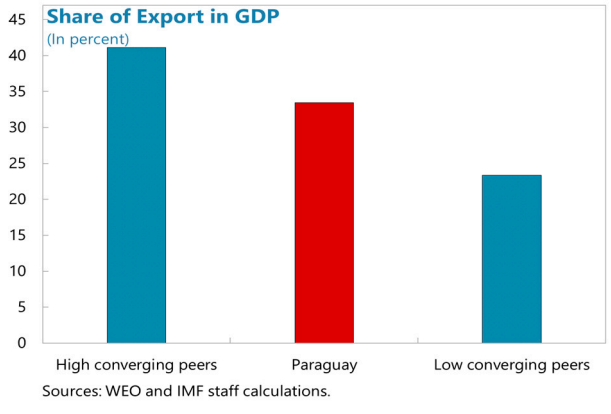

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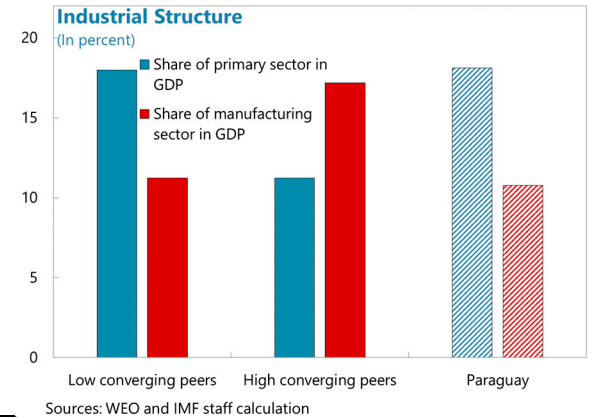
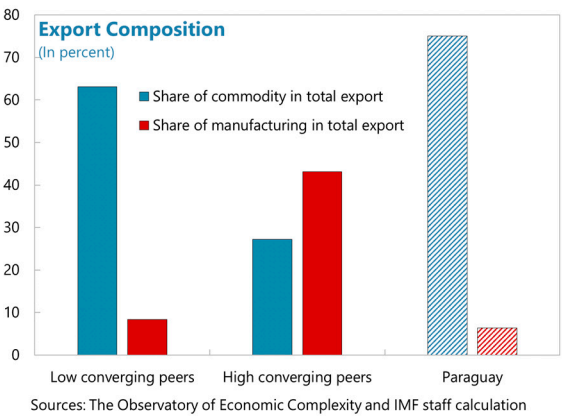
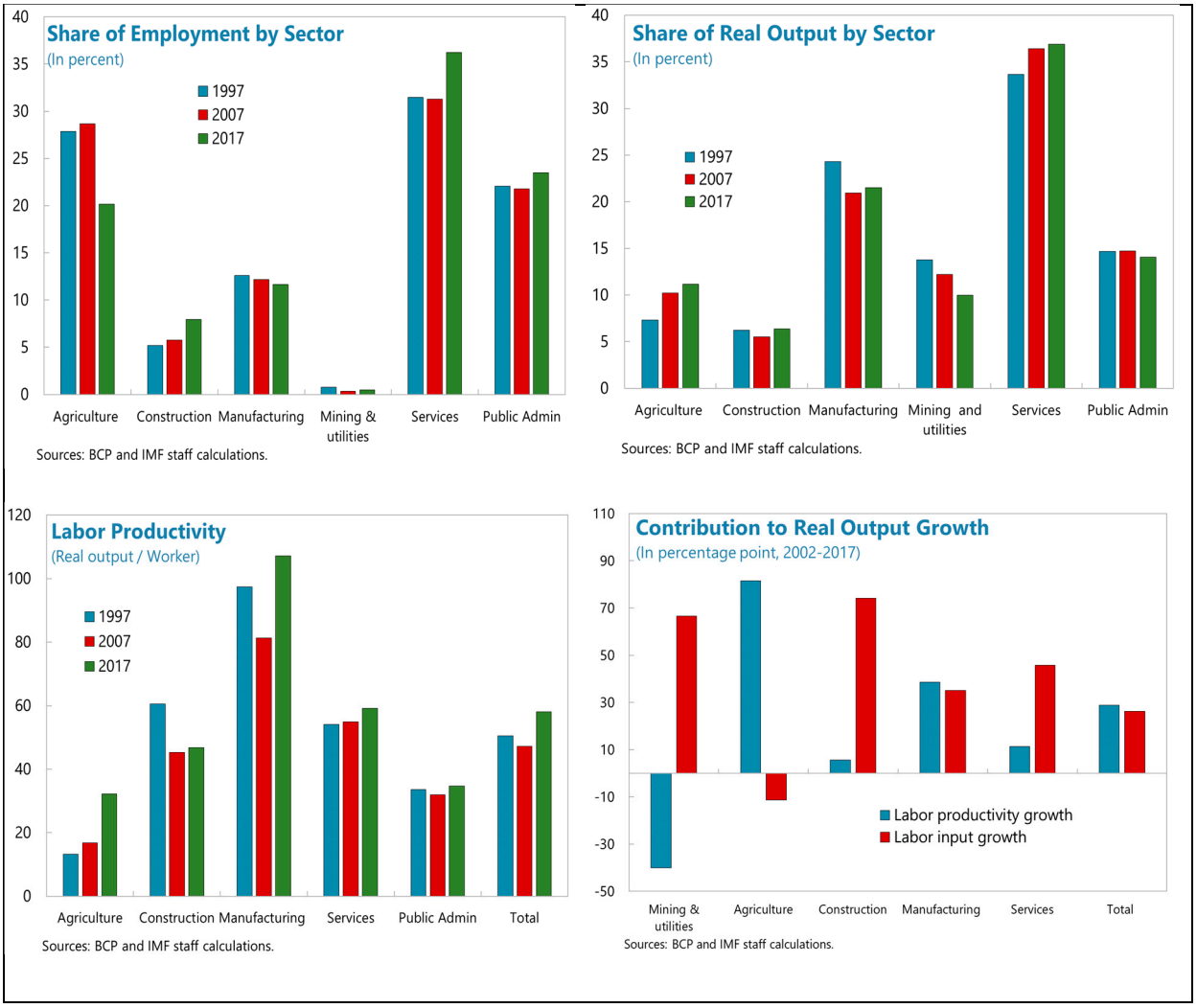


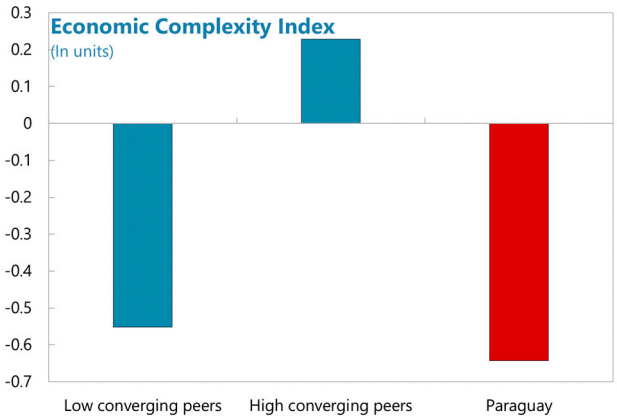
Sources: WEO and IMF staff calculation



Sources: The Observatory of Economic Complexity and IMF staff calculation



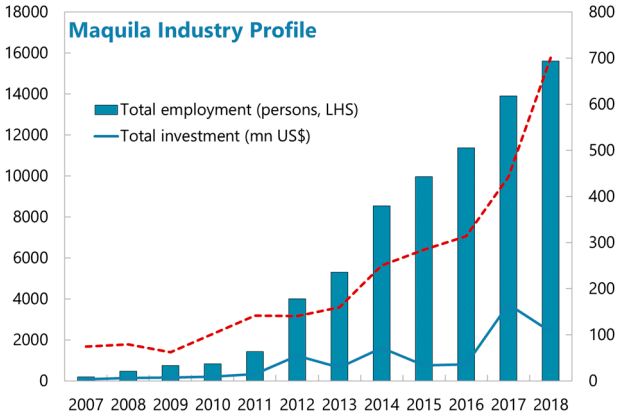
17. Paraguay significantly lags behind its high-converging peers in the economic complexity of its exports, due to the lack of export diversification and the fact that agricultural exports generally contain a lower level of technological value-added. Going forward, development of new industries and export categories, including by leveraging Paraguay's unique comparative advantages (see Box 2), are likely to be crucial for sustainable growth and convergence.



Sources: The Observatory of Economic Complexity and IMF staff calculations.

Box 1. Maquila Industry in Paraguay

The maquila industry—FDI-driven, primarily labor-intensive manufacturing production operations with an export focus—started in Paraguay around 2007 and has experienced significant growth over the past 10 years. Investments in the industry have mainly come from Brazilian companies seeking to lower production cost in labor and electricity, as well as to take advantage of the lower tax rate in Paraguay. The exports from the industry are primarily labor-intensive goods, ranging from auto parts, to textiles and apparels, to plastics and leather.

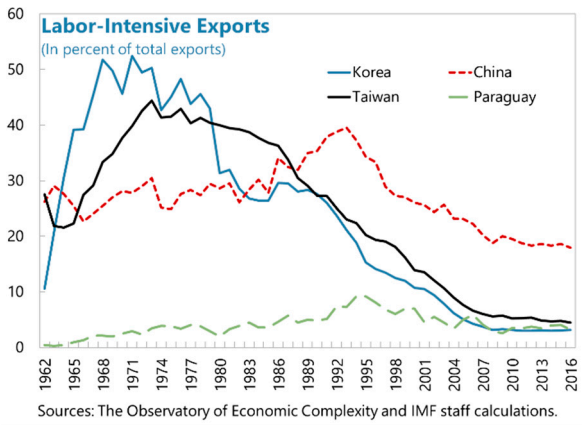


Sources: BCP and IMF staff calculations.

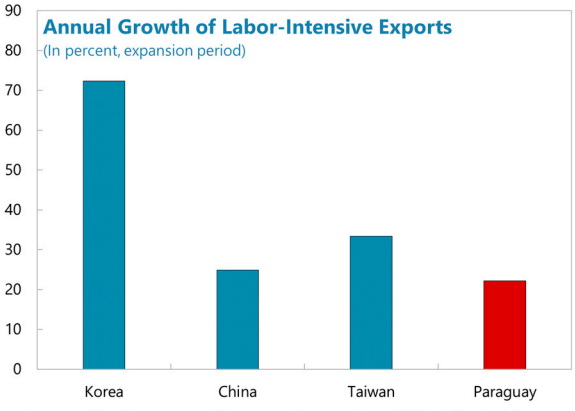
The average annual growth of the sector's exports has been over 20 percent, which is not much lower than the pace of the export growth from similar industries in some of the countries and regions in the world that have historically specialized in labor-intensive manufacturing exports as a crucial part of their growth strategy, such as China and Taiwan province of China.

However, the development of the industry started from a very low base. It currently employs around 15,000 workers, less than 0.5 percent of total employment of the country, and exports around only 4 percent of the total exports. Still, if the current growth trend of the industry can continue, it has the potential to become a nonnegligible driver of growth and exports in the not-so-distant future. In the hypothetical scenarios where the industry's exports continue to grow at a pace of 15 percent (25 percent) annual, the industry would eventually contribute to around 10 percent (30 percent) of the total exports of Paraguay by 2030.

The risks for such a scenario not materializing are substantial. Currently over 80 percent of investments in the Maquila industry come from Brazil. With the growth outlook of the Brazilian economy being less favorable, it is unclear whether Maquila-related FDIs from the country will continue to grow.



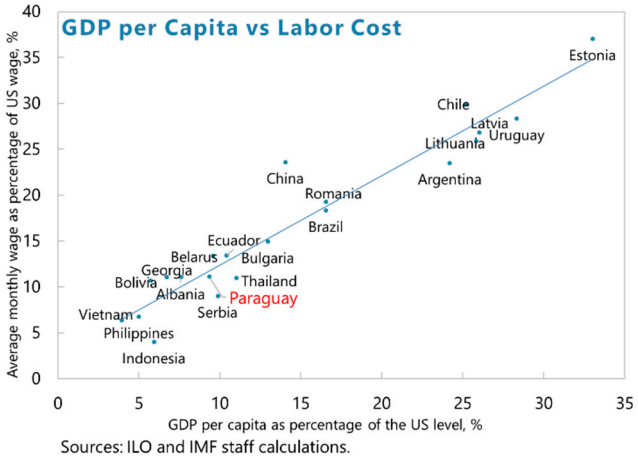
Sources: The Observatory of Economic Complexity and IMF staff calculations.



Sources: The Observatory of Economic Complexity and IMF staff calculations.

Box 1. Maquila Industry in Paraguay (concluded)

A main selling point of Paraguay is its closeness to some of the biggest South American consumer markets, e.g., Brazil, Argentina, while the labor cost is lower than in those countries. However, the lack of connectivity and weak transport infrastructure make it harder to leverage Paraguay's comparative advantage. To widen Paraguay's international appeal as an investment destination, efforts are needed to improve the country's infrastructure and institutions, as well as to encourage the development of new industries that leverage the country's comparative advantage in electricity and labor costs.



Sources: ILO and IMF staff calculations.

Box 2. Electricity Cost and Industrial Structure: Paraguay vs Iceland

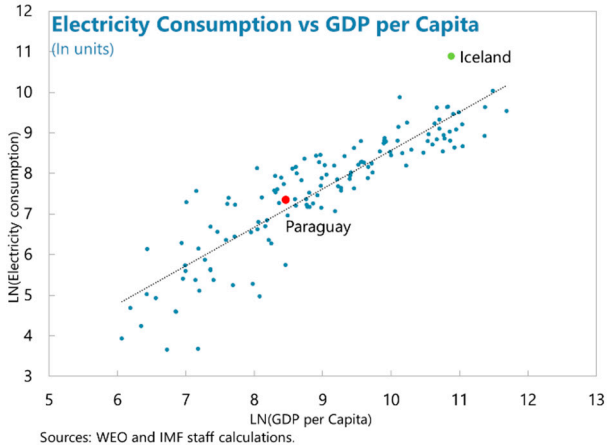
To achieve sustainable growth, a country's industrial structure should align with its comparative advantages. As a country endowed with abundant hydro power resources, low-cost electricity is a natural comparative advantage that Paraguay should make use of.

Paraguay's electricity export has been on the rise for the past 25 years, since the completion of the Itaipu project. Incomes from energy export has become a major source of government revenue and international reserves. In that sense Paraguay has indeed benefited from its electricity resources.

However, the economic structure has not evolved around this comparative advantage. There is hardly a presence of electricity intensive industries in the country, which currently only consumes 20 percent of its allotted share of power generated from Itaipu. The construction of new hydroelectric facilities has not changed Paraguay's export basket in a tangible way, except for the rise in electricity export itself.

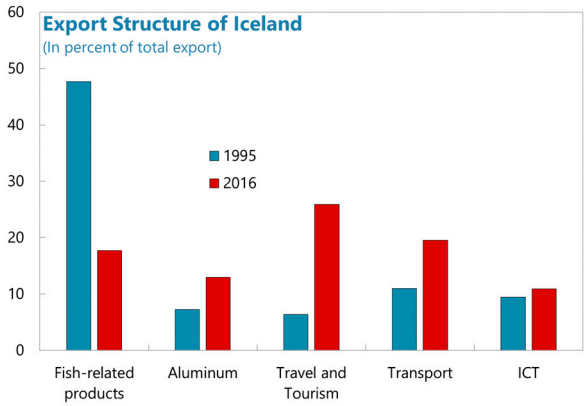
Similar to Paraguay, Iceland is a country endowed with abundant renewable electricity resources, mostly from hydro power and geothermal energy. But in contrast to Paraguay, the industrial landscape in Iceland has been significantly impacted by its power generation capacity, which allows the country to diversify from its traditional export profile that concentrated in fishery and related products.

Over the past twenty years, along with the establishment of several large-scale renewable energy projects, Iceland's export structure has drastically evolved, from a dominance of fish and

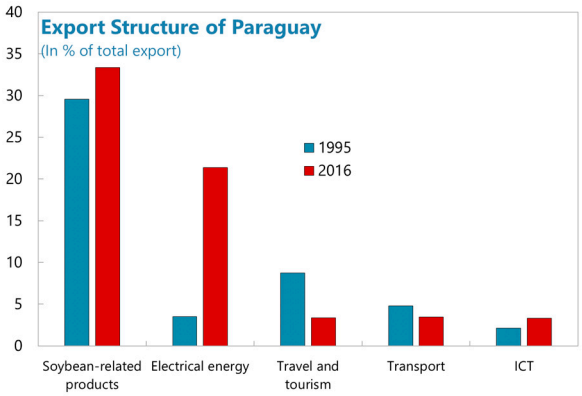


Sources: WEO and IMF staff calculations.

agricultural products, to a portfolio of electricity-intensive outputs, ranging from Aluminum, to information and communications technology (ICT) services, to transport and tourism. Iceland's domestic electricity consumption is over eight times higher than the EU average, with the majority of the consumption from the industrial sector, especially the aluminum industry.



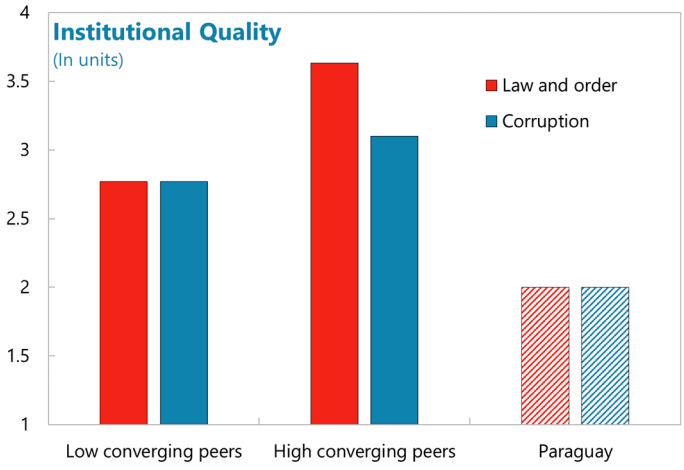
Sources: The Observatory for Economic Complexity and IMF staff calculations.



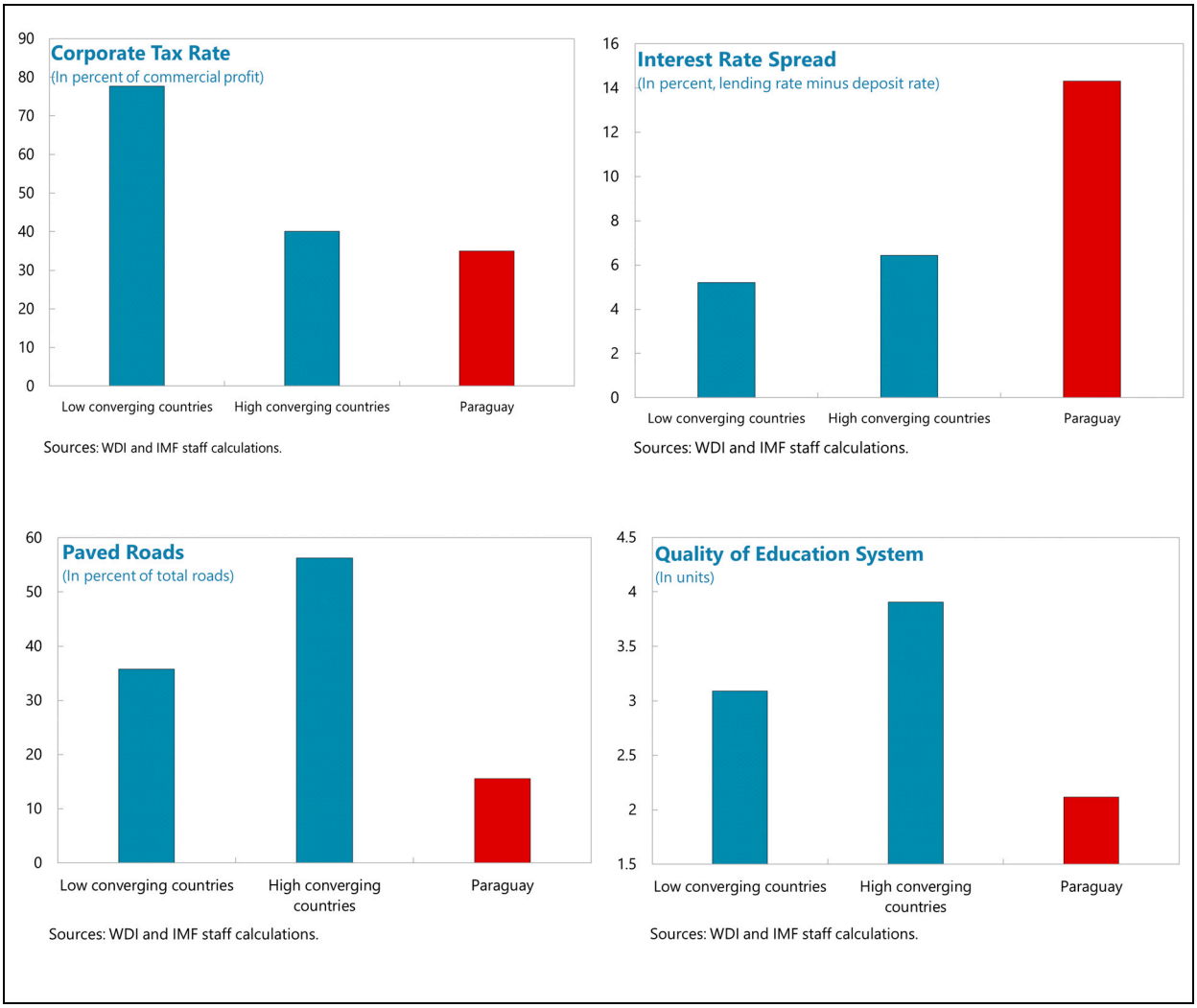
Sources: The Observatory for Economic Complexity and IMF staff calculations.

- **Institutional quality is low, as well as the quality of human capital and infrastructure**

18. Compared to both peer groups, Paraguay scores lower the quality of legal system, public observance of law, and corruption, using data from the International Country Risk Guide. In terms of other aspects of the business environment, Paraguay's tax level on the corporate sector are at par with the high-converging peers (and much lower than in the low-convergence group), while the qualities of transport infrastructure and education are lower. These results are consistent with the firm-level survey data on main obstacles of doing business in Paraguay (see Section V), which indicate that the qualities of transportation infrastructure, labor force and public institutions are among the biggest deterring factors to business operation.



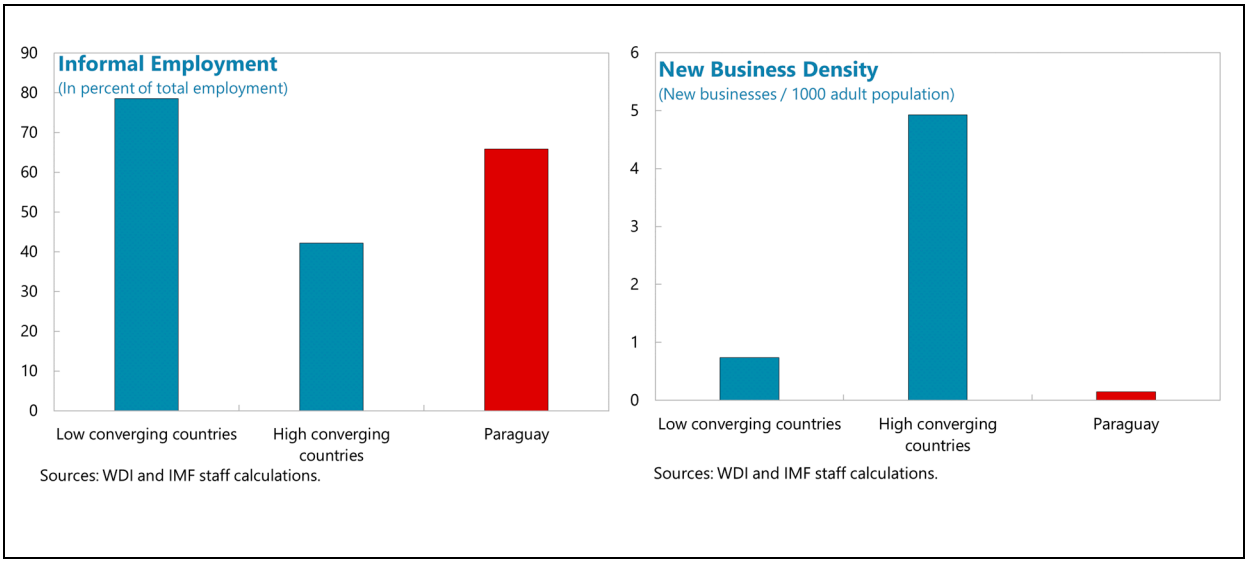
Sources: Country Risk Guide and IMF staff calculations.



- **Entrepreneurial activities are largely concentrated in the informal sector**

19. Another important pattern that emerged among the cross-country comparisons is regarding the formation and mode of operation of businesses. Data shows that compared to the high-converging peers, Paraguay's private sector contains a high percentage of informality, while the level of registered entrepreneurial activity is substantially lower compared to both peer groups. The prevalence of informality is not only detrimental to government revenue, but also to productivity growth, as past studies have shown that businesses in the informal sector tend to be smaller, less productive and grow slower.

20. This section compares Paraguay with other countries that have been at a similar convergence stage, across a wide range of economic factors that potentially impact long-term growth. The comparison set consists of two sub-groups: countries that have achieved fast convergence with advanced economies (high-converging peers), and countries that have failed to do so (low-converging peers). Data shows that the high-converging peers share some common characteristics. Compared to countries at a similar development stage what have subsequently failed



to converge, the high-converging countries tend to have higher investment and FDI rates, export more, have a more industrialized sectoral structure with a higher level of product sophistication. These countries also tend to have higher-quality institutions, infrastructure and education systems, as well as a more entrepreneurial business sector.

21. Paraguay lags behind the high-converging peers regarding most of the parameters examined in this section, except for the macroeconomic stability factors. To join the high-converging country club, structural reforms on many levels are needed. The next section will conduct an empirical analysis to identify the priorities for structural reform in Paraguay.

C. Structural Reform Priorities for Sustainable Growth

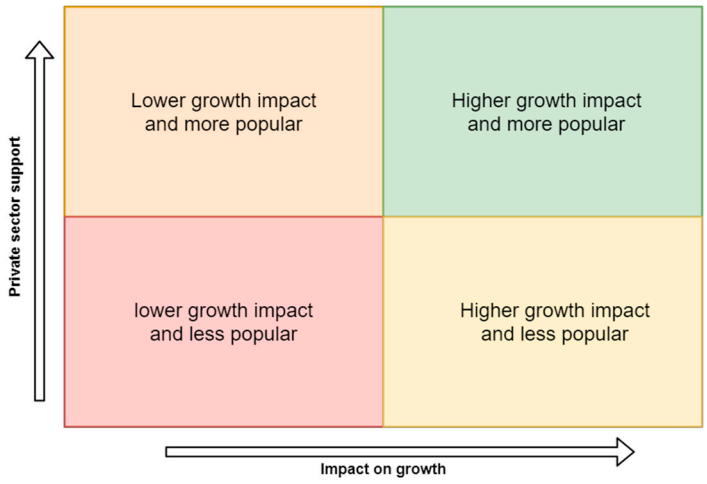
22. The last session identified various structural characteristics of countries that potentially impact long-term growth, where significant gaps exist between Paraguay and the high converging countries. This section will look at these structural factors in more details, quantify their impact on growth, and identify priority areas for structural reforms.

Methodology and Data

23. The methodology of the analysis draws inspiration from Biljanovska & Sandri (2018). Specifically, the priority level of a reform area is evaluated on two dimensions: 1) the potential impact of the reform on convergence, and 2) the potential support of the reform among private sector agents. The latter ensures that the reform effort will be met with less resistance socially and politically, increasing the ease of implementation and the likelihood of reform success.

24. Reforms falling into the upper right quadrant should receive the highest priority, as the chart below illustrates. Because these reforms are likely to gain more public support, while yielding the highest long-term growth benefit. The upper left quadrant contains the second-highest

priority reforms, which are likely to be popular with the private sector and also have some level of growth benefit. The lower left quadrant are reforms that are beneficial to growth and have received some private sector support, but to a lesser extent on both scales compared to other reforms.



25. One thing worth emphasizing is that in the results below, lower priority, i.e. placed in the lower left quadrant, does not mean the reform is dispensable, as all reform areas appearing in the four quadrants are strongly associated with growth performance empirically, and the lack of which have received at least some complaints from the private sector due to their effect on doing business in Paraguay. The goal of the analysis below is to shed some light on the sequencing and relative order of reforms that are ultimately all very important.

26. To gauge the potential growth/convergence impact of improvements in various structural areas, a cross-country growth regression is implemented, on the structural and institutional factors referenced in the previous section. The regression model takes the following format:

$$g_{it} = b_0 + b_1 y_{i,t-1} + b_2 SI_{i,t-1} + \varepsilon_{i,t}$$

where the dependent variable is the annual growth of the gap in real GDP between Country i and the United States, i.e., $g_{it} = \Delta y_{i,t}$, with $y_{it} = \ln(realGDP_{it}) - \ln(USGDP_t)$.

27. The dependent variable is a function of the lagged value in real GDP gap and the structural indicator under investigation. The standard economic convergence theory predicts a negative b_1, as poorer countries are expected to converge with the richer ones, i.e. grow faster. b_2 is the parameter of interest, as it measures the additional growth-acceleration effect from the improvement in the underlining structural indicator (*SI*), apart from what the classical convergence theory would suggest.

28. OLS and fixed-effect panel methods are applied to the model, on 1) a sample of countries at all development stages ("all countries" sample) and 2) a sample of countries at a similar convergence stage as Paraguay ("peer group" sample). The table below presents the OLS regression results, for the SI variables that have a positive and significant $\hat{b}_2$.[3] The structural indicators are in log form to ensure comparability. For each structural indicator variable, the result from the sample with the more significant estimate of b_2 is reported.

29. The potential growth impact of a structural reform factor on Paraguay is then calculated as the estimated increment in convergence speed if Paraguay's score in the factor catches up to the average level of the high-converging peers (HCP), i.e. $GrowthImpact_{SI} = \hat{b}_{2,SI}(SI_{HCP} - SI_{PRY,2017})$.

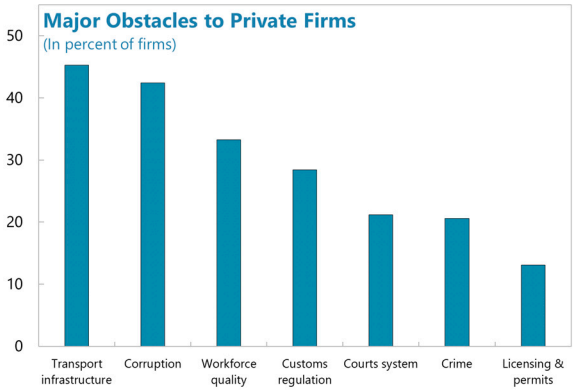
Variables	Burdens of customs procedure	Quality of education	Government effectiveness	Law and order	New business density	Quality of transport infrastructure
Lagged relative GDP per capita	-0.0156***	-0.0163***	-0.0149***	-0.00972***	-0.305***	-0.0162***
	(0.00298)	(0.00288)	(0.00317)	(0.00210)	(0.0312)	(0.00411)
Structural factor	0.0379*	0.0449**	0.0103*	0.0362***	0.00284*	0.0607***
	(0.0225)	(0.0204)	(0.00529)	(0.00823)	(0.00168)	(0.0219)
Constant	-0.0828**	-0.0902***	-0.0156*	-0.0593***	-0.798***	-0.126***
	(0.0372)	(0.0322)	(0.00855)	(0.0142)	(0.0850)	(0.0373)
Observations	1,385	1,385	3,275	4,120	256	993
R-squared	0.026	0.029	0.017	0.009	0.334	0.021

30. To gauge the potential support from the private sector agents for different reform areas, the data from the World Bank Enterprise Survey's firm-level survey for Paraguay conducted in 2017 is used. In the survey, firms were asked to answer the question: "Is factor *X* a major constraint' on business activities?" The percentage of firms that answered yes to this question for the structural factor *X* is used as a proxy for the extent of potential private sector support that reforms related to factor *X* may have, i.e. the potential "popularity" of reforms on *X*.

[3] Results for the structural indicator variables with insignificant or negative coefficient estimates are omitted here. Those include interest rate spread, informal sector employment, regulatory quality, and average years of schooling.

31. Given the importance of a strong export orientation in the growth process, we divided the survey sample by export status. The percentage-of-firms data reported in the priority ranking are the higher one between the exporting-firm sample and whole sample.

32. Note that in fact, this survey question can be seen as measuring two things: the extent to which the business sector resonates with reforms on a particular structural factor, as well as the possible impact the reforms related to the factor may have on private business growth. Albeit as a proxy for the latter, it is more indirect and subjective. Therefore, we take the survey data as solely an estimate for the potential popularity of a structural reform, and use the cross-country regression estimates to measure the growth impact of improvement in a certain factor.



Sources: World Bank Enterprise Surveys

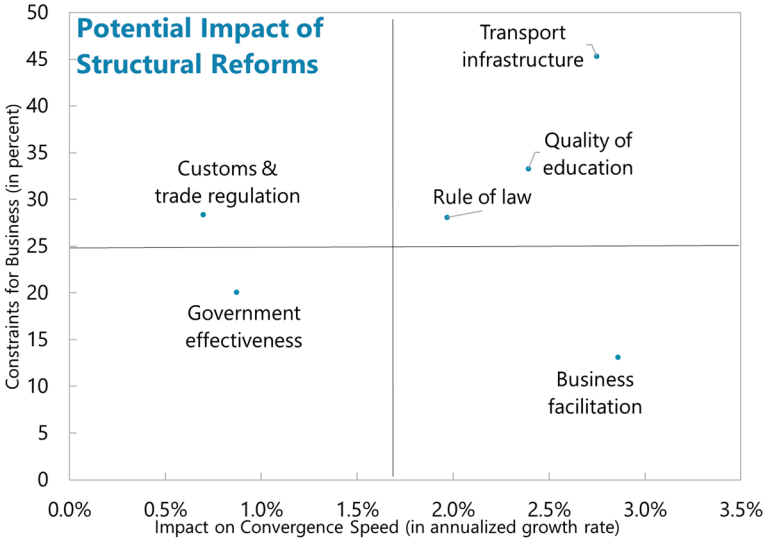
33. Since the structural factors covered in the Enterprise Survey data does not exactly match the factors used in the regressions, some assumptions need to be made on how the two sets of variables correspond to each other. The table below presents the matching assumptions used in the analysis.

Structural Reform Area	Corresponding Variable in Regression (data source)	Corresponding Variable in Firm Survey
Customs and trade regulation	Burdens of customs procedure (GCP)	Customs and trade regulation
Quality of education	Quality of education (GCR)	Inadequately educated workforce
Government effectiveness	Government effectiveness (WGI)	Average of tax administration & labor regulations
Rule of law	Law and order (CRG)	Average of corruption, courts system, crime & theft
Business facilitation	New business density (WB)	Business licensing and permits
Transportation infrastructure	Quality of transport infrastructure (GCR)	Transportation

34. The matching is not perfect. For example, the "government effectiveness" variable in the growth regression captures the quality of public services and the quality of policy formulation and implementation. It goes much beyond the effectiveness of tax administration and labor regulations. Still, complaints in the latter can be indicative of the general public's opinion of the government's effectiveness level, given the positive correlation in the quality of different government services. Similarly, "business facilitation" to encourage entrepreneurial dynamism in the private sector goes beyond efficientizing the processing of business licenses and permits. In particular, the survey data come from *established* private sector firms, which very likely under-captures the obstacles in this area faced by *new* firms.

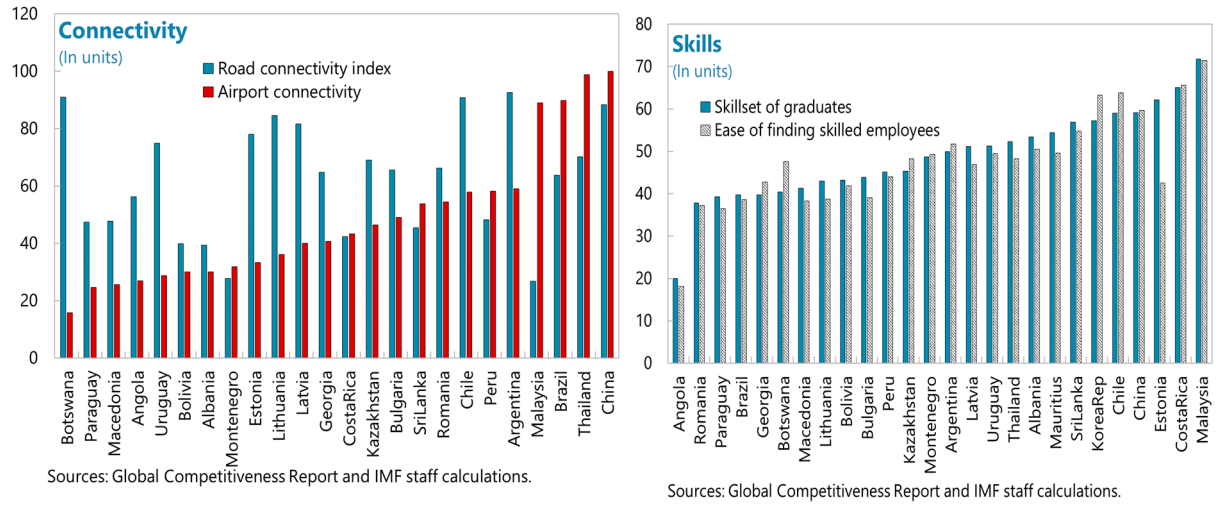
Result and Comment

35. The chart below presents the results for structural reform priority quadrants, combining the estimates from the cross-country growth regressions and the firm-level survey data. As discussed earlier, the highest priority area is the upper right quadrant, where reforms may deliver a significant impact on growth, while having the highest level of public support. Structural factors in this quadrant are, in order of priority, transportation infrastructure, quality of education, and rule of law.



Sources: National authorities and IMF staff estimates.

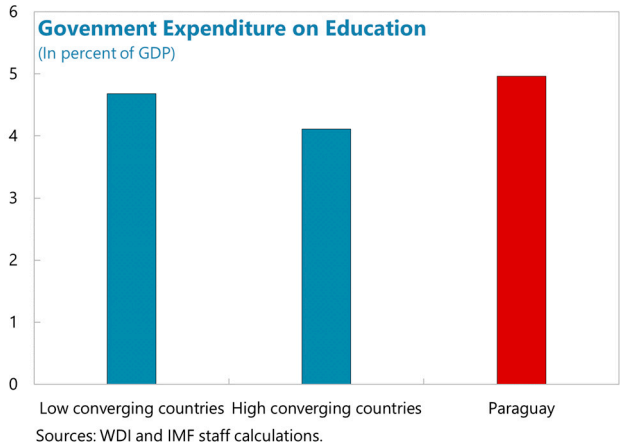
36. The estimated high impact on growth from the top three priority areas is driven by their large coefficient in the cross-country convergence regression, as well as the fact that the empirical gap in these areas between Paraguay and the high-converging peers is substantial. These estimates are supported by private sector opinions, as the three areas are also identified by the largest percentage of firms as major business constraints.



Sources: Global Competitiveness Report and IMF staff calculations.

Sources: Global Competitiveness Report and IMF staff calculations.

37. However, high impact on growth and high support from the public do not mean these will be easy reforms. Improving transport infrastructure requires substantial financial resources, which is a binding constraint on improvement efforts given the limited room to spend in the government budget. To make improvements in this area thus requires consistent implementation of strategic focus over an extended period of time on the part of the government.

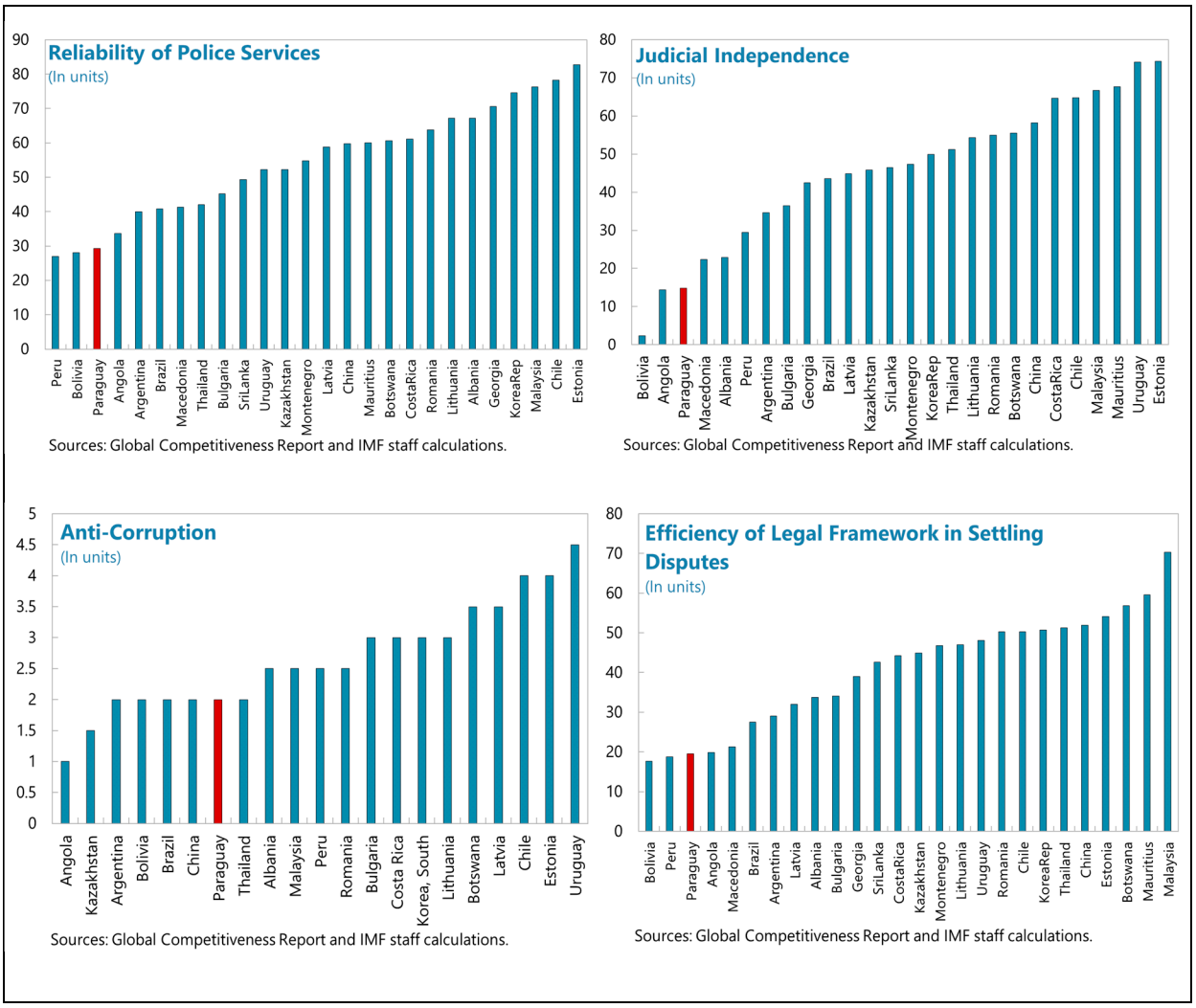


38. The quality of education, on the other hand, does not seem to show a consistent relationship with resources spent on education. In fact, the government spending on education in Paraguay, around 5 percent of GDP, is higher than the averages in both its high-converging and low-converging peers. Given already high investment level and unsatisfactory result, the government should carefully look into where the missing links are to device an effective reform plan.

39. Improving rule of law, including reforming the courts system, reducing corruption and strengthening public security, requires less financial commitment. Still, reform efforts in this area can take a long time to take effect as the status quo tends to have deep roots in the cultural and political environment of a country. Nonetheless, given that reforms in this area are not as costly as far as government finance is concerned, and the potential growth benefit, improving rule of law is an ideal area to prioritize in the short to medium term.

40. In the second-priority quadrant (upper left) sits *customs and trade regulations*. Close to 30 percent of private sector firms that are exporters identify this area as a major constraint. And it is also estimated to have a significantly positive--albeit relatively small in magnitude—impact on convergence speed. Similar to *rule of law*, this is a reform area that does not cost substantial financial resources, while being easier to implement as the roadmap and action items tend to be concrete with benchmarked international best practices to borrow from. Therefore, improvements in this area is another ideal candidate to prioritize in the short term.

41. In the third-priority quadrant (lower right) is *business facilitation*. The factor is shown to have a very high impact on convergence speed, mostly driven by the large gap in new (formal) business density between Paraguay and the high-converging peers. The private sector support for reforms in this area is proxied by the percentage of businesses identifying business licensing and permits as a major constraint. This is, obviously, a very imperfect approximation to the actual demand for increased entrepreneurial activities in the private sector. In addition, beyond general advices for improving business environment, it is unclear according to existing data why the level of new business creation is so low in Paraguay and what exactly the government can do to help increase it. This is a topic beyond the scope of the current paper, but it deserves further investigation.



42. In sum, the empirical study in this section presents a list of priorities for improvements in structural factors. The priorities are determined according to the candidate factors' estimated impact on the speed of convergence for Paraguay, as well as the potential popularities of various reforms among private businesses. The result identifies transport infrastructure, quality of education, rule of law, and customs and trade regulations as the top priority reform areas. Among these areas, improving rule of law and the quality of customs are the ideal targets for short-to-medium term reform efforts, as they do not impose substantial burden on the government budget and can have relatively concrete implementation plans. Improving transport infrastructure and quality of education is of paramount importance to sustainable convergence, though they do require more financial investments. Therefore, persistent implementation of gradual but focused strategic plans over extended periods are required to move the needle in these areas.

D. Conclusion

43. Over the past 15 years Paraguay has experienced relatively stable and rapid growth. Especially in the past 5 years or so, its economic performance has been increasingly decoupled from the rest of the region, and stands out as one of the fastest growing economies in South America. The elevated growth performance is largely the combined result of benign external environment, including a commodity price boom during the 2000s, and improved macroeconomic management and stability.

44. As a small open economy with limited domestic market size, external demand is the main driver of growth in Paraguay. And since exports consist of mostly agricultural commodities (non-agricultural, non-energy exports are only 3 percent of GDP), the movement of agriculture export prices is crucial for the economic performance.

45. After the boom in the 2000s, agricultural commodity prices have come down, and may well come down further going forward. The decline in commodity prices will not only negatively affect the export sector, but also the non-tradable sector through the income effect from exchange rate depreciation.

46. Development of new industries and faster growth of the non-agriculture, non-energy tradeable sector are therefore crucial for growth and convergence over the long run. Sustainable growth also calls for increases in TFP growth and higher private-sector driven investments. In this regard, development of the more productive, tradable sector will also help increase investments.

47. The paper compares Paraguay to the group of middle-income countries that have achieved sustainable convergence over the past few decades, across various economic and institutional factors. Paraguay fairs well in macro stability indicators, such as inflation, government balance and debt level. However, it lags behind the high-converging peers in almost all structural measures of the economy, including rates of investment and FDI, degree of industrialization, and level of economic complexity. Paraguay also trails behind its high-converging peers in many structural factors such as the quality of institutions, infrastructure, and education.

48. The paper then conducts an empirical analysis to identify the priority structural reform areas, combining the estimation of potential impact on convergence speed from various reforms, with the likely receptivity level of the private sector to the said reforms. The result indicates that the reform areas Paraguay should prioritize for are transport infrastructure, quality of education, rule of law, and customs and trade regulations.

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Annex I. High and Low Converging Country Groups

High Converging Countries:		
Country	Country Code	Starting Year
Chile	228	1988
Costa Rica	238	1989
Sri Lanka	524	2009
Korea	542	1976
Malaysia	548	1972
Maldives	556	1992
Thailand	578	2006
Botswana	616	2002
Mauritius	684	1987
Albania	914	2005
Georgia	915	2007
Bulgaria	918	1995
China	924	2007
Turkmenistan	925	2003
Montenegro	943	2001
Lithuania	946	1996
Macedonia, FYR	962	1999
Romania	968	1995
Estonia	939	1994
Latvia	941	1994

Low Converging Countries:		
Country	Country Code	Starting Year
Venezuela	299	1994
Jamaica	343	1983
Iran	429	2012
Yemen	474	1994
Timor-Leste	537	2007
Algeria	612	1989
Cameroon	622	1981
Congo, Rep of	634	1974
Benin	638	1974
Gambia, The	648	1983
Morocco	686	1992
Mozambique	688	1976
Nigeria	694	2013
Senegal	722	1980
Swaziland	734	1980
Tunisia	744	1982

Annex II. Data Sources for Structural Indicators

Name of Indicator	Source
Corruption	Country Risk Guide
Government Stability	Country Risk Guide
Law and Order	Country Risk Guide
Government Effectiveness	World Governance Indicators
Regulatory Quality	World Governance Indicators
Rule of Law	World Governance Indicators
Informal Employment (% of total employment)	World Development Indicators
Interest Rate Spread	World Development Indicators
New Business Density	World Development Indicators
Paved Roads (as % of total roads)	World Development Indicators
Private Sector Credit (% of GDP)	World Development Indicators
Total Tax Rate (% of commercial profits)	World Development Indicators
Share of Primary Sector in GDP	World Development Indicators
Share of Manufacturing Sector in GDP	World Development Indicators
Share of Service Sector in GDP	World Development Indicators
Burden of Customs Procedures	Global Competitiveness Report
Quality of Education	Global Competitiveness Report
Quality of the Education System	Global Competitiveness Report
Quantity of Education	Global Competitiveness Report
Transportation Infrastructure	Global Competitiveness Report
Starting a Business	Doing Business Report
Years of Schooling	Barro and Lee Educational Attainment for Total Population, 1870-2010
Economic Complexity Index	The Observatory of Economic Complexity
Share of Commodity in Total Export	The Observatory of Economic Complexity
Share of Manufacturing in Total Export	The Observatory of Economic Complexity

Annex III. Structural Reform Regression Results

VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.0156***	-0.318***	-0.296***	-0.587***
	(0.00298)	(0.0431)	(0.0221)	(0.0634)
Customs burden	0.0379*	0.0563	0.0612	0.0869
	(0.0225)	(0.0495)	(0.0439)	(0.0961)
Constant	-0.0828**	-0.910***	-0.695***	-1.658***
	(0.0372)	(0.150)	(0.0791)	(0.214)
Observations	1,385	236	1,385	236
R-squared	0.026	0.335	0.154	0.474
Number of country_code			152	39

VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.0163***	-0.323***	-0.299***	-0.567***
	(0.00288)	(0.0430)	(0.0206)	(0.0640)
Education quality	0.0449**	-0.0372	0.0955*	-0.0899
	(0.0204)	(0.0394)	(0.0517)	(0.147)
Constant	-0.0902***	-0.806***	-0.740***	-1.385***
	(0.0322)	(0.135)	(0.0736)	(0.215)
Observations	1,385	236	1,385	236
R-squared	0.029	0.334	0.156	0.473
Number of country code			152	39

VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.0149***	-0.300***	-0.113***	-0.446***
	(0.00317)	(0.0268)	(0.00940)	(0.0359)
Government effectiveness	0.0103*	0.00239	0.00933	-0.00470
	(0.00529)	(0.0115)	(0.0130)	(0.0253)
Constant	-0.0156*	-0.776***	-0.255***	-1.168***
	(0.00855)	(0.0706)	(0.0229)	(0.0979)
Observations	3,275	575	3,275	575
R-squared	0.017	0.312	0.088	0.461
Number of country_code			185	67

VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.00972***	-0.424***	-0.122***	-0.534***
	(0.00210)	(0.0316)	(0.0111)	(0.0366)
Law and order	0.0362***	0.00849	0.0219*	0.00455
	(0.00823)	(0.0124)	(0.0119)	(0.0220)
Constant	-0.0593***	-1.128***	-0.297***	-1.419***
	(0.0142)	(0.0854)	(0.0274)	(0.107)
Observations	4,120	622	4,120	622
R-squared	0.009	0.427	0.078	0.508
Number of country code			137	62

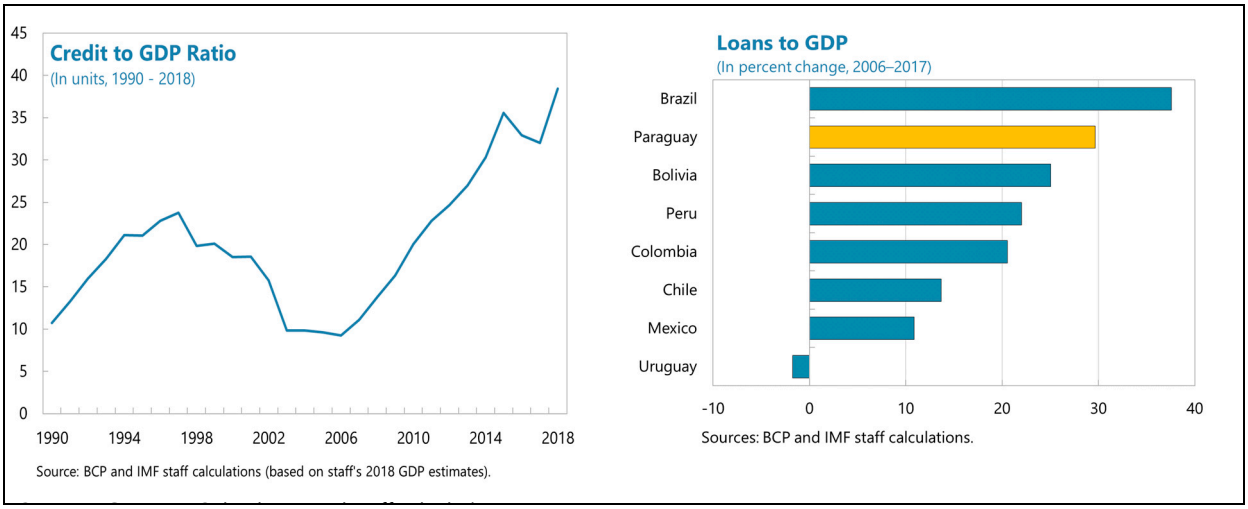
VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.0162***	-0.305***	-0.328***	-0.629***
	(0.00263)	(0.0312)	(0.0206)	(0.0454)
New business density	0.000381	0.00284*	-0.000690	0.000635
	(0.000595)	(0.00168)	(0.00278)	(0.00205)
Constant	-0.0184***	-0.798***	-0.629***	-1.646***
	(0.00679)	(0.0850)	(0.0411)	(0.121)
Observations	1,314	256	1,314	256
R-squared	0.033	0.334	0.225	0.583
Number of country code			137	38

VARIABLES	(1) OLS all countries	(2) OLS peer group	(3) Fixed Effect all countries	(4) Fixed Effect peer group
Lagged relative GDP	-0.0162***	-0.312***	-0.241***	-0.531***
	(0.00411)	(0.0580)	(0.0197)	(0.0824)
Infrastructure quality	0.0607***	-0.0247	0.102	0.137
	(0.0219)	(0.0498)	(0.0748)	(0.164)
Constant	-0.126***	-0.810***	-0.646***	-1.572***
	(0.0373)	(0.175)	(0.110)	(0.233)
Observations	993	168	993	168
R-squared	0.021	0.342	0.098	0.386
Number of country code			151	34

AN ANALYSIS OF CREDIT DYNAMICS IN PARAGUAY[1]

A. Introduction

1. In the last decade, credit in Paraguay has grown rapidly. The credit to GDP ratio increased from 9 percent of GDP in 2006 to 32 percent in 2017, one of the sharpest increases in the credit to GDP ratio in the region.



2. Rapid credit growth may reflect financial deepening, but it also carries risks. Cross-country evidence shows that a bad outcome after a credit boom has been observed in 121 out of 175 cases (Dell'Ariccia et al., 2012).

3. This paper analyzes what is behind the credit boom. Why has credit grown so sharply? What was the role played by external factors, and what was the role of domestic conditions and policies? To answer these questions, we first examine the dynamics of credit from an aggregate perspective, covering 2006Q1 to 2018Q3. We then take a micro-level perspective and examine bank behavior over the same period.

B. Credit Dynamic: An Aggregate Level Analysis

4. Paraguay has experienced a series of external shocks – agricultural exports almost tripled in dollar terms between 2003 and 2014; the global economic and financial crisis of 2008, and the subsequent easing of global monetary conditions; and a boom-bust in Paraguay's main trading partners (Brazil and Argentina).

[1] Prepared by Alex Ho with Marie Kim (currently on leave from the IMF). Comments from participants in a presentation at the Central Bank of Paraguay during the 2019 Article IV consultation mission to Paraguay are gratefully acknowledged.

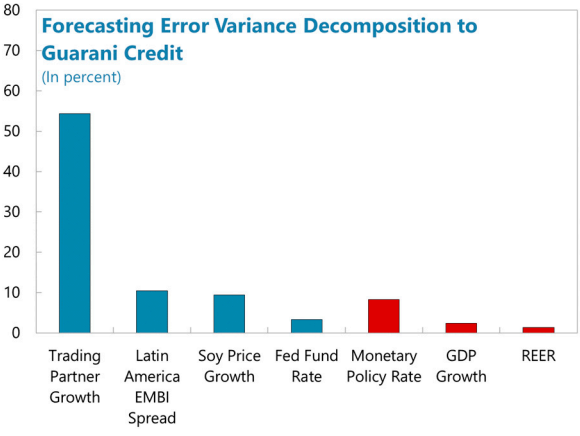
5. There have also been important changes in domestic policies. Macro-policies were strengthened in the aftermath of the banking crisis of the late 1990s. Major measures include adopting an inflation targeting regime, introducing risk-based bank supervision and the adaption fiscal responsibility law.

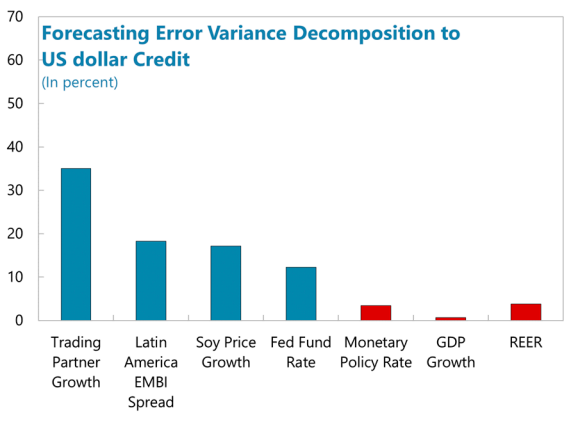
6. This section tries to quantify the importance of external and domestic shocks for both guaraní-denominated credit and dollar-denominated credit (at constant guarani-U.S. dollar exchange rates), using a simultaneous equation model, between 2006Q1 and 2018Q3. External factors included are the soy bean price in U.S. dollars (proxy for agricultural export prices), the Federal Funds rate, the weighted real GDP growth of major trading partners, and the EMBI spread for Latin America (a proxy for the regional risk-aversion). The monetary policy rate, real GDP growth and the real effective exchange rate have been included as the domestic factors.

7. A structural vector autoregressive model (VAR) with the restriction that domestic variables do not affect external variables was estimated. The impact of shocks to each of these variables on the growth of guaraní-denominated credit and dollar-denominated credit is identified using a Cholesky decomposition of the estimated variance-covariance matrix of the residual (i.e., *structural restrictions on contemporaneous correlations among variables*). The analysis is further divided into two parts – the first part looks at the determinants of ***long-run*** credit dynamics through the variance decomposition of the forecast error; the second part looks at the ***short-term*** behavior through the impulse response functions. The estimation results of the model are presented in the appendix follows.

Long-Run Determinants

8. In the long-run, external factors are more important determinants than domestic factors, as shown in the variance decomposition to the forecasting error of the VAR. The four external factors together explain 67 percent of the variation in the guaraní-denominated credit and 64 percent of the variation in the Dollar-denominated credit.





Source: BCP and IMF staff calculations.

9. The quantitative importance of the various factors differs between guaraní-denominated and dollar-denominated credit. The growth of major trading partners accounts for 54 percent of the total variation in the guaraní-denominated credit. Other external factors play a more-or-less even role. This may suggest that the guaraní-denominated credit is used for longer-term purposes, such as investment for expansion of production, that is more dependent on the development of trading partners and less dependent on the other three external factors, which are more cyclical in nature. On the other hand, in the case of the dollar-denominated credit, the role of each external factor in determining the total variation is more balanced. This suggests that the dollar-denominated credit is used for the shorter-term purpose, such as working capital.

Short-term Dynamics: Response to External Shocks

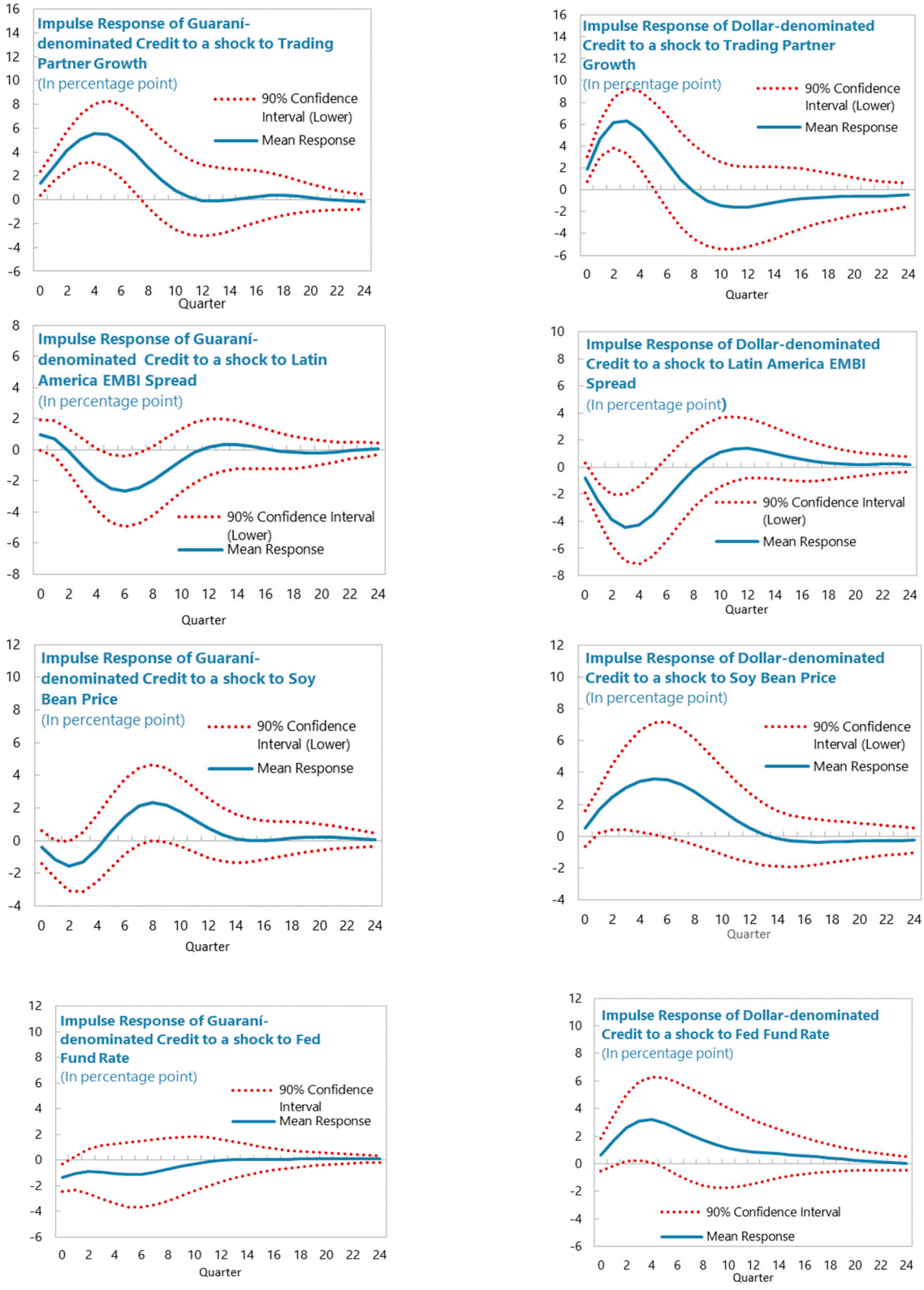
10. The impulse response analysis shows that, a positive shock to the growth of trading partners has a large, immediate and persistent impact on both guaraní-denominated credit growth and dollar-denominated credit growth. The impact of the shock on the guaraní-denominated credit is immediate and persistent – the growth of guaraní-denominated credit raises on impact by 1 percentage point and increase gradually over the next few quarters. The impact of the shock peaks at 6 percent in the fourth quarter after the shock. The impact of the shock on dollar-denominated credit is also immediate but less persistent – the growth of the dollar-denominated credit raises on impact by 2 percentage point. The impact of the shock peak at 6 percent in the third quarter after the shock.

11. A positive shock to the Latin America EMBI spread reduces growth of dollar-denominated credit growth but does not have a statistically significant impact on guaraní -denominated credit growth. The impact of the shock on the dollar-denominated credit is immediate and persistent – the growth of the dollar-denominated credit drops on impact by 1 percentage point and continue to decline gradually over the next few quarters. The impact of the shock peak at -4 percent in the second quarter after the shock. On the other hand, the statistical model cannot reject the null hypothesis that heightened regional risk aversion has no impact on the guaraní-denominated credit growth in the short-term as the impulse response of guaraní-denominated credit growth is not statistically significant at the 10 percent confidence level.

12. A positive shock to the soy bean price increases the dollar-denominated credit growth but has no statistically significant impact on the guaraní-denominated credit growth in the short-term (at the 10 percent confidence level). The shock increases the dollar-denominated credit growth by 2 percentage point in the first quarter after the shock and continue to increase to 4 percentage point in the fifth quarter after the shock.

13. A positive shock to the Fed Funds Rate has no statistically significant impact on the guaraní-denominated credit growth and the dollar-denominated credit growth.

Figure 1. Paraguay: Impulse Response of Guaraní-Denominated Credit and Dollar-Denominated Credit to Shocks to External Factors



Source: BCP and IMF staff estimates.

Short-term Dynamics: Response to Domestic Shocks

14. A positive shock to the domestic monetary policy rate (i.e, tightening the monetary policy) reduces the guaraní-denominated credit growth but increases the dollar-denominated credit growth. The guaraní-denominated credit growth fell 1 percentage point in the first quarter after the shock. The drop in guaraní-denominated credit growth widens to 3 percentage point in the third quarter after the shock and started to dissipate thereafter. Meanwhile, the dollar-denominated credit growth increases by 2 percentage point on impact of the shock. However, the impact dissipates very quickly.

15. A shock to the real effective exchange rate raises growth of dollar-denominated credit by 1.5 percentage point on impact and then stay around this level for a few quarters after the shock. An explanation might be that an appreciation raises expectations for further appreciation, which makes borrowing in dollars more attractive. The impact of the shock on dollar-denominated credit growth starts to dissipate in the seventh quarter after the shock. The response of the guaraní-denominated credit growth to the shock is not statistically significant.

16. A positive shock to GDP growth has no statistically significant impact on the guaraní-denominated credit growth and the dollar-denominated credit growth.

What drives the rapid credit growth in the last decade?

17. The empirical result suggests that the rapid growth of credit in Paraguay in the last decade was largely due to a favorable external environment— strong growth of major trading partners high prices of agricultural products improved markedly (which helps support growth of dollar-denominated credit). The impact of these two favorable factors was partly offset by the negative impact of the increase in Latin America EMBI spread.

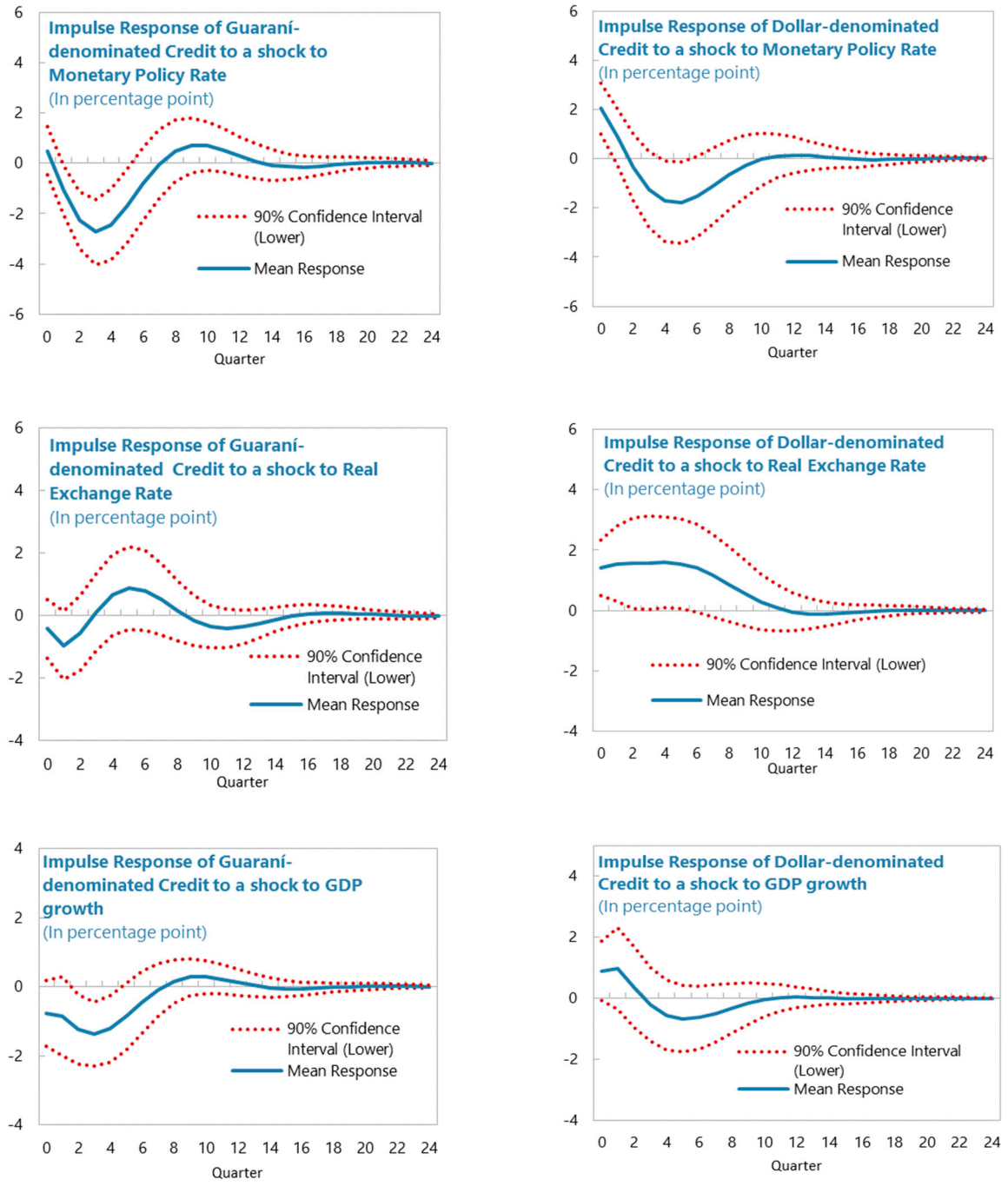
C. What Drives Credit Growth: A Bank Level Analysis?

18. So far, we have discussed the rapid credit over the past decade. This suggested that there has was one, uninterrupted credit boom. There have, however, been **two credit cycles in the last decade.**

19. These credit cycles become partly evident if we try to identify the timing of credit booms. Following the methodology discussed in Box 1, we can identify two credit booms. The first credit boom peaked in 2010Q3 – 2011Q3 with credit growth of 60 percent, y/y, and the second credit boom is identified in 2014Q4 – 2015Q4 with credit growing at 67 percent, y/y.[2]

[2] These credit booms have been typically shorter than traditional booms -about a year compared to the cross-country average of three years – and did not result in a financial crisis and/or severe downturn. The credit-to-GDP grew on average by 15 percent per year during these boom years, or about five times its median growth in non-boom years, which is in line with credit booms observed in other countries (see Dell'Ariccia et al., 2012).

Figure 2. Paraguay: Impulse Response of Guaraní-Denominated Credit and Dollar-Denominated Credit to Shocks to Domestic Factors



Source: BCP and IMF staff estimates.

20. They are even more visible when we look at NPL ratios. Distressed loans increased between late 2010 and 2012, and between 2014 and 2016. Both credit booms saw rising NPLs, increasing provisioning costs, falling profits, and increasing distress loans at the end of the cycle—all

major features of a credit boom. While credit grew at a relatively healthy rate after the first credit boom, the second credit boom was followed by a sharper credit decline.

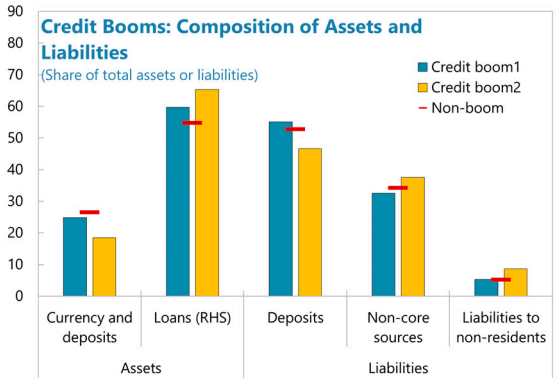
Box 1. How to Define a Credit Boom?

There is no commonly agreed statistical method on identifying (or filtering) the trend. Given data limitations, we employ two different approaches to the aforementioned two credit datasets to identify credit booms.

The first approach follows Dell'Ariccia et al (2012) to date the credit cycle in Paraguay over the period between 2008Q1 and 2018Q3. We identified boom episodes by comparing the credit-to-GDP ratio (seasonally adjusted) in each quarter to a backward-looking, rolling, cubic trend estimated over the period between quarters t-10 and t. We classified an episode as a boom if either of the following three conditions is satisfied: (i) the deviation from trend is greater than 1.5 times its standard deviation or (ii) the year-over-year growth rate of the credit-to-GDP ratio exceeds 30 percent or (iii) the annualized quarter-over-quarter growth rate of the credit-to-GDP ratio exceeds 30 percent. As noted in Dell'Ariccia et al (2012), the second condition to capture episodes in which aggregate credit accelerates very gradually but credit growth reaches levels that are well above those previously observed in the country. Using these criteria, we identified two major episode of credit boom, 2010Q2–2011Q1, and 2014Q2–2015Q3.

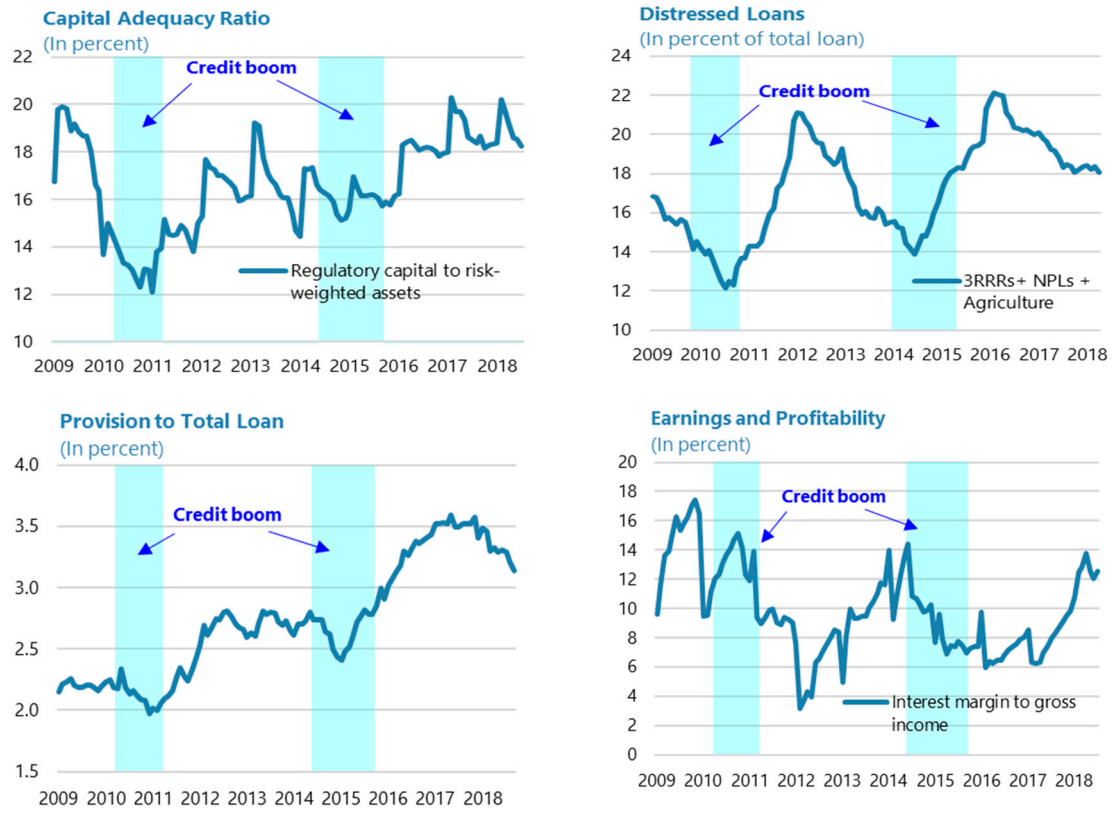
21. Banks behave differently over the different phases of the credit boom-bust cycle. At the beginning of credit booms banks have plenty of capital. Banks are more eager to take on more risk to improve the return on capital. The growth of credit accelerates and exacerbates the credit boom. A rapid expansion of credit may cause deterioration of the quality of the loan portfolio. Distress loan starts to surface in the middle or near the end of the credit boom phrase. Near the end of the boom, as NPLs start to rise, banks' provisions increase, which reduces profits. Banks become more risk averse. As banks shift from loans to risk-free assets—government bonds, credit volumes decline, which exacerbates the credit bust, and risk weighted capital to asset ratios increase. This phenomenon was particularly strong in mid-2016 as agriculture prices fell. Banks tightened credit volumes, and credit growth collapsed from 30 percent (y/y), attained in mid-2015, to close to zero percent in late 2016.

22. During a credit boom, banks take on riskier assets and rely more on non-traditional funding sources. This trend was more visible during the second credit boom, which featured a larger share of loans in their assets that were financed through non-core sources, including from non-residents.

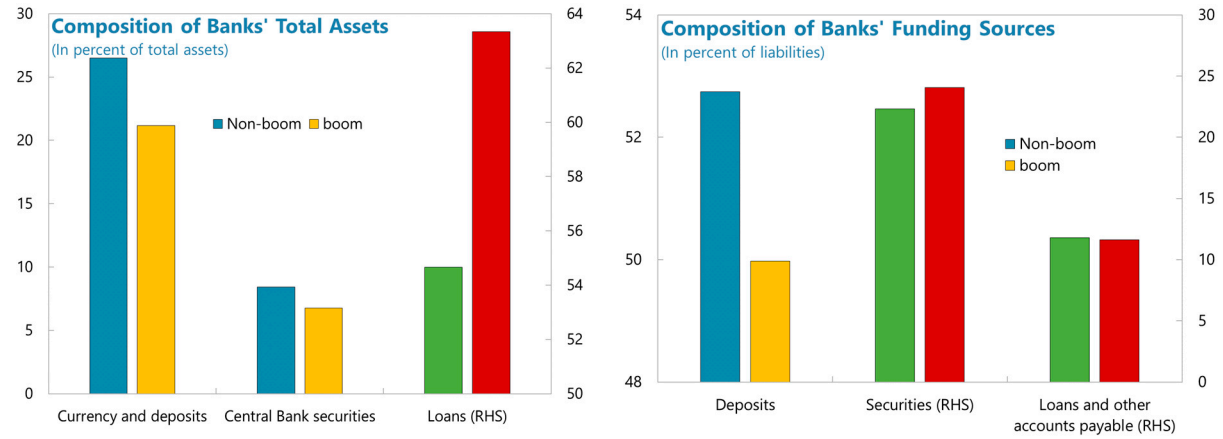


Sources: BCP and IMF staff calculations.

The Credit Boom-Bust Dynamics



Source: BCP and staff estimates.

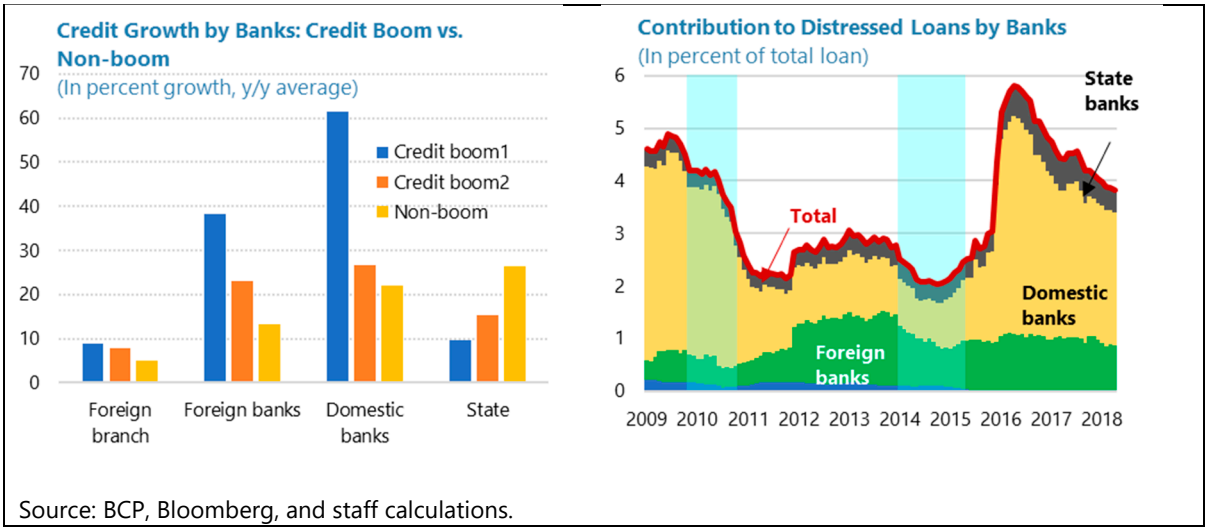


Source: BCP, Bloomberg, and staff calculations.

23. These on-offs in risk aversion are more pronounced in domestic banks.[3] Domestic banks increased credit to the agriculture sector by close to 165 percent over 2011- 2015, during which time the soy price increased by 150 percent.[4] Following the soy price collapse, domestic banks repaired their balance sheet and reduced their loan portfolio away from the soy sector more than non-domestic banks. Domestic banks also relied less on core funding sources to finance credit and become increasingly reliant on non-core funding sources such as securities.

24. Domestic banks also respond strongly to rises in regional EMBI spreads. As discussed above, higher regional EBMI spreads are negatively associated with lower dollar-denominated credit growth. Bank-by-bank historical data show further that domestic banks are the major drivers as they tend to respond more strongly to a shock in regional EMBI spread, than foreign banks and others, possibly reflecting spillover fears.

25. Among foreign banks, Brazilian and Argentinean banks behave differently. Argentinian banks tended to shrink their balance sheets in Paraguay when financial stress rose. Brazilian owned banks increased their assets and loans in Paraguay when EMBI spreads increased in Brazil. This suggests that Brazilian owned banks were relocating funds away from their domestic market. Brazilian (Argentinian) banks makes up around 19 (11) percent of total assets, and domestic banks close to 50 percent as of end-2017.



Source: BCP, Bloomberg, and staff calculations.

[3] As of end-2017, Paraguay has total 16 banks, of which 8 banks are domestic owned, 4 banks are foreign owned, 3 banks are foreign branches, and there is one state bank. Domestic banks have become more dominant players in the market, explaining close to 50 percent of total assets at end-2017, from 28 percent of total assets in early 2008. On the contrary, foreign branches have become less important explaining 4 percent of total assets at end-2017 from 13 percent in early 2008.

[4] Not only soy but total agriculture exports matter. Credit to the soy sector explains about 49 percent of total agriculture sector, on average from 2008-2016. Since the definition of agriculture sector loan has changed in 2016 and is difficult to compute the relevant agriculture price export index, this paper mainly focuses on the soy sector.

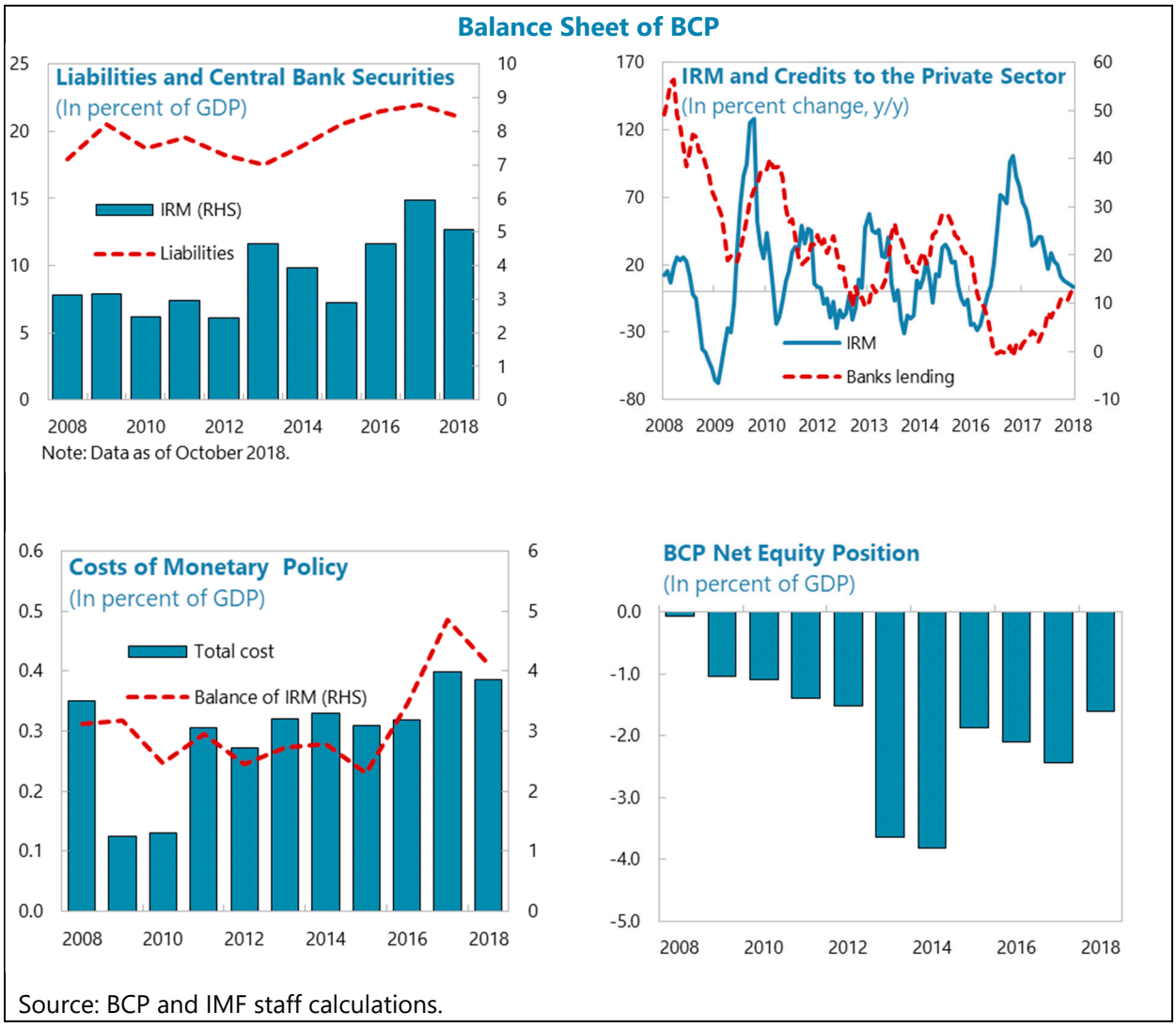
Source: BCP, Bloomberg and staff calculations.

D. How Does Monetary and Macroprudential Policy Respond During Credit Booms?

26. The monetary policy rate has not been actively used to target the credit cycle, as credit booms have not been associated with price pressures and inflation pressures have remained low.[5] For instance, during the second credit boom, monetary policy remained accommodative considering low inflationary pressures and uncertain international economic context.

27. The macroprudential toolkit in Paraguay is limited. Macroprudential policies can be used to moderate the financial cycle and building financial sector resilience. The authorities did not fully utilize its limited macroprudential toolkit to introduce measures to curb the past two credit booms and/or build financial sector resilience for the aftermath. At the height of the credit boom in 2010, as response to falling CARs, the BCP introduced two prudential policies to curb excessive risk-taking by banks: (i) introduce leverage limits to contain banks' lending and (ii) regulations tightening FX sales. However, instead of tightening regulations regarding NPLs, the BCP introduced transitory measures that effectively relaxed the definition of NPLs for credits to the agriculture and livestock sectors (See Resolution No. 33, and Resolution No.34, December 2015).

[5] The main monetary policy tool in Paraguay is the policy interest rate, which has been the principal tool used to target inflation since 2010, coupled with a flexible exchange rate, to balance between growth and price stability.



Source: BCP and IMF staff calculations.

E. Conclusion

28. We discussed driving factors of credit growth in the last decade in Paraguay, at the aggregate level and at the bank level. At the aggregate level analysis, we assessed the impact of external spillovers and domestic factors on the credit development through a structural vector autoregressive model. At the bank level analysis, we identified two credit boom periods in the last decade and found that the behavior of banks contributes to the credit cycles.

29. At the aggregate level analysis, we found that long-run dynamics of credit growth in Paraguay are driven by both external factors and domestic factors, but the external factors play a more important role. Among all external factors considered, we found that the growth of major trading partners of Paraguay plays the most significant role in determining the growth of both

Table 1. Paraguay: Available Macroprudential Policies through end-2016		
Name of MP	Description	Paraguay
CCB	A requirement for banks to maintain a countercyclical capital buffer.	✓
LVR	A limit on leverage of banks share of the bank's non-risk-weighted capital.	✓
LLP	Loan loss provision requirements, which include dynamic provisioning and sectoral provisions (e.g. housing loans).	…
Capital	Capital requirements for banks, which include risk weights, systemic risk buffers, and minimum capital requirements.	✓
LTV	Limits to the loan-to-value ratios.	…
DSTI	Limits to the debt-service-to-income ratio and the loan-to-income ratio, which restrict the size of debt services or debt relative to income.	…
LFC	Limits on foreign currency (FC) lending & rules or recommendations on FC loans.	✓
RR	Reserve requirements (on domestic or foreign currency) for macroprudential purposes.	✓
Tax	Taxes and levies applied to specified transactions, assets, or liabilities.	…
SIFI	Identification of and additional buffer requirements for global and domestic systemically important financial institutions.	…
Liquidity	Regulations for liquidity and funding risks.	…
LTD	Limits to the loan-to-deposit (LTD) ratio and penalties for high LTD ratios.	…
LFX	Limits on net or gross open foreign exchange (FX) positions, limits on FX exposures and FX funding, and currency mismatch regulations.	✓
LCG	Limits on growth or the volume of aggregate credit.	…
Conservative	Requirements for banks to maintain a capital conservation buffer.	…
LoanR	Loan restrictions, that are more tailored than those captured in "LCG". They include loan limits and prohibitions, which may be conditioned on loan characteristics, bank characteristics, and other factors.	…
Other	Macroprudential regulation not included elsewhere, including stress testing, restrictions on profit distribution, and structural measures (e.g., limits on exposures between financial institutions).	…

guaraní-denominated credit (by more than half of the total variation) and dollar-denominated credit (by close to one-third of the total variation). We also found that investors' risk-aversion, as measured by the EMBI spreads of Latin America, and soy bean prices, explain a large amount of movement in dollar-denominated credit growth (each factor explains about 18 percent of the total

variation). Among all domestic factors considered, the monetary policy rate is the most important driver in explaining the dynamics of credit growth in Paraguay in the long-run.

30. In addition, through the impulse response analysis, we showed that the external factors and the domestic factors have different impact on the short-term dynamic of the credit growth in Paraguay. We found that both guaraní-denominated credit growth and dollar-denominated credit growth move in tandem to the growth of the major trading partners. Secondly, regional risk-aversion could lower the growth of dollar-denominated credit growth but not the guaraní-denominated credit growth. Thirdly, improvement in soy bean price could spur an increase in dollar-denominated credit growth but not guaraní-denominated credit growth. On the domestic side, a tightening of the monetary policy reduces the guaraní-denominated credit growth but increases the dollar-denominated credit growth in the short-term while a real appreciation of guaraní could raises growth of dollar-denominated credit.

31. The empirical result suggests that the rapid growth of credit in Paraguay in the last decade was largely due to a favorable external environment in the last decade — strong growth of major trading partners and high prices of agricultural commodity prices.

32. At the bank-level analysis, we find evident that banks' risk on-off behavior contributes to the credit cycles observed in the last decade. We find that banks tend to behave more aggressively (by taking on more riskier assets) during the two credit boom periods (i.e., the period when credit grows faster than the trend level) identified in the last decade. This behavior contributes to the credit boom-bust pattern observed. We also find that the response to external shocks is heterogeneous among banks and is depending on the original of the capital.

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Annex I. Estimation Result of the Structural VAR

1. This appendix presents the estimation result of the Structural VAR discussed in the main text. The empirical model is specified as follow:

$$y_t = \mu + \mathrm{A}y_{t-1} + B\varepsilon_t$$

where y_t is a vector of dimension (9 X 1) and consists of the *Fed Fund Rate (dyfedpolicy), Trading Partner Growth (worldgdpA), Soy Bean Price (dypsoy), Latin America EMBI Spread (dyembi_lac), Domestic Monetary Policy Rate (dypolicy), Real GDP growth (dyngdpr), Real Effective Exchange Rate (dyreer), Guaraní-denominated credit (dycredit_lc) and Dollar-denominated credit (dycreditfcx)*. The model is estimated with quarterly data from 2006Q1 to 2018Q3. All variables are denominated in term of year-over-year growth rate except for the Fed Fund Rate, Latin America EMBI Spread and Domestic Monetary Policy Rate. These three variables are denominated in year-over-year difference in percentage point. ε_t is vector of dimension (9 X 1). It consists of the shock to each variable in vector y_t. The shocks are assumed to be independently normally distributed. A is a square matrix of dimension (9 X 9) that governs the relationship among variables in y_t. B is a square matrix of dimension (9 X 9) that governs the impact of shocks on each variable in y_t. μ is a vector of constants. Restrictions are imposed on both matrix A and matrix B to reflect the prior that the domestic variables do not affect the development of the external variables.

The estimation results of matrix A and matric B are respectively:

Estimation Results of Matrix A

VARIABLES	(1) dyfedpolicy (t)	(2) worldgdpA (t)	(3) dypsoy (t)	(4) dyembi_lac (t)	(5) dypolicy (t)	(6) dyngdpr (t)	(7) dyreer (t)	(8) dycredit_lc (t)	(9) dycreditfcx (t)
dyfedpolicy (t-1)	0.93***	-0.03	3.28	-26.50	1.91***	-1.68	3.10**	-1.25	2.22
	(0.05)	(0.12)	(2.91)	(16.47)	(0.51)	(1.03)	(1.58)	(1.58)	(1.78)
worldgdpA (t-1)	-0.14***	0.75***	1.00	33.59***	-0.86***	0.94	-0.86	2.38***	0.52
	(0.02)	(0.06)	(1.50)	(8.36)	(0.29)	(0.58)	(0.89)	(0.89)	(1.00)
dypsoy (t-1)	const.	const.	0.80***	-0.71	0.03**	-0.04*	0.11***	-0.01	0.02
	(n.a.)	(n.a.)	(0.11)	(0.55)	(0.01)	(0.02)	(0.04)	(0.03)	(0.04)
dyembi_lac (t-1)	-0.00**	-0.01***	0.01	0.70***	-0.00	-0.01***	-0.01	0.00	-0.03***
	(0.00)	(0.00)	(0.02)	(0.12)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
dypolicy (t-1)	const.	const.	const.	const.	0.74***	0.09	0.70**	-0.95***	-0.86**
	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(0.10)	(0.21)	(0.32)	(0.32)	(0.36)
dyngdpr (t-1)	const.	const.	const.	const.	0.21***	0.21	0.42**	-0.17	0.17
	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(0.07)	(0.13)	(0.21)	(0.21)	(0.24)
dyreer (t-1)	const.	const.	const.	const.	-0.09**	-0.01	0.46***	-0.19	0.11
	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(0.04)	(0.08)	(0.12)	(0.12)	(0.14)
dycredit_lc (t-1)	const.	const.	const.	const.	0.11***	-0.02	0.28***	0.73***	0.21**
	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(0.03)	(0.06)	(0.09)	(0.09)	(0.10)
dycreditfcx (t-1)	const.	const.	const.	const.	0.04	-0.02	-0.04	0.08	0.84***
	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(0.03)	(0.05)	(0.08)	(0.08)	(0.09)
Constant	0.40***	0.76***	-1.59	-95.47***	-1.55***	1.79	-3.28*	-2.00	-3.46*
	(0.09)	(0.22)	(5.10)	(28.98)	(0.53)	(1.12)	(1.72)	(1.71)	(1.91)
Observations	50	50	50	50	50	50	50	50	50
R-squared	0.93	0.88	0.66	0.62	0.80	0.37	0.76	0.93	0.94

Note:
const: Constrainted to zero in the estimation.
Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Estimation Results of Matrix B

	dyfedpolicy (t)	worldgdpA (t)	dypsoy (t)	dyembi_lac (t)	dypolicy (t)	dyngdpr (t)	dyreer (t)	dycredit_lc (t)	dycreditfcx (t)
dyfedpolicy (t)	0.34	const	const	const	const	const	const	const	const
worldgdpA (t)	0.14	0.80	const	const	const	const	const	const	const
dypsoy (t)	1.34	8.44	14.88	const	const	const	const	const	const
dyembi_lac (t)	-28.19	-56.86	-27.89	71.19	const	const	const	const	const
dypolicy (t)	0.16	-0.15	0.26	-0.17	1.36	const	const	const	const
dyngdpr (t)	-1.38	0.70	0.14	0.44	0.91	2.53	const	const	const
dyreer (t)	0.05	0.47	2.01	0.63	0.73	-0.40	4.05	const	const
dycredit_lc (t)	-1.36	1.39	-0.40	0.95	0.48	-0.77	-0.43	4.03	const
dycreditfcx (t)	0.65	1.90	0.49	-0.79	2.04	0.90	1.41	0.43	3.87

Note:
const: Constrainted to zero in the estimation.

Annex II. The Banking Sector Between 1990 and 2006

The annex reviews the development of the banking sector between 1990 and 2006, when Paraguay experienced a protracted banking crisis.

Early Liberalization and the Banking Crisis in 1990s

1. In the early 1990s, the first democratically elected governments after the Stroessner era introduced reforms aimed at liberalizing financial markets. Reforms included the unification of the exchange rates and floating of the guarani, the liberalization of interest rates, the introduction of market-based monetary instruments, the elimination, at least partially, of selective credit controls and the authorization of making foreign currency loans by local banks for selected purposes, as well as the harmonization and gradual reduction of reserve requirements. In addition, the Central Bank of Paraguay (BCP) began to carry out open market operations using its own short-term debt instrument.

2. These reforms fueled the expansion of the banking sector and bank credit. Prior to 1980, the Paraguayan banking system largely consisted of foreign banks. During the 1980s, several domestic banks and finance companies started to operate, holding a small share of deposits. In the late 1980s and early 1990s, the relaxed entry requirements in the law, resulted in a large increase in the number of domestic banks and finance companies operating in the system. The number of financial intermediaries operated in the country grew to close to 100 in late 1994, at the onset of banking crisis.

Number of Financial Institutions between 1995 and 2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003
Number of banks	35	32	33	23	22	22	20	18	14
Wholly foreign owned	13	14	9	9	9	9	8	7	6
Majority foreign owned	...	...	9	8	7	8	8	7	5
Locally owned private banks	20	16	13	5	5	4	3	3	2
Public development bank	2	2	2	1	1	1	1	1	1
Number of finance companies	68	54	50	36	33	28	25	21	17

Source: Chapter 2 of Paraguay Corruption Reform and the Financial System, Table 2.2

3. Macro-economic conditions further contributed to the increase of bank credit. Growth had been strong, and inflation was in double digits prior to the outbreak of the crisis in 1995. High inflation and a cap on lending interest rate resulted in negative real lending rates, which fueled the expansion of bank credit in the early phase of the cycle. Policy measures to alleviate the impact of a negative cotton price shock on the economy in 1992 further contributed to the growth of credit.[6]

[6] The authorities provided subsidized credit, through commercial banks, to the agricultural sector.

4. Bad banking practices, including excessive concentration and connected lending without appropriate credit-risk analysis, inadequate accounting practices, and inefficient supervisory framework, set the stage for the banking crisis in 1995 (Franks et al, 2002).

5. Banking sector supervision did not keep pace with the expansion of the banking sector (Garcia-Herrero, 1997). Progress in banking supervision during the liberalization process was slow, especially the enforcement of capital requirements and minimum entry capital. Many new small banks and financial companies had very low levels of capital. Adding to the problem, although the Superintendence of Banks was aware of the distressed situation of part of the financial system, it was not allowed to apply the appropriate sanctions by the political authorities. Meanwhile, the BCP continued to give credit to problem banks, while requesting shareholders to provide additional capital. However, this capital never materialized. Thus, when a confidence shock hit the banking sector in mid-1995, it morphed into a full blow banking crisis quickly due to the lack of public confidence in the banking system in general.

6. The banking crisis broke out in mid-1995 triggered by the publication of an accounting discrepancy in the BCP's books, which shook public confidence. Additionally, the third and fourth largest commercial banks (Banco General and Bancopar), which had been identified by the Superintendence of Banks as having capital deficiencies in 1994, in terms of deposits, were unable to meet their obligations. The BCP intervened the banks to keep them open to the public. The crisis spread quickly in the following few months. Two additional commercial banks and a few other finance companies and saving and loan association fell into distress, requiring BCP intervention. There was a massive withdrawal of deposits from private domestic banks as a group, and from intervened banks in particular.

7. To avoid a run on the entire banking system and a failure of the payments system, the BCP provided large scale liquidity support. Deposits were withdrawn from private domestic and government-owned banks and put into foreign banks that left total deposit in the banking system remained relatively stable. Because of the reluctance of healthier banks, especially foreign banks, to channel their excess liquidity through the interbank market, the BCP's window was the main source of liquidity for distressed banks. About half of the borrowing from the BCP was used by intervened banks to offset deposit withdrawals, and the other half to cover the call loans outstanding with other financial institutions and short-term external obligations. In addition, pressure started to mount from other organized sectors for special lines of credit to ease the perceived "liquidity shortage" and for longer term credit facilities for investment projects directly or indirectly through banks.

8. The waves of bank failures ended in late 1998 after the closure of three weak banks (including a politically sensitive bank - Workers Bank). By that time, about half of the financial institutions had failed (see table 1). One of the contributing factors to the end of the crisis was the changed way of dealing with insolvent banks by the authorities – instead of extending liquidity support, the government decided to resolve ailing institutions, including politically sensitive ones.

9. Inadequate resources for the supervisory authorities and political interference in dealing forcefully with remaining weak or insolvent banks explained why many of these banks could remain

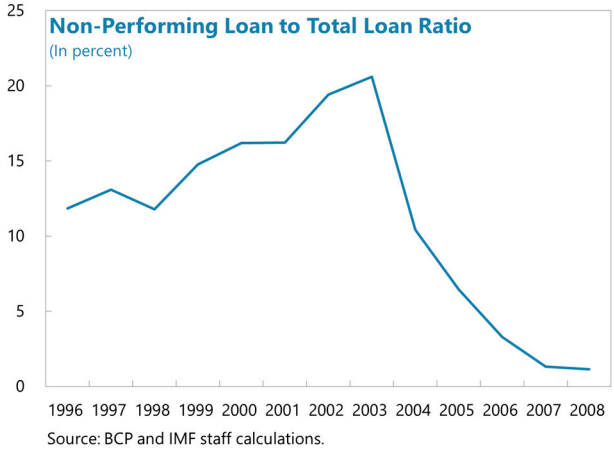
operating and thereby effectively increased the overall costs of their resolution when they were ultimately closed in late 1997 and 1998. The direct cost of the intervention effort led by the central bank was estimated to be around 5 percent of GDP (Garcia-Herrero, 1997). This cost includes i) the liquidity support (amount to 4 percent of GDP) provided by the BCP at end-1995 to intervened and distressed banks; ii) the additional liquidity support of 1 percent of GDP in mid-1996.

10. The crisis reduced the share of private domestic banks. There were increases in the share of deposits, assets and net worth held by foreign-owned banks, as well as government-owned banks. By end-December 2002, 85 percent of total deposits in the banking system was in branches of foreign banks or majority foreign-owned banks, and 83 percent of total assets were held by foreign banks or majority foreign-owned banks. In sum, the impact of the crisis was uneven across different types of banks and the banking system became more concentrated and segmented.

11. At a micro-level, the increased share of foreign wholly-owned and majority owned banks contributed to the slow recovery of credit. Local firms (which tend to be smaller local firms, in asset size, than foreign firms operated in Paraguay) used to obtain credit from domestic private banks, before the crisis, could no longer get credit from these institutions due to the higher interest rate, reflecting the lack of deposit base at these institutions. However, these borrowers were also not able to obtain credit from foreign owned banks as they were perceived to be too different from the usual borrowers at foreign-owned banks (large international corporations), and foreign-owned banks did not want to take the risk of accepting borrowers from the failed institutions (mostly small and local borrowers).

The Economy After the Banking Crisis

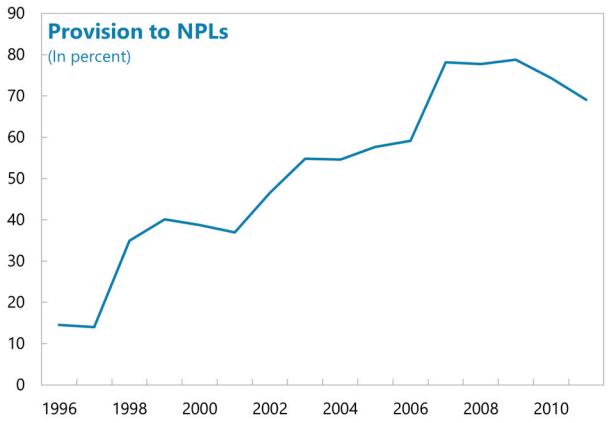
12. The economy was in recession between 1998 and 2002 as it was hit by a mix of external and domestic shocks—the Argentinean financial crisis, a drought and a foot-and-mouth disease. The result was an increase in the non-performing loan ratio. Credit to the private sector fell from the peak reached in 1997.



13. The Argentinean financial crisis in 2002 had a direct impact on the financial system in Paraguay. In mid-2002, there was a deposit run on Banco Aleman, owned by an Argentine-Uruguayan conglomerate, began after the parent institutions run into difficulties. The ailing bank was the third-largest bank by asset back then (about 11 percent of banking system assets). The authorities responded swiftly by intervening in the bank, paying out small deposits with a deposit guarantee provided by the central bank, and transferring most other assets and liabilities to other banks in the system. As the ability of most banks to absorb these shocks improved a lot since 1998, there were no wide spread failure of banks, except for the public development bank (BNF).

14. Rapid growth came back afterwards, in part, due to good macro-policies. Between 2003 and 2008, in the context of several IMF programs, there was an improvement of macro-economic policies and an opening of the economy. Inflation and exchange rate volatility came down as the central bank shifted to inflation targeting, while prudent fiscal policy reduced government debt significantly. The global agricultural commodity price boom led to a rapid growth in real incomes and a surge in domestic demand and a credit boom.

15. The quality of banking supervision improved as major revisions to Banking laws were passed, which bought banking supervision closer to those prescribed in the Basel Core Principles. Supervisors were granted more resources, more independence and more sanctioning capacity. Management capacity of bank supervisors and corporate governance were also improved. The soundness of the banking sector improved as banking practices become better regulated as a result of these reforms.[7] For example, individual bank generally held more capital than the amount required legally; [8] provision to NPLs had increased considerably.



Source: Data extracted from past AIV reports and Frank et al (2002)

Lessons Learned after the Banking Crisis

16. The credit boom in the early 1990s was largely the result of financial market liberalization that stimulated the expansion of the banking sector, coupled with favorable economic conditions. However, the loose entry requirements allowed weak banks to join. In addition, poor enforcement of banking laws allowed banks to evade capital requirements. This resulted in a banking crisis with half of the banks failed and a collapse of the credit. Credit growth stagnated after the banking crisis. Credit growth then resumed around 2006 and kept growing until 2015.

The fall of soybean price in 2015 triggered a decline in credit growth but, unlike the previous crisis, there was no banking crisis, due to the improved resilience of the banking sector. This improved resilience is a result of a series of efforts to improve the soundness of the banking sector since the previous banking crisis, which allows it to handle the credit increase more comfortably. The modernization of the bank supervision framework and increased capacity of the supervisors contributed to the improvement. Banks that remained after the previous banking crisis were generally healthier financially and adopted safer banking practices.

[7] For example, banks faced strengthened capital requirement; stricter information requirements for the granting of loans, more stringent criteria for portfolio classification; higher provisioning requirements for the nonperforming loan portfolio.

[8] See discussions in Paraguay's 2007, 2009 and 2010 Article IV reports.