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SELECTED ISSUES

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PERU

SELECTED ISSUES

June 3, 2016

Approved By
Western Hemisphere Department

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CONTENTS

THE ADJUSTMENT TO COMMODITY PRICE SHOCKS IN CHILE, COLOMBIA AND PERU[1]

This chapter presents a comparative analysis of the macroeconomic adjustment in Chile, Colombia, and Peru to commodity terms-of-trade shocks. The study is done in two steps: (i) an analysis of the impulse responses of key macroeconomic variables to terms-of-trade shocks and (ii) an event study of the adjustment to the recent decline in commodity prices. The experiences of these countries highlight the importance of flexible exchange rates to help with the adjustment to lower commodity prices, and staying vigilant in addressing depreciation pressures on inflation through tightening monetary policies. On the fiscal front, evidence shows that greater fiscal space, like in Chile and Peru, gives more room for accommodating terms-of-trade shocks.

A. Introduction

1. The "commodity super-cycle" has come to an end as commodity prices have been decreasing steadily since 2011, and this external shock is likely to be persistent. Commodity prices experienced a remarkable increase during the 2000s, the so-called commodity super-cycle, which was only slightly interrupted by the global financial crisis, generating a terms of trade (ToT) boom for many commodity-exporting economies. For instance, in Chile and Peru, terms of trade doubled from 2000 to 2011, and in Colombia they increased by 70 percent. However, the prices of metals and oil declined after 2011 and mid-2014, respectively. Through deteriorating ToT, the shock resulted in lower national incomes, wider current account deficits, and weaker national currencies.

2. Large ToT movements can have important implications for macroeconomic performance as relative prices and incomes change. This chapter compares the macroeconomic adjustment in Chile, Colombia, and Peru in response to fluctuations in commodity prices. This comparison is relevant as these are commodity exporters' emerging economies (mainly copper for Chile and Peru, and oil for Colombia) that are comparable in size and have sound macroeconomic frameworks in place, including fiscal rules and inflation-targeting regimes.

3. First, macroeconomic responses to a commodity ToT shock are estimated. Using a vector auto-regression methodology (VAR), the implications of movements in the ToT (using a country-specific commodity price index) on government revenues and expenditures, GDP growth, the real effective exchange rate (REER), and the current account are analyzed. Once the relevant shocks are identified, impulse response and forecast error variance decomposition analyses are conducted.

[1] Prepared by F. Roch.

4. Second, an event study of the actual adjustment to the recent drop in commodity prices is presented. In the three economies, current account and trade deficit widened, while currencies depreciated significantly. However, despite these similar patterns, the timing and size of the adjustment has differed between these economies, largely because metal prices began their downward adjustment in 2011, while oil prices started to decline only since mid-2014. Thus, Chile and Peru are in the final stages of the adjustment process, while Colombia is in the midst of adjusting to more recent price declines in oil. The experiences of Chile, Colombia, and Peru highlight the importance of flexible exchange rates to help with the adjustment to new commodity prices.

5. This chapter is organized as follows. Section B describes the data and presents the methodology used to estimate the impact of commodity prices on key macroeconomic variables. Section C presents the results. Section D presents an event study and Section E concludes.

B. Data and Methodology

6. A country-by-country VAR to analyze the implications of a shock in commodity prices on key macroeconomic variables is estimated. Following Medina (2016), the analysis mostly relies on a country-specific bivariate VAR estimation. In particular, the model used is:

$$\begin{bmatrix} 1 & b_{12} \\ b_{21} & 1 \end{bmatrix} \begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} c_{10} \\ c_{20} \end{bmatrix} + \begin{bmatrix} a_{11}(L) & a_{12}(L) \\ a_{21}(L) & a_{22}(L) \end{bmatrix} \begin{bmatrix} y_{t-1} \\ z_{t-1} \end{bmatrix} + \begin{bmatrix} e_{yt} \\ e_{zt} \end{bmatrix}$$

where y_t is the country-specific commodity price index (included in all regressions); z_t is the macroeconomic variable of interest; c_{10} and c_{20} are the constant terms; $a_{ij}(L)$ is the polynomial lag operator; and e_{it} is the uncorrelated disturbance. The domestic variables of interest include: public expenditures, public revenues, and real GDP. However, for the external variables a three-variable VAR is estimated which includes the REER, current account, and the commodity price index. The identification of structural shocks is achieved through a Cholesky decomposition, assuming that the domestic variables do not affect the terms of trade contemporaneously. For each VAR, the number of lags is determined based on the Aikaike information criterion. The estimation uses quarterly data from the first quarter of 1999 until the last quarter of 2015 and a country-specific commodity price index aimed at capturing the impact of variations in commodity prices at the country level.[2] All the series are seasonally adjusted and log-differenced (owing to nonstationary) except the current account balance which is expressed as a percentage of GDP.

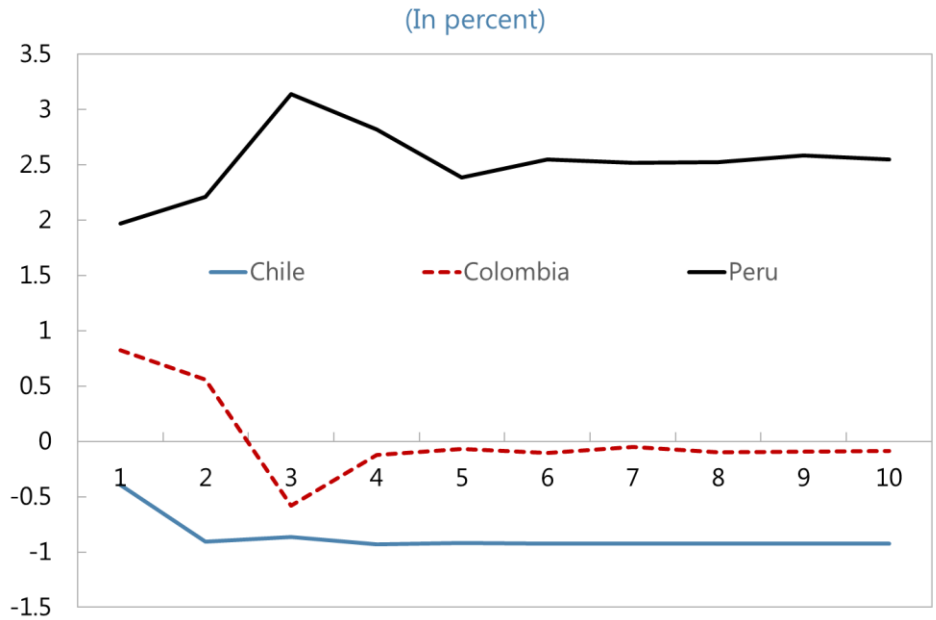
[2] This commodity price index was constructed by Gruss (2014).

C. Results from VAR Methodology

Impulse response function analysis

7. Public primary expenditures behave differently across the three countries in response to a commodity price shock. Figure 1 shows the estimated accumulated impulse response functions of primary expenditures. In the case of Chile, a one standard deviation shock to commodity prices leads to a one percent decline in primary expenditure. However, in the case of Peru, this shock leads to an increase of 2 percent in primary expenditures. Finally, primary expenditures in Colombia are insensitive to commodity price shocks after some initial volatility.

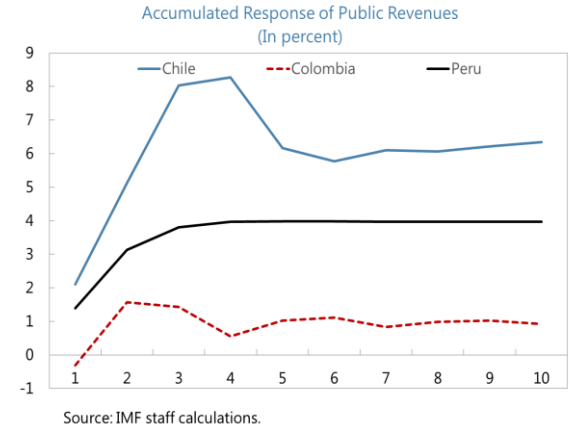
Figure 1. Accumulated Response of Primary Expenditures



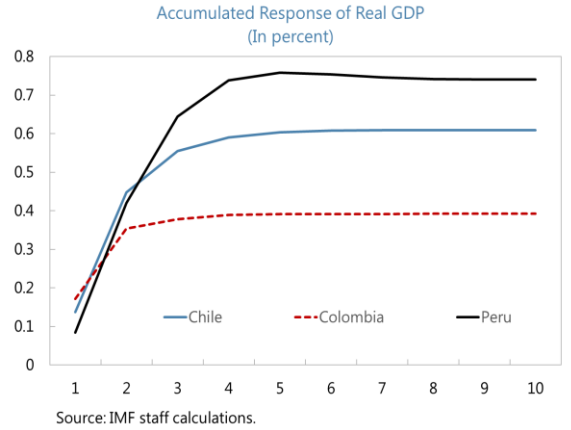
Source: IMF staff calculations.

8. For all three countries, a positive shock to commodity prices is associated with higher GDP growth and public revenues. Figure 2 shows the estimated accumulated response functions for public revenues and real GDP growth. Regarding public revenues, Chile experiences the biggest increase of around 8 percent after 4 quarters. In Colombia and Peru, the responses are more moderate, peaking at 4 and 1.5 percent respectively after 3 quarters. With respect to real GDP growth, the initial response is broadly similar in the three cases up to two quarters ahead. However, in the medium term, Peru is the country that benefits the most from a positive ToT shock.

Figure 2. Accumulated Response of Public Revenue and GDP Growth



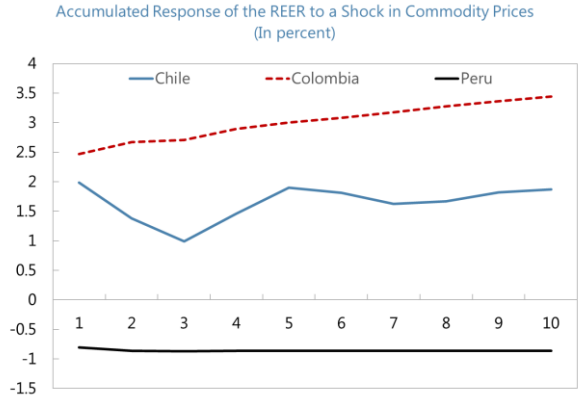
Source: IMF staff calculations.



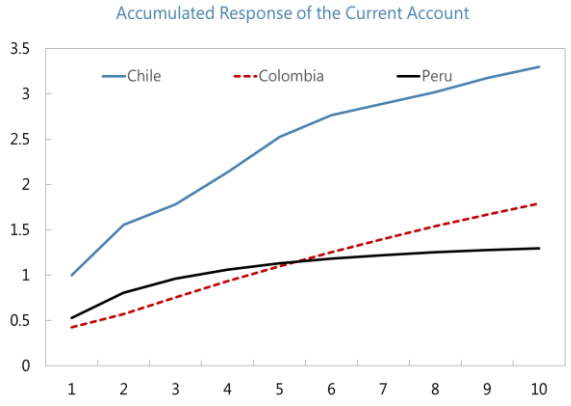
Source: IMF staff calculations.

9. With respect to the external adjustment, the REER and the current account appear to be more flexible in the case of Colombia. Figure 3 shows the estimated accumulated response functions for the REER and the current account. Intuitively, a positive commodity price shock should lead to an appreciation in the real exchange rate. Indeed, the results suggest that relationship for both Chile and Colombia, with a stronger appreciation in the latter. However, in Peru, the REER depreciates slightly, perhaps owing to the active intervention policy of the Central Reserve Bank of Peru. With respect to the external current account, the shock to commodity prices has a stronger positive effect in the case of Colombia, while in Chile and in Peru the current account adjusts in similar ways during the initial five quarters. Over the medium term, the current account improves more in Chile, possibly related to the response of the REER.

Figure 3. Accumulated Response of the REER and the Current Account



Source: IMF staff calculations.



Source: IMF staff calculations.

Forecast error variance decomposition analysis

10. Fiscal expenditures and revenues in Chile and Peru are similarly affected by the fluctuations in commodity prices, but not in Colombia. Table 1 presents the estimated variance decomposition of forecast errors of expenditures and revenues, which allows quantifying the contribution of a shock in commodity prices to fluctuations in the domestic variable of interest.

Movements in commodity prices account for about 5 percent of variations in primary expenditures at a 10-quarter horizon for both Chile and Peru, while they account for only 2 percent in Colombia. Similarly, commodity price fluctuations explain 25 and 20 percent of fluctuations in revenues in Chile and Peru respectively, and roughly 3 percent in the case of Colombia.

Table 1. Variance Decomposition of Forecast Errors of Expenditures and Revenues

Contribution of Commodity Prices Shocks to the Variance of Primary Expenditure Growth			
Quarters After the Shock	Chile	Colombia	Peru
1	2.06	0.89	6.53
2	4.56	0.69	4.31
3	4.46	1.81	5.16
4	4.48	1.99	5.16
5	4.48	1.98	5.23
6	4.48	1.98	5.23
7	4.48	1.98	5.23
8	4.48	1.98	5.22
9	4.48	1.98	5.22
10	4.48	1.98	5.23

Source: IMF staff calculations.

Contribution of Commodity Prices Shocks to the Variance of Revenue Growth			
Quarters After the Shock	Chile	Colombia	Peru
1	7.73	0.09	8.17
2	15.54	2.44	18.68
3	22.97	2.44	19.94
4	22.30	2.69	19.99
5	25.03	2.75	19.99
6	25.14	2.75	19.99
7	25.15	2.76	19.99
8	25.14	2.76	19.99
9	25.16	2.76	19.99
10	25.17	2.77	19.99

Source: IMF staff calculations.

11. Commodity price fluctuations play a remarkable role in accounting for variations in GDP, the REER, and the current account. Table 2 presents the estimated variance decomposition of forecast errors of real GDP, the REER, and the current account. The contribution of commodity prices shock to the variance of real GDP is on average 10 percent, broadly similar in the three cases. As expected, the variation in commodity prices account for a large part of the variance in the REER, especially in Chile and Colombia where the contributions are estimated at around 34 and 24 percent respectively.[3] Similarly, the fluctuations in commodity prices account for a significant part of the variance of the current account, with a larger share in Chile and Colombia.

[3] These results are consistent with those presented in the April 2015 WHD Regional Economic Outlook.

Table 2. Variance Decomposition of Forecast Errors of Real GDP, the REER, and the Current Account

Contribution of Commodity Prices Shocks to the Variance of GDP Growth			
Quarters After the Shock	Chile	Colombia	Peru
1	1.41	3.87	0.58
2	7.98	7.75	8.16
3	8.68	7.82	11.21
4	8.77	7.83	11.69
5	8.78	7.83	11.70
6	8.78	7.83	11.70
7	8.78	7.83	11.70
8	8.78	7.83	11.71
9	8.78	7.83	11.71
10	8.78	7.83	11.71

Source: IMF staff calculations.

Contribution of Commodity Prices Shocks to the Variance of the REER			
Quarters After the Shock	Chile	Colombia	Peru
1	33.89	25.34	18.58
2	33.85	25.01	18.58
3	33.87	24.79	18.57
4	33.88	24.77	18.57
5	34.47	24.70	18.57
6	34.25	24.63	18.57
7	34.42	24.57	18.57
8	34.34	24.53	18.57
9	34.40	24.49	18.57
10	34.38	24.46	18.57

Source: IMF staff calculations.

Contribution of Commodity Prices Shocks to the Variance of the Current Account			
Quarters After the Shock	Chile	Colombia	Peru
1	25.92	22.44	13.67
2	21.12	18.18	10.59
3	17.60	16.16	9.00
4	16.48	15.30	8.14
5	16.38	14.71	7.66
6	16.03	14.25	7.37
7	15.69	13.93	7.20
8	15.49	13.69	7.09
9	15.44	13.50	7.02
10	15.39	13.35	6.98

Source: IMF staff calculations.

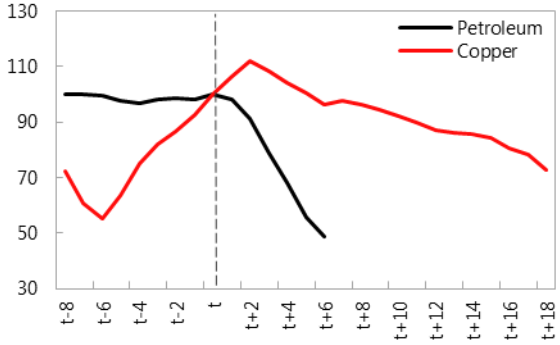
D. Event Study

12. The timing and size of the shock in Chile and Peru have been different than in Colombia. While the price of copper has been declining since 2011, the oil price decline began in the second half of 2014 (Figure 4). Thus, Chile and Peru are in the final stages of the adjustment process, while Colombia is in the midst of adjusting to the more recent oil price declines. Moreover, the shock that Colombia suffered was more severe in that oil prices plunged by about 40 percent in 5 quarters, whereas the price of copper took 18 quarters to decrease by 45 percent. As expected, these large commodity price shocks deteriorated ToT substantially, with Colombia experiencing the largest impact (Figure 4). Thus, the contribution of ToT to Gross National Disposable Income after the shock was negative and sizeable, especially in Colombia (Figure 5).

Figure 4. Commodity Prices and ToT

Commodity Prices

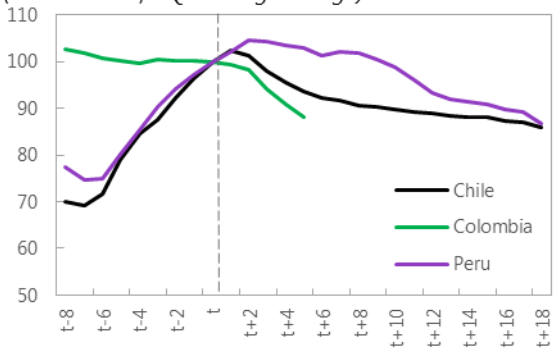
(Index: t=100, 4Q moving average)



Sources: IMF, WEO database and Fund staff calculations.
Note: Chile and Peru t = 2011Q1; and Colombia t = 2014Q2.

Terms of Trade

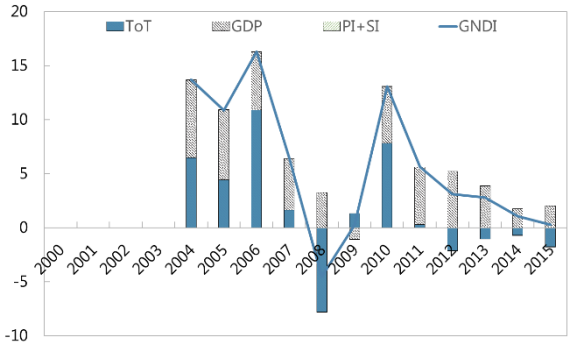
(Index: t=100, 4Q moving average)



Source: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1, and for Colombia t = 2014Q2.

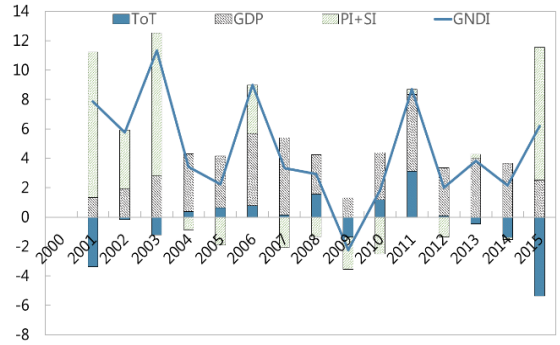
Figure 5. Contributions of ToT to Gross National Income Growth Rates

Chile: Contributions of ToT to Gross National Income Growth Rates
(In percent)



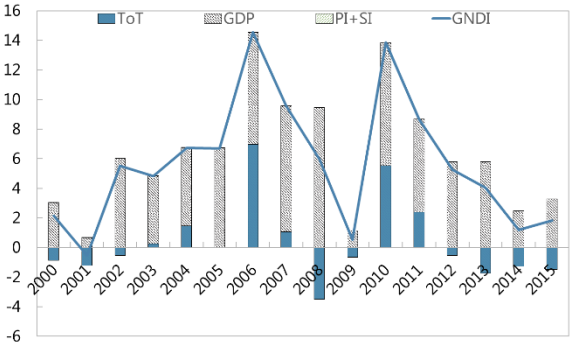
Sources: Haver Analytics and Fund staff calculations.

Colombia: Contributions of ToT to Gross National Income Growth Rates
(In percent)



Sources: Haver Analytics and Fund staff calculations.

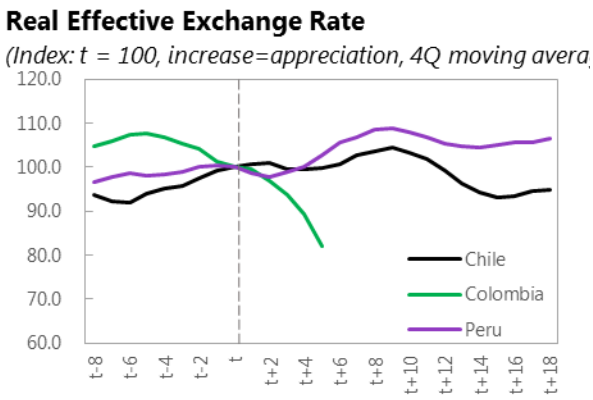
Peru: Contributions of ToT to Gross National Income Growth Rates
(In percent)



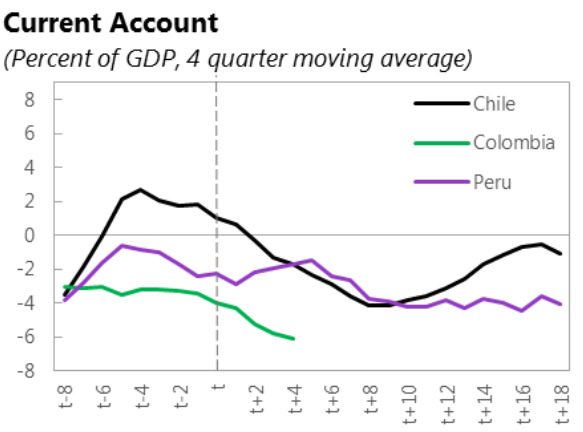
Sources: Haver Analytics and Fund staff calculations.

13. The exchange rate and current account adjustments are important elements of the macroeconomic response to the terms of trade fall, with Peru's FX intervention delaying adjustment (Figure 6). In the case of Chile, when the terms of trade initially started to fall, the exchange rate was relatively slow to adjust. However, by the end of its adjustment process, Chile's real effective exchange rate had depreciated by 5 percent. In contrast, given the magnitude and speed of the shock, Colombia experienced a sharp and fast real depreciation of its exchange rate of around 18 percent. Peru, however, had a minor real appreciation of about 6 percent, which could be in part the result of the Central Bank of Peru interventions in the FX market to prevent sharp movements in its currency. Consistent with this more muted adjustment in the real exchange rate, the current account deficit in Peru has deteriorated from 2 percent of GDP in 2011 to 4.4 percent of GDP in 2015. The exchange rate adjustment in Chile allowed for a significant current account correction, with a deficit that is now mostly closed. Finally, in Colombia the current account deteriorated as a result of the oil prices decline, and has yet to reflect the adjustment in quantities.

Figure 6. REER and the Current Account



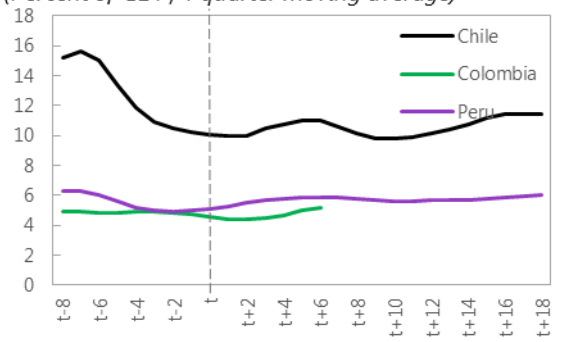
Sources: IMF, IFS database and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1, and Colombia t = 2014Q2.



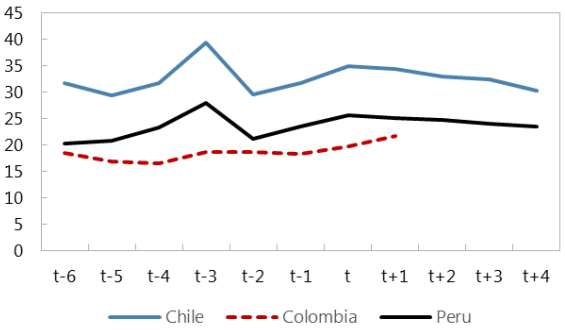
Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1, and for Colombia t = 2014Q2.

14. In Chile, most of the adjustment in the current account comes from import contraction. In Chile, the current account deficit initially widened due to the decline in the value of its traditional exports. However, after 18 quarters the current account deficit was roughly zero. This was achieved mainly by a decline in imports (from 35 to 30 percent of GDP) rather than a pick-up of non-traditional exports (Figure 7). In Peru, there have not been significant fluctuations in non-traditional exports and imports, consistently with a stickier current account deficit and more stable FDI (Figure 8).

Figure 7. Non-traditional Exports and Imports

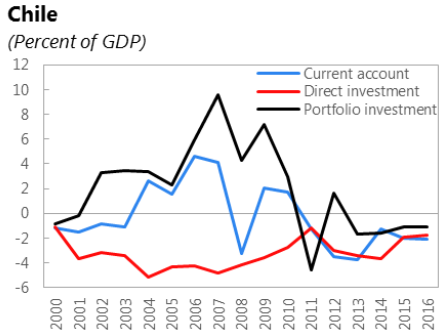


Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1, and for Colombia t = 2014Q2.

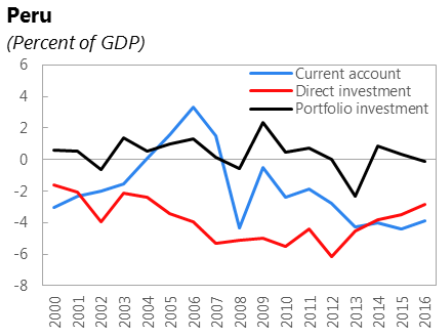


Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011, and Colombia t = 2014. A period represents a year.

Figure 8. Foreign Direct Investment



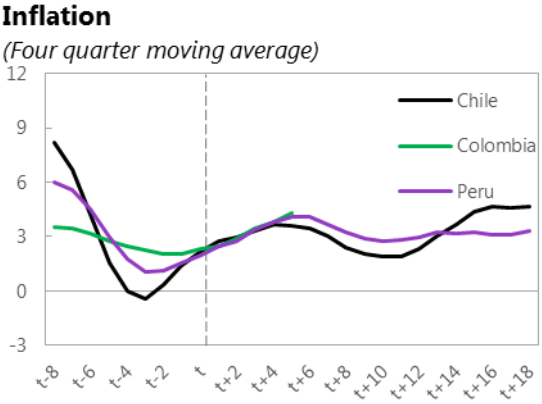
Sources: IMF, World Economic Outlook database and Fund staff calculations.



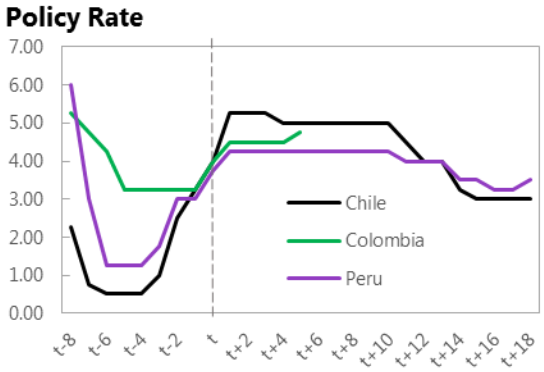
Sources: IMF, World Economic Outlook database and Fund staff calculations.

15. Currency depreciation has greatly influenced inflation dynamics, thus reducing the space for countercyclical policies in these countries. In the three cases, the shock to commodity prices created inflationary pressures (Figure 9), which reduced the policy space to conduct countercyclical monetary policy and pushed central banks in the three countries to raise the policy rate in order to keep inflation inside the target range (Figure 9). Moreover, in the case of Colombia, the tightening of monetary policy has also aimed at moderating domestic demand in order to contain the widening current account deficit. These timely policy actions supported the credibility of the inflation targeting regimes, and contained inflationary pressures.

Figure 9. Inflation and the Monetary Policy Rate



Sources: IMF, IFS database and Fund staff calculations.
Note: For Chile and, Peru t = 2011Q1; and Colombia t = 2014Q2.

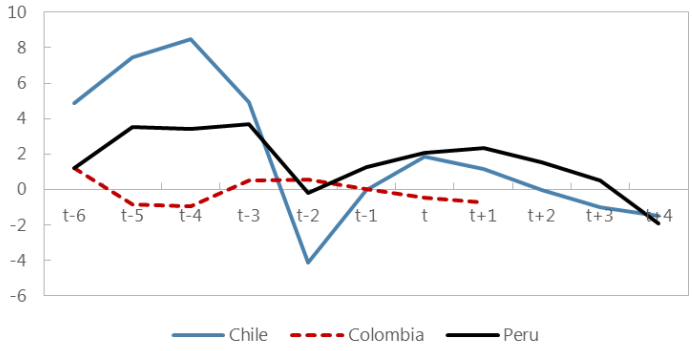


Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1; and Colombia t = 2014Q2.

16. On the fiscal front, primary balances have deteriorated steadily in all three countries (Figure 10). In line with the VAR analysis above, the shock to commodity prices reduced commodity related revenues, which is reflected in the lower growth rates of public revenues observed after the shock (Figure 11). At the same time, except for the case of Colombia, the growth rate of public expenditures remained broadly stable (Figure 11). This might reflect the fact that at the time the shock hit, Colombia was already featuring a primary deficit while both Chile and Peru exhibited surpluses. Thus, the latter two countries had more room to implement a gradual fiscal adjustment, which helped smoothing the adjustment to the shock.

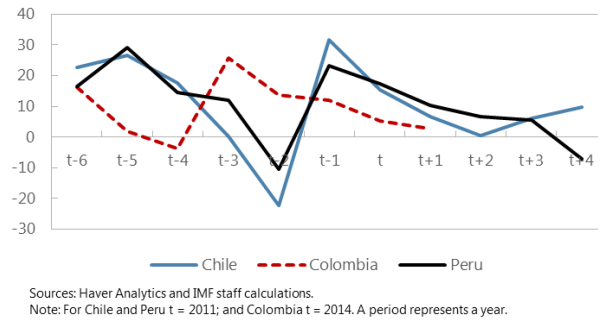
Figure 10. Primary Balance

(Percent of GDP)

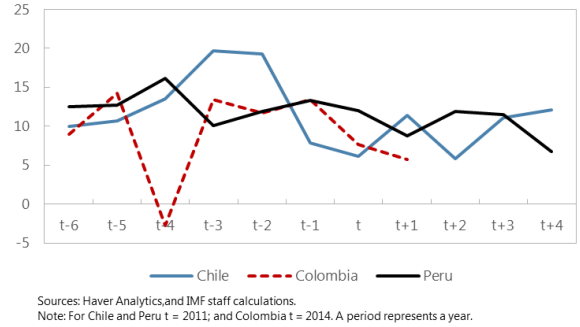


Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011; and Colombia t = 2014. A period represents a year.

Figure 11. Public Revenues and Expenditures



Sources: Haver Analytics and IMF staff calculations.
Note: For Chile and Peru t = 2011; and Colombia t = 2014. A period represents a year.



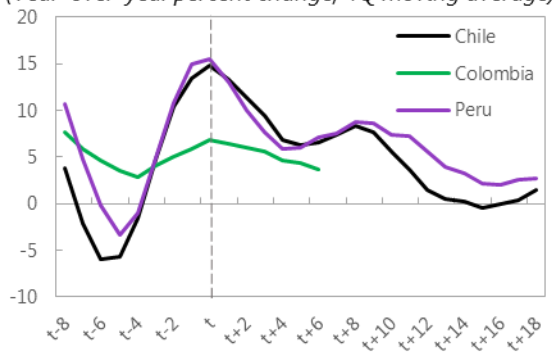
Sources: Haver Analytics,and IMF staff calculations.
Note: For Chile and Peru t = 2011; and Colombia t = 2014. A period represents a year.

17. In all three cases we observe a slowdown in total domestic demand at the time the shock hit, with a curious resilience of the Colombian economy in the face of a sharper shock (Figure 12). However, one salient difference is that the initial slowdown in Chile and Peru was significantly more abrupt than in Colombia, despite the shock being more acute in the latter. Furthermore, in the final stages of the transition, Chile had a stronger adjustment in domestic demand than Peru, which is consistent as well with the adjustment in the current account explained above. The macroeconomic adjustment in these countries has also affected the dynamics of real GDP growth (Figure 12). In the cases of Chile and Peru, real GDP growth has decreased continuously after the fall in their terms of trade. Colombia seems to be following the same path as GDP growth also declined after oil prices started plunging. However, the strong policy frameworks in place allowed these countries to withstand the large ToT shock and still post positive growth rates. Moreover, GDP growth has already started to recover in the case of Peru.

Figure 12. Total Domestic Demand and Real GDP Growth

Total Domestic Demand

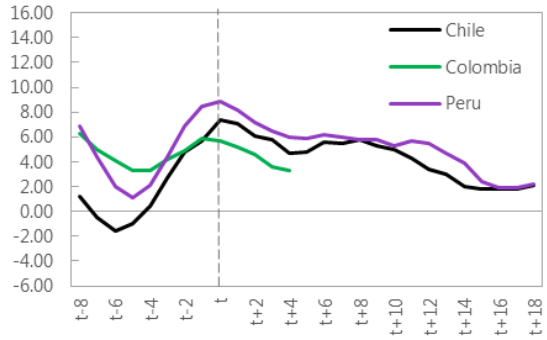
(Year-over-year percent change, 4Q moving average)



Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1; and for Colombia t = 2014Q2.

Real GDP Growth

(Year over year percent change- 4q MA)



Sources: Haver Analytics and Fund staff calculations.
Note: For Chile and Peru t = 2011Q1; and Colombia t = 2014Q2.

E. Conclusions

18. Overall, despite a slowdown in activity, GDP growth remained resilient to the terms of trade shocks in the three countries, reflecting their sound policy frameworks. GDP growth has declined in all three countries in the past couple of years but remained positive and is already recovering in the case of Peru. Fiscal loosening, especially in Chile and Peru (which had larger fiscal space), contributed to smooth the adjustment to the shock. Going beyond the recent episode, the impulse-response analysis suggests that the "usual" behavior of public spending in Peru and Chile is quite different from what happens in Colombia: following ToT shocks, public spending tends to be more procyclical in Peru than in Chile, while it does not react to ToT shocks in Colombia. The importance of having a fiscal buffer to smooth the negative effects of external shocks should remain a key consideration for fiscal policy in Peru going forward.

19. More exchange rate flexibility underpins faster current account adjustments to ToT shocks. A rapid depreciation of the currency in Chile is probably the biggest factor behind the full adjustment in its current account deficit. However, in real effective terms, this was not the case for Peru, probably as a result of the active FX intervention by the central bank to smooth volatility. As a result, Peru's current account deficit remained elevated by 2015 at 4.4 percent of GDP. Looking ahead, a continued gradual real depreciation of the sol and an increase in mining exports are expected to halve the Peruvian current account deficit by 2021.

20. Robust monetary frameworks have limited the response of inflation to ToT shocks. These countries' credible inflation targeting regimes limited the inflationary pressure by both strong communication and hikes in the policy rate. In Chile and Peru, where the ToT shocks started about five years ago, inflation is already moving back toward the target range, and staff expects the same to happen in Colombia.

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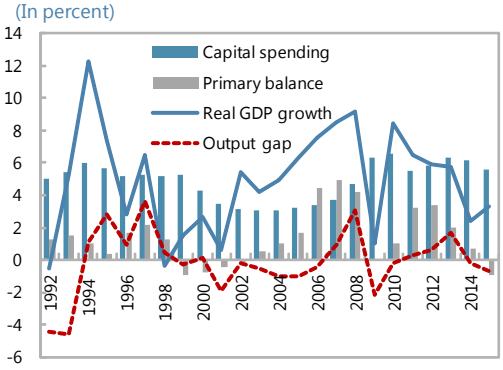
FISCAL MULTIPLIERS AND INSTITUTIONS IN PERU: GETTING THE LARGEST BANG FOR THE SOL[1]

With the end of the commodity super cycle, Peru's potential growth has declined, raising questions of what government policies could do to help boost growth, including over the medium term. This chapter shows that public investment multipliers have a larger effect on growth than current spending or tax-related stimulus in the short and medium terms. Peru's low debt and financial savings grants fiscal space for increasing investment spending, which could also entice and complement private investment, provided the former is efficient, fiscally sustainable and complemented by further reforms in public investment management and changes to the decentralization framework.

A. Context

1. Peru's fiscal policy evolved over the turbulent eighties, austere nineties, and the commodity boom of the 2000s. It has played a crucial stabilization role, especially at times when dollarization and inflation were exceptionally high (Vtyurina, 2015). Impressive fiscal retrenchment in the nineties was growth-inducing by bringing stability after years of hyperinflation and economic mismanagement. While preserving fiscal sustainability, reflected by very low public debt levels, public investment has grown significantly and supported private investment (Ross and Peschiera, 2015). Deep structural reforms have aimed at strengthening fiscal rules, public treasury, and financial and investment management systems (Pessoa and others, 2015). Private sector investment has been crowded-in through the Public-Private Partnership (PPP) framework. However, infrastructure projects have been often derailed by bureaucratic and regulatory impediments, lingering weaknesses in the public investment management (PIM) system, and the unfinished decentralization process, leaving a still-large infrastructure gap.

Peru: Selected Indicators
(In percent)



Source: Central Reserve Bank of Peru.

2. Looking ahead, a slow global recovery and low commodity prices have prompted policymakers around the world to re-think the role of fiscal policy in supporting growth. The fiscal expansion enacted by the Peruvian authorities to the 2014 downturn brought to the fore the discussion on the effects of different fiscal expansionary measures on growth in the short term.

3. With the end of the commodity super cycle and the projected halt in mining investment, Peru's medium-term growth potential has also been revised downward. In this

[1] Prepared by S. Vtyurina and Z. Leal.

context, it seems imperative to consider if Peru should maintain high public investment rates in order to attract and complement private investment to help close the infrastructure gap and become more competitive. However, maintaining or increasing capital spending will not be effective unless a strong PIM system is in place to obtain the largest bang for the sol invested.

4. The chapter is organized as follows. Section II provides a brief background on public investment trends and recent fiscal stimulus measures. Section III overviews studies on fiscal multipliers; and section IV and Annex 1 present the results from the econometric analysis of the effect of fiscal policy measures on output. Section V discusses weaknesses in executing capital spending, including at a local level, and assesses Peru's capital spending efficiency and the PIM system. Section VI concludes with recommendations.

B. Public Investment Trends and Fiscal Levers

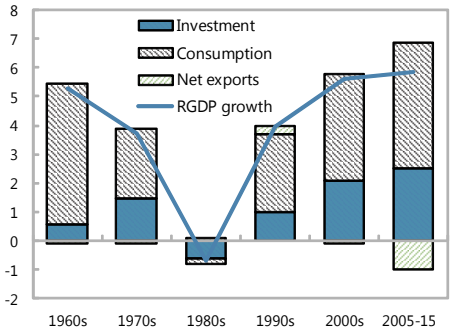
Stylized facts on investment

5. Over the past decade, public investment spending has increased in Peru in line with private investment, reflecting investment promotion initiatives and the need to fill a large infrastructure gap (Ross and Tashu, 2015).

- As a percent of GDP, public investment spending increased from about 3 percent in the early 2000s to about 6 percent in 2013, before moderating in 2014–15. In the same period, private investment jumped from 14¼ percent to 19¼ percent of GDP. Over the last decade, public investment contributed 2¾ percentage points (21 percent) to the average annual growth in total real fixed capital investment of 12¾ percent.

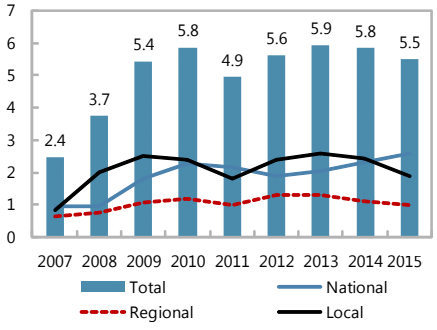
- Local government spending has been a major boost to public investment till 2014. Local investment spending has tripled, increasing from less than 1 percent of GDP in 2007 to 2½ percent of GDP in 2013. Taken together, national and regional fixed investment spending has gone from about 1½ percent to 3 percent of GDP. To some extent, these results are a reflection of the decentralization process and the government's efforts to bring investment

Contributions to Real GDP Growth
(In percent)



Sources: Central Reserve Bank of Peru and National Statistics Institute.

Public Fixed Investment Spending
(In percent of GDP)



Source: National Statistics Institute.

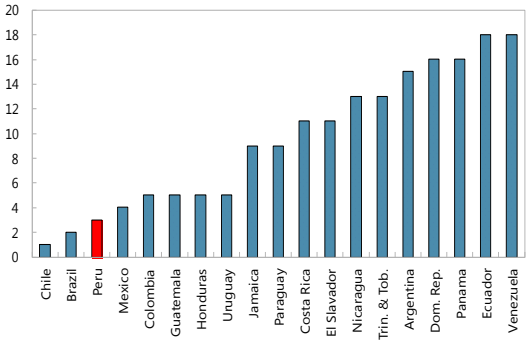
projects to the regional and municipal levels, on the back of increased revenues during the commodity super cycle.[2]

- In global and regional comparisons, public investment has risen in Peru over the last decade above the levels for emerging market economies (EMs) and Latin America and Caribbean countries (LAC). However, its capital stock, including on a per capita basis, still lags behind EMs, although is at par with LAC (Figure 1).[3] At the same time, Peru leads in PPPs and has received high rankings regionally for the quality of its framework.

- As in other emerging markets, Peru's infrastructure gap remains large (WEO, 2014). The Peruvian Association of National Infrastructure Investment (AFIN), a private research and advocacy group, has estimated a national infrastructure gap at around US$160 billion over 2016–25. For the next four years, the gap is about US$70 billion. Deficit areas include energy, telecommunications, transportation, health and education.

Overall PPP Environment

(Rank, 1=highest)



Source: Infrascope 2014 (Economist Intelligence Unit).

Peru: Infrastructure Gap by Sector

Sector	2016-20	2021-25
Water and Sanitation 1/	6.9	5.2
Telecommunications	12.6	14.4
Transport	21.2	36.2
Energy	11.4	19.4
Health	9.4	9.4
Education 2/	2.6	1.9
Hydraulic	4.5	3.9
Total	**68.8**	**90.7**

Source: AFIN (2015).

1/ Considers only water and sanitation service access and no improvement in existing connections and waterwaste

2/ Covers only increases in coverage and does not take into account functional adequacy of schools, rehabilitation, or seismic reinforcement.

Stimulus measures

6. Peru has been able to comfortably resort to fiscal measures during cyclical downturns thanks to fiscal buffers accumulated during the boom years.

- Following exceptionally high growth of 9.8 percent in 2008, activity in Peru decelerated sharply in 2009 due to the global financial crisis, GFC (IMF, 2010). In mid-2009, the government announced the *Plan for Sustaining Economic Growth, Employment, and Poverty Alleviation in a Global Crisis*, which presented a set of fiscal measures equivalent to nearly 4 percent of GDP that could be ready for implementation if conditions warranted. The substantial fiscal stimulus—mainly for infrastructure and maintenance projects and largely financed by public

Peru: Anti-Crisis Fiscal Measures (2008-09)

	Percent of GDP
Support to construction sector	0.85
Access to drinking water	0.05
Support to SMEs and export sector	0.37
Public investment	1.37
Investment continuity initiative	0.41
Key new or accelerated projects (68)	0.28
Fund for Regional and Local Public Investment	0.63
Other	0.05
Social programs and targeted support to worker	0.15
Total	**4.17**

Source: Ministry of the Economy and Finance.

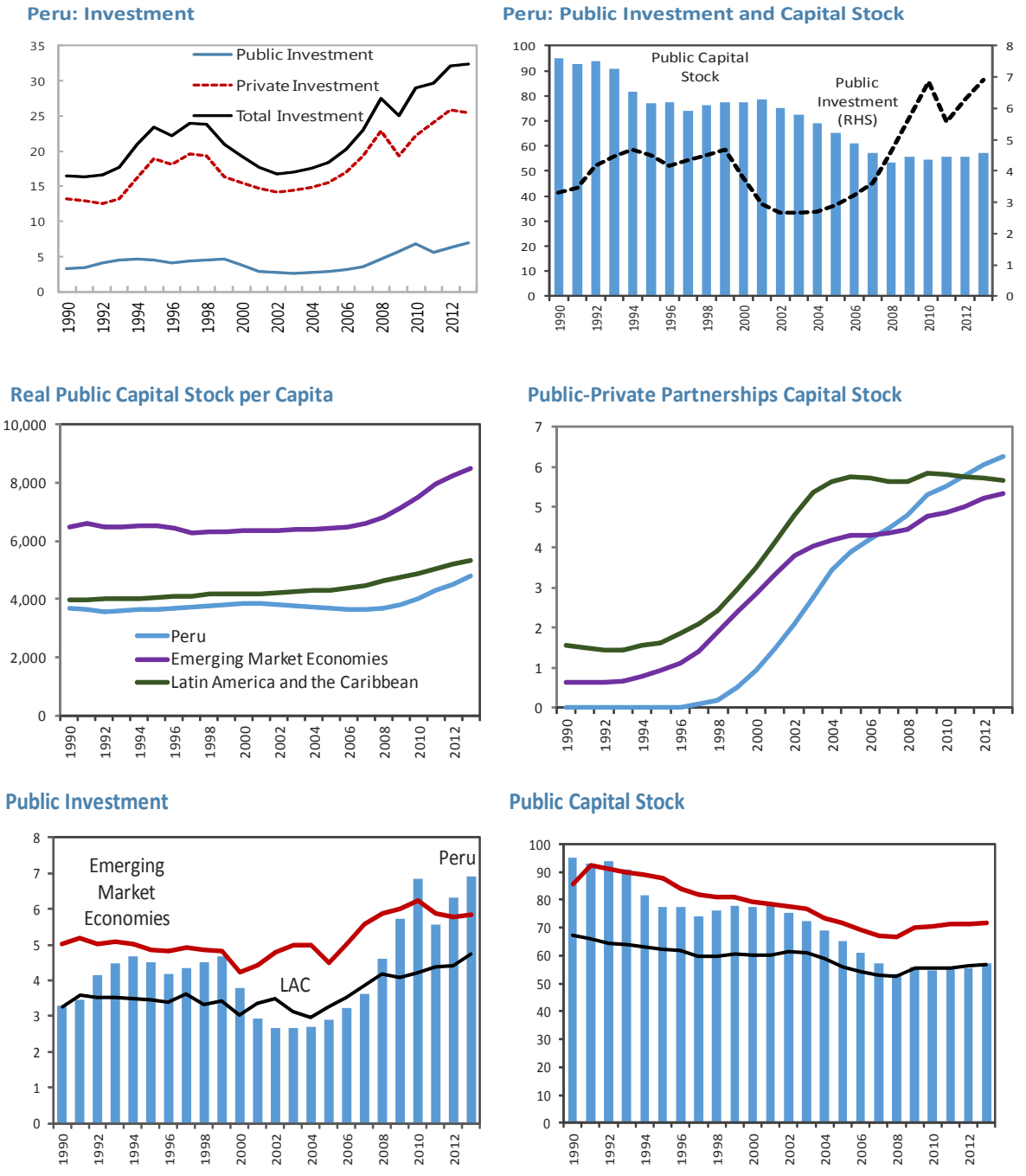
[2] Although Peru's commodity revenue intake is not that large comparing to large single commodity producers, especially of oil, at the height of the cycle, it reached above 4 percent of GDP, leading to higher transfers, and the accumulation of buffers, including in the Fiscal Stabilization Fund.

[3] In emerging market economies and low-income countries, sharply higher public investment in the late1970s and early 1980s significantly raised public stocks, but since then public capital relative to GDP has fallen (WEO, 2014).

financial assets—resulted in a fiscal impulse of around 3 percent of GDP over 2008–10 and budget deficits in two of those years. The government started to withdraw the fiscal stimulus once there were clear signs of a robust and sustained recovery of private expenditure in 2010.

Figure 1. Investment Dynamics

(2005 Purchasing Power Parity U.S. dollar-adjusted, in percent of GDP, unless otherwise indicated)



Sources: National Authorities and Fund staff calculations.

- In response to changes in the global environment starting in 2012, the authorities targeted a reduction in the budget surplus, which declined to around 1 percent of GDP in 2013 and turned to nearly balance in 2014. In addition, in mid-2014, when it became clear that the economy was softening rapidly due to external and domestic supply shocks, the government designed a fiscal stimulus plan equivalent to about 3 percent of GDP to boost aggregate demand, including higher public investment, maintenance spending at regional and local level, accelerating pass-through from international oil prices to local prices and tax reduction. This led to an overall budget deficit of about 2 percent of GDP in 2015. However, most of the stimulus in 2014–15, came from tax measures—about 30 percent of a 2 percentage point decline in tax revenue came from tax rate reductions[4]—and an increase in current spending (in 2014) rather than higher public investment, which was under-executed in both years and dropped significantly in 2015 as percent of GDP. The limited resulting stimulus once again drew attention to the effects of fiscal expansion on growth, in particular whether capital spending would have had a stronger impact on growth than tax measures or current outlays.

Peru: Selected Fiscal Stimulus Measures

(In percent of GDP)

A. Taxes (2015)	**0.7**
B. Net expenditure (2014)	**0.3**
Bonuses and salary increases	0.3
C. Expenditure (2015)	**0.9**
Current expenditure	0.1
Capital expenditure	0.4
Repayment of debt in arrears	0.3
Social assistance	0.1
Total (A+B+C)	**1.9**

Sources: National authorities; and Fund staff estimates.

C. Background on Multipliers

7. Fiscal multipliers measure the effect of discretionary fiscal policy on output. Fiscal measures are considered to have a large impact on growth when a multiplier (in absolute terms) exceeds one. A spending multiplier greater than one indicates that boosting public spending as a share of GDP would raise output by more than the initial spending increase. A revenue multiplier lower than -1 implies that raising the ratio of taxes to GDP by 1 percent causes GDP to decline by more than 1 percent.

8. The implementation of contra-cyclical responses around the world has not been without controversy with respect to their magnitude or composition. The fiscal multiplier depends on certain macroeconomic characteristics, being substantially high, for instance, if individuals' marginal propensity to consume is high, if automatic stabilizers are small, if the fiscal expansion does not trigger interest rate increases, if the exchange rate is fixed and if the fiscal accounts are sustainable (Spilimbergo et al., 2009). The composition of the fiscal expansion (taxes, current, or capital spending) matters as well; and capital spending on average has been found to

[4] Income tax reductions were envisaged as a medium-term measure to increase competitiveness by aligning rates with the neighboring countries.

provide an effective impulse both in the short and in the long term (WEO, 2014). This said, findings have varied with the degree of a country's economic development, especially if PIM systems are poorly designed. This implies an important caveat, as it takes time to design and implement capital expenditures, possibly rendering them ineffective when trying to time a fiscal stimulus to stabilize the economic cycle or even producing an involuntary pro-cyclical fiscal stance (Rossini and others, 2012; MEF, 2015). Estimates of multipliers vary, sometimes significantly. Due to data limitations, it is harder to measure multipliers in emerging markets (EMs), and some studies propose a range of multipliers derived for countries with similar structural characteristics (Batini et al. (2014)). Peru fits into the country category with medium-size overall multipliers (0.4−0.6) in the first year of fiscal expansion. Some studies suggest that both spending and revenue multipliers are small in EMs, with revenue multipliers higher than spending ones (Ilzetzki, 2011).[5] A few studies have been done specifically for Peru (Table 1).

Table 1. Peru: Selected Empirical Estimates of Fiscal Multipliers

Study	Cycle	Multiplier Estimate		Description
		Short-term	Medium-term	
Central Reserve Bank of Peru (2012)	downturn	0.24; 0.92	0.49; 1.42	Current; capital spending (period 1992Q1:2012Q1)
Rossini and others (2012)		0.78; 1.36; -0.44	0.52; 2.63; -0.38	Current; capital spending; current revenue
Sanchez and Galindo (2013)	downturn	1.3; 0.2		Government spending; taxes (period 1992Q1:2011Q4)
BBVA bank (2014)		0.55; 0.6; -0.1	0.2; 1.6; -0.2	current; capital spending; tax revenue
Ministry of Economy and Finance (2015)	downturn	0.12; 0.55	0.95; 1.69	Central government current; capital spending (1995Q1:2014Q4)
	upturn	0.13; 0.55	0.82; 1.74	
Central Reserve Bank of Peru (2014-15)	downturn		0.93; 1.42; -0.25	Current; capital spending; current revenue
	upturn		0.28; 0.73; 0.00	

D. Methodology and Results

9. We use a non-linear model to estimate the asymmetric response of growth to discretionary changes in fiscal revenues and expenditures at two different stages of the economic cycle. That is, fiscal multipliers are estimated using a threshold vector autoregressive model (TVAR) in which a threshold variable is used to indicate the change from a regime of lower growth to a regime of higher growth, and vice versa. The general idea is to evaluate whether the response of fiscal policy is different depending on the economic cycle, which cannot be tested using conventional linear vector autoregressive models (VAR or SVAR). In this model, we use gross domestic product (GDP) growth as the threshold variable and its value is determined endogenously from the model, as it chooses the value that best fits the data in both regimes. While several regimes (cycles) can be estimated from the TVAR model, for our purpose we only use two. The regimes are defined based on the boundary value of a threshold variable or indicator variable that marks the change from one regime to another. This threshold value can be chosen either

[5] For literature review on advanced economies Baunsgaard and others (2014).

endogenously or exogenously and the variables from the model will have different coefficients depending on the regime in which they are.

The TVAR model is of the form:

$$Y_t = \partial_1 X_t + \partial_2 X_t I [z_{t-d} \geq z^*] + U_t$$

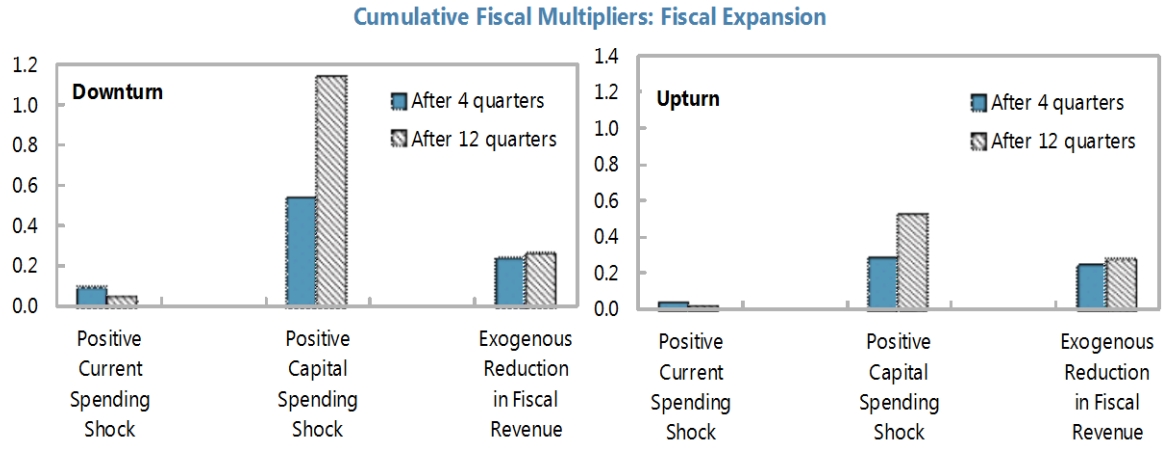
where Y_t is a vector containing real revenues, real current expenditures, real capital expenditures, and real GDP growth rates. The consumer price index was used as deflator, data were seasonally adjusted, except for the series already adjusted by the authorities, and used as the first difference of the logarithm of their levels. The data refer to the general government and covers the period from 1995Q2 to 2015Q3. $X_t = (1, y_{t-1}, \dots, y_{t-p})'$, z_{t-d} is the threshold variable that indicates the prevailing regime, d is the time lag (set to 3), $z^*$is the threshold value that sets the boundary for the regime change and was estimated endogenously at 1.5 percent.[6,7] This means that data will be used for the upper regime for the quarters in which GDP growth is above 1.5 percent. $I[.]$ is an indicator function that takes the value of 1 when the threshold variable is above z^* and zero when the threshold variable is below z^*. U_t is the vector of disturbances. The lag length of the variables was set at 1 and has been taken from the lag order selection criteria in the linear VAR estimation (Schwarz information criterion). For this model we followed the methodology proposed by Baum and Koester (2011) and used a Gauss code provided by Anja Baum (2012) and adapted for the case of Peru (see Annex I for further details).

10. The results show supportive evidence for a nonlinear impact of fiscal policy on output: the effects of fiscal policy shocks on economic activity depend on their size, direction and timing with respect to the economic cycle. The results are in accordance with other studies for Peru, and we confirm the size and direction of spending multipliers. One sol in capital spending will increase output by 0.5 *soles* in the first 4 quarters in the lower regime and slightly less in the upper regime. Cumulative effects are more disperse after 12 quarters when capital spending multipliers reach to 1.1 in the downturn and to 0.5 in expansion. We find current spending multipliers are insignificant in size in both cycles. This partly reflects the fact that current spending is usually associated with transfers, which, like tax cuts, are intermediated by households' savings behavior before affecting household spending and, then, economic activity. In addition, the long-term effects of specific adjustments and the efficiency of tax and expenditure changes depend on their

[6] To obtain the time lag value, we run a Tsay test for the threshold variable. Results from the test indicate that a lag of 3 is statistically significant at 90 percent confidence level. Results of the test are available upon request.

[7] We have used a code provided by Gabriel Bruneau from the Bank of Canada to estimate this threshold value. The estimation method is a maximum likelihood, optimized by grid search. The likelihood is discontinuous at the threshold. Therefore, a grid of potential threshold value is formed. All values of potential threshold split the sample into separate regimes, and a least square is computed for each regime (since all least square is conditional on the value of the threshold, this is considered a conditional least square). Then the likelihood is computed based on all conditional least squares, and the threshold that maximize the likelihood is then chosen.

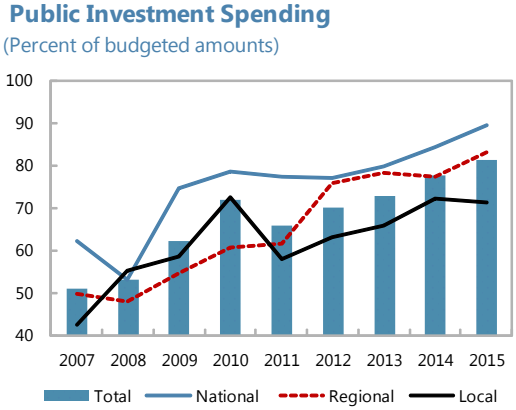
preexisting levels and structure. A historically high level of informality in Peru and low tax-to-GDP ratios also point to the limited effect of tax cuts on output, suggesting fiscal spending increases are more effective stimulus measures. Within spending, while capital outlays may take a while to be implemented, as argued above, current spending may create contingent liabilities in the shape of future spending (e.g. it is hard to cut public wages once they are increased) and thus be less nimble in the face of changing economic conditions.



Source: Fund staff estimates.

E. Quality, Efficiency and Management of Public Infrastructure[8]

11. The success of public investment projects across countries depends on many factors: the level of economic development and availability of fiscal space, structural characteristics of the economy, the quality of governance, geography, and climate (IMF, 2015). However, a growing body of literature underscores the role that the legal, institutional, and procedural arrangements, including risk management, for public investment management play in determining the level, composition, and impact of public investment on the economy.



Source: Ministry of Economy and Finance.

12. The Peruvian authorities have long recognized the importance of capital investment spending on growth and social indicators given large gaps. Implementation of planned public investment spending has improved over time, although still remains well below 100 percent, especially at the regional and local levels. Overall, fixed public investment spending is now about

[8] See more on regional comparisons of infrastructure trends in Western Hemisphere Department's Spring 2016 Regional Economic Outlook Chapter 5.

80 percent of budgeted amounts—up 13 percentage points from 2007 (MEF 2016). The increase in metal prices (and, thus, higher commodity revenues during the super cycle) has reduced financial resource constraints for the national government, and at sub-national levels in specific mining regions. At the same time, the decentralization process has created a number of new jurisdictions with relatively inexperienced capital spending administrative units (see Section C).

Infrastructure quality and efficiency

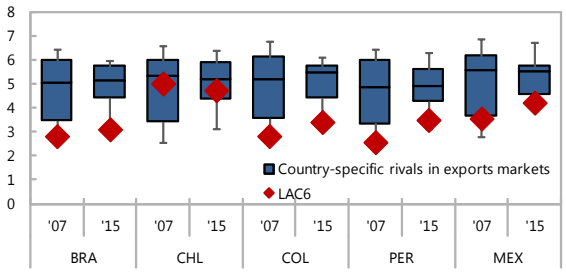
13. Given large capital multipliers, it is important to examine the quality and efficiency of capital spending in Peru so that to determine where improvements may be necessary to achieve a greater bang for the sol. A large chunk of public spending goes into infrastructure, a category which is most scrutinized when the country's competitive position is being assessed. Companies will be more reluctant to invest in a project in a country lacking the transport or logistical infrastructure. Following that notion, country-specific benchmarks were created for the region's five largest economies by identifying each country's top five competitors in each of its top five export products. The benchmark is the range of stock and quality of infrastructure in this rival group (Figure 2). On this metric, while improving from 2007 more than its neighbors, Peru's infrastructure quality is below its trading partners, suggesting continuing competitiveness concerns. Peru also dropped by 7 spots to 112th place out of 140 countries for quality of overall infrastructure by the World Economic Forum's, and is 17th of 22 countries in Latin America and the Caribbean.

14. A Public Investment Efficiency Indicator (PIE-X), recently designed by IMF (2015), estimates the relationship between the public capital stock and indicators of access to and the quality of infrastructure assets (Figure 2).[9] The PIE-X estimate for Peru confirms that there is substantial scope for improving public investment efficiency. While Peru compares fairly well with other LAC countries and EMs when looking at survey-based indicators (efficiency gap of 28 comparing to the average of 19 for LAC and EMs), it lags significantly behind on the physical indicator measure (54 versus 39, respectively).

[9] Sample includes over 100 countries. Countries with the highest levels of infrastructure coverage and quality (output) for given levels of public capital stock and income per capita (inputs) form the basis of an efficiency frontier and are given a PIE-X score of 1. Countries are given a PIE-X score of between 0 and 1, based on their vertical distance to the frontier relative to peer best performers. The less efficient the country, the greater the distance from the frontier, and the lower its PIE-X score. Charts were adapted for Peru and LAC. A more detailed discussion of the measurement of infrastructure performance as well as the construction of PIE-X can be found in Annex II (IMF 2015).

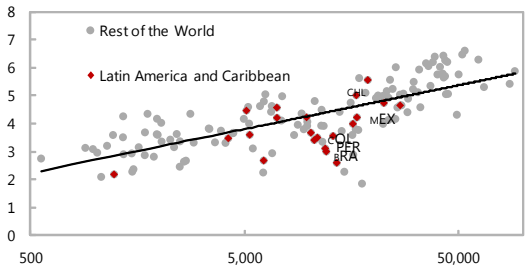
Figure 2. Selected Competitiveness and Quality Indicators

LAC5 and Trade Rivals Comparison 1/
(Index, 7 = best)



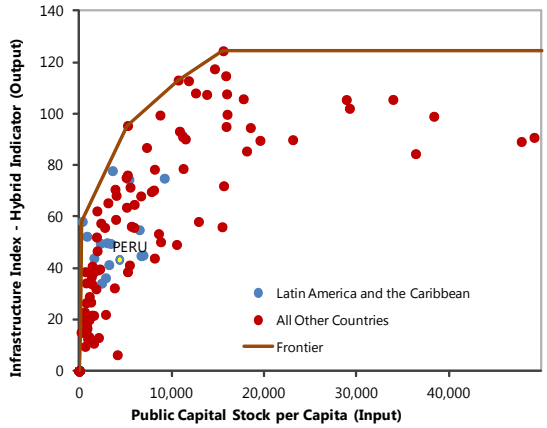
Sources: Staff estimates with World Economic Forum and UNCOMTRADE data.
1/Trade rivals sample defined as the top 5 exporters of each of the top 5 goods exported by the respective country.

Quality of Infrastructure
(x-axis, GDP per capita, current PPP U.S. dollars, 2012; y-axis, Infrastructure indices, 7 = best)



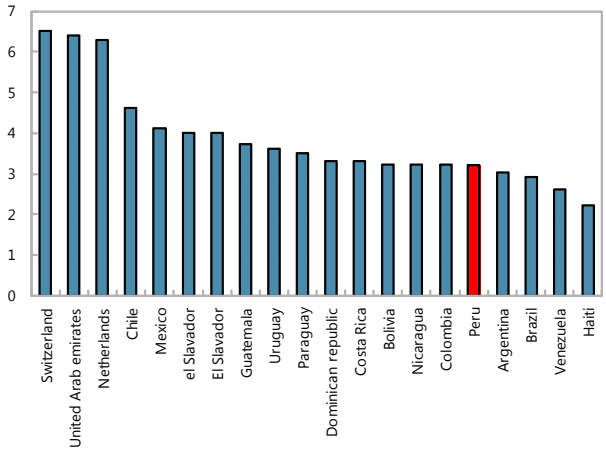
Sources: World Economic Forum; and World Bank.

Efficiency Frontier (Hybrid Indicator) 1/



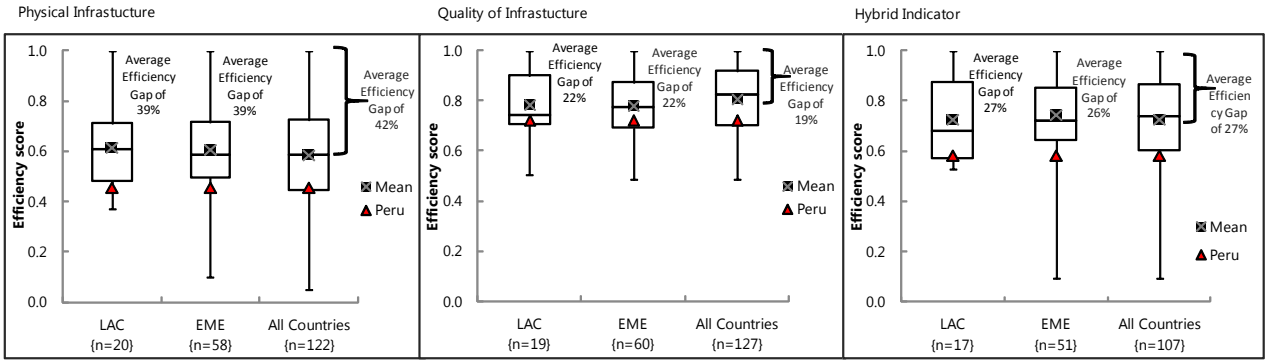
Sources: Center for International Comparisons (2013); World Economic Forum (2014); OECD (2014); World Economic Outlook; World Development Indicators; and Fund Staff estimates.
1/ Combines the physical and survey based indicators into a synthetic index of the coverage and quality of infrastucture networks.

Quality of Infrastucture Ranking



Source: Global Competitiveness Report 2015-16 (World Economic Forum).

Public Investment Efficiency Indicator

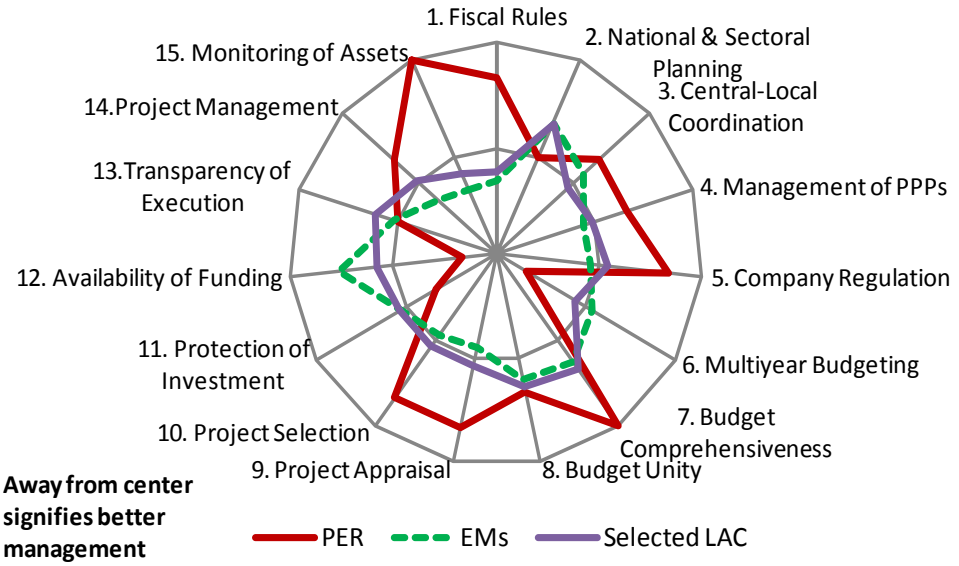


Source: Fund staff calculations.

Public investment management system

15. While infrastructure quality and efficiency shows large gaps, it does not have a linear relationship with the PIM system. In fact, on the face of it, Peru compares relatively well to other EMs and selected LAC counties, and excels in several categories according to PIM Assessment (PIMA), a survey-based ranking tool developed by IMF (2015). The assessment provides a comprehensive overview of the public investment decision-making process by evaluating 15 key institutions for planning, allocation, and implementing public investment (with scores of 0 (non-existent) to 10 (fully implemented)), farther from the center indicates better implementation (Figure 3).

Figure 3. Strength of Public Investment Management by Institution



Source: Fund staff calculations based on FAD and desk surveys of 12 EMS and LAC countires (Argentina, The Bahamas, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Grenada, Guatemala, Honduras, Jamaica, Mexico, Panama, Paraguay, and St. Lucia.) Survey for Peru was conducted with the inputs from the Ministry of the Economy and Finance.

16. Peru scores exceptionally well in the area of planning (categories 1–5). Ensuring sustainable levels of public investment manifests itself through the existence of fiscal rules that allow for planning for resources, including for public investment, making sure that public investment decisions are based on clear and realistic priorities and cost estimates, that there is certainty about funding from the central government and a sustainable level of sub-national borrowing, that management of PPPs leads to effective selection of projects and that regulation of infrastructure companies promoted open and competitive markets.

17. Peru scores more modestly in the area of resource allocation (categories 6–10). A rather obvious weakness lies in the area of multi-year budgeting. This category implies the practice in budgeting that provides transparency and predictability regarding levels of investment by ministry, program and project over the medium term. Project selection and appraisal use standard methodology and systematic vetting. Peru does not publish projections of capital spending beyond the budget year as the budget is approved on a yearly basis.[10] Thus, there are no multiyear targets/ceilings on capital expenditure by ministry or program. And while projections of the total cost of major capital projects are published, they are not presented together with annual projections over a three-to-five year horizon. A particular weakness relates to multi-year investment spending, as there is no official record regarding commitments in future years from signed public investment contracts. This fact, coupled with the lack of absorption capacity, generates work abandonment and unplanned project modifications, particularly at the sub-national level. Peru does well in budget comprehensiveness, which ensures that all public investment is authorized by the legislature and disclosed in the budget recommendation.

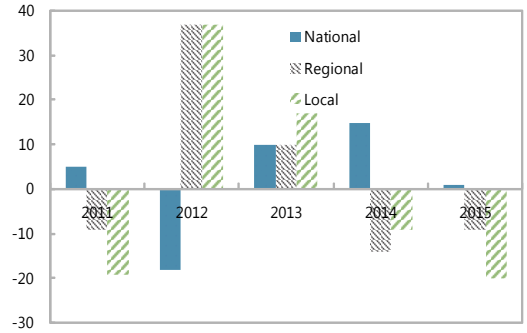
18. Project implementation could also be improved substantially (categories 11–15). Peru scores well in project management by having a designated staff preparing implementation plans, and in monitoring of public assets through comprehensive asset surveys that are conducted regularly by the government. This said, project appropriations are not sufficient to ensure the coverage of total project costs as they are approved by congress on a one-year basis and unspent appropriations of capital lapse at the end of the year (with a few exceptions). Cash flow forecasts are not prepared or updated regularly and ministries/agencies are not provided with commitment ceilings in a timely manner and cash for project outlays is sometimes released with delays, leading to some setbacks in project implementation. Finally, many major projects are tendered in a competitive process, but the public has only limited access to procurement information and only some large projects are subject to external audit.

[10] Peru publishes projections of fiscal accounts on a three-year basis in the MEF's Macroeconomic Framework report but these are not binding beyond the budget year.

Sub-national framework

19. As discussed briefly above, the decentralization process that started in 2002, and is not yet complete, also poses a challenge for Peru's PIM (Cheasty and Pichihua, 2015). To fund subnational government responsibilities, regional and local governments are supposed to share transfers from the national government, license fees (canons), and royalties from commodity-related operations. That has allowed decentralization of public spending, but actual implementation has greatly varied across regions and municipalities, both in terms of quantity and quality. To a large extent this is explained by the diversity of Peru's subnational governments, many of which are small and have limited capacity to deliver local services. The local level in Peru is now one of the most fragmented in Latin America, which makes it quite challenging to assess their capacity to invest.

Infrastructure Spending by Government Level
(Percent change)



Source: Ministry of Economy and Finance.

20. Public investment spending by local governments now accounts for more than 45 percent of total public investment in Peru. Decentralization of spending is tied to the delivery of general local services such as public sanitation, maintenance of parks and gardens, and local road construction and maintenance. To a large extent, investment spending at the local level is concentrated primarily among a small group of local governments that receive enormous resources from license fees and royalties, without consideration of their spending responsibilities or capacity.[11] So, financing has come before capacity, contrary to best practices in decentralization. The abundance of resources, sometimes in very small and ill-equipped jurisdictions, has in many cases resulted in suboptimal project choices, wasted outlays, slow execution rates, buildup of idle balances in the banking system, and alleged corruption. At the same time, deep and frequent employee turnover after elections, coupled with human resource limitations has led to capital spending shortfalls, especially in the last two years. Recent corruption investigations (2013–14) of several regional leaders have also led to worse investment execution at the local level by about 14 percent, on average, during 2014–15 (MEF, 2016).

21. To address these issues, the national government has tried to help sustain investment levels at the local level. The Ministry of Economy and Finance (MEF) created a Special Investment Monitoring Unit (EESI) to facilitate the implementation of investment projects under the principles of competence and neutrality. The main functions of EESI are to monitor investment projects and identify obstacles affecting their implementation. In addition, 110 investment committees were

[11] These revenues are transferred primarily to local governments in extractive areas, with their use restricted to investment spending.

formed in all three levels of government, allowing prioritization of a portfolio of strategic projects and modernization of the procurement procedures. The central government has also provided training for officials of regional and local governments on standards and methodology for the formulation and evaluation of projects; technical assistance in implementation and operation of the budgetary systems, investment and procurement; and tools for integrated management of investment projects (MEF, 2016). Arguably, the recent decline in investment could have been worse had these initiatives not been undertaken. However, deep structural changes are needed to improve the decentralization framework.

F. Conclusions and Recommendations

22. With the end of the commodity super cycle, Peru needs a new engine for growth, which could be non-mining investment and exports. Its low tax burden provides fiscal space for increasing public capital spending to improve infrastructure and competitiveness through better fiscal revenue collection. Higher public investment would continue to complement and encourage private sector investment, as long as it is efficient (further reforms in PIM and changes to the decentralization framework would contribute to greater efficiency) and fiscally sustainable. Despite increased investment in infrastructure and improved frameworks, Peru faces challenges in developing, executing, and managing investments, as infrastructure stocks have stagnated and are not considered of high quality. Based on our analysis, we offer the following considerations:

- ***Investment push:*** Our econometric exercise shows that public investment multipliers have a larger effect on aggregate output than current spending or tax-related stimulus in both the short and the medium terms, and especially during downturns.[12] In fact, weighting revenue and spending impulses by their respective multipliers, the impact of the fiscal impulse on the economy in 2015 was a negative 0.3 percent, despite the attempted measures. Had capital spending been executed as budgeted in 2015, real output growth would have been higher by 0.1 percentage point of GDP. While the effect is smaller in the short term, on the demand side, an extra boost could have come from crowding in private investment (as there was some economic slack) and an improvement in confidence. Over the longer term, if Peru increases investment to 6−6.5 percent of GDP, this could result in about 2-percentage-points increase in output growth. Supply-side effects should kick in and raise potential output further, mainly through higher capital stock and TFP, as has happened in Peru previously. This would also improve potential for private sector investment, which would benefit from improved infrastructure, both indirectly and directly (through participation in PPPs). In this way, infrastructure can lift near-term demand and potential growth, which would also help counter risks of a significant drop in potential output owing to the end of the commodity super cycle.

[12] Increased public investment raises output, both in the short term because of demand effects and in the long term as a result of supply effects. But these effects vary with a number of mediating factors, including (1) the degree of economic slack and monetary accommodation, (2) the efficiency of public investment, and (3) how public investment is financed (WEO, 2014).

- ***Fiscal sustainability:*** Peru's debt levels are very low, with net debt at 7 percent of GDP. However, given the exposure to commodity cycles, natural disasters, and contingent liabilities, it would be advisable for Peru to follow a medium-term fiscal path that allows for higher capital spending yet keeps current spending in check and ensures increasing tax collection as a percent of GDP. Independently of the combination of higher public investment and higher fiscal revenues, for debt to stabilize below 30 percent (starting from 2021), the budget would have to run primary balances of about 0.5 percent of GDP because the interest rate paid on the public debt is expected to be somewhat above nominal trend economic growth, unless potential GDP growth rises significantly in coming years as a result of this investment push.[13]

- ***Enhancements in PIM:*** Increasing public investment may lead to limited output gains, if efficiency in the investment process is not improved (WEO, 2014). While Peru scores well in several areas of PIM best practices, there is room for improvement (Table 2).[14] The new administration has a unique opportunity to embrace past successes and answer to challenges by steadfast implementation of reforms where possible and by building political consensus for reforms in more sensitive areas.

Summary of Recommendations

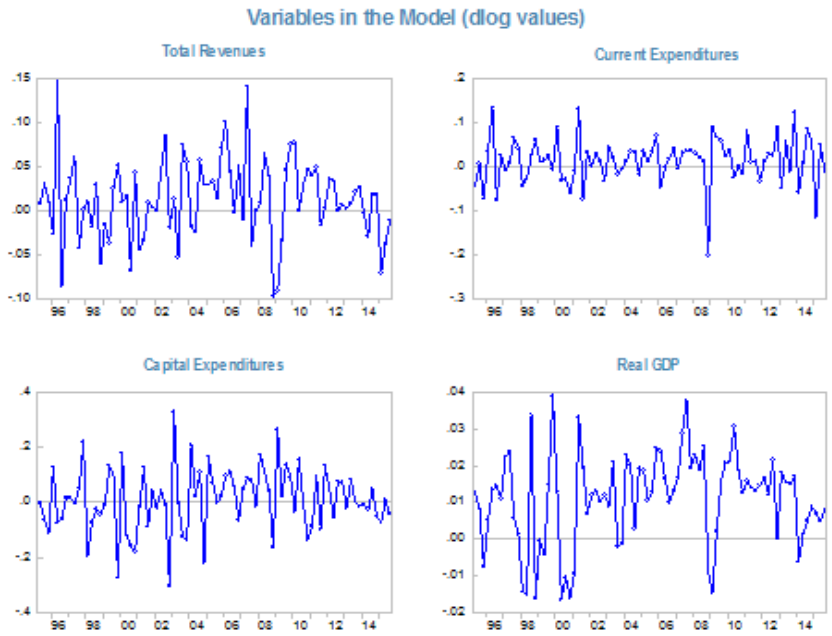
PIM	Decentralization
Adopt a multi-year budget with the objective of guaranteeing full execution of multi-year investments, including documentation on scheduled commitments, especially in public investment	Revisit the assignment of natural resource revenues through a set of more transparent and equitable transfer mechanisms
Improve cash flow management so as to minimize project implementation delays	Strengthen the efficiency of subnational investment and service delivery through further capacity building initiatives
Design an Information System to integrate the process of planning, budgeting and investment over the project cycle. Monitor all major projects during project implementation for annual project costs, as well as physical progress, and conduct and publish external ex-post audits	Consider merging jurisdictions and reallocate resources away from low-capacity districts to avoid waste and seek efficiency from economies of scale
While information is available on the total cost of each project and the amount invested to date, the national planning system (SNIP) could be updated in a more timely fashion, especially with information on the stage of project execution at the municipal level	Centralize the assessment and selection of investment projects and decentralize their execution
Develop a national infrastructure strategy	

[13] See IMF Country Reports No. 14/21 and 22 for analysis.

[14] Draws on technical assistance recommendations.

Appendix I. Background on Data and Methodology[1]

1. In the model, changes in real revenues were ordered first, followed by changes in current and capital spending, and real GDP growth. The threshold value is selected endogenously over a search of possible values while keeping a minimum of 35 percent observations in each regime. Results of the first difference of the logarithm for the variables in the model appear in the charts below.



Results from unit root tests were also conducted for the transformed variables and do not indicate the presence of non-stationary series.[2]

Unit Root Test

ADF test

	t-statistic	p-value
Revenue	-8.76	0.0000
Capital Expenditure	-11.25	0.0001
Current Expenditure	-9.065	0.0000
GDP	-6.448	0.0000

Source: Fund staff estimates

[1] Results and their interpretation (not shown here) are available upon request from the authors.

[2] The data are arranged in increasing order on the basis of the threshold variable (z) this means from less dependent variables to more dependent variables. We decided the ordering to be first of revenues, then current expenditures, and lastly capital expenditures, as the latter will be more dependent on the level of current expenditures and revenues at a certain budgeted outcome, and in the case of Peru, expenditure is a residual determined by fiscal rules. As the ordering of variables with respect to revenues has been under debate due to a perceived failure of capturing exogenous policy changes correctly (see Baum et al for an overview of criticisms), the responses of output to revenue shocks thus should be interpreted cautiously, however, our results are in line with other estimates for Peru (perhaps subject to the same criticisms). Multipliers are also small even without disaggregation to control for all cyclical factors.

Generalized impulse response functions

2. In a linear VAR model the impulse response function (IRFs) will not depend on the history of the data, their response is symmetrical in terms of the sign of the shock and are linear in terms of the size of the shock. In contrast, generalized impulse response function (GIRFs) commonly used for nonlinear models and particularly for TVAR models will depend on whether the system is in one regime or the other, and the specific time in which the shock take places. Therefore GIRFs are data dependent and will be useful for our estimations of the response of growth to shocks to the variables of the system at different states of the cycle. Koop, et. al (1996) proposed the estimations of GIRFs based on the difference between the estimations of the path of variables with a shock and without the shock to a specific variable.

The GIRFs are calculated as:

$$\mathrm{GIRF} = \mathrm{E}[\mathrm{X}_{\mathrm{t+m}}|\varepsilon_{\mathrm{t}}, \varepsilon_{\mathrm{t+1}} = 0, \dots, \varepsilon_{\mathrm{t+m}} = 0, \Omega_{\mathrm{t-1}}] - \mathrm{E}[\mathrm{X}_{\mathrm{t+m}}|\varepsilon_{\mathrm{t}} = 0, \varepsilon_{\mathrm{t+1}} = 0, \dots, \varepsilon_{\mathrm{t+m}} = 0, \Omega_{\mathrm{t-1}}]$$

Where ε_{t} is an exogenous shock of a determined size, $\Omega_{\mathrm{t-1}}$ is the history available at time $\mathrm{t}-1$ before the shock in time t and m is the horizon for the forecast period. In our model we set the size of the shock at 2 percent and the forecasting horizon at 20 quarters.
Besides estimating responses to shocks between different regimes, GIRF's also incorporate regime switches, meaning that after a shock takes place, the system is allowed to change from one regime to another.

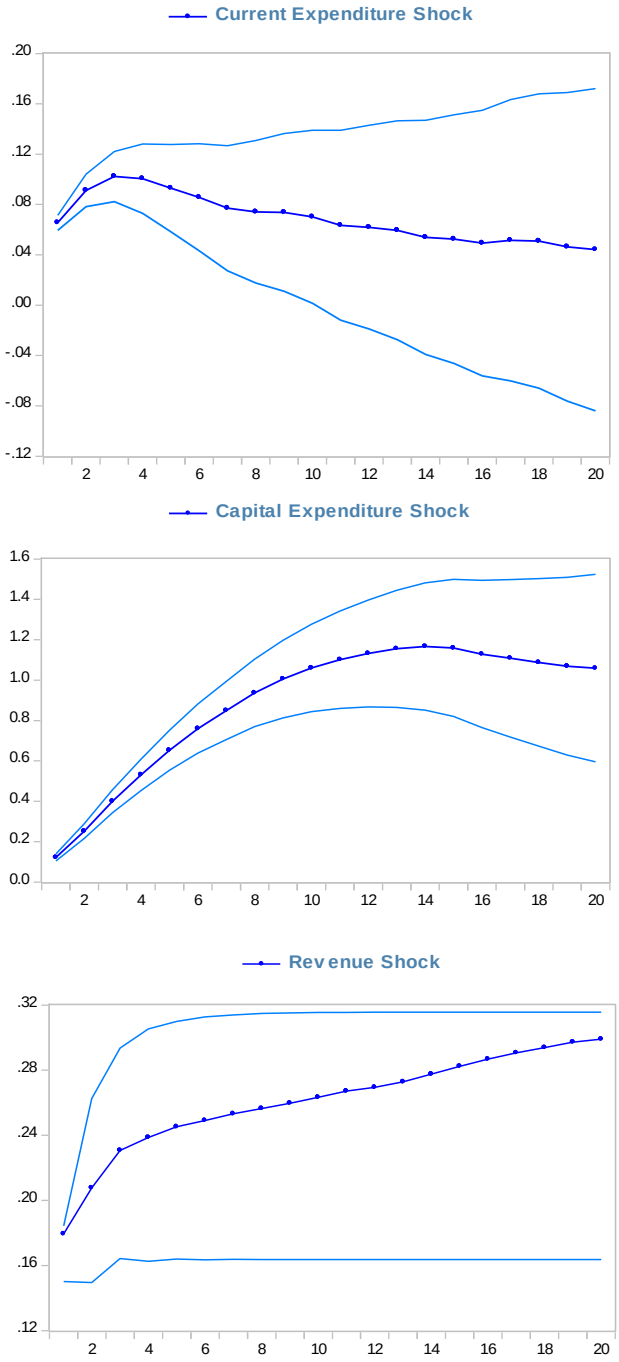
Results

3. We find a non-linear and statistically significant impact of fiscal policy on output.[3]

A 2-percent positive shock was applied to current and capital expenditures and a 2-percent negative shock to revenues. We find evidence that fiscal multipliers for government consumption are, in general, smaller than multipliers for capital spending. Consumption multipliers tend to disappear faster and tend to be higher for the lower regime than the upper regime. In contrast, positive shocks to capital spending can reach cumulative responses above 1 by 12 quarters in the future for the lower regime and are much smaller during upturns where they are below 0.6.

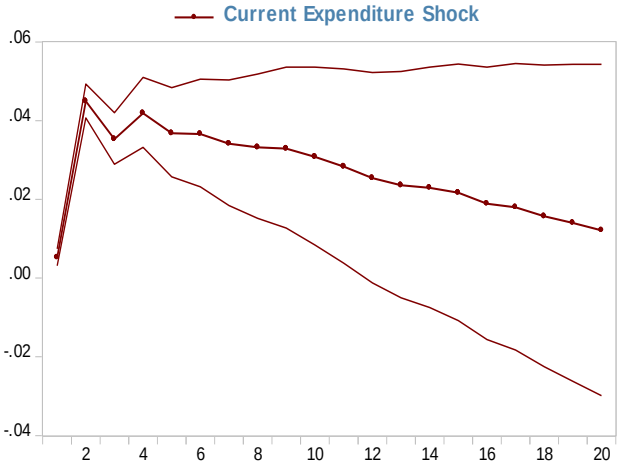
[3] Confidence bands in non-linear models are used to test significance of the shock results. Results remain robust for the shocks in current and capital spending and revenues.

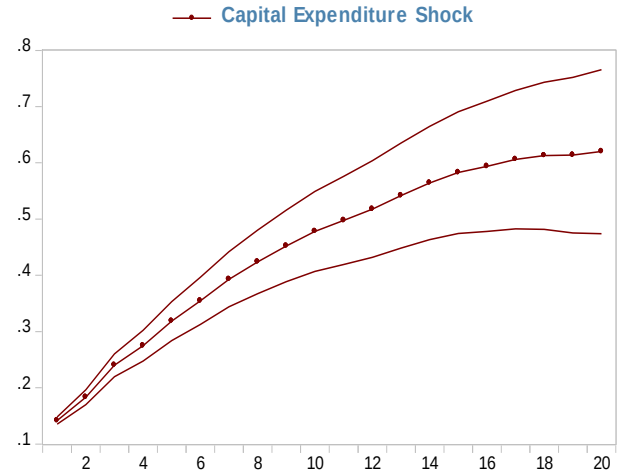
Fiscal Multipliers: Fiscal Expansion
Cumulative Response- Lower Regime

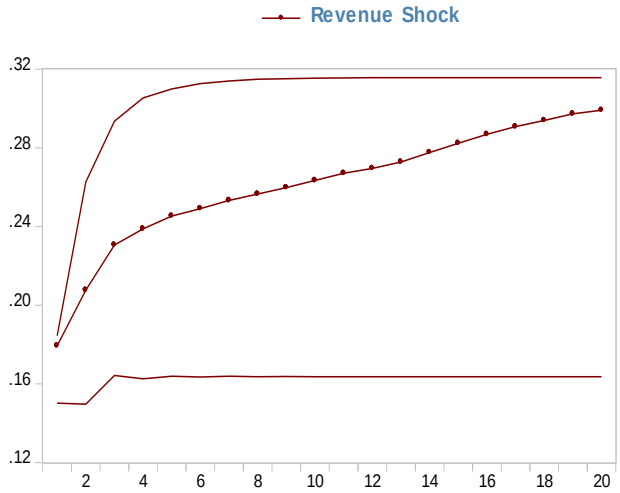


Source: Fund staff estimates.
Note: A 2 percent positive shock was applied for current and capital expenditures and a 2 percent negative shock to revenues.

Fiscal Multipliers: Fiscal Expansion
Cumulative Response- Upper Regime







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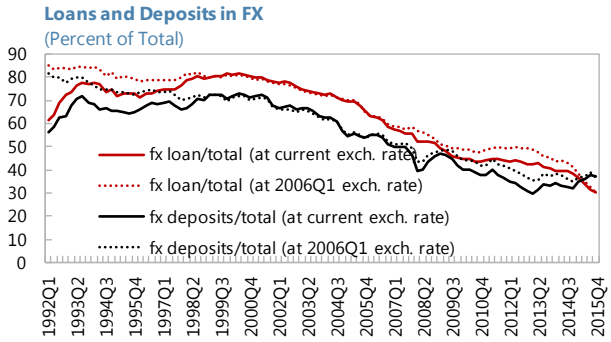
THE MISSING LINK? EXCHANGE RATE VOLATILITY AND DE-DOLLARIZATION IN PERU[1]

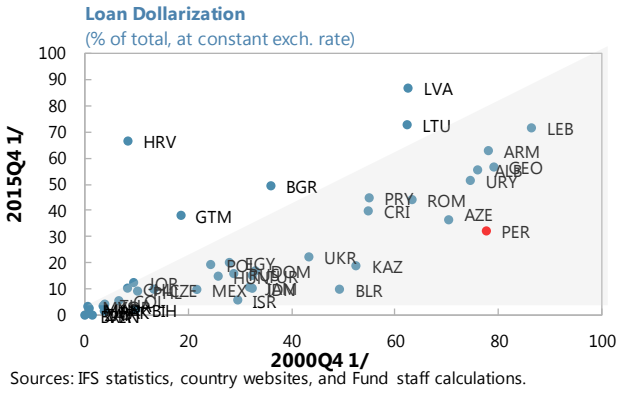
High levels of dollarization may render corporations and individuals very exposed to exchange rate volatility. But, higher exchange rate volatility may reduce incentives of holding liabilities or assets in foreign currency, thus reducing overall dollarization in an economy and increasing the pass-through of monetary policy decisions to inflation and economic activity. This chapter studies the impact that higher volatility in the nominal bilateral exchange rate with respect to the U.S. dollar has on the speed of de-dollarization across a sample of 33 emerging market economies, spanning the period 1997-2015. It finds that, indeed, higher exchange rate volatility, after controlling for global and country-specific factors, speeds up de-dollarization. More exchange rate flexibility may be the last needed step to reduce dollarization in Peru to very low levels.

A. Motivation

1. The share of dollar lending and dollar deposits in the Peruvian banking system has declined significantly over time. Hyperinflation in the early 1990s gave rise to very significant dollarization, which reached over 80 percent of all bank loans and deposits. A series of reforms, including the adoption of inflation targeting in 2002, and significant macroeconomic adjustment resulted in very low and stable inflation. This, together with sound macroeconomic policies, helped to bring dollarization down gradually.[2] Peru's impressive de-dollarization also stands out when compared with experiences of de-dollarization in other emerging markets.



Sources: BCRP and Fund staff calculations.



Sources: IFS statistics, country websites, and Fund staff calculations.
1/ Data points could be slightly different depending on data availability.

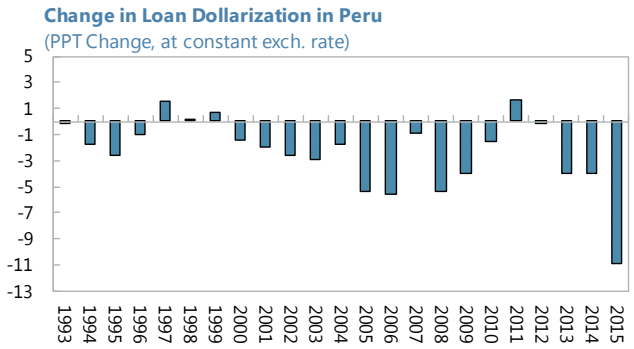
2. But, dollarization still hampers monetary policy transmission in Peru. When inflation is high or very uncertain, risks to creditors' claims rise, thereby triggering banks' unwillingness to extend sufficient credit. Risks to savers also rises if the local currency is not considered very reliable to

[1] Prepared by G. Everaert (SPR).

[2] While we use the term de-dollarization in this chapter, for most countries in Europe, FX lending consists of lending in Euros or Swiss Francs.

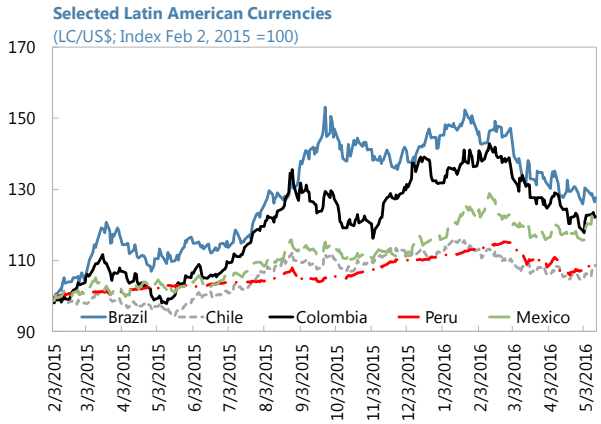
store value. In this situation, lending in foreign currency (FX) could protect the economy from a sharp credit crunch while at the same time protecting consumers' savings. However, in a low inflation environment such as in Peru, dollarization may have more mixed effects on the economy. It complicates the transmission of monetary policy rates to market interest rates and may increase the pass-through of exchange rates to inflation. It also aggravates concerns about financial stability as, for instance, exchange rate depreciation may lead to losses by un-hedged borrowers. Dollarization (of deposits) also complicates the central bank's lender-of-last-resort role as the central bank typically has a more limited ability to provide funding in FX in case of FX liquidity pressures.[3]

3. To further speed up de-dollarization, the central bank recently implemented a number of measures. In particular, in early 2015, the central bank established medium-term deadlines by which commercial banks were to reduce foreign exchange lending, including on particular categories such as mortgage loans and loans for car purchases. Failure to meet these deadlines results in higher reserve requirements on 'excess' FX lending operations. This program significantly accelerated loan de-dollarization;[4] in 2015, FX lending as a share of total lending fell by some 10 percentage points to below 30 percent, the strongest ever decline in one year.



Sources: BCRP and Fund staff calculations.

4. This chapter looks at whether higher exchange rate volatility can contribute to ongoing de-dollarization. Specifically, this chapter studies the impact that higher daily volatility in the nominal bilateral exchange rate with respect to the U.S. dollar has on de-dollarization.[5] Exchange rate volatility in



Sources: Bloomberg, and Fund staff calculations.

[3] For this reason, Peru's central bank also relies on FX intervention and reserve requirements to conduct monetary policy. Peru's central bank also holds ample international reserves to meet potential FX liquidity pressures.

[4] Deposit dollarization, however, did not fall commensurately. To close banks' open FX position and supply soles to the financial sector to avoid a credit crunch, the central bank provided FX repos to commercial banks. This facilitated the conversion of FX lending into sol lending.

[5] For countries where lending is primarily in Euros or Swiss Francs, the bilateral exchange rate vis-a-vis the Euro or the Swiss Franc is used.

Peru has been consistently lower than in a number of other emerging markets. Often, higher dollarization is invoked as the reason why Peru should have lower exchange rate volatility, as sudden and frequent exchange rate movements may have larger impacts on private sector balance sheets.[6] However, limited exchange rate volatility can also contribute to higher risk taking and encourage borrowing in FX, as private agents would take a central bank policy of smoothing exchange rate fluctuations as insurance against particular positions in the FX market.

5. This chapter argues that higher exchange rate volatility, after controlling for global and country-specific factors, speeds up de-dollarization by making future exchange rate movements closer to a random walk, thus limiting incentives for holding dollar liabilities. The chapter is structured as follows. Key insights from the literature are summarized in Section B, followed by a discussion of our methodology and results in Section C. Section D looks more broadly at the issue of costs and benefits of exchange rate volatility. A final section concludes.

B. Brief Overview of the Literature

6. The literature explains the phenomenon of dollarization in different ways. Many papers state that dollarization (transaction and/or financial dollarization) results from the lack of confidence in the local currency (which is typically related to uncertainty associated with high or unpredictable inflation), or from the portfolio responses of risk-averse agents. The minimum variance portfolio model, developed by Ize and Levy-Yeyati (2003), suggests that the equilibrium level of dollarization may be non-zero in the absence of hyperinflation experiences, and demonstrates that risk-averse consumers prefer dollar savings when volatility of inflation rises relative to the real exchange rate. Moron and Castro (2003), De Nicolo et al. (2005), and Rennhack and Nozaki (2006), also find empirical support for this hypothesis.

7. The experience with de-dollarization emphasizes that a precondition for durable de-dollarization is credible macroeconomic management.[7] De-dollarization requires restoring the functioning of, and trust in, the national currency as a unit for saving and intermediation. Stable and low inflation increases the confidence in the local currency, thereby reducing the need for using FX to preserve purchasing power. Credible monetary and fiscal policies along with the development of local currency markets supported de-dollarization in Chile (Herrera and Valdés, 2004), in Israel (Galindo and Leiderman, 2005) and in several other countries (De Nicolo et al, 2005). Inflation targeting has also been found to be more conducive to de-dollarization than other monetary arrangements (Rennhack and Nozaki, 2006; and Catão and Terrones, 2016, specifically for the case of Peru). However, once macroeconomic stability is achieved, the impact

[6] Ize and Levy-Yeyati summarize the literature on balance-sheet effects in highly dollarized economies. Consistently with fear of floating when dollarization is high, Kliatskova and Mikkelsen (2016) show that in countries with large FX corporate debt, the central bank reacts more strongly to exchange rate changes, both by intervening in the foreign exchange market and by changing its monetary stance.

[7] Successful cases of persistent de-dollarization often cited in the literature are Israel, Mexico, Poland, and Chile (see for instance, Reinhart, Rogoff, and Savastano, 2003; Galindo and Leiderman, 2005).

of inflation or sovereign spreads (such as EMBI) has been found to be too small to contribute significantly to further de-dollarization (Garcia-Escribano and Sosa, 2011). Indeed, dollarization can be quite persistent even after macroeconomic stability is achieved (Reinhart et al., 2003; Galindo and Leiderman, 2005; Castillo and Winkelried, 2005).

8. Macro and micro-prudential policies can also help reduce dollarization over time. These can include differential treatment of reserve requirements on FX versus local currency deposits (e.g. higher reserve requirements on FX deposits, different remuneration, or requiring reserve requirements on FX deposits to be in local currency), stricter prudential requirements (e.g. higher liquidity ratios on FX liquidity, charging higher risk premia on deposit insurance for FX deposits), lower loan-to-value limits and/or stricter limits on collateral evaluation or requirements, and limits on open FX positions. The latter typically are linked to the findings that reductions in deposit dollarization help speed up credit de-dollarization (Luca and Petrova, 2007). Kokenyne et al. (2010) provides empirical support for the effectiveness of micro-prudential measures. Garcia-Escribano and Sosa (2011) show that macro-prudential regulations (especially reserve requirements and prudential regulations) contributed to credit de-dollarization in four Latin American countries (including Peru), but had a more limited impact on deposit de-dollarization. Lower insurance for FX deposits, however, can also lead to lower financial intermediation (Moron and Castro, 2003).

9. Deepening local currency financial markets and broadening savings options are other factors contributing to de-dollarization. Liquid bond markets offering a range of different savings instruments can act as alternative investment opportunities to dollar deposits (e.g. including the ability for the public to invest directly in local currency government bonds). It can also help extend the yield curve of public bonds. Garcia-Escribano and Sosa (2011) find this effect to be significant. Indexation, if credible, can provide a bridge to promote investments in local currency-denominated assets (Ize and Levy-Yeyati, 2005), and be gradually phased out over time as confidence in local currency denominated assets increases (for instance, as it was the case in Chile or Colombia).

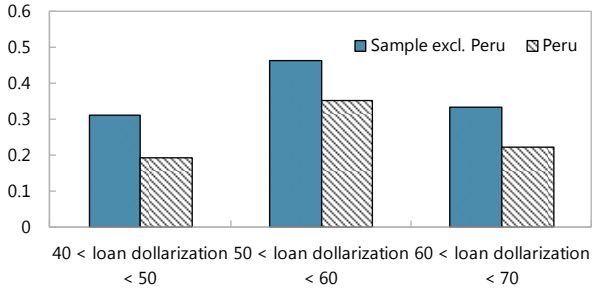
10. Finally, **several studies show a link between de-dollarization and exchange rate flexibility.** Allowing two-way exchange rate movements makes foreign exchange risk more apparent, and hence introduces incentives for lower dollarization (Hardy and Pazarbasioglu, 2006) or the development of hedging instruments. Empirical evidence for this is shown in Kokenyne et al. (2010) and is found significant in two out of the four countries studied by Garcia-Escribano and Sosa (2011) in Latin America.

C. Empirical Methodology and Results

11. As Peru meets many of the policies or characteristics conducive to de-dollarization, the missing link seems to be higher exchange rate volatility, which is the focus of this chapter. Peru's inflation has been among the lowest in Latin America in the last decade, and monetary policy conduct has benefited from the generally prudent fiscal policy evident from low public debt. In addition, Peru also had several micro and macro prudential policies already in

place before the new de-dollarization measures were introduced. For instance, there is a two percent tax on checks denominated in FX, higher reserve requirements on FX deposits, and higher loan-to-value ratios and risk weights on FX loans and mortgage credit denominated in FX. While Peru's local currency markets are still in the process of deepening, Peru issues local currency bonds with sizeable maturities, and the presence of pension funds provides an opportunity to deepen liquidity and longer-term savings instruments. Yet, as highlighted before, exchange rate volatility in Peru remains much below that of its peers at similar dollarization levels.

Average Daily Exchange Rate Volatillity at Different Levels of Loan Dollarization



Sources: IFS statistics, and Fund staff calculations.

12. Even though exchange rate volatility per se could be related to dollarization levels, this chapter focuses on how policy affects exchange rate volatility and, thus, dollarization. The chapter uses a two-stage approach to assess the impact of policy behavior on exchange rate volatility and de-dollarization of bank FX lending. First, the volatility of daily exchange rate changes (averaged over the quarter) is "purged" of country-specific terms-of trade changes and measures of global volatility, using an econometric model with cross-country panel fixed effects. The residual volatility is interpreted as variability that is driven by policy behavior, and not related to global factors or terms-of-trade shocks. In the second step, changes in loan dollarization are regressed on a number of explanatory variables, including this measure of residual exchange rate volatility. The latter also follows a panel fixed effects specification. The focus is on explaining *loan* de-dollarization in the domestic *banking* system as FX assets of the domestic banking system carry a greater risk to financial stability than the dollarization of deposits in the banking system.

13. The regressions use a large sample of emerging market economies covering almost two decades of data. The database consists of quarterly loan dollarization for a sample of 45 emerging market economies,[8] but includes countries with fixed or quasi-fixed exchange rate regimes (based on the IMF's AREAER metric) where exchange rate volatility would be associated only to re-alignments. Excluding countries with fixed or quasi-fixed exchange rate regimes reduced the sample to 33 countries, spanning the period 1997–2015 (unbalanced panel). The analysis relates closely to the work of Kokenyne et al. (2010) who used data for 21 countries during the 2000s, a period of exchange rate appreciation for most emerging markets, and focused on headline exchange rate volatility, as opposed to policy-induced exchange rate volatility. Data were sourced from the IFS's monetary and financial working data statistics (Standardized Report Forms) and complemented by data from country authorities' websites, where available.

[8] No data were obtained for China, India, Argentina, Sri Lanka, Vietnam.

Box 1. Regression Specifications

The first step regression has the following form: Exchange rate volatility, *deri*, measured as the standard deviation of daily percentage changes in the standardized bilateral exchange rate to the relevant FX currency (U.S.$, Swiss Franc, or Euro) is regressed on the q-o-q change in the terms–of-trade, *tot,* one period lagged, and a measure of global volatility, *VIX*, which is the average of the value of the VIX during a given quarter *t*. Alternative specifications use the average of emerging market currency volatility as a proxy for global volatility. Country specific effects are ν_i for country *i* at time *t* and $\varepsilon_{i,t}$ is the residual.

Hence, in the first stage, the specification for the panel fixed effects is:

$$deri_{i,t} = \alpha + \beta_1 * tot_{i,t-1} + \beta_2 * vix_t + \nu_i + \varepsilon_{i,t}$$

With $resid_{i,t}$ equal to $deri_{i,t}$ minus the predicted value $\widehat{deri_{i,t}}$.

The second stage, the specification for the panel fixed effects model is as follows:

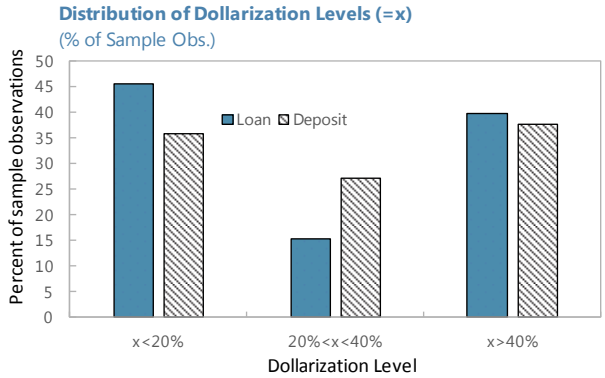
$$dedloan_{i,t} = \alpha + \beta_1 * resid_{i,t-1} + \beta_2 * loanlevel_{i,t-1} + B_3 * Z_{i,t} + \nu_i + \varepsilon_{i,t}$$

where *dedloan* reflects the percentage-point change in loan de-dollarization between Q4 of year t and Q4 of year t-1 (with a negative sign indicating a reduction in dollarization), $resid_{t-1}$ reflects the residual volatility, $loanlevel_{t-1}$ stands for the level of loan dollarization at the end of the previous period and thus controls for mean-reversion properties, and the *vector Z* includes a number of additional controls. Country-specific effects are ν_i for country *i* and $\varepsilon_{i,t}$ is the residual. Loan dollarization and changes thereof are measured at constant (2006Q1) exchange rates.

We test the significance of the following control variables:

- *Inflvol*: the average volatility of q-o-q CPI inflation. High average inflation volatility is expected to be positively associated with dollarization. We also tested whether high average q-o-q inflation (*infl*) itself is associated with higher dollarization.
- *D_appr*: A dummy variable for periods of appreciation of the bilateral exchange rate to test whether periods of appreciation speed up loan de-dollarization by the expectation of increasing the value of the local currency. Appreciation, however, may be the result of large capital inflows, which may directly add to dollarization.
- *Irdiff*: The real interest rate differential between local currency and foreign currency loans. A higher interest rate differential is expected to be associated with slower loan de-dollarization, as local currency borrowing is more expensive. For some countries, we were able to obtain country-specific information on FX and local currency interest rates, but for others we used generic US$, Euro, or Swiss franc interest rates.
- *D_it*: a dummy variable for the presence of IT targeting to test whether this is associated with faster de-dollarization.
- *Itresid*: we also assess whether inflation targeting has an impact when interacted with residual exchange rate volatility.
- *Fraser_d*: the change in the Fraser index, as a proxy for improvements in institutional quality and trust in local institutions.

14. Lags are used to partially address the problem of endogeneity. The problem of endogeneity stems from the fact that, as highlighted above, low exchange rate volatility may be the result and also the cause of financial dollarization. High dollarization poses risks through balance-sheet effects and may therefore lead to a 'fear of floating' or a tendency to more gradually smooth the exchange rate path in the face of sudden shocks. But such smoothing or an implicit insulation against FX risks may also trigger private agents to take more risks in the FX market, leading to higher dollarization levels in the economy. In this sense, dollarization and low exchange rate volatility may be mutually enforcing. This also leads to the proposition that there could be multiple states of the world (i.e. equilibria)—one in which high dollarization typically coincides with low exchange rate volatility, while the other features low dollarization with higher tolerance for exchange rate flexibility. The possible difficulty of moving from one equilibrium to another may be why the literature has found very few cases of successful de-dollarization over time; dollarization is typically very persistent and some countries never de-dollarize. In our sample, the distribution of dollarization levels is U-shaped, giving some credence to the conjecture of stable equilibria at extreme events.[9]



Sources: IFS statistics. and Fund staff calculations.

15. Our results show that exchange rate volatility (or the lack of it because of policy actions) matters and is statistically significant. First, basic descriptive statistics show that residual exchange rate volatility, as measured in the first stage of our analysis, was much higher for countries that subsequently became successful in significantly reducing loan dollarization (measured as a reduction of loan dollarization of at least 20 ppts over the sample period, to below 20 percent).

[9] Peru, in this respect, is aiming to move from one equilibrium to the other.

Table 1. Residual Volatility

	Using VIX		Using Currency Volatilty of EMs	
	Countries Successful at De-Dollarizing 1/ 2/	Countries that Remained Significantly Dollarized	Countries Successful at De-Dollarizing 1/ 2/	Countries that Remained Significantly Dollarized
Mean	0.50	-0.04	0.49	-0.05
25th Percentile	0.18	-0.32	0.17	-0.32
50th Percentile	0.30	-0.14	0.34	-0.16
75th Percentile	0.68	0.11	0.67	0.12
No. of Obs.	96	1431	77	1109

Sources: Fund staff calculations.

1/ Reduction by at least 20 PPTS to below 20 percent.

2/ Residual volatility prior to becoming successful at de-dollarization.

16. Second, panel regressions show that residual volatility is significantly related to reductions in loan dollarization. While our econometric results support the mean-reversing properties of dollarization, the negative sign for our volatility measure also holds when using an alternative measure as dependent variable—the percentage change in loan dollarization—a specification that does not have mean-reverting properties. The interest rate differential has the expected positive sign and is significant at the 5 or 10 percent level in most specifications. However, periods of appreciation, the presence of inflation targeting, or inflation volatility are not significant factors for the dynamics of de-dollarization (even though the IT dummy usually has the expected negative sign). Garcia-Escribano and Sosa (2011) also did not find macroeconomic variables to have significant explanatory power, likely because most countries in the sample already achieved macro stabilization.

Table 2. Dependent Variable: 90-Day Standard Deviation of Daily ER Percentage Changes

	FE	RE	FE	FE	FE	FE	RE	FE	FE	FE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VIX	0.02 **	0.02 **	0.02 **	0.02 **	0.02 **	..	..	..	..	..
(t-stat)	(14.63)	(14.64)	(14.76)	(14.79)	(14.75)	..	..	..	..	..
FX Volatility of EM Currency	..	..	..	..	..	0.04 **	0.04 **	0.04 **	0.04 **	0.04
(t-stat)	..	..	..	..	..	(14.16)	(14.16)	(14.19)	(14.20)	(14.18)
Term of Trade Y/Y % Change	0.00	0.00	..	..	..	0.00 **	0.00 **	..	..	..
(t-stat)	(0.85)	(0.78)	..	..	..	(2.41)	(2.34)	..	..	..
Term of Trade Q/Q % Change	..	..	0.00	0.00	..	..	..	0.00	..	0.00
(t-stat)	..	..	(0.67)	(1.28)	..	..	..	(0.98)	..	(1.64)
Term of Trade Q/Q % Change, t-1	..	..	..	0.00	0.00	..	..	..	0.00	0.00
(t-stat)	..	..	..	(0.04)	(0.22)	..	..	..	(0.55)	(0.25)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Countries	40	40	40	40	40	40	40	40	40	40
No. of Obs.	2394	2394	2357	2268	2269	1980	1980	1982	1938	1937

Sources: Fund staff calculations.

1/ FE indicates fixed effects, RE indicates random effects.

Table 3. Dependent Variable: PPT Change in Loan Dollarization

	(1)	(2)	(3)	(4)	(5)
Residual ER Volatility, t-1	-2.54 **	-2.58 **	-2.38 **	-2.91 **	-2.85 **
(t-stat)	(-2.73)	(-2.91)	(-2.67)	(-2.99)	(-2.93)
Loan Dollarization Level, t-1	..	-0.19 **	-0.19 **	-0.19 **	-0.19 **
(t-stat)		(-6.09)	(-6.12)	(-5.71)	(-5.76)
Avg. qoq Inflation Volatility	..	..	..	0.19	0.33
(t-stat)				(0.59)	(0.96)
Dummy for Inflation Targeting	..	..	..	-1.15	-0.99
(t-stat)				(-1.13)	(-0.97)
Fraser Index, Change	..	..	..	1.11	0.70
(t-stat)				(0.72)	(0.45)
Dummy for Appreciation	..	..	..	0.06	0.07
(t-stat)				(0.12)	(0.13)
IR Diff. LC and FX Loans, Co. Specific	..	..	0.13 **	..	0.11 *
(t-stat)			(2.22)		(1.85)
Constant	-0.69 **	4.72 **	4.03 **	5.27 **	4.35 **
(t-stat)	(-2.73)	(5.13)	(4.06)	(3.75)	(2.92)
Fixed Effects	yes	yes	yes	yes	yes
No. of Countries	33	33	31	31	31
No. of Obs.	374	374	367	357	357

Sources: Fund staff calculations.

1/ From regression of ER volatility on vix, terms of trade changes.

Table 4. Dependent Variable: PPT or Percentage Change in Loan Dollarization
(Sample Restricted to Countries with Loan Dollarization Exceeding 25 Percent in at Least One Year)

	PPT Change in Loan Dollarization (q4/q4)					% Change in Loan Dollarization 2/	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
residual ER volatility, t-1	-2.4 **	-3.79 **	-3.67 **	-3.03 **	-2.96 **	-4.67 **	-5.13 **
(t-stat)	(-2.79)	(-2.85)	(-2.76)	(-2.47)	(-2.36)	(-1.93)	(-2.04)
loan dollarization level, t-1	-0.19 **	-0.19 **	-0.19 **	-0.19 **	-0.19 **	-0.07	-0.06
(t-stat)	(-4.90)	(-4.62)	(-4.67)	(-4.96)	(-4.89)	(-1.06)	(-0.88)
avg qoq inflation volatility	..	0.21	0.41	..	..	..	
(t-stat)		(0.47)	(0.89)				
Dummy for Inflation targeting	..	-1.35	-1.12	..	-1.33	..	0.66
(t-stat)		(-1.06)	(-0.88)		(-1.15)		(0.33)
IT*ER volatility	..	..	..	..	-0.4	..	1.99
(t-stat)					(-0.18)		(0.59)
Fraser index, change	..	1.4	1.02	..	..	..	
(t-stat)		(0.67)	(0.49)				
Dummy for appreciation	..	-0.2	0.07	..	..	..	
(t-stat)		(-0.02)	(0.09)				
IR diff. lc and fx loans, co specific	..	..	0.14 *	0.15 **	0.17 **	0.02	0.02
(t-stat)			(1.63)	(1.93)	(2.31)	(0.13)	(0.18)
constant	6.37 **	6.97 **	5.85 **	5.61 **	7.51 **	-1.07	-1.79
(t-stat)	(4.06)	(3.27)	(2.62)	(3.51)	(3.89)	(-0.36)	(-0.47)
fixed effects	yes	yes	yes	yes	yes	yes	yes
no. of countries	23	22	22	22	22	22	22
no of obs.	251	240	240	250	249	193	192

Sources: Fund staff calculations.

1/ From regression of ER volatility on vix, terms of trade changes.

2/ Outliers (bottom 5 and top 95 percentile observations) dropped from regression.

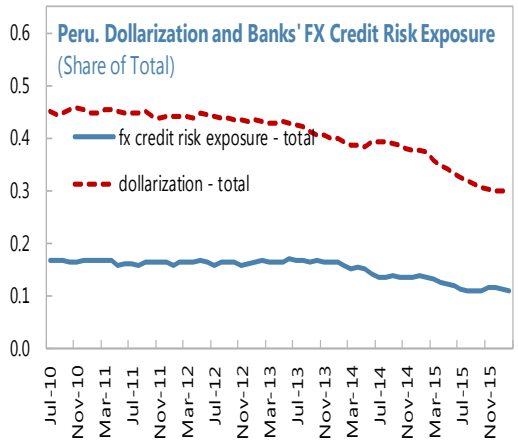
17. The results are robust to a number of alternative specifications. First, the first stage results are very similar when using a measure of emerging market currency volatility instead of the VIX as a measure of global volatility. Second, regressions for a more restricted sample of countries with a more pronounced dollarization prevalence/problem (where dollarization was at least 25 percent at one moment in the sample), or econometric specifications using random effects (as opposed to fixed effects) produced similar results. The introduction of lagged values for inflation, inflation volatility, periods of appreciation, and contemporary values for residual exchange rate volatility have not affected the conclusions in this chapter either.

D. Costs and Benefits

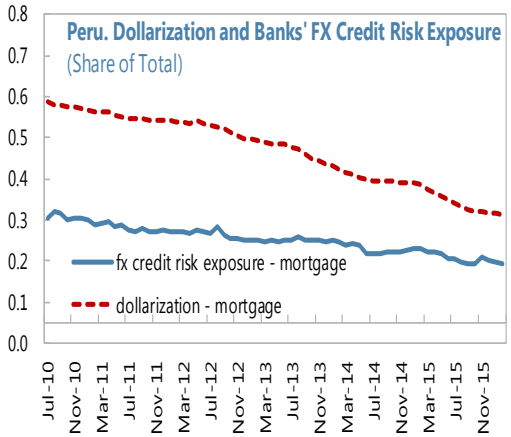
Costs

18. While a dose of healthy volatility is shown to help reduce dollarization, a number of caveats need to be taken into account. First, there may be a strong case to limit excessive volatility under disorderly market conditions. In those cases, volatility may encourage herding behavior and destabilize markets, rather than promote healthy price discovery. Indeed, the analysis in IMF (2016) suggests that exchange rate volatility may raise CDS spreads; while the level of the exchange rate does not seem to affect CDS spreads, sudden changes do.

19. Exchange rate volatility may also pose higher risks to unhedged FX borrowers, but this risk has significantly declined in Peru. This balance sheet effect has been quantified to explain 70 percent of Peru's output and investment decline in the aftermath of the 1998 Russian crisis, when dollarization levels in Peru reached about 70 percent (Gondo and Orrego, 2011). However, now that dollarization has fallen significantly, risks from the balance sheet effect have decreased. Ramirez-Rondan (2015) estimate that there is a critical threshold when negative balance-sheet effects dominate the otherwise positive competitiveness improvements from local currency depreciation. Their estimates put this threshold at about 32 percent (of dollar lending), based on a panel of 69 Peruvian firms from 2003–13. So far, Peruvian firms have withstood the stress from a cumulative depreciation against the U.S. dollar since 2011 of some 30 percent quite well. In addition, supervisory data suggest that losses to banks from FX exposures on the total loan portfolio stand at a third of the dollarization ratio, or 11 percent of total loans. For certain loan categories, such as mortgages, vehicles, and loans to SMEs, total FX exposure risks are higher (at around 14, 20 and 24 percent respectively as of end-February 2016) but they are declining steadily.



Sources: Superintendencia de Banca, Seguros y AFP.

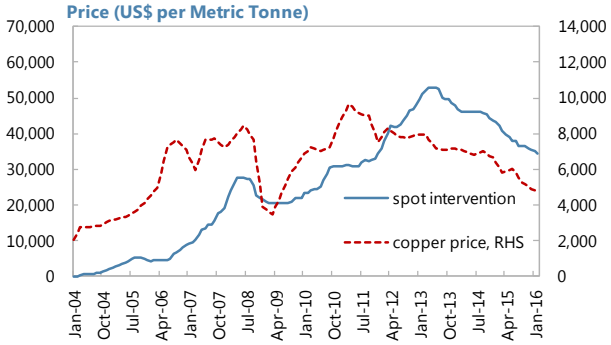


Sources: Superintendencia de Banca, Seguros y AFP.

Benefits

20. The benefits of exchange rate volatility and flexibility extend beyond aiding de-dollarization. First, a rapid adjustment of the exchange rate should engender speedier adjustment of the REER and avoid the creation of inefficient allocation of resources. Second, by removing notions of implicit guarantees provided by limited exchange rate risk, volatility may help develop a market for hedging. Finally, a higher tolerance for volatility and the speed of trend changes may reduce the need for exchange rate interventions. Peru has actively used FX intervention in both phases of the commodity prices cycle—when copper prices rose and when they fell—leaning against the wind while limiting volatility. However, with commodity prices expected to stay lower for longer and taking into account the significant sales of reserves so far, the value of preserving the use of Peru's still ample reserves seems to have increased.

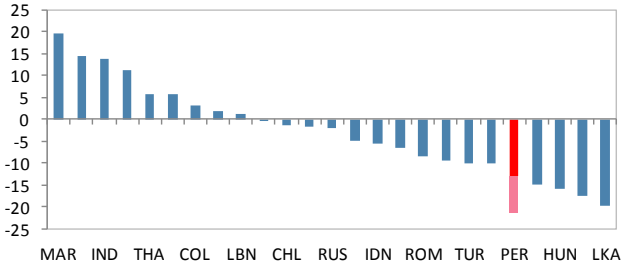
Spot Intervention (Cumulative, US$ Million) and Copper Price (US$ per Metric Tonne)



Sources: Banco Central de Reserva del Peru, World Economic Outlook, and Fund staff calculations.

FX Intervention Dec 15-Jan 2016

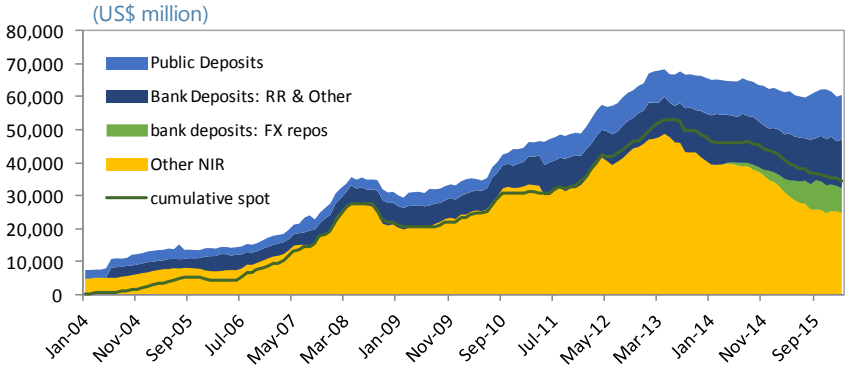
(US$ change in reserves adj. for exchange rate changes, as % of end-2014 GIR) 1/



Sources: IFS statistics, Banco Central de Rerserva del Peru, and Fund staff calculations. 1/ Spot (red) and non-spot (pink) intervention for Peru.

Peru: Components of NIR and Cumulative Spot Intervention

(US$ million)



Sources: Banco Central de Reserva del Peru, and Fund staff estimates.

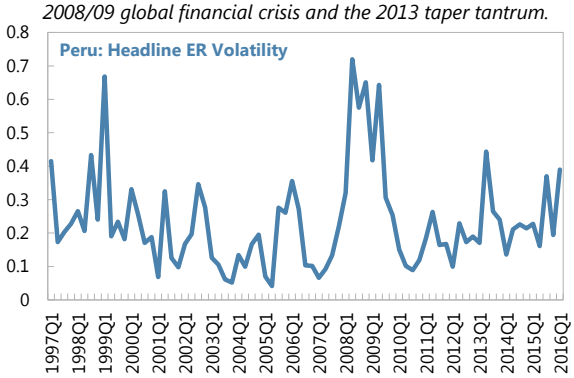
E. Conclusion

21. This chapter shows that higher exchange rate volatility can contribute to the authorities' de-dollarization agenda. Peru has enjoyed over a decade of low and stable inflation, but even though dollarization has declined markedly, it remains relatively high. This chapter shows, using a panel of 33 emerging market countries, that, after controlling for terms-of-trade and global shocks, residual exchange rate volatility is positively associated with faster de-dollarization. This result is robust to a number of alternative specifications. Hence, allowing greater day-to-day volatility of the exchange rate in Peru may help to accelerate the de-dollarization process in Peru.

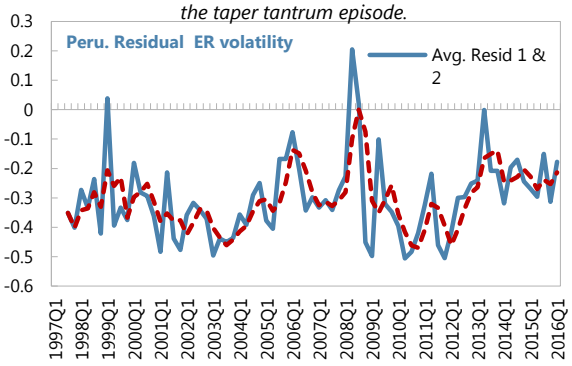
22. Measures of exchange rate volatility suggest that volatility is evolving in that direction already. Daily exchange rate volatility in Peru is still lower compared to a number of peers. However, headline volatility has increased markedly since late 2015 (panel chart 1). After controlling for terms–of-trade shocks and global volatility, exchange rate volatility is currently also above that in the pre-taper tantrum episode of mid-2013 or non-crisis periods in the past decade. Spot intervention also tapered despite high global volatility. Finally, controlling for the impact of the electoral cycle, exchange rate volatility also seems to have increased. Together, the available evidence suggests that Peruvian authorities have been gradually allowing greater exchange rate volatility.

Figure 1. Exchange Rate Volatility in Peru

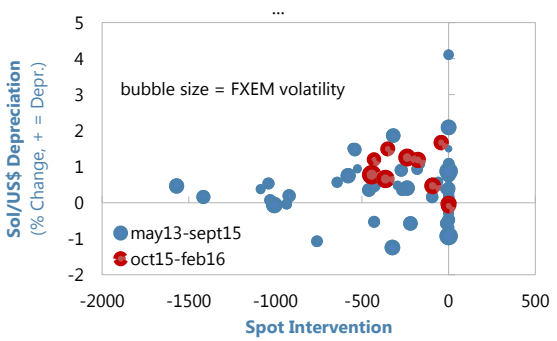
Headline volatility has trended up recently, after spikes during the 2008/09 global financial crisis and the 2013 taper tantrum.



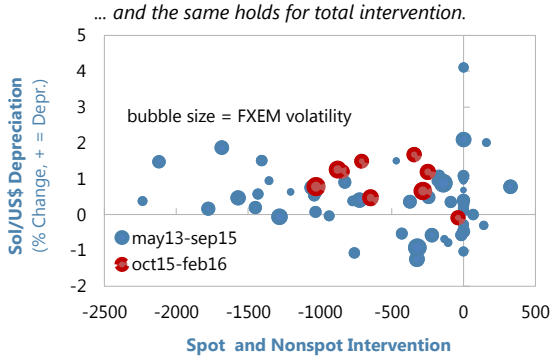
Residual exchange rate volatility also edged up, especially after the taper tantrum episode.



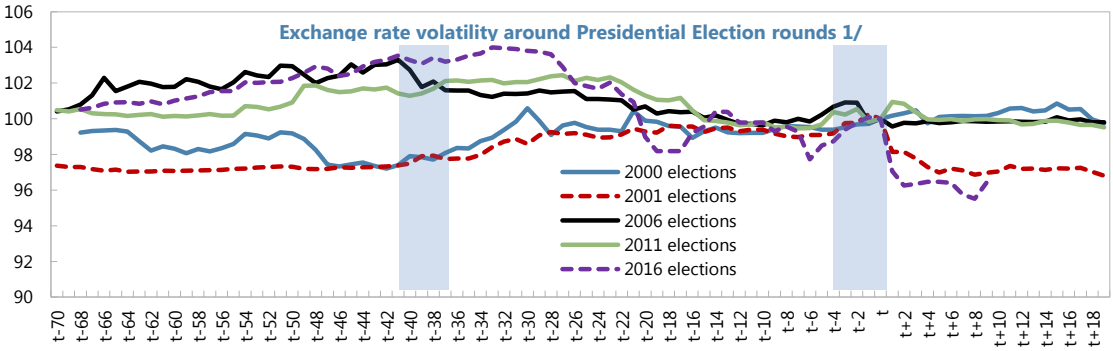
Spot intervention has been smaller despite higher global volatility ...



... and the same holds for total intervention.



While higher volatility is typically observed around elections, volatility also appears higher compared to earlier election rounds.



Sources: Banco Central de Rerserva del Peru, Bloomberg, and Fund staff calculations.

1/ First round of presidential elections (t-40). Second round (t). For 2016, first round of presidential elections is t.

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SELECTED ISSUES IN INTERNATIONAL TAXATION[1]

International taxation issues have moved to the forefront of tax policy concerns, both in Peru and more globally, as aggressive cross-border tax planning by many multinational enterprises has given rise to significant public disquiet. The weaknesses of the international tax architecture need to be looked at carefully from the perspective of developing countries. This chapter examines some of Peru's more salient risks to base erosion and profit shifting—pricing of mining exports and intra-group debt servicing—pointing out strengths and vulnerabilities of the Peruvian tax system and recommending alternative approaches to address remaining challenges.

A. Introduction

1. Peru's tax system has made substantial progress both in its design and in institutional capacity.[2] However, important challenges remain; tax-to-GDP ratio is still relatively low and the end of the boom in the commodity cycle will increase pressure on public finances. There is significant space for reforming the tax system and many of the areas that need improving have been identified.[3] Simplification, streamlining exemptions and modernization at sub-national level are measures that would render the system more efficient and help enforcement to yield more revenues. Tax arbitrage across countries could also reduce tax revenues in Peru. Indeed, international taxation issues have moved to the forefront of tax policy concerns, both in Peru and more globally, and it is the focus of this chapter.

B. International Taxation: Atop the International Policy Agenda

2. International aspects of corporate taxation have come to prominence in the public debate. Revenue concerns reflect the need for consolidation while protecting spending priorities in many advanced economies, and the need for domestic resource mobilization in developing countries. Against this background, aggressive cross-border tax planning by many multinational enterprises (MEs), in a relatively weak international tax architecture, has given rise to significant public disquiet.[4] This long-standing problem has now come to a head.[5]

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[1] Prepared by R. Schatan.

[2] IMF's Fiscal Affairs Department (FAD) has provided extensive technical assistance on fiscal policy to Peru during the last decade. Since 2006, FAD has delivered 36 reports in all aspects of fiscal policy, seven of them specific to tax policy.

[3] R. Fenochietto & S. Vtyurina (May 2015).

[4] See for example, ActionAid (November 2010), "*Calling Time: Why SABMiller Should Stop Dodging Taxes in Africa*", available at: http://www.actionaid.org.uk/doc_lib?calling_time_on_tax_avoidance.pdf and Christian Aid (May 2008), "*Death and taxes: the true toll of tax dodging*", available at: www.christianaid.org.uk/images/deathandtaxes.pdf.

[5] IMF (May 9, 2014).

3. The G20 mandated in 2103 the Organization for Economic Cooperation and Development (OECD) to revise international tax standards. The purpose is to assure that MEs pay their taxes where "value is created" and to close the loopholes in the system that allow corporate income to enjoy less-than-single taxation. The OECD recognized that, indeed, international tax standards had not kept pace with global business practices and were insufficiently coordinated, providing significant opportunities to MEs for base erosion and profit shifting (BEPS).[6] The IMF weighed in the discussion warning that base erosion of corporate international taxation could have significant negative spillovers on the financial stability of developing countries.[7]

4. Recently, the OECD, in consultation with a good number of non-member countries, released the final reports on BEPS. The reports explain some of the crucial weaknesses in the current international tax architecture and point towards a new consensus on what needs to be done to limit BEPS within that architecture, including measures to be adopted by G20 and OECD member countries.[8] Non-member countries have been encouraged to follow suit. While collective action is generally a positive move, it is still an open question whether all BEPS recommendations are equally relevant to developing countries, or if some of the issues need to be looked at more carefully from the perspective of these countries. This is an important question for Peru at this point, and is the basis for the G20's charge to the four main international organizations concerned—the IMF, World Bank, OECD and UN—to develop jointly "toolkits" for appropriate responses to these issues for lower income "source" countries.

C. Peru in the Global Economy

5. The Peruvian economy has integrated with the world economy at a fast pace in the last decade. Foreign direct investment (FDI) has surged: flows almost quadrupled in 2012 compared to the annual average in 2004–07, growing faster than in any other Latin American country.[9] Additionally, Peru is now becoming a capital exporter, with an outbound flow of FDI amounting over US$4 billion in 2014.[10] Foreign trade has also increased with respect to GDP, from 40 percent in 2005 to 50 percent in 2011, and while declining in the following years due to the fall in commodity prices it remained at a still relatively high 43 percent in 2014.[11] Another example of Peru's fast integration

[6] OECD (2013).

[7] IMF (May 9, 2014).

[8] OECD (2015). Summarizes the OECD position on 15 specific actions required to address BEPS, as identified in OECD (2013).

[9] Since then FDI has dropped due to the downturn in the commodities cycle, but still remains over twice the levels of 2000–07. CEPAL, *La inversión extranjera en América Latina y el Caribe 2015*, Santiago de Chile: 2015, p. 38.

[10] CEPAL (2015), op. cit, p. 34. Capital exports represent another specific set of challenges to the tax system, from defining the timing for taxing foreign earned income to providing (direct and indirect) relief for foreign taxes paid on those earnings.

[11] This percentage is considerably higher than in Brazil, Argentina and Colombia, but it is lower than in Mexico and Chile. In addition, service trade in Peru is 6.3 percent of GDP, higher than in most other countries in Latin America (except for Chile and Panama).

to the global economy is the rise in external private sector debt stock, non-guaranteed by government, which shot up more than 10 times between 2005 and 2015, from US$3.5 billion to US$42.8 billion.[12]

D. Tax Challenges in a Global Economy

6. The tax system inevitably needs to adapt to an economy with expanding cross-border activity. This should allow income from international transactions to be correctly taxed while protecting the tax base. The potential vulnerabilities of a country's tax revenues to aggressive tax planning could make a very long list;[13] however, two issues are particularly relevant to Peru:

- The mining sector has been a driving force behind Peru's economic expansion; it is an export industry for the most part and a large host of FDI. The risk of profit shifting through under pricing exports is inevitably high and consequential, especially when exports are artificially routed through tax haven affiliates.[14]

- Rising intra-company debt is another potentially important BEPS challenge. About a third of all FDI in Peru in 2013–2014 was financed with related party loans rather than equity.[15] Abstracting from the more fundamental question whether such related party debt should even be considered legitimate debt, current international standards do allow restrictions on deductions of interest payments to related non-residents to protect the tax base from profit shifting.

This report focuses upon these critical elements in Peru's international taxation structure.

E. Transfer Pricing for Commodities

Choosing a transfer pricing method

7. International standards, as defined by the OECD guidelines on transfer pricing,[16] establish five general methods to price intra-group transactions. The methods follow the arm's length principle (ALP), i.e., pricing as independent parties would.[17] One of those methods is the Comparable Uncontrolled Price (CUP) method, where the pricing benchmark is simply the price of a

[12] World Bank database.

[13] The OECD action plan against BEPS identified 14 specific vulnerabilities, but this is not an exhaustive list of all the weaknesses of the international taxation system, especially of those that may represent a challenge to developing countries.

[14] 30 percent of gold exports and 22 percent of copper exports are reported by taxpayers as related party transactions; data provided by SUNAT.

[15] CEPAL registers over US$5.3 billion in intercompany loans financing FDI in Peru in 2013–14. Equity is a smaller percentage, and the difference is reinvestment of profits. CEPAL (2015), op. cit, p. 63.

[16] OECD (2010).

[17] Following the general principle established in article 9 of the Model Tax Conventions of the U.N. and the OECD.

market transaction equal to that performed by related parties. It is often difficult to find such perfect benchmark, however, since many variables may affect the price of otherwise similar transactions. Transfer pricing guidelines allow either adjusting the benchmark to estimate the price that would have prevailed if the transaction were the same or, failing this, switching methods and valuing the intra-group transaction by estimating the rate of return that independent enterprises would obtain in such trade.

8. Intuitively, commodities should be a prime candidate for applying a CUP method. By definition, they are standardized goods, widely traded in international exchanges that quote a daily price. However, the issue is not always clear-cut: there are commodities that do not trade in exchanges, and sometimes quality and other specifics may define a wide price range, rendering the CUP method somewhat unreliable. The question arises consequently as to when is appropriate to change methods, in the understanding that natural resources often enjoy economic rents which make a sizeable tax base and that this base can be more easily eroded with transfer pricing methods that rely on estimating profitability from loosely related businesses.

9. Peru has a strict rule. The Income Tax Law establishes a clear priority for the CUP method in the case of commodities,[18] so that taxpayers cannot stray away from actual market prices at their discretion and can opt only justifiably, as last resort, for another method.[19] The OECD approach on this issue, instead, is mostly non-committal. In its final BEPS report on this topic, it states that:

- *"… the CUP method would generally be an appropriate transfer pricing method for commodity transactions between associated enterprises…"*[20]

10. This is a much softer standard than Peru's regulation. It provides considerably more flexibility for taxpayers to adopt methods different from CUP in pricing commodities. Given the difficulty (and risks) involved in enforcement of looser standards in a strategic industry, it is probably best for Peru to ensure that embracing international initiatives on BEPS would not require relaxing its current regulation on transfer pricing methods for commodity pricing.[21] This would be inadvisable.

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[18] Ley del Impuesto a la Renta (LIR), art. 32-A.

[19] Such legal hierarchy also makes it easier for the tax authority to revert to CUP if the taxpayer has chosen another method. Mexico also follows a similar approach, establishing a priority for CUP method. Ley del Impuesto Sobre la Renta (Mexico), art. 216.

[20] OECD (2015).

[21] It should be noted that the OECD Action 10 standard cited above is softer than initially proposed in an earlier draft released for public discussion, which said: *"… the CUP method would be generally the most appropriate transfer pricing method for commodity transactions …"*. See OECD, *BEPS Action 10: Discussion Draft on the Transfer Pricing Aspects of Cross-Border Commodity transactions* (December 6, 2014–February 6, 2015), p. 4. Softer language is consistent with private sector comments requesting a more flexible approach; see for example comments by IFA Mexico in OECD, *Comments Received on Public Discussion Draft; BEPS Action 10*, *Transfer Pricing Aspects of Cross-Border Commodity Transactions* (February 10, 2015), p. 162.

Anti-abuse methods applicable to commodities

11. Choosing the most appropriate method is only the first hurdle in pricing controlled commodity transactions. MEs may sell to a related party situated in a low tax jurisdiction and value the transaction using a quoted price as a starting point, but they may apply a number of adjustments or discounts for a diversity of circumstances or functions allegedly performed by the foreign affiliate, which may be hard to verify. Or they may select a contract date which cherry-picks quoted prices when they are lowest within a given period.

12. A number of Latin American countries, including Peru, have specific rules addressing the latter problem, preventing MEs from backdating contracts, restricting the quoted price to be that on the export's shipping date.[22] This has been a controversial practice, especially because countries have applied it with differing degrees of flexibility on how to adjust the quoted price due to, for example, transport costs or quality differences with respect to the quoted commodity.[23] The OECD BEPS final report on commodity transfer pricing argues that (i) adjustments should be allowed and (ii) the quoted price on shipping date can be deemed to be the arm's length price when no reliable evidence as to the date of the transaction is available.

13. It is difficult to object to reasonable and verifiable adjustments to the quoted price;[24] disallowing it could systematically err against the taxpayer. However, using the price quoted on shipping date as a default rule, so that taxpayers may use the price in any other date, unless the tax authority can show the choice inconsistent with the evidence, shifts the burden of proof to the tax authority on an issue where objective 'evidence' is very hard to find. Using the quoted price on shipping date, as the only option, on average, is unbiased. Taxpayers therefore are not affected by this simple and objective rule if adjustments are allowed. Peru's legislation restricts the date of the quoted price that taxpayers may use, permitting shipping date (or an average of prices around that date) and the contract date; the latter option is unfortunate, however, for it defeats the purpose of the anti-abuse measure, aimed precisely at eliminating the effect of related parties manipulating contract dates.[25] Thus, Peru's legislation can be improved by allowing (i) price adjustments generally when using CUP to price commodities and (ii) eliminating the option to pick the quoted price according to the date of the taxpayer's contract.

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[22] This often called the "6th method". See CIAT (2013).

[23] There is some disagreement if this is really a distinct method from CUP; some would argue that not allowing adjustment makes it a different method, but such restriction could be understood as an anti-abuse measure within the spirit of the CUP method. See PriceWaterhouseCoopers (January 29, 2013)

[24] Peru does not allow them for all commodities and this is an unnecessary restriction. LIR, art. 32-A .What may constitute a reasonable and verifiable adjustment is not discussed here, but it is clearly an important issue as well.

[25] LIR, art. 32-A, e). The administrative regulations have not been published so this provision is not in effect yet, but it would appear difficult for the loophole to be fixed in administrative rules.

F. Deduction of Interests

"Thin Cap" rules

14. Interest payments are a common instrument to erode the corporate tax base; rules to avoid 'thin capitalization' of firms (thin cap rules) are a common antidote. The traditional thin cap formula disallows the deduction of interest payments arising from a taxpayer's indebtedness level above a certain ratio to its equity. When these rules were first introduced in advanced countries, the typical ratio was 3 to 1; nowadays countries with this rule in place typically use a lower ratio, many 1.5 to 1. Peru has still a high ratio of 3 to 1.

15. Peru's thin cap rule has some design problems also. For example, it controls only intra-group (related party) debt. Thus, a taxpayer could be indebted to its maximum financial capacity with independent lenders (which could be back-to-back operations with affiliates),[26] and the rule would still allow deducting the service of an additional debt with related parties for an amount three times its equity. That would most likely represent a shift in profits.[27]

16. Many countries have moved to stricter rules, as recommended by the OECD BEPS final report on interest deductions.[28] A common approach is adopting an 'earning stripping' rule, which allows for interest deductions up to a certain percentage of EBIDTA (30 percent in some countries). This restricts interest deductions from all debt, and limits the tax effects of both the amount of debt and the interest rate levels. Another method used by some countries limits interest deductions to a proportion of the global third party gearing ratio of the ME.

17. These are examples how Peru could—and should—tighten its anti-abuse rules given its increasing exposure to private sector debt. However, these anti-abuse rules should not be understood as being also a transfer pricing 'safe harbor' for interest deductions; complying with them does not mean necessarily that interest deduction is legitimate—at arm's length—especially when considering some debt structures increasingly used in the mining sector, such as 'streaming' and 'royalty' finance. These financial arrangements lend resources as an advance payment for future mineral production, whose price is fixed at a discount level from expected market prices sufficient to repay the principal and the (implicit) interest on the loan. Complying with the ALP in such cases, as

[26] There is a strong incentive in Peru to structure back-to-back loans since the withholding tax on all interest payments to non-resident related parties, except financial institutions, is 30 percent (LIR, art. 54, c), even if they are shown to be priced at arm's length. In principle back-to-back loans are also withheld at 30 percent rate also (LIR, art. 56, j), but the concept of back-to-back is difficult to define for operational purposes and such loans are difficult to identify in practice.

[27] Peru's rule has other problems, for example, the law defines the base of the ratio as 'assets', which formally includes debt, making it much wider than intended and it is not clear that the correction to 'net assets' made in administrative regulations is effective. The ratio is measured at year's end, which may not be representative; other countries typically have their thin cap rule based on the annual average of net assets. In addition, the rule requires some exceptions, for example, for the financial sector, which has its own sector regulation and operates normally with higher ratios.

[28] OECD (2015).

in all financing transactions among related parties, would still require that the arrangement and interest rate are commercially rational and agreed to by independent parties under similar circumstances.

Hedging

18. Hedging is another financial operation that poses significant transfer pricing challenges to the extractive sector. Although it is a common practice for producers to hedge future prices of commodities (with an implicit rate of interest) in order to manage the risk associated with price volatility, there is the larger question about the rationality of hedging with an affiliate of the same enterprise. Strictly speaking, there is no reduction in the risk faced by the global enterprise while clearly altering the profit allocation within the group.

19. Some countries limit the functions that can be imputed to an extractive subsidiary. This is due mainly to the difficulty for tax authorities to determine the commercial rationality of financial derivatives among related parties. In some cases, they exclude financial risk management as one of those functions and only allow (for transfer pricing purposes) spot market pricing for the commodity in question. In other cases, a 'schedular' regime applies, so that financial losses from hedging operations can be deducted only from gains of the same kind.

20. Countries are moving toward tighter control in this area. Eventually, a future round of formal multilateral discussions on BEPS might possibly address these issues. In the meantime, however, Peru would do well to consider, on its own accord, adopting anti-abuse rules against related party hedging in this strategically important industry.

G. Concluding Remarks

21. Peru is rightly concerned about strengthening its international taxation system. Integrating to the world economy requires aligning regulations with new and more complex business operations and protecting the country's tax base from the risks of aggressive cross-border tax planning. Adapting to a changing international business environment is a continual and challenging process, as the OECD work on BEPS demonstrates. FAD has assisted Peru in this process since early on, analyzing the issues that, at different points in time, have been considered a priority and recommending specific policies and administrative measures to address them. However, there is still significant space to improve. As indicated, Peru can improve its rules to price intra-group commodity exports and to prevent thin capitalization, and can introduce safeguards against spurious related party hedging in the extractive industry.

22. The measures discussed here would address important areas of vulnerability for Peru. The OECD report on commodity transfer pricing favors a more flexible approach for selecting a particular transfer pricing method. However, broad international initiatives to protect the tax base need to be adapted to realities on the ground, especially for developing economies. Simpler and objective rules, which do not systematically err against either taxpayer or tax authority, are justified when insufficient resources make complex rules impractical or inoperable.

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