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REGIONAL ECONOMIC OUTLOOK: BACKGROUND PAPERS
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CONTENTS

1. Asia and Latin America: How Deep are their Linkages?[1]

Asia and Latin America and the Caribbean (LAC), two regions with large growth potential, have become increasingly connected over the last 20 years. However, this process has been asymmetric: while trade linkages have deepened considerably, the interregional investment and financial connections remain limited. We document key stylized facts about Asia-LAC linkages, their magnitude, and the main countries and sectors connecting the two regions. We also highlight both opportunities and challenges from deeper trade, as well as the impediments to stronger investment and financial linkages.

Globalization and economic integration among countries and global regions create both opportunities and challenges. Enhancing trade, investment, and financial linkages among regions by removing the impediments to deeper integration provides new possibilities to boost regions' growth and promote risk-sharing. However, higher interdependence could also be a source of vulnerabilities, since shocks could propagate directly or indirectly across countries. Studying interlinkages between regions has become crucial to understand both the drivers and the bottlenecks of global growth in order to design adequate economic policies.

We focus on three types of linkages between Asia and LAC: trade, investment, and financial. We show that, while interregional trade has deepened substantially, it has not been accompanied by equally strong investment and financial linkages. The relevance of China as a key trading partner for most LAC countries has increased dramatically over the last decade. However, we find that other Asian economies play a more important role in interregional investment and financial linkages.

Trade

LAC trade with Asia has increased over the last 20 years, at the expense of trade with North America (Figure 1). Asia is the second largest trading partner for LAC, both in terms of imports and exports and, within Asia, China is the main destination. Brazil, Chile, Mexico, and Argentina are the main LAC exporters to Asia, while Mexico is the main importer, though this is partly explained by its position in the global value chain. LAC exports to Asia are very concentrated around a small number of commodities, particularly minerals (copper and iron ores) and vegetables (soybeans and soybean oil), while LAC imports from Asia are concentrated in machines and electronics (40 percent of total import from Asia to LAC), reflecting the comparative advantages of both regions *(Figure 2).*

Figure 1. LAC Exports by Destination
(Percent of total LAC exports)
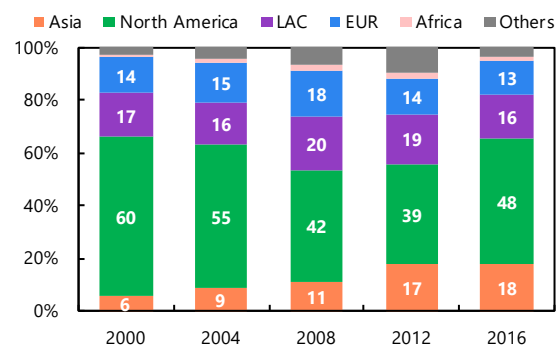
Sources: UN Comtrade; and IMF staff calculations.
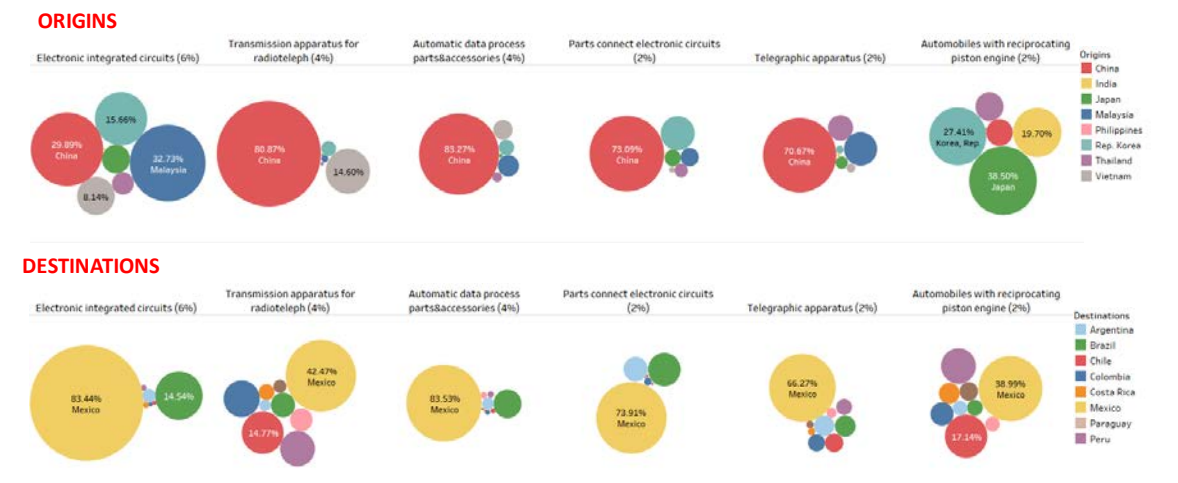Note: EUR = Europe; LAC = Latin America and the Caribbean.

Figure 2. Top 6 Export Products by Country of Origin and Destination

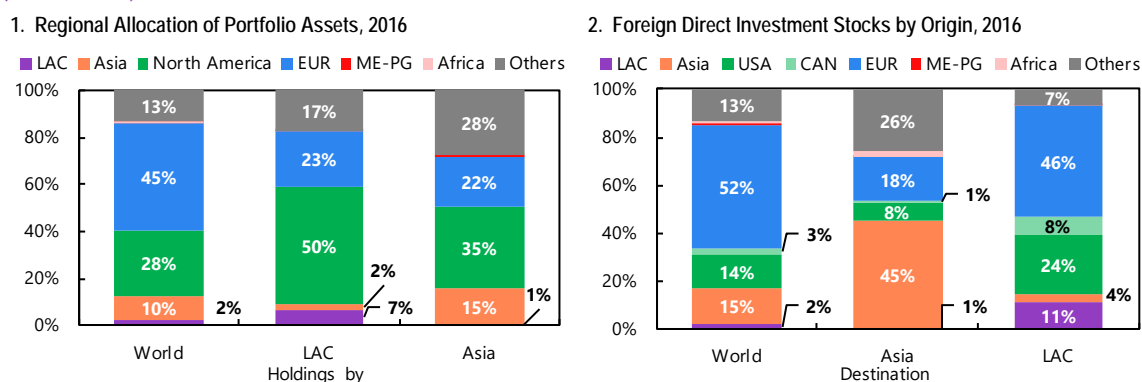1. Exports from LAC to Asia

2. Exports from Asia to LAC

Sources: UN COMTRADE; and IMF staff calculations.

Export dependency on Asia, and particularly on China, has increased across LAC countries for all commodities. The complementarity between China's demand for raw materials to support its investment-led growth and LAC's abundance of natural resources is the main explanation of trade flows from LAC to Asia. Similarly, exports of final goods from China to LAC reflect the country's availability of abundant and low-cost labor force, and its vast experience in manufacturing. However, the progressive shift of China from an investment- to a consumption-led economy poses new challenges for LAC countries. The deceleration of China's demand for commodities may have implications for LAC exporters. While the demand for soybeans and meat products may remain strong to support a growing urban population in China (Casanova et al, 2015), the demand for mineral intermediate inputs may decline over time. Such development could have severe repercussions on the economies of the Andean region, particularly Chile, whose export dependence on China regarding mineral commodities has exponentially increased over the last decade. To rebalance relations with China, LAC countries should diversify and increase the value added of their exports and take advantage of the gap left by China's retreat from specific markets. Policies supporting trade integration and reducing trade costs could also facilitate this transition.

Investment

The increased linkages between Asia and LAC through trade have not been accompanied by an expansion of interregional investment. In LAC, portfolio investment is heavily biased towards North America, and only 2 percent is allocated to assets issued by Asian countries (Figure 3, panel 1). Despite Asia's more diversified investment position, assets issued by LAC countries represent only 1 percent of its portfolio. With respect to foreign direct investments (FDI), Asia shows a clear 'home bias', while investments in LAC are mostly of European and U.S. origin (Figure 3, panel 2). Asia holds 4 percent of the total FDI stock in LAC and LAC contributes to the stock of FDI in Asian countries by 1 percent only. Such FDI and portfolio investment composition has remained stable over time.

Figure 3. Portfolio and Foreign Direct Investment
(Percent share)

1. Regional Allocation of Portfolio Assets, 2016

Legend: LAC ■ Asia ■ North America ■ EUR ■ ME-PG ■ Africa ■ Others

	World	LAC	Asia
Others	13%	17%	28%
EUR	45%	23%	22%
North America	28%	50%	35%
Asia	10%		15%
	2%	2% / 7%	1%

Holdings by

2. Foreign Direct Investment Stocks by Origin, 2016

Legend: ■ LAC ■ Asia ■ USA ■ CAN ■ EUR ■ ME-PG ■ Africa ■ Others

	World	Asia	LAC
Others	13%	26%	7%
EUR	52%	18%	46%
		1%	8%
USA	14%	8%	24%
Asia	15%	45%	
LAC	2% / 3%	1%	11% / 4%

Destination

Sources: IMF, Coordinated Direct Investment Survey database; IMF, Coordinated Portfolio Investment Survey database; and IMF staff calculations.
Note: Data labels use International Organization for Standardization (ISO) country codes. EUR = Europe; LAC = Latin America and the Caribbean; ME-PG = Middle East and Persian Gulf.

Despite China's prominent role in trade with LAC, Japan and South Korea are the key players for portfolio investment and FDI. These two countries together represent 86 percent of LAC's holdings of Asian securities, with Chile and Brazil being the main investors. Japan and South Korea are also the main holders of LAC securities in Asia's investment portfolio (89 percent), with a bias towards instruments issued by Brazil and Mexico. Regarding FDI, Asia's investment position in LAC is highly concentrated geographically, both in terms of origin (60 percent from Japan and 20 percent from South Korea) and destination (46 percent in Brazil and 32 percent in Mexico). In the case of LAC investments in Asia, Singapore is the main destination, accounting for almost 60 percent of the total investment position.

Most FDI between Asia and LAC corresponds to greenfield investments, since interregional merger and acquisition activity remains very limited (Table 1). Greenfield investments of Asian companies in LAC exploit the comparative advantages of the countries in the region. For instance, investments in South America, particularly the Andean region, are mostly focused on mining and petroleum, which are the industries attracting most investments to LAC. FDI to Central America exploits the low-cost labor and the proximity to the U.S., in sectors such as the apparel industry or offshore business services. Market-seeking investments, such as automotive and business electronics, go to Brazil to benefit from its large domestic market, while Mexico's investments reflect its status of export platform for U.S.-destined products. LAC investments in Asia target fast-growing consumer markets in financial, IT, and business services; investments in manufacturing are very rare.

Table 1. Cross-Border Merger and Acquisition Activity in Asia and Latin America and the Caribbean

Geographic partners	Number of companies (numbers in 2010)	Total transactions (US$ billion)	Percentage of total amount	Details
Interregional Asia and LAC	1 (6)	1.7	0.17	**Host:** Brazil **Home:** Hong Kong **Industry:** Phosphate rock **Amount:** US$1.7 billion
Intraregional Asia	28 (14)	69.1	7.05	
Intraregional LAC	6 (2)	12.9	1.36	
AP or LAC as acquirer	37 (23)	122.5	12.5	**Host economies:** U.S. (16), U.K. (3), Germany (3), Russia (3), Israel (2), Netherlands (2), Switzerland (2), Australia, Belgium, Bermuda, Congo, Ireland, Spain
Total	**79 (49)**	**206.2**	**21.04**	

Source: Based on United Nations Conference on Trade and Development's Cross-Border Mergers and Acquisitions data in 2016, with deal values exceeding US$1 billion.

Why is interregional investment between Asia and LAC lagging behind? Several factors may be restricting FDI flows: (i) limited efforts to promote the countries in both regions; (ii) small markets and undiversified exports of LAC countries; (iii) unfavorable business environment and institutional factors (some Asian and LAC economies have among the most restrictive FDI regimes in the world based on the OECD FDI Regulatory Restrictiveness Index); and (iv) regulatory restrictions that limit incentives to invest in the absence of adequate guarantees to investors (e.g., FTAs without investment chapters). In the case of portfolio investment, Asian investors searching for yield may prefer securities issued by Asian emerging countries rather than in LAC securities because of their informational advantage.

Other Financial Linkages

Direct financial linkages between Asia and LAC through the banking system are very limited, but indirect linkages are strong for some countries. According to the Bank for International Settlements (BIS) data on banks' cross-border exposure, direct financial linkages are small and mostly related to lending by Japanese, South Korean, and Taiwanese banks to LAC countries. Japan accounts for about 80 percent of the entire bank exposure of Asia to LAC, concentrated in Brazil and Mexico, as well as in offshore financial centers such as Panama and Bermuda. Indirect financial linkages[2] are stronger, though still smaller than intra-regional linkages among Asian countries (connected through the U.K. and the U.S. banks) and among LAC countries (connected through Spanish banks). As shown in the heat map (Figure 4), there are significant indirect linkages between Asia and some LAC emerging markets (Argentina, Colombia, and Panama) through the common exposure to the U.S. banking system.

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[2]Indirect financial linkages are proxied by the fund competition index, based on Van Rijckeghem and Weder (1999) and Chui, Hall, and Taylor (2004). The index measures the dependence of two emerging market economies on funds from common creditors in advanced economies. It comprises two terms: the first one measures the importance of the common lender for the two emerging market economies and the second one measures the extent of fund competition between the two emerging market countries from the same country lenders.

Figure 4. Indirect Financial Linkages Through the Banking System Between Latin America and the Caribbean and Asia
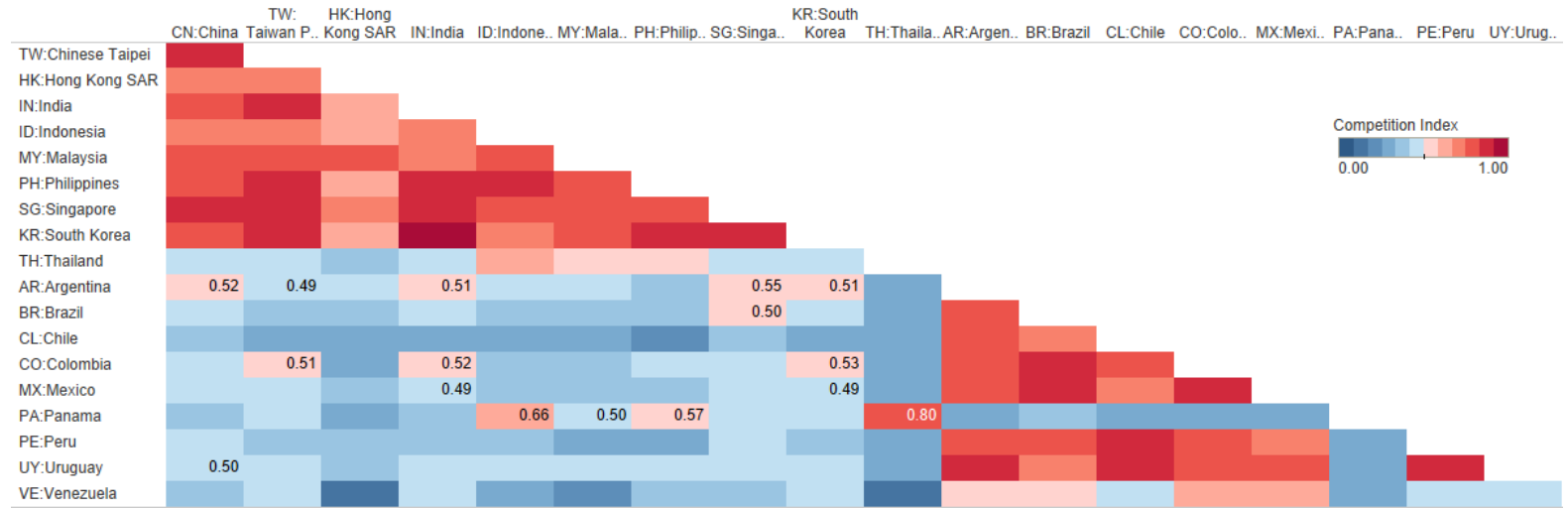
Sources: Bank for International Settlements database; and IMF staff calculations.
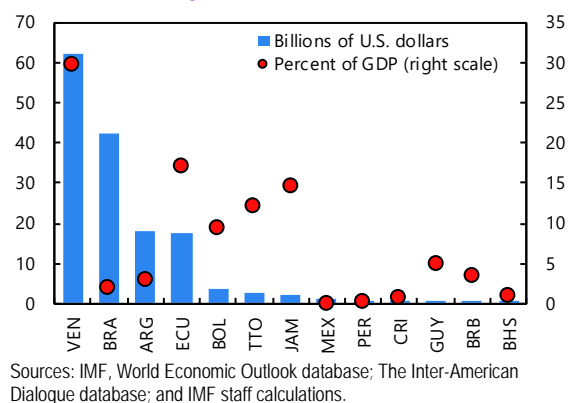Note: Indirect linkages are measured by the fund competition index. Red and dark colored cells in the heatmap represent high competition for funds from a common global lender, while blue and dark colored cells in the heatmap represent low competition for funds from a common global lender. The heatmap indicates that intraregional (Asia-Asia and LAC-LAC) competition for global funds is high, while interregional (LAC-Asia) competition for global funds is low. The exceptions to the latter are Argentina, Colombia, and Panama. For instance, Panama seems to have strong indirect linkages with Thailand and Indonesia, with values of the index of 0.8 and 0.7, respectively.

The 'common bank lender channel' could be a potential source of contagion between the two regions. Losses in a country/region due to a financial crisis could force a common global lender to reduce exposure to other countries/regions in order to restore capital asset ratios and readjust portfolio risk. This transmission mechanism was very strong during the Mexican and the Asian crisis in the 1990s, as documented by Kaminsky and Reinhart (2000) and Van Rijckeghem and Weder (1999).

The role of China in the LAC financial system is steadily expanding. BIS data limitations do not allow for a clear analysis. However, Cerutti, and Zhou (2018) show that Chinese banks' foreign claims, although very modest when compared to domestic ones, have been growing substantially over the last eight years. Such banking connections, mostly related to Chinese FDI, are important for several developing economies in Asia, Africa, and the Caribbean. The development and global expansion of the mostly state-owned Chinese banking sector may create opportunities for financial integration between the two regions, helping to further deepen interregional trade and investment linkages.

Figure 5. China Aggregate Financing in LAC
(Accumulated lending; 2005–17)

Sources: IMF, World Economic Outlook database; The Inter-American Dialogue database; and IMF staff calculations.

Estimates from the Interamerican Dialogue suggest that the accumulated amount of official loans from China Policy Banks, by the end of 2017, was around 30 percent of GDP in Venezuela, 17 percent in Ecuador, 15 percent in Jamaica, and 12 percent in Trinidad and Tobago. Lending to other countries such as Argentina and Brazil, is large in US dollars but represents a smaller share (3 and 2 percent, respectively) of GDP (Figure 5).

Looking Forward

Linkages between Asia and LAC have grown over time and are expected to further intensify in the future. While China may not be the only Asian country shaping these dynamics, it is likely to remain the major driving force. In particular, the ongoing rebalancing of China may impact the export composition of LAC countries but would also leave a gap that could be filled by LAC exporters seeking new markets. Investment linkages between the two regions have been also growing but remain weak. However, as the Chinese financial system becomes more sophisticated and diversified, China could play a more prominent role also as investor in LAC, along with Japan and South Korea.

References

Casanova, C., Xia, L. and R. Ferreira. 2015. "Measuring Latin America's Export Dependency on China." BBVA Working Paper 15/26, BBVA Research.

Cerutti, E. and H. Zhou. 2018. "The Chinese banking system: Much more than a domestic giant." VOX, CEPR'S Policy Portal. https://voxeu.org/article/chinese-banking-system, accessed on August 9, 2018.

Chui, M., Hall, S. and A. Taylor. 2004. "Crisis spillovers in emerging market economies: interlinkages, vulnerabilities and investor behavior." Bank of England Working Paper 212, Bank of England.

Kaminsky, G. and C. Reinhart. 2000. "On crises, contagion, and confusion." *Journal of International Economics,* vol. 51(1), pages 145–168, June.

Van Rijckeghem, C. and B. Weder. 2001. "Sources of contagion: is it finance or trade?" *Journal of International Economics,* vol. 54(2), pages 293–308, August.

2. Investment and Savings in Latin America[1]

Saving and investment in the LA6 countries (Brazil, Chile, Colombia, Mexico, Peru, and Uruguay) is lower than in other emerging markets (EMs), a key factor behind the region's low potential growth. In this note we show that domestic savings matter for aggregate investment: The Feldstein and Horioka's (1980) finding is alive and well. We also present evidence that low savings in LA6 are, to a large extent, due to structurally low government savings, providing support for the advice that governments in the region should strive to save more to help increase potential growth.

Stylized Facts

Investment in LA6 countries is low and correlated with savings. Even though investment picked up in LA6 countries during the commodity price boom, it has been consistently below levels witnessed in other EMs by more than 3 percent of GDP (Figure 1). In theory, investment should not depend on domestic savings in an open economy. In practice it does, as international capital markets are far from perfect, and the role played by foreign savings in financing domestic investment is limited. Countries that save more do invest more, a fact first documented by Feldstein and Horioka (1980) long ago and that continues to hold (Figure 2).

Figure 1. Investment, 1995–2016
(Percent of GDP; average)
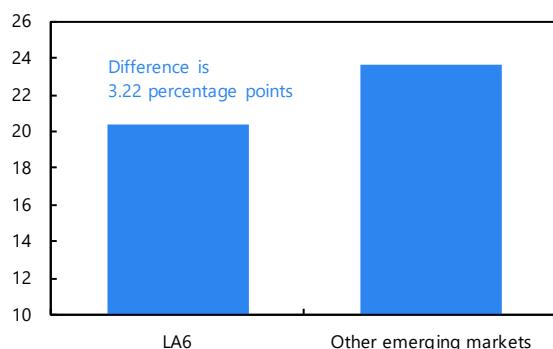
Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Simple average. LA6 = Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

Figure 2. Feldstein-Horioka Puzzle, 2016
(Percent of GDP)
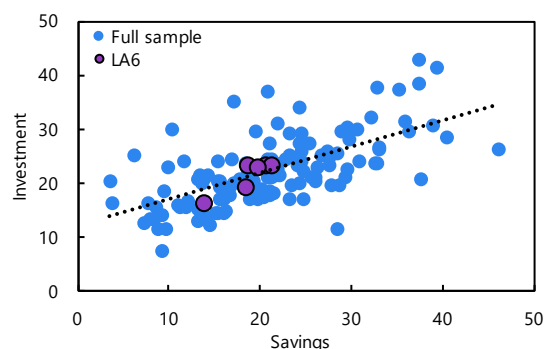
Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; and IMF staff calculations.
Note: LA6 = Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

Empirical Analysis

Different empirical strategies point to the importance of savings as a determinant of investment. To assess the importance of private savings as a determinant of investment, we analyze a panel of 165 countries and break the dataset into three intervals of 5 years and one of 7 years and average all variables within each subperiod: 1995–99, 2000–04, 2005–09, and 2010–16. The list of controls includes: (i) beginning of period GDP per capita, to account for catching-up/convergence forces; (ii) time-effects, to capture the influence of global cycles; (iii) deviations of GDP from a country-specific trend, to account for domestic

[1]This *Regional Economic Outlook* background paper was prepared by Carlos Goncalves.

cycles; (iv) measures of institutional quality from the World Bank; (v) country-fixed effects (in columns 2 and 3); (vi) lagged investment;[2] and finally, our main variable of interest, (vii) the savings rate.

The savings rate is the only robust control variable across several model specifications (see results in Table 1; not all reported due to space constraints). Its coefficient oscillates between 0.2 and 0.5 and it is always statistically significant. All other determinants present the expected sign, though they are not always statistically significant. Furthermore, the economic importance of the coefficient on savings is large. For instance, if LA6 countries had the same average saving rates of other EMs, the former's investment/GDP ratio would rise by 1.4 percentage points, accounting for around half of the difference in average investment across these two groups.[3]

Table 1. Pooled LS, Fixed Effects, and Arellano-Bond Estimations

Full sample	Y variable = Investment/GDP		
Controls	Pooled LS	Fixed Effects	Arellano-Bond Estimator
Lagged investment			0.166**
			(0.0410)
Initial GDP per head	-0.000160***	-0.000233	-0.000156
	(2.00e-09)	(0.110)	(0.113)
GDP cycle (filter)	0.797***	0.441***	0.371**
	(0.000280)	(0.000221)	(0.0306)
Rule of Law -- World Bank	2.482***		
	(5.12e-10)		
Savings	0.434***	0.423***	0.256***
	(0)	(1.28e-06)	(0.00232)
Time Effects and constant	YES	YES	YES
Country Fixed Effects	NO	YES	YES
Observations	557	560	271
R-squared	0.434	0.293	
Number of id	n.a.	150	143

Source: IMF staff calculations.
Note: Robust pval in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Instrumental variables regressions that overcome the biases associated with endogenous regressors corroborate the importance of savings in the investment equation. In principle, including fixed-effects and the economic cycle variable should go a long way in dealing with endogeneity in the regressions reported above. But another plausible strategy is to use Instrumental Variables (IV) techniques in a cross-section of countries. We use latitude, legal origins, population density, and the country's age structure as instruments for the two endogenous controls: "savings" and "institutional quality" (Figure 3). As shown in Table 2, the savings rate continues to be highly statistically significant as a determinant of investment.[4]

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[2]When the lagged dependent variable is added to the estimation, the coefficients obtained with the fixed effects estimation are biased by construction. Thus, the Arellano-bond estimator is used instead.

[3]The 1.4 percentage points increase comes from the effect of savings on investment obtained with the regression estimation (0.4) times the difference between average savings in other EMs and LA6: (24–20.5).

[4]All variables are averages during 1995–2016.

Figure 3. Age Structure as An Instrument for Savings, 2016
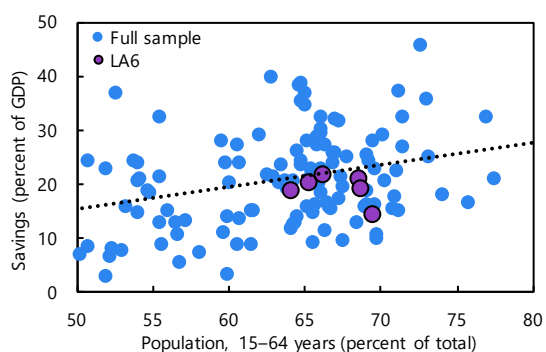
Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; and IMF staff calculations.
Note: LA6 = Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

Table 2. Instrumental Variables Results

Controls	IV, cross section	
	OLS	IV1
Initial GDP	-0.000215***	-0.000172***
	(2.38e-08)	(0.00984)
Rule of Law	2.179***	1.139
	(2.28e-05)	(0.276)
Savings	0.498***	0.526***
	(0)	(5.83e-07)
Observations	123	123
R-squared	0.576	0.555
P-value Hansen test	n.a.	0.07

Source: IMF staff calculations.
Note: IV1 instruments: dependency ratio, legal origins, latitude. Robust pval in parentheses.
*** p<0.01, ** p<0.05, * p<0.1.

Policy Analysis

The low level of savings in LA6 is due, to a large extent, to lower than average public savings in the region. As shown in Figure 3, all LA6 countries are below the linear fit linking "age structure" to savings (i.e., they save less than their age structure would suggest). The pattern becomes clearer once we disaggregate total savings into its private and public subcomponents. Around half of the difference in savings is due to the low public savings in LA6 countries (Figure 4).

Moreover, recent data shows that the structurally low public savings are not recovering in the region. In the EMs subgroup, public savings now are at the same level they were in 1995, whereas in LA6 the average is still 2 percentage points below. Figure 5 also shows that most of the variation in net public savings over time is due to oscillations in public savings, while public investment is relatively stable (and slightly procyclical).

Figure 4. Public Savings, 1995–2016
(Percent of GDP; average)
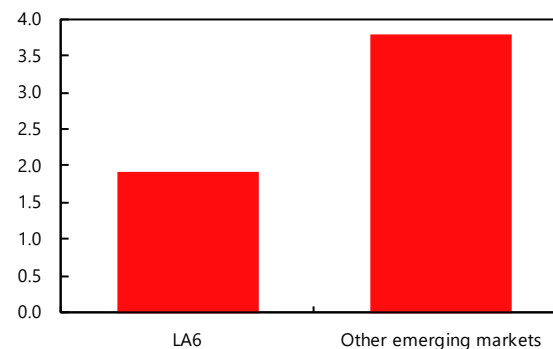
Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Simple average. LA6 = Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

Figure 5. Public Savings and Public Investment
(Percent of GDP)
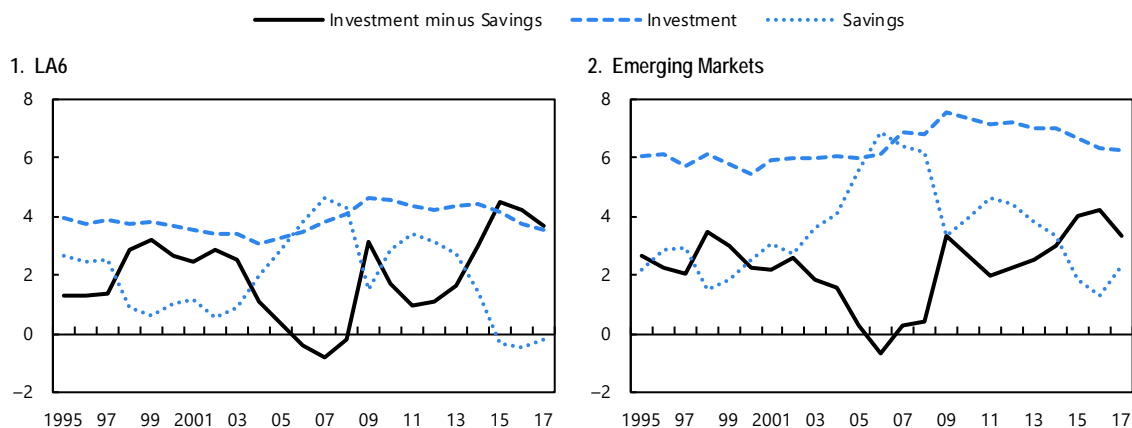
Sources: IMF, World Economic Outlook database; World Bank, World Development Indicators database; and IMF staff calculations.
Note: Simple average. LA6 = Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

An increase in public savings would lead to an increase in total savings and hence pave the way for higher investment. Even if boosting public savings in the region is an objective worth pursuing, private agents, in theory, could anticipate that higher public savings would eventually lead to a reduced tax burden and lower their own savings. But as Table 3 demonstrates, these offsetting force is weak in practice. Higher public savings do lead to higher total savings (although the effect is less than one to one). This is true after controlling for the country's GDP cycles, global cycles, GDP per capita, and age structure.

Table 3. Public Savings on Total Savings

Controls	Total Savings
Public Savings	0.724***
	(0)
GDP cycle	0.325*
	(0.0868)
GDP per capita	0.000111***
	(1.48e-05)
POP_1564_pc	0.310***
	(8.97e-06)
Observations	544
R-squared	0.441

Source: IMF staff calculations.
Note: Robust pval in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

During the years of high commodity prices, governments in the region did not save enough out of the windfall: Looking forward, governments should aim at increasing public savings. There is no evidence that during the 10-year terms-of-trade boom that started in 2003 Latin American countries saved a larger share of the windfall than before.[5] Figure 6 shows that only Chile and Peru increased net public savings in the 2003–06 period. The end of the commodity super-cycle around 2013–14 generated a sharp fall in these countries' real income and, with the exception of Mexico, the larger share of the adjustment was shouldered by the private sector.[6] This analysis suggests that in order to increase investment and long-run economic growth, authorities should increase public savings.

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[5]See for example Adler and Magud, 2015.

[6]The reduction in net public savings was compensated by an increase in net private savings, leading to a reduction in the current account deficit.

Figure 6. Savings and Investment
(Percent of GDP)

Legend: Private (savings - investments) | Public (savings - investments) | Current account balance (% GDP) | Commodity terms of trade (index: June 2012 = 100; right scale)

1. Brazil
2. Chile
3. Colombia
4. Mexico
5. Peru
6. Uruguay
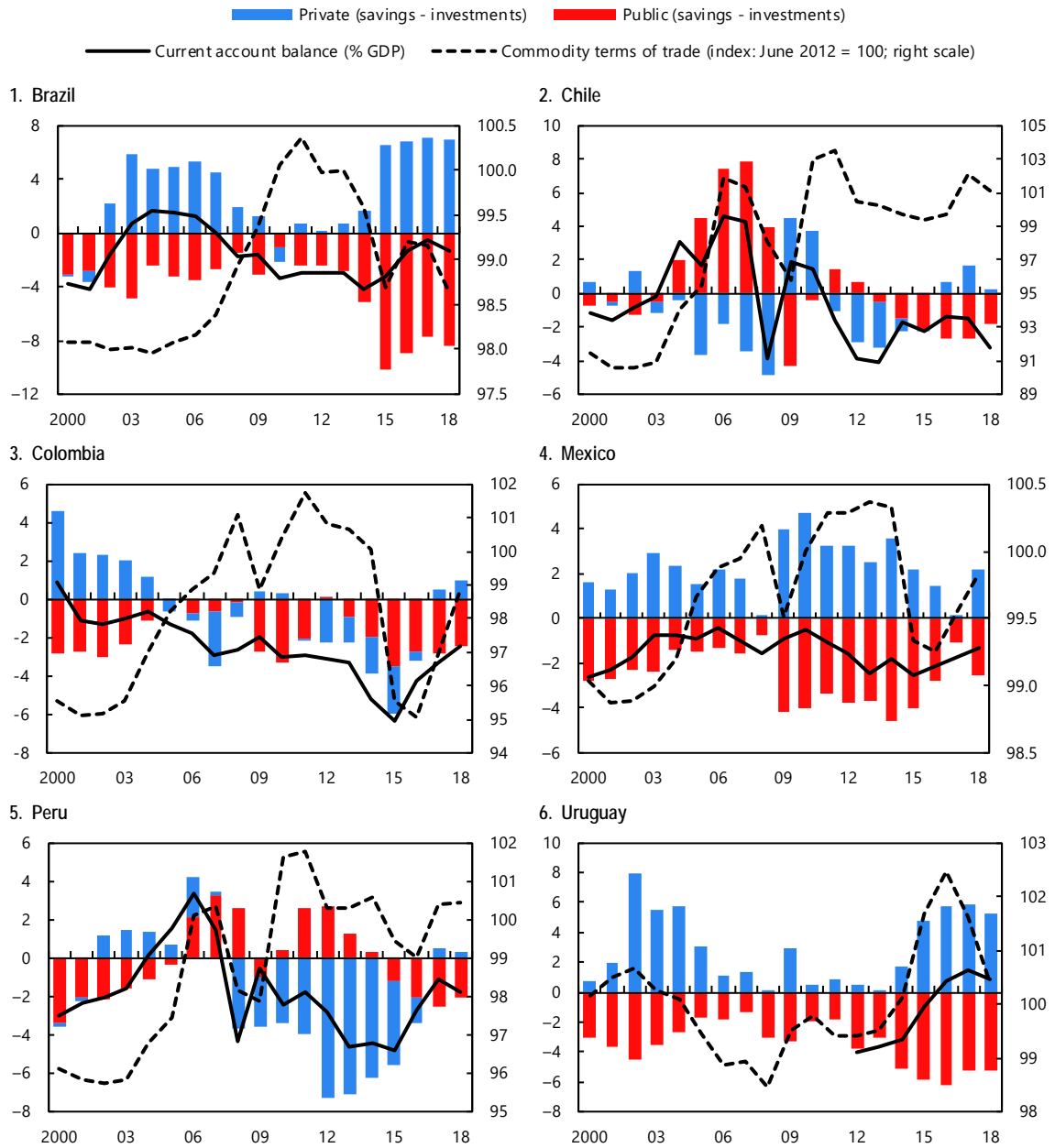
Sources: IMF, World Economic Outlook database; and IMF staff calculations.

References

Gustavo Adler and Nicolas Magud. "Four Decades of Terms-of-Trade Booms: A Metric of Income Windfall," *Journal of International Money and Finance,* vol. 55, 2015.

Martin Feldstein and Charles Horioka. "Domestic Saving and International Capital Flows," *The Economic Journal,* vol. 90, No. 358, 1980.

3. Labor Market Dynamics in Latin America[1]

Since the turn of the century, strong labor markets have been central to the social gains experienced by the largest Latin American economies. Average unemployment across the region fell from 10.4 percent in 2000 to a low of 6.1 percent in 2014,[2] and labor informality declined by close to 20 percentage points. Higher labor incomes, especially for low income households, contributed to lower poverty and inequality. This good performance was particularly pronounced for commodity exporters during the commodity price boom (IMF, 2018).

A key concern has been whether these social gains would be preserved after the commodity price cycle turned. With a few exceptions, labor markets have been relatively resilient to the downturn, although unemployment increased again to 8.8 percent in 2017 (driven to a large extent by Brazil). In this note, we assess the factors driving this resilience and the dynamics of labor markets in the region, using some standard decompositions and impulse responses.

The fall in unemployment in the commodity price boom phase was driven by labor demand growth outpacing an expanding working age population. In all LA6 countries (Argentina, Brazil, Chile, Colombia, Mexico, and Peru) both labor supply and labor demand grew strongly over the commodity terms-of-trade (ToT) boom period (Figure 1).[3] Growth in the working age population played a larger role than changes in labor force participation (LFP) in increasing supply, except to some degree in Chile and Colombia, were LFP increased substantially. On the demand side, the (positive) contribution of output growth to the decline in unemployment dominated the (negative) contribution of labor productivity growth. In Mexico, productivity gains were very small and played no role in the change in unemployment.[4]

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[1]This *Regional Economic Outlook* background paper was prepared by Frederic Lambert and Frederik Toscani.

[2]Average of the unemployment rate in Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

[3]Commodity cycles are defined using a business cycle dating algorithm which finds local minima and maxima based on a set of criteria as defined in Harding and Pagan (2002), building on Bry and Boschan (1971). The sample starts in 2000 (2004 for Argentina) and we define the country-specific boom period as the period from the commodity terms of trade trough in the early 2000s until the peak in the 2010-14 period, disregarding the temporary downturn around the global financial crisis.

[4]Changes in the unemployment from the pre-boom period level can be decomposed as follows: $u - u* = -(y - y*) + (z - z*) + (part - part*) - (wap - wap*)$, where *u,y,z,*part, and *wap* respectively denote the logarithms of the unemployment rate, GDP, labor productivity, the labor force participation rate, and working-age population, and the * superscript denotes pre-boom values. In the charts, an increase in output or a decrease in labor productivity is represented as a negative bar since it decreases unemployment everything else equal. Changes in labor demand correspond to the sum of changes in output and changes in labor productivity. An increase in labor demand, which decreases unemployment, is represented as a negative bar.

Figure 1. Unemployment Fluctuations: Commodity Terms of Trade Boom 2001-2011
(Percentage points)
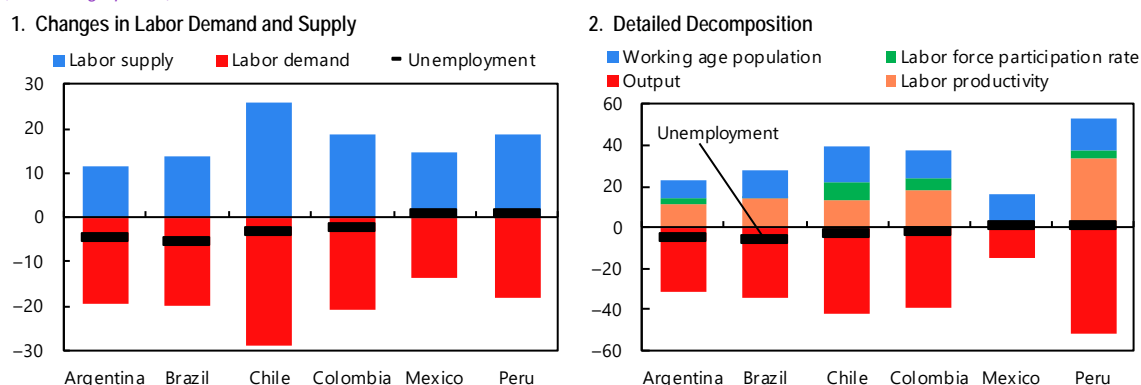
1. Changes in Labor Demand and Supply

2. Detailed Decomposition

Sources: Haver Analytics; national authorities; and IMF staff calculations.
Note: Commodity terms of trade boom periods are as follows: Argentina (2005:Q1–12:Q3); Brazil (2003:Q1–11:Q1); Chile (2001:Q3–11:Q1); Colombia (2005:Q4–14:Q2); Mexico (2001:Q1–08:Q2); Peru (2002:Q3–11:Q1).

The negative terms-of-trade shock of 2011–16 slowed these positive trends but labor markets proved resilient overall.[5] In Chile, Colombia and Peru, the slowdown in the growth rate of labor demand was broadly offset by a slowdown in the growth rate of labor supply (with LFP essentially constant), keeping the unemployment rate roughly constant (Figure 2). Public sector employment, and especially informality, also acted as margins of adjustment, contributing to resilience in headline numbers. In Brazil and Argentina, output nearly stagnated between 2012 and 2017, thus virtually removing any positive demand impact on unemployment. Given the expansion in labor supply, unemployment increased. In both Argentina and Brazil, but especially in Brazil, there is some evidence of labor hoarding (as evidenced by a fall in labor productivity), which limited the increase in unemployment. Nevertheless, the deep recession took a heavy toll on the labor market in Brazil: 4 million formal jobs were lost between 2015 and 2017 and the unemployment rate nearly doubled to 13.7 percent.

Figure 2. Unemployment Fluctuations: Commodity Terms of Trade Bust 2011-2016
(Percentage points)
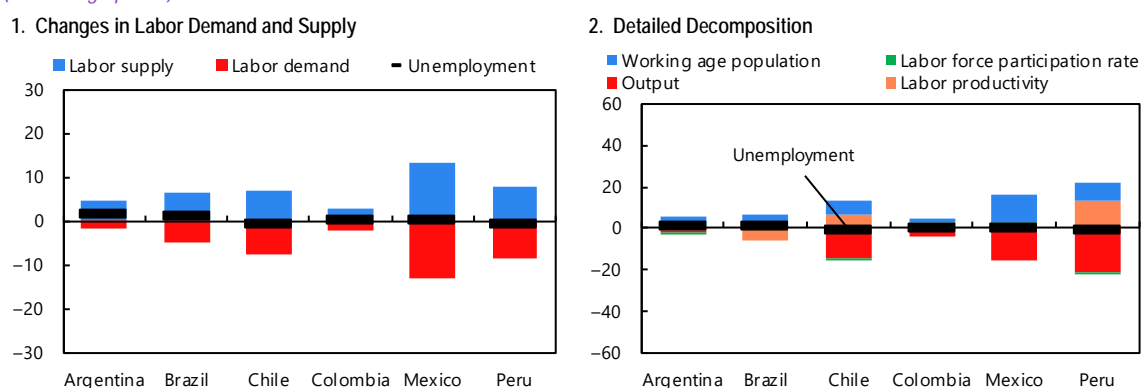
1. Changes in Labor Demand and Supply

2. Detailed Decomposition

Sources: Haver Analytics; national authorities; and IMF staff calculations.
Note: Commodity terms of trade decline periods are as follows: Argentina (2012:Q4–15:Q4); Brazil (2011:Q2–15:Q4); Chile (2011:Q2–15:Q4); Colombia (2014:Q3–16:Q1); Mexico (2008:Q3–16:Q1); Peru (2011:Q3–16:Q2).

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[5]Turning points depend on the commodities exported by different countries, but in broad terms metal prices started declining in 2012 while oil prices did so by mid-2014.

The decomposition into demand and supply factors does not allow to gauge the cyclical or structural nature of those developments. Okun's law, that relates changes in output to short-term changes in unemployment, is the main tool to study cyclical relations between economic activity and labor markets. We can write it in first differences as:

$$u_t - u_{t-1} = c + a(y_t - y_{t-1}) + \varepsilon_t,$$

where u_t is the unemployment rate in period t, y_t is log output, and ε_t is an error term. c is a constant and a is the Okun coefficient.[6]

Estimations of the above equation show a more muted response of unemployment to GDP growth in many Latin American countries than in advanced countries or other emerging market economies (Figure 3). The weaker relationship between output fluctuations and labor market developments is confirmed by the results of a similar regression to the one above with employment as the dependent variable: employment responds less to output growth in most Latin American countries than in advanced economies or other emerging market economies.[7] This result is also in line with the conclusions of previous empirical work (IMF, 2012 and 2014).

Figure 3. Labor Market Response to Output Fluctuations

Sources: Haver Analytics; national authorities; and IMF staff calculations.
Note: A dark border around the bar indicates the estimated coefficient is significant at the 10, 5 or 1 percent level, depending on the width of the border. EMDE = emerging market and developing economies; LA6 = Argentina, Brazil, Chile, Colombia, Mexico, Peru.

The lower responsiveness of labor markets to output fluctuations may result from the persistence of labor market rigidities. Despite recent reforms, Latin American labor markets are still considered among the most rigid in the world (Table 1). Hiring and firing practices remain particularly restrictive in Latin America.[8] Such restrictions may discourage firms to increase employment when growth picks up, while they limit firms'

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[6]We also considered other specifications including lags of the dependent variable as well as lags of the change in output. The results are broadly similar. Sample period spans 2002Q1 to 2017Q4 but varies by country depending on data availability.

[7]*Emerging markets* sample: Albania, Argentina, Belarus, Belize, Brazil, Chile, China, Colombia, Costa Rica, Croatia, Dominican Republic, Ecuador, FYR Macedonia, Indonesia, Jordan, Macao SAR, Malaysia, Mexico, Peru, Philippines, Poland, Saudi Arabia, Serbia, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Ukraine, Uruguay, Venezuela. *Advanced economies* sample: Australia, Belgium, Canada, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Taiwan Province of China, United States.

[8]Caballero et al. (2004) shows that job security regulations slow the economy's adjustment to shocks, and reduce productivity growth.

ability to lay off workers in downturns. In that case, firms may prefer to reduce productivity than to adjust employment (see Figure 2 on decomposition of the changes in unemployment in Brazil, for example).
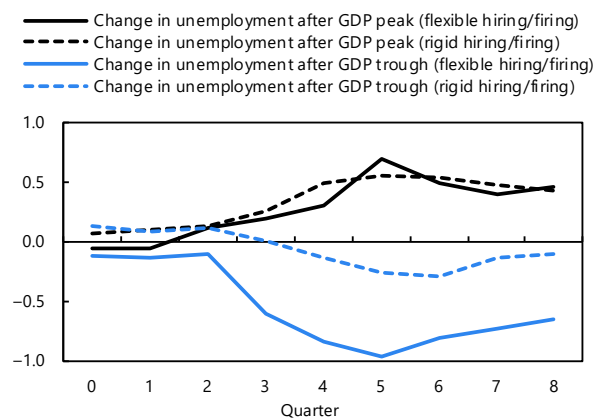
Table 1. Measure of Labor Market Rigidities

	Advanced Economies	Emerging Market Economies		Low Income Countries
		Latin America	Others	
Cooperation in labor-employer relations (1-7, 7 best)	5.1	4.2	4.3	4.1
Flexibility of wage determination (1-7, 7 best)	4.9	4.8	4.9	4.8
Hiring and firing practices (1-7, 7 best)	4.0	3.0	3.9	3.8
Redundancy costs (number of weeks of salary)	12.6	22.0	19.1	20.7

Sources: Country level data from the World Economic Forum's Global Competitiveness Report. Averages by region are IMF staff calculations.

Preliminary estimations using local projection methods hint at the negative effect of labor market regulations on the response of unemployment to output growth. One way to control for structural factors is to include them in the Okun's relationship and condition the response of unemployment on different employment regulations (Hijzen et al., 2017). In Figure 4, the dashed lines represent the response of unemployment to a change in log output when hiring and firing regulations are tighter than average, and the solid lines the unemployment response when regulations are more flexible. The responses in periods of expansion are in blue and the responses in downturns in black. The graph shows a larger decline in unemployment during expansions when hiring and firing practices are more flexible.[9]

Figure 4. Impact of a 1 Percentage Point Change in GDP Depending on Hiring/Firing Practices
(Percent)

— Change in unemployment after GDP peak (flexible hiring/firing)
--- Change in unemployment after GDP peak (rigid hiring/firing)
— Change in unemployment after GDP trough (flexible hiring/firing)
--- Change in unemployment after GDP trough (rigid hiring/firing)

Source: IMF staff calculations.

In the context of high formal labor market rigidities, informal labor may act as a key margin of adjustment. IMF (2012) showed that economies with higher labor formality tend to have larger Okun's coefficients. This is also true for the LA6. As Figure 5 shows, the higher the formality rate, the more unemployment declines and the more employment increases in periods of economic booms.

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[9]Specifically, we estimate the following series of fixed-effects panel regressions $u_{it+h} - u_{it} = \theta_h^{F,P} d_{it}^{F,P} + \theta_h^{R,P} d_{it}^{R,P} + \theta_h^{F,T} d_{it}^{F,T} + \theta_h^{R,T} d_{it}^{R,T} + \sum_{l=0}^{L} \beta_{h,l} Y_{it-l} + \alpha_i + u_{it+h}$ for h=1,….,8, where i indexes the country, $d_{it}^{F,P}$ is a dummy which is one in a country with flexible (F) hiring and firing practices in the year of the peak of a GDP cycle (P). Similarly, $d_{it}^{R,P}$, $d_{it}^{F,T}$ and $d_{it}^{R,T}$ capture a peak in a country with rigid hiring and hiring practices, a trough in a country with flexible practices and a trough in a country with rigid practices, respectively. A history of L=4 lags of the control variables Y_{it-l} are included, where Y includes GDP growth, the unemployment rate, labor market institutions, commodity terms of trade and country-specific linear time trends. The coefficients of interest $\theta_h^{F,P}$, $\theta_h^{R,P}$, $\theta_h^{F,T}$ and $\theta_h^{R,T}$ are plotted in the above graph.

Figure 5. Labor Market Response to Output Fluctuations and Labor Informality

1. LA6: Okun Coefficients

2. LA6: Employment Responsiveness
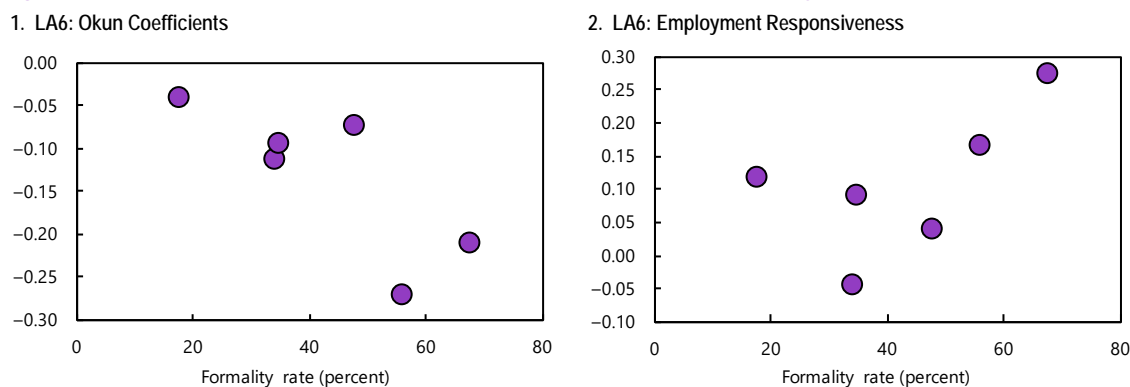
Sources: Haver Analytics; national authorities; and IMF staff calculations.
Note: LA6 = Argentina, Brazil, Chile, Colombia, Mexico, Peru.

This analysis, while still preliminary, suggests that further reforms aiming at enhancing the flexibility of labor markets in Latin American countries could allow for more dynamic and responsive labor markets while at the same time contributing to reducing informality and increase productivity.

References

Bry, Gerhard and Charlotte Boschan, 1971, *Cyclical Analysis of Time Series: Procedures and Computer Programs*, New York, NBER.

Caballero, Ricardo J., Eduardo Engel and Alejandro Micco, 2004, "Microeconomic Flexibility in Latin America," NBER Working Papers, 10398.

Harding, Don and Adrian Pagan, 2002, "Dissecting the cycle: a methodological investigation," *Journal of Monetary Economics*, vol. 49(2), pages 365–381, March.

Hijzen, Alexander, Andreas Kappeler, Mathilde Pak, and Cyrille Schwellnus, 2017, "Labour market resilience: The role of structural and macroeconomic policies", OECD Economics Department Working Papers, 1406.

IMF, 2012, "Resilience in Emerging Market and Developing Economies: Will it Last?" *World Economic Outlook*, Chapter 4, October.

IMF, 2014, *Western Hemisphere Department Regional Economic Update, October.*

IMF, 2018, "Poverty and Inequality in Latin America: Gains during the Commodity Boom but an Uncertain Outlook," *Western Hemisphere Department Regional Economic Outlook*, April.

4. The Role of Foreign Exchange Intervention in Latin America's Inflation-Targeting Countries[1]

Latin American countries with inflation targeting (IT) regimes have frequently intervened in foreign exchange markets, and there are some interesting lessons from these experiences. Many central banks in the region, including those with IT, responded to external shocks with foreign exchange intervention (FXI) (Figure 1). The motives stated for those interventions were to contain excessive foreign exchange (FX) volatility and to build up international reserve buffers for self-insurance. Disorderly market conditions could lead to exchange rate movements that would amplify shocks and unanchor inflation expectations. Markets could become one-sided and illiquid, and participants prone to herd-like behavior, eventually undermining macroeconomic and financial stability. FXI could contain these disruptive effects but should not substitute for necessary policy adjustments. A forthcoming IMF book presents in detail the experience of Latin American inflation targeters during the 2000s and draws policy lessons from these episodes.[2] This note summarizes some of the results from the book.

A frequent concern among policy makers is that FXI may send conflicting signals about the commitment to IT. Appearing to pursue an additional FX objective could undermine the credibility of a central bank's inflation objective primacy. Despite clear interactions between domestic currency and FX markets and prices, IT is not incompatible with FXI, however. Ghosh and others (2016) suggest using two instruments (interest rates and FXI) to tackle two objectives (anchoring inflation expectations and ensuring external balance), which can be done to the extent that domestic and foreign assets are not perfect substitutes.

The Latin American experience shows that the credibility of an IT framework can be preserved with a strong communication strategy that explains the authorities' intentions on both policies. Chapter 3 of the April 2018 *Regional Economic Outlook: Western Hemisphere* emphasized the importance of communications for a pure IT regime. In the same vein, a clear FXI communication policy on the back of data transparency can help markets understand the objectives sought with FXI while maintaining the priority of IT. It can thus contribute to the market internalizing the central bank's FXI reaction function—as is the case with its interest rate policy. Communication strategies have been further enhanced by the fact that most countries in the region have followed a rules-based approach to FXI, which facilitates the market's understanding of intervention and its subordination to the interest rate policy.

Some lessons that can be gleaned from the successful experiences of countries in the region are the following.

Clear communication has been key to explain the subordination of FXI to the IT objective. Chile intervenes very rarely, having done it only four times since adopting IT (2001, 2002–03, 2008, and 2011), but in all FXI cases the central bank's communique stressed explicitly that interventions were subordinated to the macroeconomic framework. During the first two events the central bank provided FX liquidity, while in the latter two it accumulated international reserves to match similar countries' ratios of reserves to GDP

Figure 1. Recent Foreign Exchange Intervention in Select Latin American Countries
(Millions of U.S. dollars)
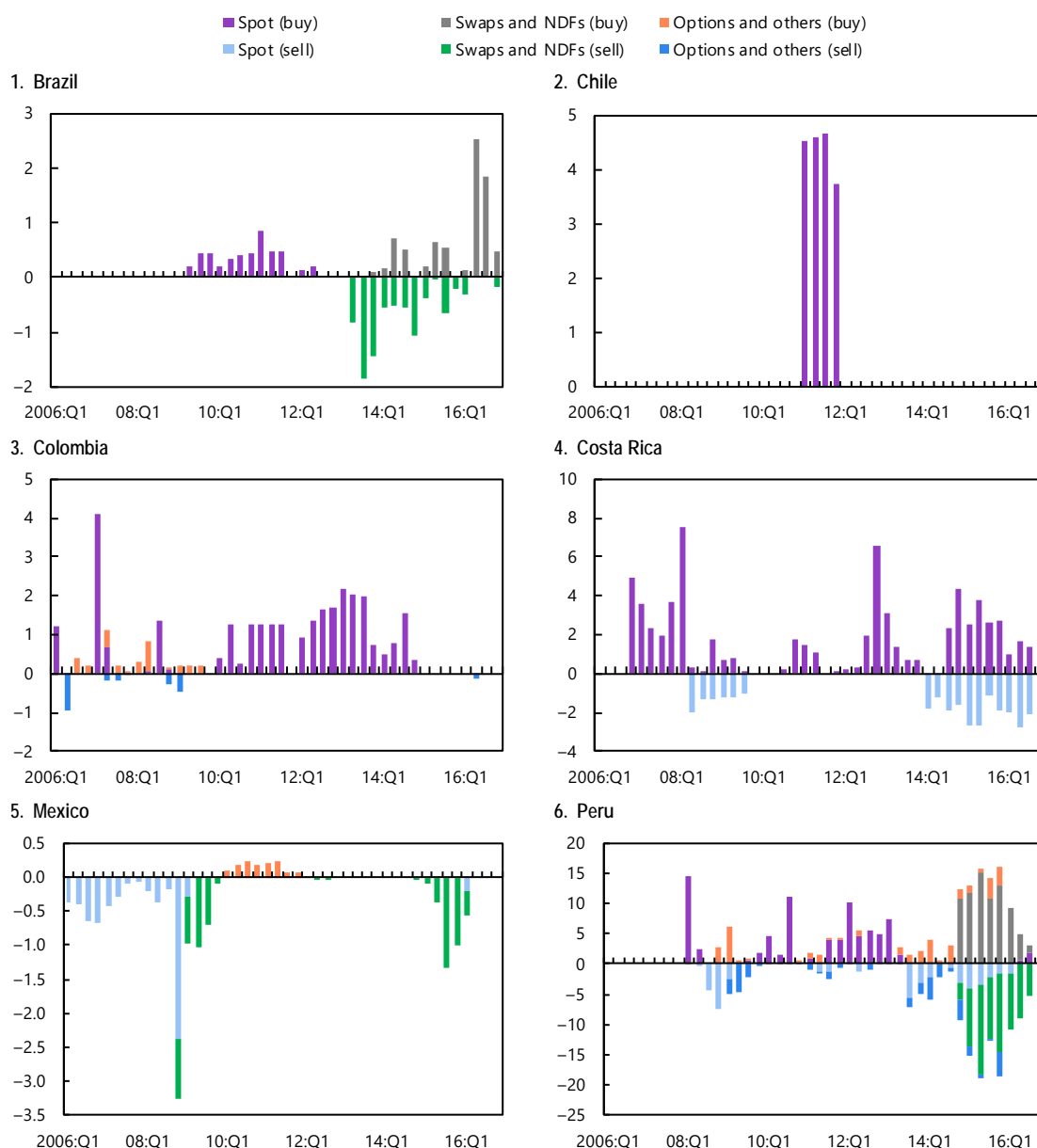
Sources: National authorities; and IMF staff calculations.

on the back of persistent appreciation pressures. In all these cases, the central bank announced the terms of the FXI operations clearly. As a result, most of the impact of the intervention was observed right after the announcements—typically on the same day. As an example, in the 2011 event, the central bank announced in early January a program of (auction-based) FX purchases of $12 billion through daily purchases of $50 billion over 240 days; in this episode, the central bank further stated that subordination was to a monetary policy with exchange rate flexibility.

Rules-based intervention, combined with the provision of data on FXI, has strengthened its transparency. To achieve a level of international reserve buffers deemed to be sufficient, Mexico sold U.S. dollar put options between 1996 and 2001. The FX Commission implemented this policy by giving financial institutions the right to sell U.S. dollars to the central bank the following month if the option's strike price the day before was below its 20-day moving average. This enabled the central bank to increase international reserves in over $12 billion while internalizing price information for the market. Colombia used the same mechanism during November 1999 to September 2002, March to August 2003, and March to May 2008, accumulating over $2.8 billion. By transparently communicating the intervention rules, and providing intervention data to reaffirm their intentions, central banks avoided the notion of an exchange rate target level and enabled market participants to factor in the reaction function of the central bank to protracted movements in exchange rates, thus mitigating uncertainty and improving the ability of central bank to achieve its inflation objective.

Using derivative instruments specifically tailored to tame FX volatility reinforced the objective of FXI. Colombia used so-called "volatility options" to mitigate exchange rate volatility without impacting its trend. Put (call) auctions with a maturity of one month were offered, that would be exercised when the strike exchange rate was lower (higher) than its 20-day moving average minus (plus) 5 percent. During 1999–2001 the volume of these options was $190 million (about 50 percent of the daily market volume); later the volume was reduced to $180 million and the threshold to 4 percent. Over time, volumes and threshold kept changing conditional on experience and needs. In terms of effectiveness, estimates suggest that for every purchase of $1 million the domestic currency depreciated by 0.01 percent for three weeks.

Intervention through derivatives has been useful in deepening financial markets and to preserve FX reserves. Brazil announced in August 2013 daily sales of $500 million in swaps contracts until year-end. In the event, the program was extended to mid-2014. By early 2015, the central bank had a $108 billion accumulated swap exposure (about 1/3 of the stock of international reserves). Some estimates of the impact of these interventions are around ¼ percent change in the exchange rate per every $1 billion purchase or sale. As in the case of purchase programs in Chile, most of the impact took place on the date of the announcement. Given that implementation occurs with some lag, these estimates are typically not statistically significant. Mexico has also provided non-deliverable forward contracts since 2017 to intervene without sacrificing reserves and to satisfy investors and corporate hedging needs. The original program auctions were announced for up to $20 billion. After an initial allotment of $1 billion in March of that year, additional auctions brought the total to $4.5 billion. In December 2017, an additional $500 million dollars were placed.

In highly dollarized economies, FXI has helped mitigate the financial stability effects of large currency mismatches. Countries like Costa Rica, Peru, and Uruguay have large dollarized liabilities that may be associated with currency mismatches. Excessive exchange rate volatility can thus result in unwarranted financial stability, justifying FXI. For example, Peru has followed a lean-against-the-wind strategy through mostly (two-sided) discretionary spot interventions to reduce potential financial instability risks. In periods of stress, the volumes

Figure 2. Exchange Rate Movements
(Nominal exchange rate indices; index: 2008 = 100)
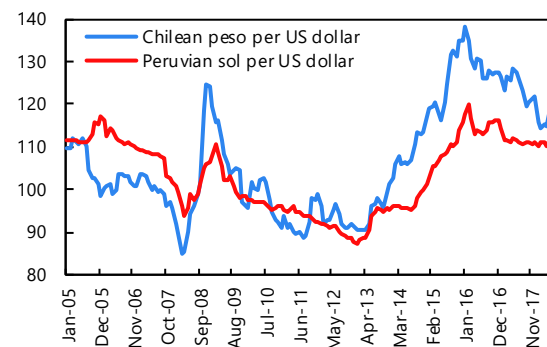
Sources: Haver Analytics; national authorities; and IMF staff calculations.

were as high as purchasing 25 percent of the spot market turnover in 2006 or selling 13 percent of the market turnover between June 2008 and February 2009 and 11 percent of the turnover in 2016. As a result of this interventions, the volatility of Peru's exchange rate has been much smaller than Chile's (another mineral exporter subject to similar external shocks; Figure 2).

Latin America's experience suggests that FXI can effectively be integrated into an IT policy framework. Although the debate about the effectiveness of these (and other) episodes of FXI in the level and volatility of the exchange rate remains unsettled, tensions between effectively delivering an inflation target while smoothing FX pressures have been successfully managed in the region. In Latin America, FXI seems to be more effective when interventions are transparent and preannounced on the back of a strong FXI communication policy and data transparency, while derivatives intervention appears as effective or, at worse, slightly less effective than spot intervention.

Going forward, further enhancing transparency and communication of FXI policy can help the market better internalize the central bank FXI reaction function. As with other asset market interventions, the mere announcement would reduce the need for actual intervention, increase the effectiveness of intervention, and reduce its cost. In turn, this would help enhance the credibility of the central bank and its inflation credentials, thus strengthening central bank's IT effectiveness.

References

Chamon, Marcos, David Hofman, Nicolas E. Magud, and Alejandro Werner (editors), 2019. *"Foreign Exchange Intervention in Inflation Targeters in Latin American,"* forthcoming (Washington: International Monetary Fund).

Ghosh, Atish R., Jonathan D. Ostry, and Marcos Chamon, 2016. "Two Targets Two Instruments: Monetary and Exchange Rate Policies in Emerging Market Economies" *Journal of International Money and Finance,* vol. 60, pp. 172–196.

International Monetary Fund's *Regional Economic Outlook: Western Hemisphere,* April 2018 (Washington: International Monetary Fund).

5. Productivity in Latin America[1]

Forty years ago, productivity levels in the major Latin American countries were not far from those in the United States, with differences in income per capita mainly explained by differences in human and physical capital. Nowadays, productivity is the main factor behind the non-convergence of income levels. At the same time, misallocation of productive resources is prevalent in the region. This note finds that this misallocation of productive resources is significant enough to explain low productivity in the region and the lack of convergence to income levels observed in advance economies. There is some evidence that tariffs, a poor business environment, and labor market distortions explain high productivity dispersion across firms and sectors in the region—usually associated with resource misallocation.

Macro Facts and Conceptual Background

During the last four decades countries in the region have witnessed a lackluster total factor productivity (TFP) performance. Figure 1 displays the Solow residual calculated for LAC countries as a share of U.S. in the most traditional fashion, that is, by computing: $y_t - \alpha k_t - (1 - \alpha).h_t$, where k is physical capital and h is a human capital measure and α is the share of capital in total income. For the largest countries,[2] TFP relative to the U.S. has exhibited a protracted downward trend; which was interrupted only during the commodity price boom. However, productivity levels (and growth) are still much lower as compared to other emerging markets (October 2017 *Regional Economic Outlook Update: Western Hemisphere*).

Figure 1. LA7: Total Factor Productivity Across Time
(Relative to the United States)
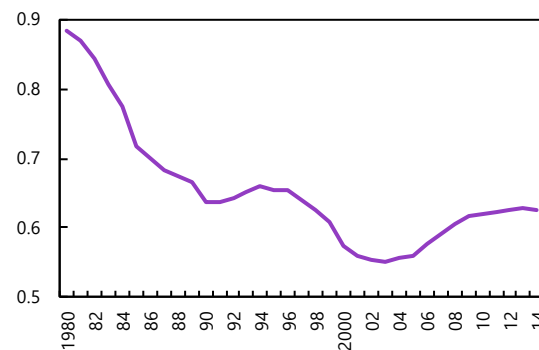
Source: IMF staff calculations.
Note: LA7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay.

The level of a country's TFP is driven at the micro level by two factors: (i) domestic firms' distance from the technological frontier and (ii) within-country misallocation of resources preventing more efficient firms from expanding. The first problem may result from political economy issues (some groups that miss out from new technologies lobby against change), low domestic human capital levels or others. But according to (ii), even if there exist firms in the country displaying TFP levels similar to those found in more advanced economies, overall productivity can still be low if less productive firms do not leave the marketplace and prevent productive inputs—capital and labor—from flowing to where returns are higher. This may be due to entry/exit barriers, differential tax rates and other regulations and is prevalent also in other emerging markets (EMs) (see October 2018 *Regional Economic Outlook: Asia Pacific*).

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[1]This *Regional Economic Outlook* background paper was prepared by Carlos Goncalves.
[2]Argentina, Brazil, Colombia, Chile, Mexico, Peru, and Uruguay.

High Dispersion in Labor Productivity Across Sectors in Latin America

Analysis done at the sectoral level reveals there is more dispersion in within-country labor productivity across sectors in Latin America than in other EMs. [3] In principle, if factors of production could flow unimpeded from one sector to the other, differences in labor productivity should be negligible: labor flows would undo initial differences in returns. However, in practice, some variability in productivity is inevitable due to adjustment costs. Using the Groningen Growth and Development Centre's 10-sector database, two measures of within-country productivity dispersion are constructed: highest to mean labor productivity ratio (Table 1).

Table 1. Sectoral Labor Productivity Dispersion
(Ratio)

Ranking	Country	Highest to Mean Productivity Ratio, 10-sector	
5	MEX	5.70	
7	COL	5.35	Very high
9	VEN	4.49	
13	ARG	4.09	
15	BOL	4.02	Moderate
17	BRA	3.82	
20	CHL	3.44	
25	PER	2.92	Low
34	CRI	1.61	

Sources: Timmer, M. P., de Vries, G. J., and de Vries, K. (2015), "Patterns of Structural Change in Developing Countries;" In J. Weiss, and M. Tribe (Eds.), Routledge Handbook of Industry and Development (pp. 65-83), London: Routledge; and IMF staff calculations.

As Figure 2 shows, labor productivity dispersion in Latin America was high in Bolivia, Brazil, Colombia, Mexico, and Venezuela. Although this aggregate data is available until 2011, as will be shown in the following section the pattern still holds using very recent firm-level data from Orbis.

Figure 2. Histogram of Coefficient of Variation of Within-Country Labor Productivity, 2011
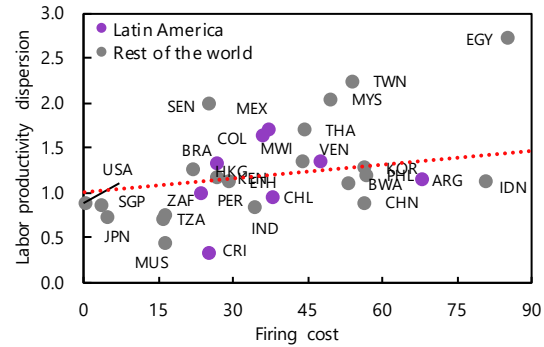*(Number of countries)*
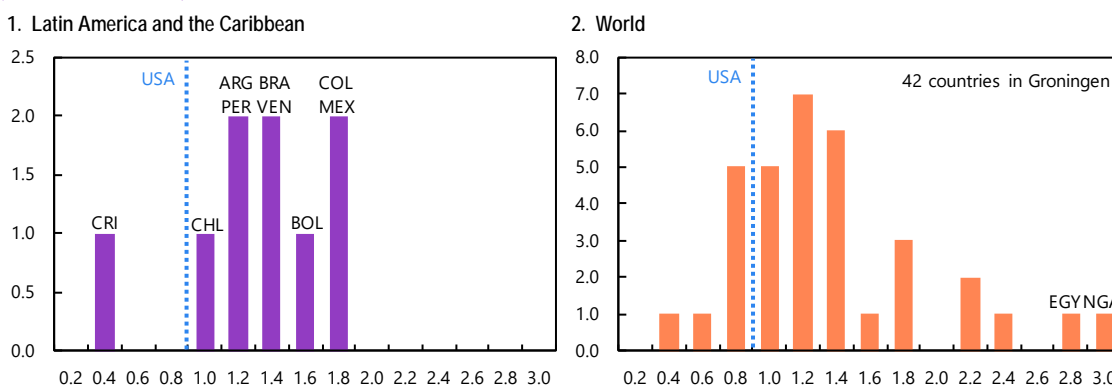
Sources: Timmer, M. P., de Vries, G. J., and de Vries, K. (2015), "Patterns of Structural Change in Developing Countries;" In J. Weiss, and M. Tribe (Eds.), Routledge Handbook of Industry and Development (pp. 65-83), London: Routledge; and IMF staff calculations.
Note: Standard deviation of productivity (divided by average) across 10 sectors. Data labels use International Organization for Standardization (ISO) country codes.

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[3]Coverage is large, but data ends in 2011. Additionally, one cannot calculate the Solow residual using this dataset since it provides no information on capital.

The dispersion in sectoral labor productivity is associated with measures of flexibility of the labor market: poorly functioning labor markets exacerbate misallocation. By raising the costs of reallocating labor, rigid labor market laws may adversely affect the long-term growth potential of the economy. As Figure 3 suggests, labor productivity is more spread out in countries where, for instance, the firing costs of redundant labor are larger. In Latin America, Argentina and Venezuela stand out as countries featuring inflexible labor markets and high productivity dispersion.

Figure 3. Labor Market Institutions and Labor Productivity Dispersion, 2011

Sources: Timmer, M. P., de Vries, G. J., and de Vries, K. (2015), "Patterns of Structural Change in Developing Countries;" In J. Weiss, and M. Tribe (Eds.), Routledge Handbook of Industry and Development (pp. 65-83), London: Routledge; and IMF staff calculations.

High Dispersion of Overall Total Factor Productivity Across Firms in Latin America

Available firm-level data for Brazil, Colombia, and Mexico[4] reveals that TFP varies substantially across firms within the same sectors. Using firm-level data from Orbis dataset aggregated to NACE 2-digit sector classification, Figure 4 illustrates that the amount of intra-sector dispersion in TFP is much higher in Brazil than in the U.S. The same is true for Colombia and Mexico.

Figure 4. Histogram of Within-Sector Total Factor Productivity Dispersion, 2016
(Number of sectors)
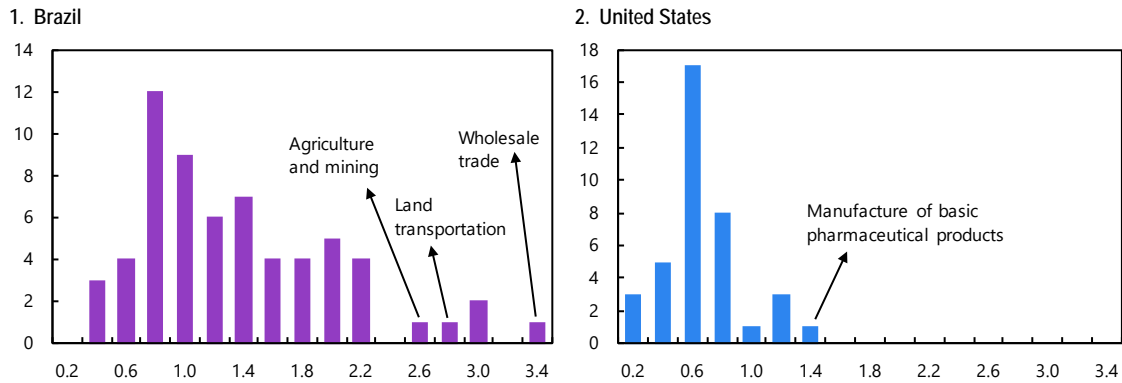
Sources: Orbis database; and IMF staff calculations.

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[4]From Orbis dataset, we calculate TFP-revenues as: $\frac{PY}{K^{\alpha}L^{1-\alpha}}$. Data in Orbis is more detailed and more up to date, ending in 2016.

Looking directly at firms instead of sectoral aggregations, we confirm the previous results: there is much more dispersion in TFP across firms in Latin American countries than in the U.S. As shown in Table 2, the ratio of total factor productivities between firms at the 50 and the 25 percentiles—P(50)/P(25)— is nearly three times larger in Brazil than in the U.S.

Table 2. Productivity Ratios at Firm Level
(Ratio)

	p(75)/P(50)	p(50)/P(25)	Number of firms
Brazil	2.72	3.45	9,370
Colombia	2.10	2.20	27,766
Mexico	2.11	2.20	2,932
USA	1.45	1.26	6,679

Source: IMF staff calculations.

Empirical Analysis

Previous sections showed evidence of dispersion in sectoral TFP across countries. Differential taxes, regulations, and other distortions in goods and factor markets explain that dispersion and the associated loss in overall TFP. In this section, we present some evidence on the role of tariffs, taxes, business climate, and labor market distortions as determinants of productivity dispersion.

The within-sector variability of firms' TFP is associated with sector-specific import tariffs in Brazil and Colombia, but not in Mexico. Results presented in Table 3 aggregate firms by NACE 2-digit sectoral classification. Hence, import tariffs are likely part of the explanation, even though the unexplained component is very large.

Table 3. Productivity Dispersion Within Countries/Across Sectors and Import Tariffs

	(1) Brazil	(2) Colombia	(3) Mexico
	Within sector total factor productivity dispersion		
Sector import tariff (mean)	0.0192***	0.0153***	0.0146
	(0.00626)	(0.00409)	(0.0135)
Constant	0.828***	0.884***	1.205***
	(0.0835)	(0.0388)	(0.124)
Observations	95	95	87
R-squared	0.115	0.108	0.014

Source: IMF staff calculations.
Note: Observations are number of sectors included in the regression. Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Using a sample of 60 countries for which firm-level data is available, we find that ease of doing business and, to a lesser extent, wage flexibility in the labor market, matter for misallocation. Table 4 shows that a measure of bureaucratic red tape, namely, the time necessary to pay taxes, is strongly correlated with TFP dispersion. Interestingly, country size (proxied by population) also matters. There are two possible reasons for that: (i) geographical dispersion renders labor and capital markets less integrated and (ii) larger population leads to lower international trade and hence lower competition.

Table 4. Productivity Dispersion Across Countries and Doing Business

	Full sample	Excludes Outliers
	Total factor productivity dispersion	
Time to pay taxes	0.000288*	0.000151***
	(0.000146)	(4.97e-05)
Flexibility of wage determination	-0.0410	-0.0543
	(0.0376)	(0.0374)
Population	2.52e-10**	3.09e-10***
	(1.12e-10)	(8.49e-11)
Constant	0.954***	1.014***
	(0.179)	(0.177)
Observations	63	60
R-squared	0.120	0.107

Source: IMF staff calculations.
Note: Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A measure of misallocation proposed by Hsieh and Klenow[5] suggests that in Brazil (123 percent), Colombia (98 percent), and Mexico (130 percent), misallocation is at least twice as large as in the U.S. These percentages were obtained by computing how much productivity would increase in the manufacturing sector if the wedges that generate misallocation were eliminated. In essence, the methodology entails constructing a counterfactual exercise in which all distortions (policy driven or otherwise) are driven to zero. Arguably, this is a too stringent counterfactual, since even the most efficient economies still present nontrivial levels of misallocation. A better benchmark exercise would compare then these numbers against the misallocation levels found in a developed economy—which hover between 40 percent and 60 percent.

The degree of misallocation varies considerably across sectors in a given country. In particular, as Table 5 suggests, misallocation tends to be more severe in the nontradable sectors—"services"—as compared to manufacturing and agriculture, hinting again that lack of competition may be an important factor behind a poor allocation of productive resources.

Table 5. Misallocation Across Sectors

Brazil			Colombia			Mexico		
NACE 4-digit	Sector	Percent of misallocation	NACE 4-digit	Sector	Percent of misallocation	NACE 4-digit	Sector	Percent of misallocation
6810	Services	998.6	7830	Services	913.3	4120	Services	692.7
6420	Services	978.0	7490	Services	862.4	2651	Manufacturing	624.7
7219	Services	893.3	7111	Services	827.0	113	Agriculture	429.1
6430	Services	811.5	6190	Services	824.5	7311	Services	416.7
4211	Services	764.3	6832	Services	714.0	1712	Services	409.0
4673	Services	668.5	4631	Services	655.4	5210	Services	340.4
4120	Services	661.1	8122	Services	625.1	2442	Manufacturing	336.2
6190	Services	640.4	5813	Services	606.6	4634	Services	305.5
6209	Services	626.4	1920	Manufacturing	595.2	1051	Manufacturing	300.2
4612	Services	614.9	8211	Services	516.8	6820	Services	266.2
5210	Services	598.7	4519	Services	513.3	4672	Services	262.1
3312	Manufacturing	576.2	210	Agriculture	491.2	2410	Manufacturing	260.3

Sources: Orbis database; and IMF staff calculations, following the Hsieh and Klenow (2009) methodology.
Note: NACE = Nomenclature of Economic Activities.

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[5]For the sake of space, we are not displaying the model's equations here. See Hsieh and Klenow (2009) for details.

Policy Discussion

Misallocation of resources varies substantially across countries, but also a lot within countries. This finding suggests that not only macro but also microeconomic distortions explain the lackluster productivity performance and non-convergence of LAC countries.

Many economic policies common in Latin America are in principle conducive to a poor allocation of productive resources. Small and unproductive firms may survive due to policy-induced wedges that are hard to quantify like: (a) targeted subsidies, (b) national content laws and lack of import competition, (c) poorly functioning credit markets, (d) tax regimes favoring small firms, and (e) government credit lines at below market interest rates to "selected" firms/sectors.

References

Chang-Tai Hsieh and Peter Klenow, "Misallocation and Manufacturing TFP in China and India," *Quarterly Journal of Economics*, Vol 74, 2009.