Inflation Dynamics in Latin America: A Comparison with Global Trends and Implications for Monetary Policy

Rodrigo Vergara

I. Introduction

Inflation rates in most advanced economies remain stubbornly low. To many observers, this reflects persistent economic slack in the aftermath of the Global Financial Crisis, combined with the evolution of oil prices since late 2014. Indeed, this combination has put low inflation or even deflation at the forefront of policymakers' concerns.

This narrative, however, better fits the situation in the advanced world than in many emerging-market economies (EMEs). In this presentation, I will put special emphasis in the recent inflationary experience of Latin America (LATAM), having in mind that there is heterogeneity in the region, hence it would be impossible to represent every single country in the region with this analysis. Contrary to what seems to be the norm among advanced economies (AEs), LATAM has seen a surge in inflation in the last two years. As I will argue, such a trend prevails despite a slowdown in activity, and mainly is the result of a combination of external shocks and structural elements that make inflation dynamics in these countries especially susceptible to those shocks.

Regarding the external shocks, we highlight the effects of the end of the commodity supercycle. This development is hugely important for

several LATAM countries, where commodities account for a relatively large share of exports. While this process started at different specific dates for each particular economy, most of the countries of the region we consider have seen a significant deterioration in their terms of trade (ToT) since 2013, and consequently, a depreciation of their currencies *vis*-à-*vis* the U.S. dollar that has been larger than elsewhere.

Regarding structural characteristics, we have studied the hypothesis that a higher degree of exchange rate pass-through (ERPT) may also explain recent inflationary experiences, to the extent that it amplifies the inflationary effect of a given external shock. In a joint paper with colleagues at the Central Bank of Chile, we constructed an indicator of ERPT for a sample of 48 countries, based on impulse-response functions simulated from structural VARs. There we document that LATAM has a relatively high degree of ERPT, a phenomenon that is shared more generally with other EMEs. These results are consistent with a large body of literature on ERPT.[1] We also study the cross-sectional determinants of our ERPT index, although I will leave this issue for a different occasion.

To put these results in perspective, we contrast the experience in LATAM with other groups of countries which serve as natural controls. The first is a group of Southeast Asian EMEs under flexible exchange rate regimes. These countries share with LATAM the structural feature of having a high degree of ERPT, which more generally appears to be an emerging world phenomenon. While inflation in these countries has been lower than in LATAM, this is mainly because most of them do not rely on commodities, and hence faced a very different evolution of their ToT, leading to significantly lower depreciation rates. Hence, the main feature separating LATAM from other EMEs are external shocks. When LATAM is compared with commodity exporting AEs (CEAEs) it is found that the deterioration of ToT in these countries has been of a comparable magnitude, although the depreciation of their currencies has been smaller than in LATAM. However, it is also found that ERPT coefficients are much smaller for these economies, and closer to the rest of the AEs in the sample. The conclusion is that, while experiencing similar ToT shocks, CEAEs faced lower inflationary pressures mostly due to

different structural characteristics. Finally, a subset of EMEs with high ERPT levels is studied, which are also commodity exporters and thus subject to similar ToT and nominal exchange rate (NER) depreciation shocks, finding that they, too, recently have experienced significantly higher inflation.

II. Recent Stylized Facts about Inflation Around the World

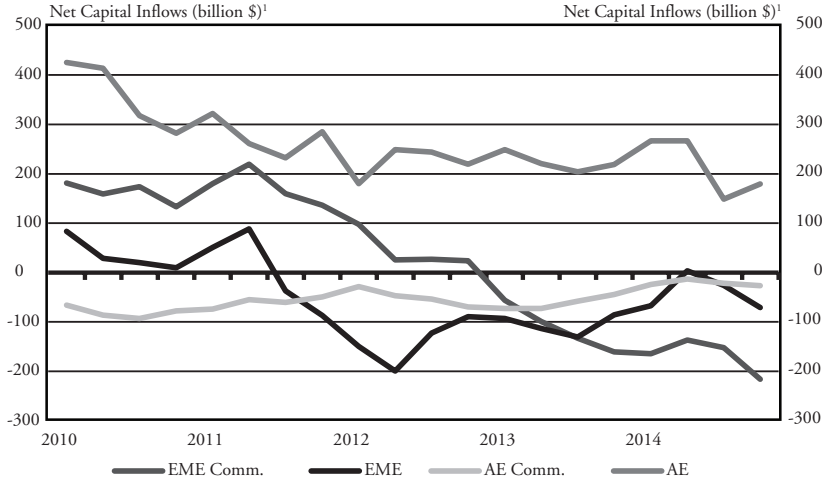
As I mentioned before, three main recent developments regarding inflation have been the decline in the price of oil, the appreciation of the U.S. dollar and the increasing output gaps in many economies. While the exact date and quantitative importance of these mechanisms, in particular the last two, differs for each particular country, a natural starting point to conduct the analysis is the so-called taper talk episode, when markets began to internalize the normalization of the Federal Reserve monetary policy. This episode was especially important for commodity-exporting EMEs, as it triggered an important reversal in capital flows and a consequent depreciation *vis-à-vis* the dollar (Chart 1).

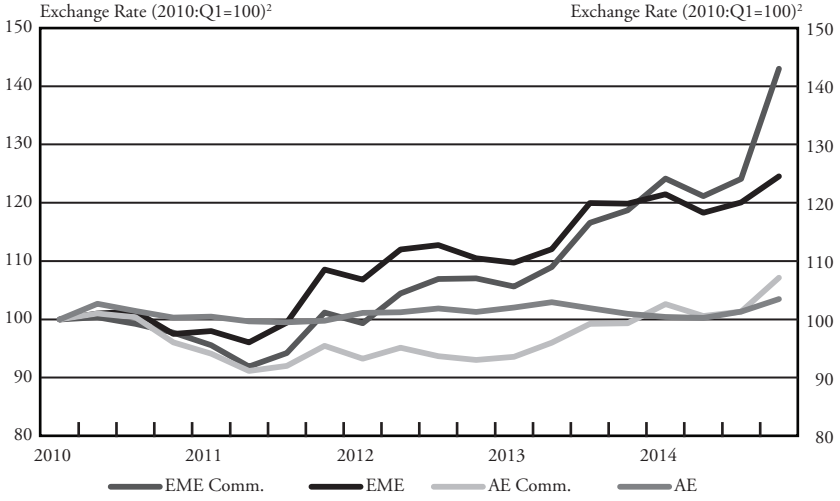
To gain further insight about the causes behind the heterogeneity of NER depreciation, Chart 2 plots the relation between changes in ToT and currency depreciation rates, *vis-à-vis* the dollar. While ToT worsened for commodity exporters across the board, the degree of depreciation was larger among EMEs than for AEs. For non-commodity exporting EMEs and AEs, the ToT improved reflecting mostly the fall in oil prices.

Chart 3 seeks to explain the cross-sectional determinants of inflation across 48 countries since the taper talk of 2013.[2] The upper panel plots the relation between the average output gap based on differences with a univariate HP filter (horizontal axis), and the annualized inflation rate (vertical axis), measured as the deviation from the inflation target.[3] The lower panel plots the relation between the annualized NER depreciation (horizontal axis), and inflation deviations.

The chart makes two central points. First, in the cross section of countries considered, there is a weak relation between estimates of the output gap and inflation (upper panel).[4] These scatter plots do not imply, of course, that negative output gaps are irrelevant. Indeed,

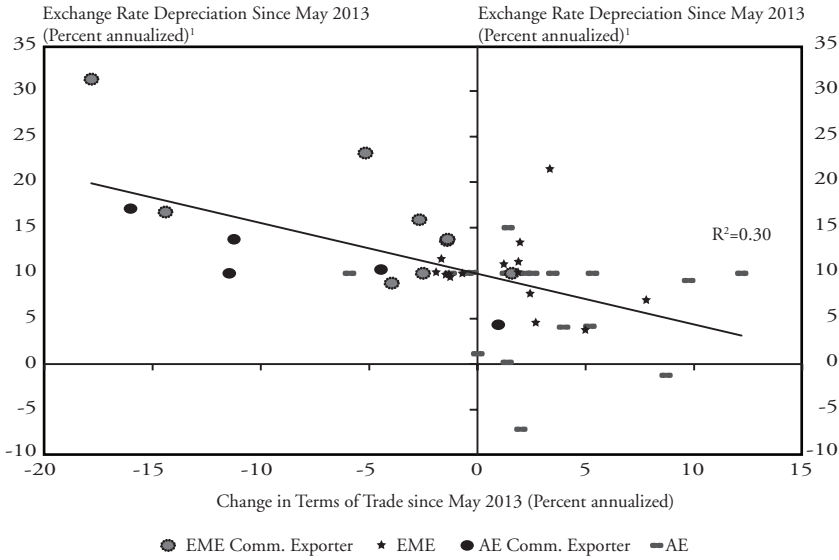
Chart 1
Net Capital Inflows and Exchange Rate Depreciations





[1]IFS (nonresident net capital inflows - resident net capital outflows).
[2]Exchange rate: domestic currency per $1. Increase means depreciation of domestic currency. Groups are GDP (PPP) weighted.

Chart 2
Terms of Trade and Currency Depreciations Since May 2013

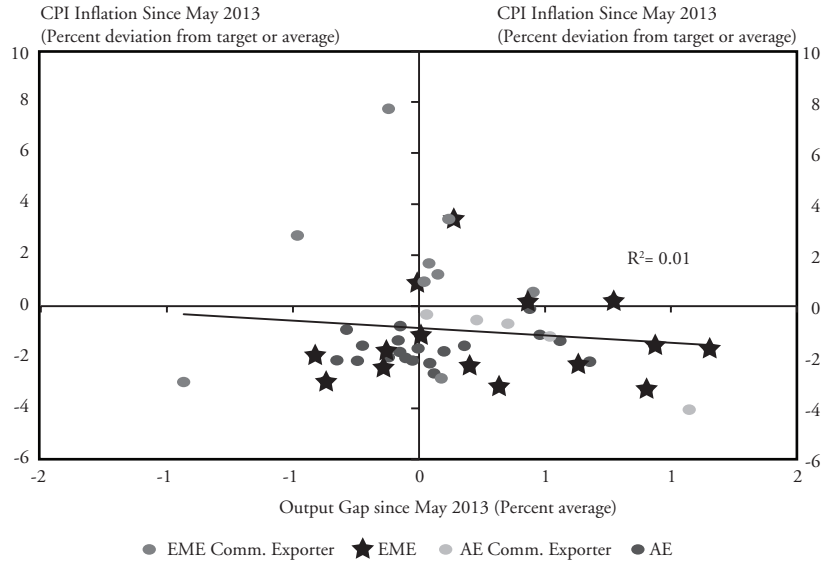


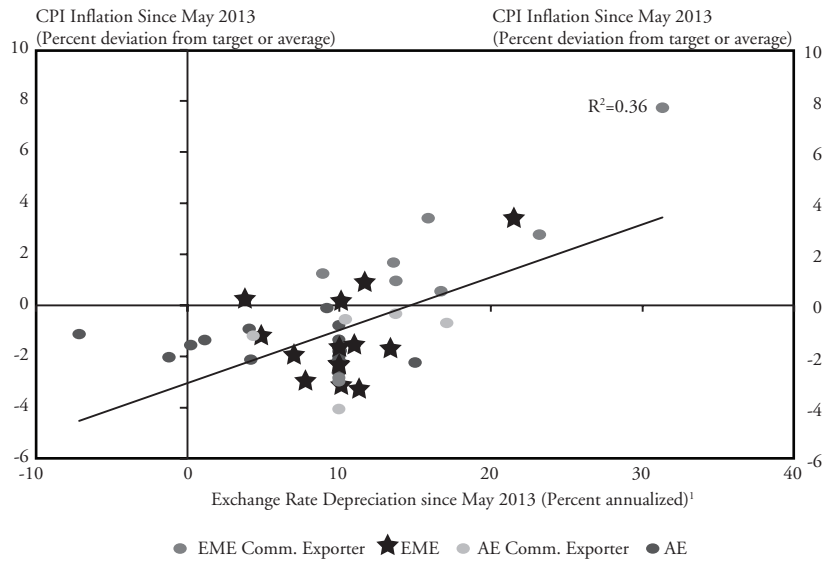
[1]Exchange rate: domestic currency per $1. Positive value means depreciation of domestic currency.

a number of central banks in AE have explicitly estimated a significant impact of economic slack as a driver of the low inflation levels currently observed.[5] However, several recent studies and speeches by central bankers also tend to downplay the role of activity in the determination of inflation more recently.[6] This could be due to a number of factors, including: 1) a better anchoring of inflation expectations, which tends to lower the response of inflation to temporary output gaps, 2) a more prominent role for global output gaps, which tends to reduce the importance of domestic economic slack in Phillips curves, and 3) downward wage rigidity, which may shift the lead-lag relationship between unemployment and wage inflation.[7]

The second major point of the chart is that there is a significant correlation between the rate of currency depreciation and the inflation deviations (lower panel). The dark gray dots correspond to EME for which commodities signify more than 40 percent of total exports. There are four countries considered in the sample that satisfy this criterion: Brazil, Chile, Colombia and Peru. In general, these dots tend to be above the linear trend line describing the relation between

Chart 3
Output Gap, Nominal Exchange Rate Depreciation and Inflation Since May 2013





[1]Exchange rate: domestic currency per $1. Positive value means depreciation of domestic currency.

NER depreciation and inflation: that is, for a given level of NER depreciation, commodity-exporting EMEs tend to have greater inflation rates.

The chart includes EMEs more broadly (stars), whose depreciation and inflationary experiences are quite diverse in the post-taper-talk episode. Commodity-exporting advanced economies (black dots), on the other hand, exhibited relatively low inflation rates, despite annualized depreciation rates in excess of 10 percent in a number of cases. Other AEs more generally (gray rectangle) show low inflation rates, irrespective of their degree of NER depreciation.

Table 1 presents a more formal exercise where the inflation deviation is regressed on output gap, NER depreciation and an interaction term reflecting EME status. Of course, the results should be taken with a grain of salt, since output gaps and depreciation rates depend, among other variables, on monetary policy decisions, which in turn depend on inflation outcomes. With these potential endogeneity problems in mind, the results do tend to confirm the message from Chart 3, highlighting the role of NER depreciation as a driver of inflation in the cross-section, in particular for EMEs. In contrast, activity (measured either by the output gap, or average growth since May 2013 minus the sample average) appears as statistically nonsignificant.

III. Measuring and Explaining ERPT in the Cross Section

The stylized facts just mentioned suggest a significant correlation between NER depreciation rates and inflation outcomes since May 2013 in a large cross section of countries. The degree of currency depreciation, in turn, is significantly correlated with the evolution of ToT, in particular for commodity-exporting countries.

A more formal analysis was conducted studying the link between inflation rates and NER depreciations. Specifically, we constructed measures of exchange rate pass-through (ERPT) for the 48 economies considered. A couple of patterns appear. First and foremost, EMEs have significantly higher degrees of ERPT, a result that is consistent with previous studies such as Calvo and Reinhart (2000), Choudhri and Hakura (2006), and Ca'Zorzi et al. (2007). Second, among EMEs, LATAM stands out as having a higher degree of ERPT,

Table 1
Cross-sectional Determinants of Inflation Since May 2013

Dependent Variable	CPI Inflation Since May 2013 (annualized deviation from target)			
	(1)	(2)	(3)	(4)
Output Gap	-0.159 [0.620]	-0.222 [0.658]		
GDP Growth Differential			0.103 [0.285]	0.272 [0.290]
Depreciation[1]	0.205*** [0.069]	0.095 [0.057]	0.212*** [0.066]	0.103* [0.053]
Depreciation x EME		0.130*** [0.040]		0.140*** [0.041]
Constant	-2.995*** [0.696]	-2.666*** [0.572]	-3.003*** [0.753]	-2.614*** [0.603]
N° Observations	48	48	48	48
Adjusted R-squared	0.333	0.439	0.335	0.454

* p<0.1
** p<0.05
*** p<0.01, robust standard errors in brackets
[1]Domestic currency per U.S. dollar. Increase means depreciation
Source: Author's calculations based on Bloomberg and CEIC.

a result largely driven by the high contribution of Brazil to the sample (given its high ERPT estimate and large size), but also true for some of the smaller economies in the group, such as Chile and Peru.

Among developed economies, on the other hand, ERPT estimates are much closer to zero.

IV. Comparing LATAM with Selected Country Groups

Table 2 summarizes the estimates of ERPT, as well as some key indicators of external shocks, including the evolution of ToT and the NER depreciation *vis-à-vis* the dollar (both in annualized terms), for different control groups. The first control group includes a subset of EMEs from Southeast Asia that are classified as non-commodity exporters. These economies are closer to LATAM in terms of economic development. Also, all these economies exhibit flexible exchange rates. In terms of ERPT, the group average is estimated at 0.11, which is smaller than the 0.19 estimated for LATAM, but higher than for AEs.

Table 2
Shocks, Structural Conditions and Inflation Outcomes

	Shocks		Structural	Outcome
	ER (%)[1]	TOT(%)	ERPT	Inflation Deviation (%)
LATAM	17.6	-4.6	0.19	1.83
EME Non-Commodity	6.1	1.9	0.11	-0.34
AE Commodity	12.0	-7.8	0.07	-0.052
EME Commodity	23.6	-10.3	0.16	5.38

[1]Exchange rate: domestic currency per $1. Positive value means depreciation of domestic currency
Notes: LATAM includes Brazil, Chile, Colombia, Mexico and Peru. EME non-commodity includes Malaysia, Philippines and Thailand. AE commodity includes Australia, Canada, Norway and New Zealand. EME commodity includes Indonesia, Russia and South Africa. Groups are GDP (PPP) weighted.
Source: Author's calculations.

At the same time, the exposure of this group to external shocks was markedly different. Indeed, ToT actually improved after May 2013, mostly reflecting the sharp drop in oil prices. Consequently, the rate of NER depreciation was only one-third of the figure for LATAM. This comparison suggests that, for this group of countries, having significantly lower exchange rate depreciation is likely to be the main feature explaining its lower inflation outcome (-0.34 percent on average) *vis-à-vis* LATAM (1.83 percent).

A second relevant control group is one in which exposure to external shocks was similar, but which does not share the high degree of ERPT of LATAM. This group consists of the AE commodity exporters with flexible exchange rate regimes, including Australia, Canada, New Zealand and Norway. The table shows that these countries actually suffered worse ToT shocks than LATAM during this period (-7.8 percent versus -4.6 percent for LATAM), although the NER depreciation was smaller. But the key difference seems to be the degree of ERPT, which is about one-third of the value estimated for LATAM. In consequence, the NER depreciation had but minor effects on inflation for this group.

Lastly, we consider a selected group of EMEs which are also commodity exporters, including Indonesia, Russia and South Africa. Table 2 shows that this group suffered the worse ToT evolution in the period considered among all four groups (-10.3 percent annualized), which translated into the largest NER depreciation (23.6 percent).

At the same time, the degree of ERPT is estimated at a group average of 0.16, very similar to LATAM's. Our hypothesis that inflationary pressures in this period reflect a combination of both shocks, as well as structural responses to these shocks, will therefore predict a large, positive inflation deviation for this group. This is exactly the outcome reported in the table (5.38 percent for the group's average).

In conclusion, the recent inflationary experience in LATAM seems strongly related to the evolution of external events. First, ToT have worsened significantly, which, combined with other elements such as a divergence in the expected path of monetary policy in AEs, have led to rather large NER depreciation of the currencies in the region *vis*-à-*vis* the dollar. Second, the structural characteristics of these economies are consistent with a relatively large degree of ERPT into domestic prices. Both elements seem important to understanding the recent deviation of inflation above targets. Indeed, countries which share high levels of ERPT but were exposed to less NER depreciation show inflation rates below targets. On the other hand, countries which experienced similar external shocks but have significantly lower ERPT have also exhibited lower inflation rates. And finally, countries which share both the degree of ERPT and the exposure to external shocks with LATAM have also seen a significant rise in recent inflation rates.

V. The Case of Chile

Let me finish with some brief remarks on my own country, Chile. In the last couple of years we have faced a significant deterioration in our terms of trade and a decline in capital inflows. This, along with the global appreciation of the dollar, has translated into a 45 percent nominal depreciation of the Chilean peso in two years. In addition, the economy has decelerated and now is growing in the range of 2 percent as compared to more than 5 percent during the aftermath of the Global Financial Crisis. The central bank has reacted with a more expansionary monetary policy, which has produced a further depreciation.

The depreciation of the peso is seen as a natural and optimal development given the new economic conditions. However, the negative side has been an inflation rate above target for more than a year already.

From a central bank policy point of view, the depreciation poses two risks. The first is a financial stability risk. If there are currency mismatches in the financial and/or corporate sector, a significant depreciation can lead to bankruptcies. We follow mismatches very closely in Chile and although the information is not perfect for the corporate sector, we consider that in our case there is not a significant risk. It's worth mentioning that during the crisis we had a depreciation of similar magnitude and suffered no problems derived from mismatches in the corporate sector. The second is that this change in relative prices, that produces increase in inflation in the short run, leads to a de-anchoring of inflation expectations. This has not been the case in Chile where inflation expectations remain well anchored at the target. That is also the reason why we have kept monetary conditions very accommodative despite inflation being transitorily above target, although we monitor very closely inflation developments.

Author's note: This presentation is based on joint work with Elías Albagli and Alberto Naudon (E. Albagli, A. Naudon and R. Vergara, "Inflation Dynamics in Latin America: A Comparison with Global Trends and Implications for Monetary Policy," Central Bank of Chile, August 2015).

Endnotes

[1]See Calvo and Reinhart (2000), Choudhri and Hakura (2006) and Ca'Zorzi et al. (2007).

[2]We include 24 EMEs and 24 AEs. The selection criterion is based on data availability to at least 2000, to be able to calculate comparable ERPT statistics in Section III. We also exclude countries which have fixed exchange rate regimes *vis-à-vis* the dollar (such as China and Hong Kong), since we focus on the ERPT with respect to this currency in our later exercises.

[3]For countries without a stated inflation target, we use the post-2000 sample average as a point of comparison. In the case where there is a significant trend in inflation, we use instead a 24-month rolling window of average inflation.

[4]This weak relation still holds if we compare only EMEs, or only AEs, in the cross section.

[5]See, for example, the Central Bank of Canada's *Inflation Report* (April 2015, page 24).

[6]See Yellen (2014) for the case of the United States, and Weale (2014) for the case of the United Kingdom.

[7]See Moccero et al. (2011), IMF (2013) and BIS (2014) for a discussion on the role of inflation expectations; Borio and Filardo (2007), Milani (2010), Bullard (2012) and BIS (2014) for the role of global output gap; and Krugman (2013) and Yellen (2014) for the role of downward wage rigidities.

References

Bank for International Settlements. 2014. Eighty-fourth annual report.

Borio, Claudio, and Andrew Filardo. 2007. "Globalisation and Inflation: New Cross-Country Evidence on the Global Determinants of Domestic Inflation," BIS Working Papers no. 227.

Bullard, James. 2012. "Global Output Gaps: Wave of the Future?" Speech, Federal Reserve Bank of St. Louis, March 28.

Calvo, Guillermo, and Carmen Reinhart. 2000. "Fixing for Your Life," NBER Working Paper, 8006.

Ca'Zorzi, Michele, Eke Hahn and Marcelo Sánchez. 2007. "Exchange Rate Pass-Through in Emerging Markets," *The IUP Journal of Monetary Economics*, vol. V, issue 4, pp. 84-102.

Choudhri, Ehsan U., and Dalie S. Hakura. 2006. "Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter?" *Journal of International Money and Finance*, vol. 25, pp. 614-639.

IMF. 2013. *World Economic Outlook* (April).

Krugman, Paul. 2013. Personal blog.

Milani, F. 2010. "Global Slack and Domestic Inflation Rates: A Structural Investigation for G-7 Countries," *Journal of Macroeconomics*, vol. 32, no. 4, pp. 968-981.

Moccero, Diego, Shingo Watanabe and Boris Cournède. 2011. "What Drives Inflation in the Major OECD Economies?" OECD working paper.

Weale, Martin. 2014. Speech at the Confederation of British Industry, Belfast, June 18.

Yellen, Janet. 2014. Speech at the Federal Reserve Bank of Kansas City Economic Policy Symposium, Jackson Hole, Wyo., Aug. 22.