Regional Economic Outlook:
Western Hemisphere
April 2017

Chapter 3:

External Adjustment to Terms-of-Trade Shifts

Yan Carrière-Swallow
(joint work with Nicolás Magud and Juan Yépez)

Port of Spain, Trinidad and Tobago | June 14, 2017

Motivation

I. Recent adjustment in historical perspective

II. Quantifying the mechanisms of adjustment

III. Depreciations and export performance

Policy conclusions

Motivation

I. Recent adjustment in historical perspective

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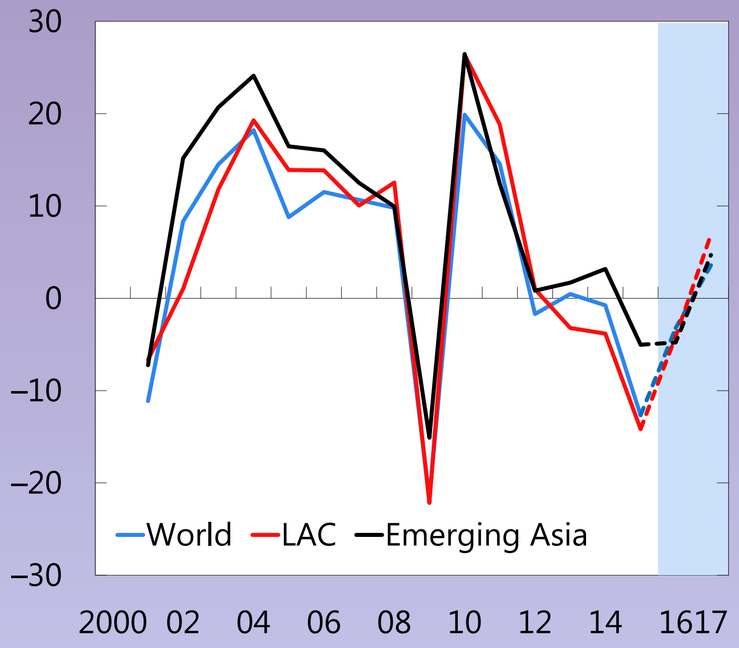
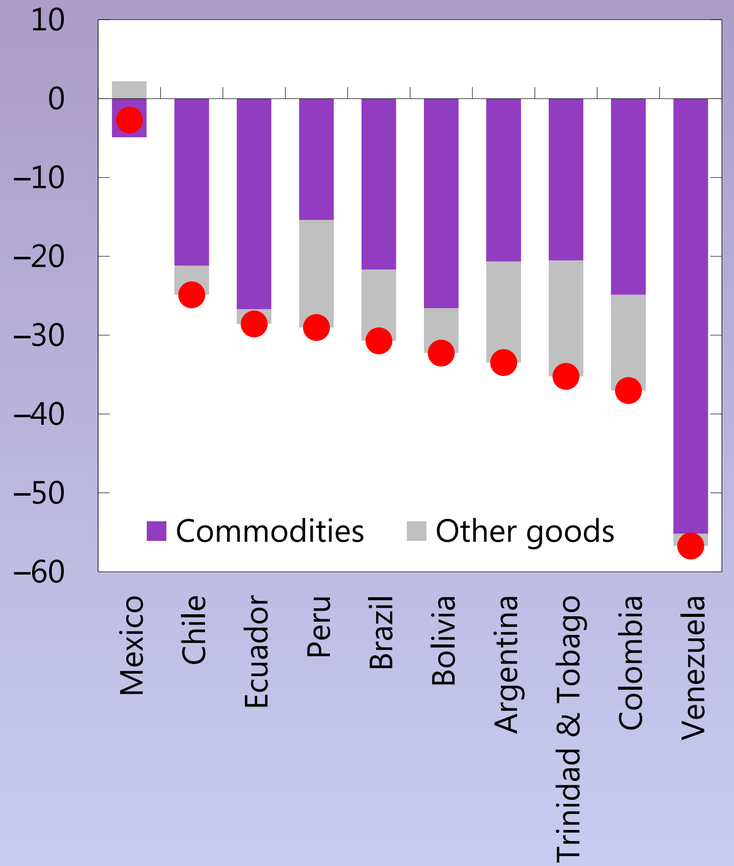
Policy conclusions

Motivation: Large external shock

Growth Rate of World Exports
(Percent change in constant U.S. dollars)



Large Fall of LAC Export Value…[1]
(Peak to trough change in 2013 USD)

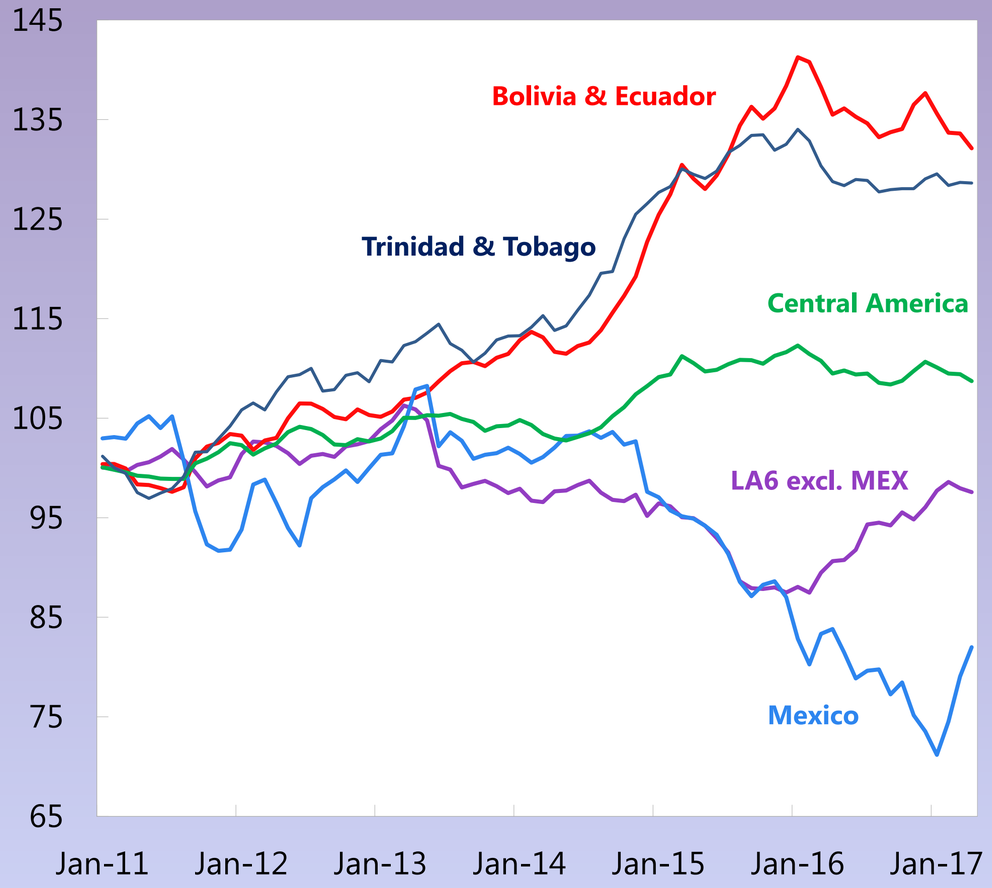


… largely reflects weak terms of trade[2]
(From peak to trough, percent change)

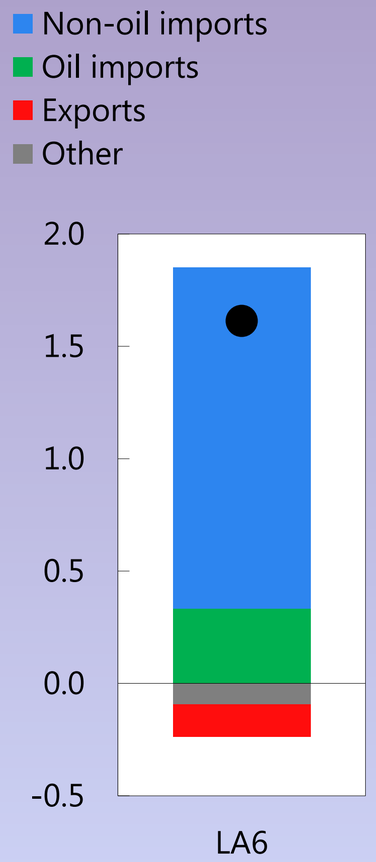
Sources: IMF, World Economic Outlook database; UN Comtrade; U.S. Bureau of Labor Statistics; and IMF staff calculations.
Note: Trade values in constant U.S. dollars have been deflated by the U.S. Consumer Price Index for all urban consumers (all Items). LAC = Latin America and the Caribbean.
[1]Peak and trough are defined using annual data for 2010–15. For export values the peak to trough years for Argentina, Brazil, and Chile correspond to 2011 to 2015; for Colombia, Peru, and Venezuela to 2012 to 2015; for Ecuador to 2013 to 2015; for Bolivia and Mexico to 2014 to 2015.
[2]Peak and trough are defined using annual data for 2010–16. For terms of trade the peak to trough years for Bolivia, Colombia, and Venezuela correspond to 2012 to 2016; for Ecuador and Peru to 2011 to 2016; for Brazil to 2011 to 2015; for Chile to 2010 to 2016; for Argentina to 2014 to 2015; and for Mexico to 2013 to 2015.

How have countries adjusted?

Divergent real effective exchange rates…
(Index: 2011 = 100; + = appreciation)



… but despite depreciations, current account adjustment has been driven by import compression
(Percent of GDP; peak to trough)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Peak to trough is: Brazil (2014–16), Chile (2013–14), Colombia (2014–16), Mexico (2013–14), Peru (2015–16), and Uruguay (2015–16) for the period 2012–16.

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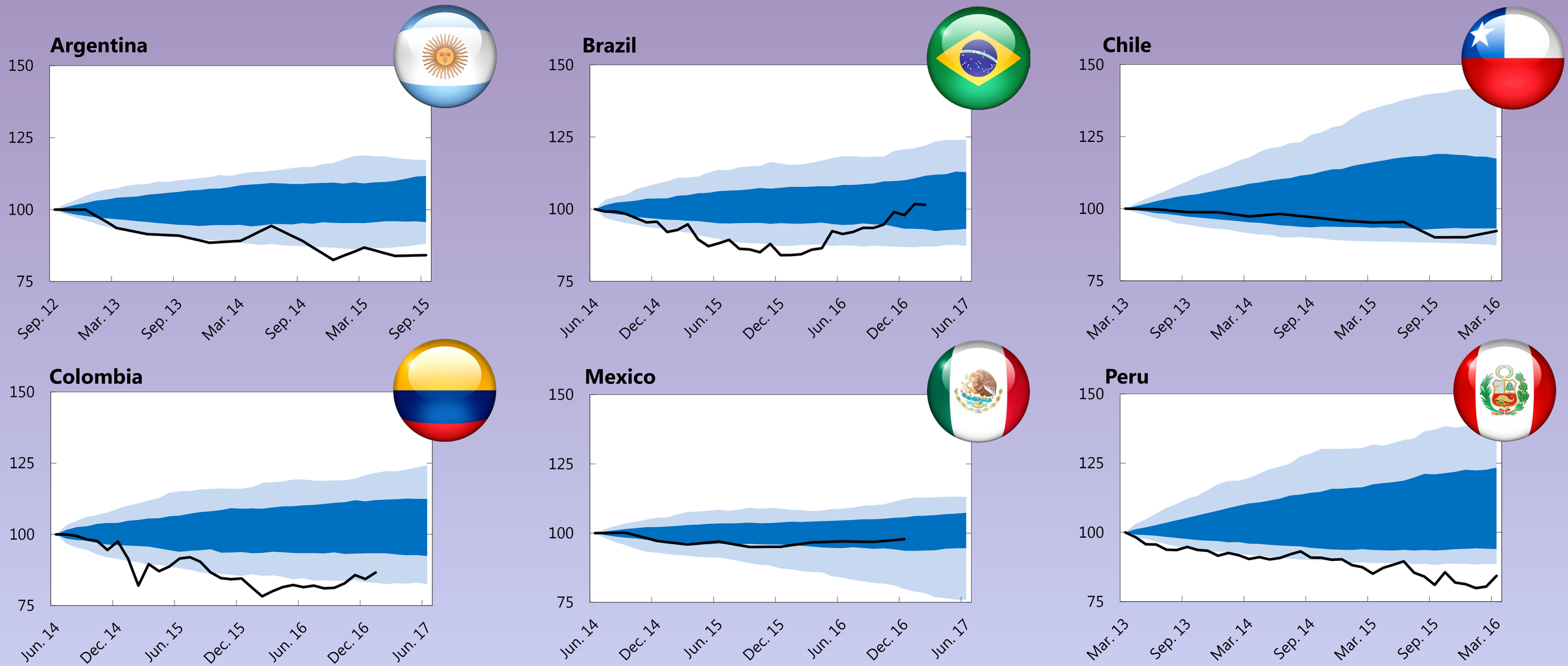
I. Recent adjustment in historical perspective

II. Quantifying the mechanisms of adjustment

III. Depreciations and export performance

Policy conclusions

Terms-of-trade shocks have been large and persistent



Sources: Haver Analytics; IMF, World Economic Outlook database; and IMF staff calculations.

Note: Confidence bands report the empirical distribution of changes in the terms-of-trade index since January 1980, based on 36-month trajectories. The recent episode starts in September 2012 for Argentina; June 2014 for Brazil, Colombia, and Mexico; and March 2013 for Chile and Peru. For Argentina, the period before 1986 is interpolated annual data, while the period after 1986 is interpolated quarterly data. For Chile, the period before 1996 is interpolated annual data while the period after 1996 is interpolated quarterly data. For Peru, the period before 1996 is interpolated annual data.

Putting the recent adjustment in historical perspective

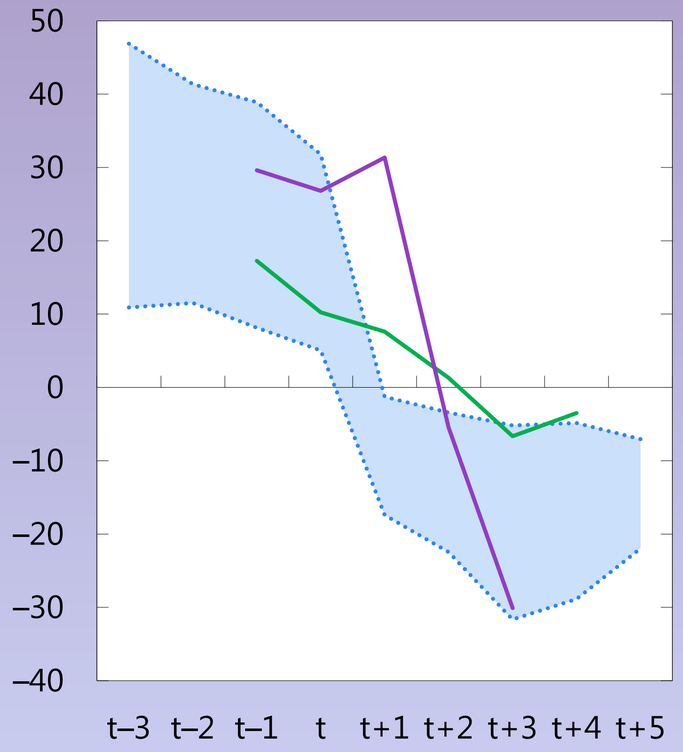
- Event study of terms-of-trade busts in emerging economies, following Adler, Magud & Werner (2017).

- Annual data for 150 countries from 1960 to 2015.

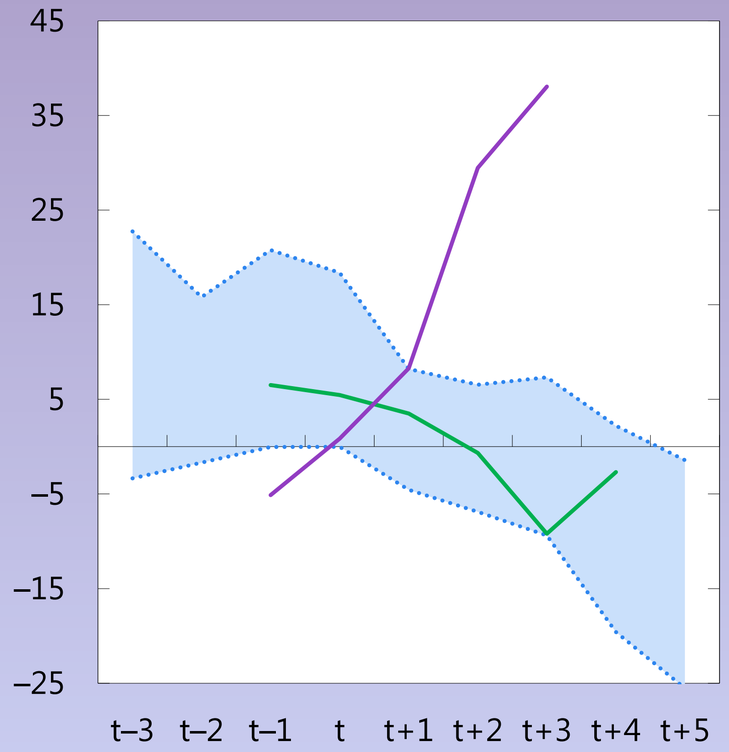
- Terms-of-trade busts identified using estimation of a Markov-Switching model.
  - Identifies 58 episodes where falls in the terms of trade are sufficiently (i) large and (ii) persistent.

Recent adjustment in historical perspective

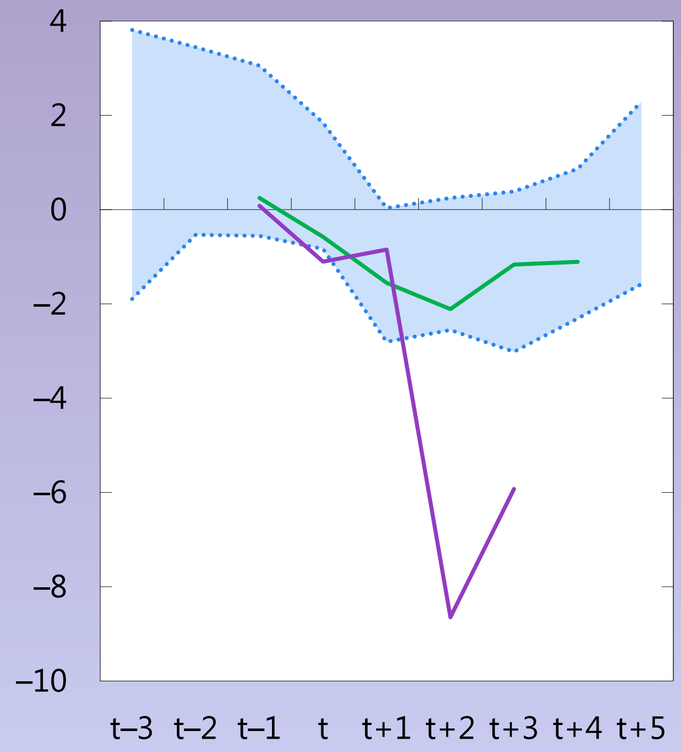
The terms of trade shock has been in line with global experience of TOT busts …
(Index, demeaned)



… but LA's managed ER regimes have seen unusual appreciation of the REER …
(Index, demeaned)



… contributing to large current account movements
(Percent of GDP, demeaned)

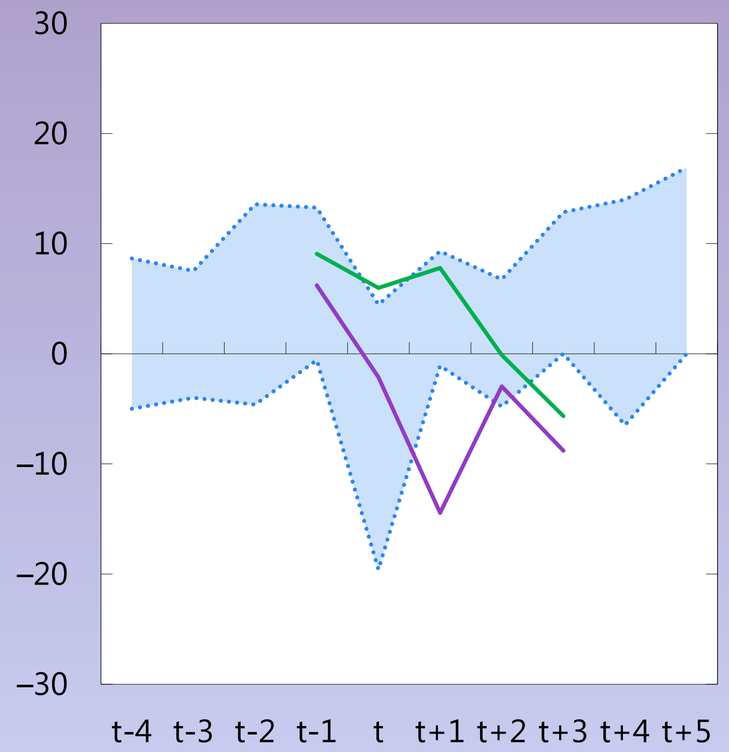


25th–75th percentiles historical events
Median flexible, recent LAC
Median managed, recent LAC

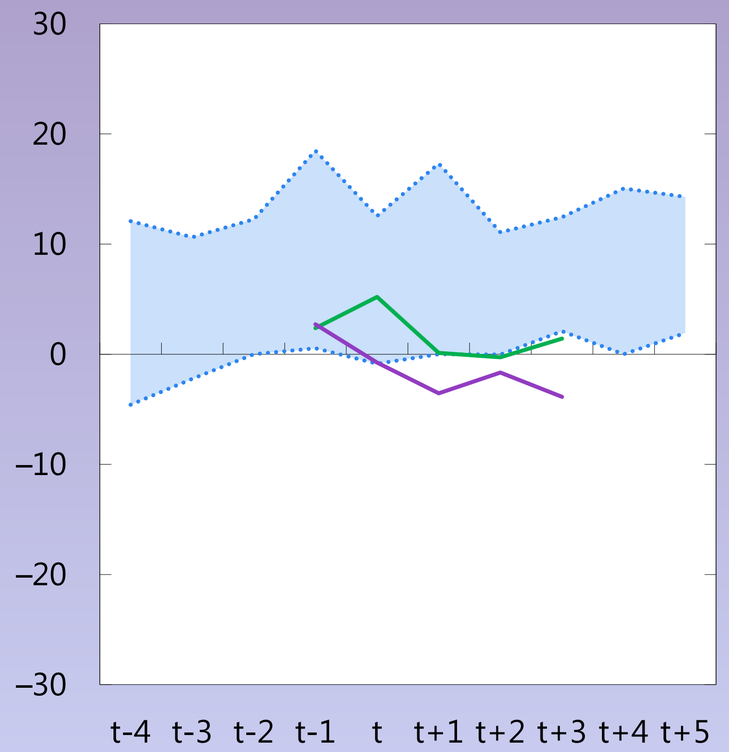
Sources: Adler, Magud, and Werner (2017); IMF, World Economic Outlook database; and IMF staff calculations.
Note: Flexible exchange rate regimes include Brazil, Chile, Colombia, Mexico, and Peru; managed exchange rate regimes refer to a diverse set of countries with more limited exchange rate flexibility, and include Argentina prior to 2016, Bolivia, Ecuador, and Venezuela. Interquartile bands correspond to a large sample of emerging markets and developing economies. Period *t* denotes the year in which the terms of trade begin to fall for each event. Observations are demeaned by event. LAC = Latin America and the Caribbean.

Recent adjustment in historical perspective

Trade flows have adjusted through import compression…
(Growth of import volumes, percent)



… rather than through export expansion
(Growth of export volumes, percent)



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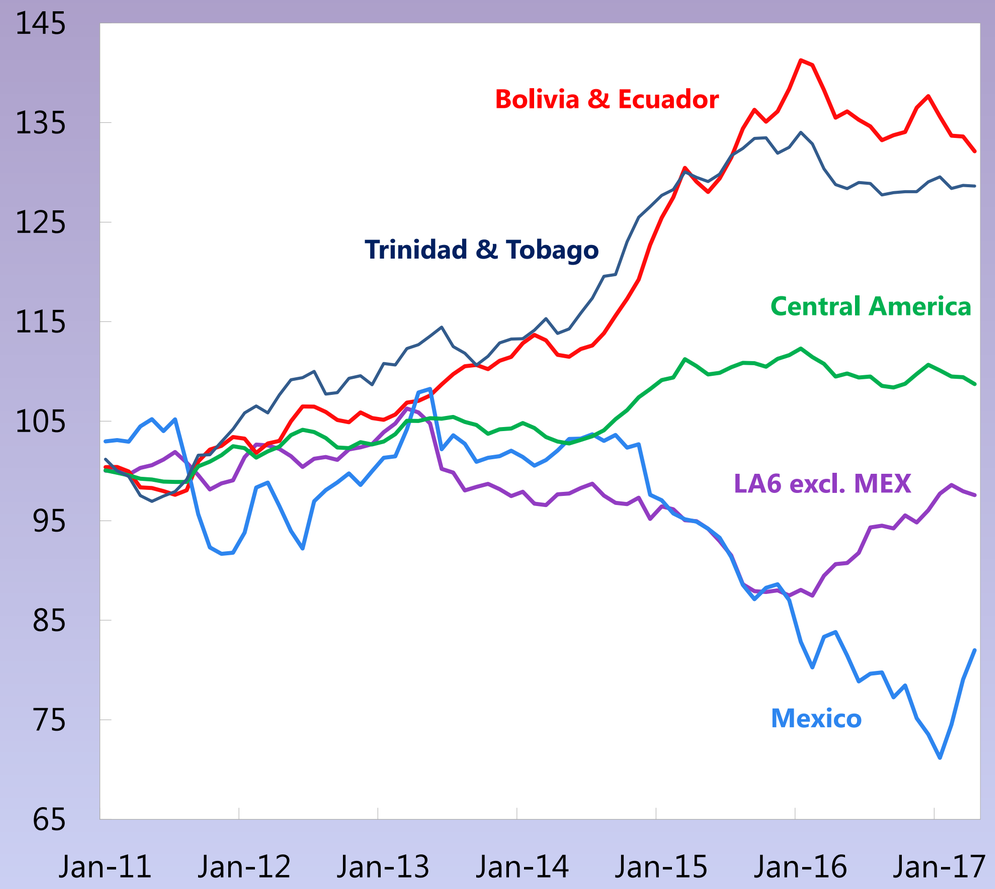
The sacrifice ratio of external adjustment

Divergent real effective exchange rates…
(Index: 2011 = 100; + = appreciation)



Fuentes: IMF, Information Notice System database; World Economic Outlook database; and IMF staff calculations.
Notes: LA6 = Brazil, Chile, Colombia, Mexico, Peru and Uruguay. Simple averages across countries.

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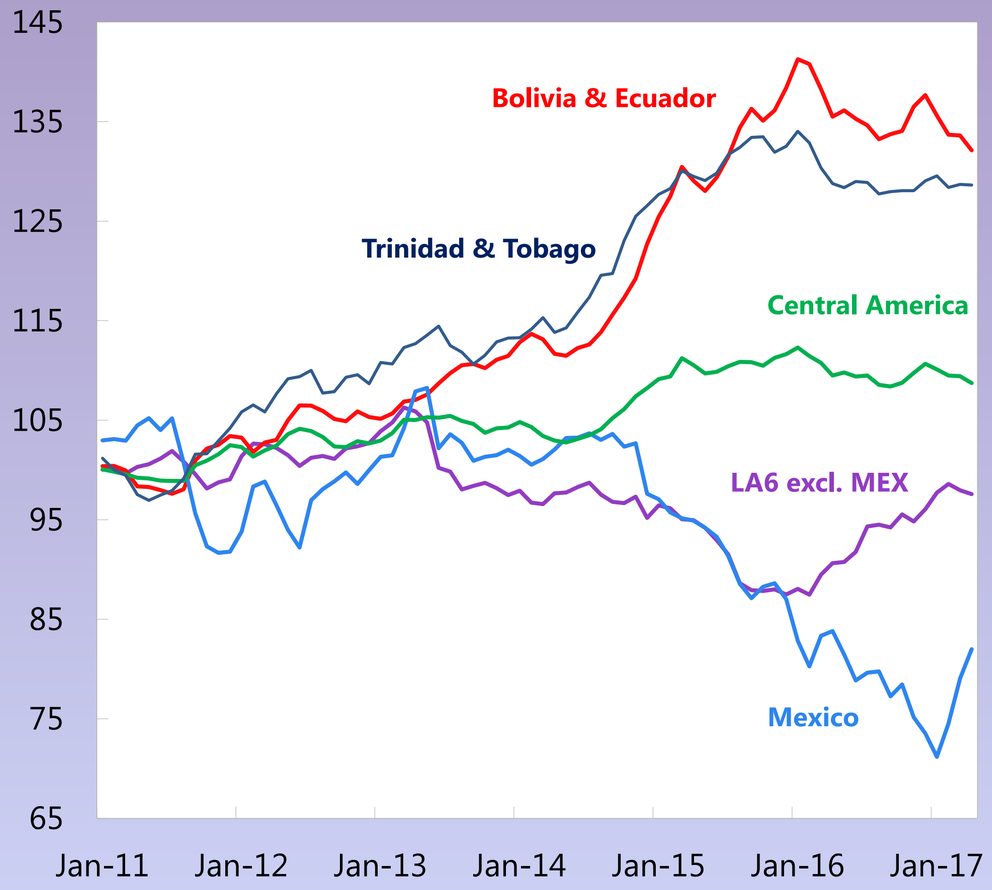
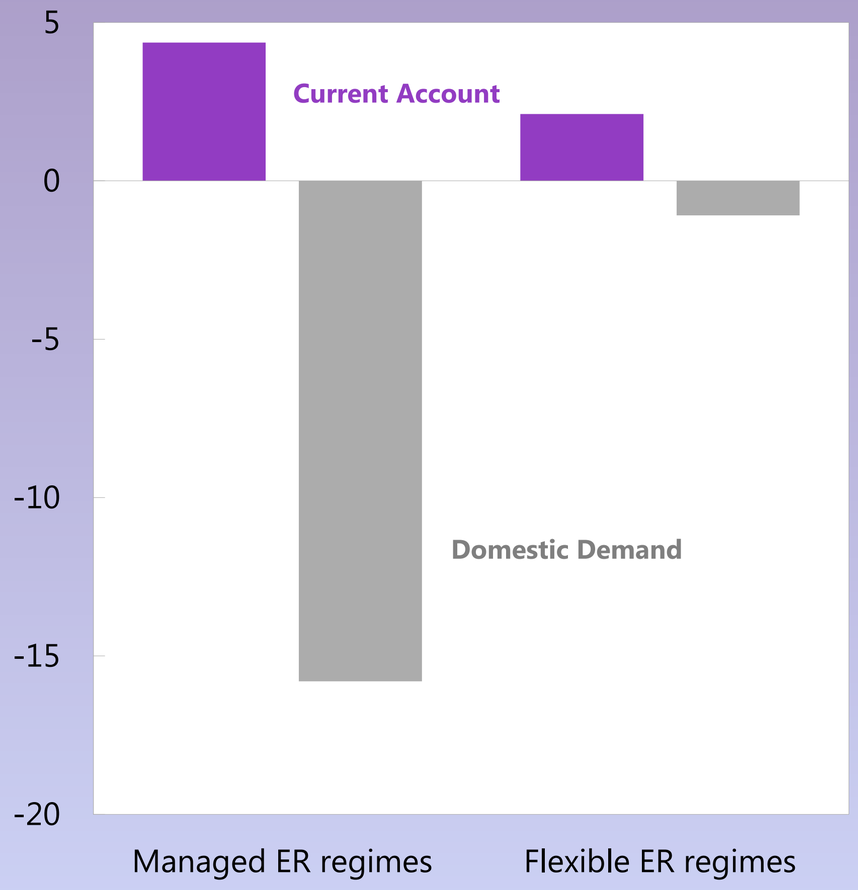


… have contributed to different compositions of CA adjustment
(Change since peak CA deficit)



Fuentes: IMF, Information Notice System database; World Economic Outlook database; and IMF staff calculations.
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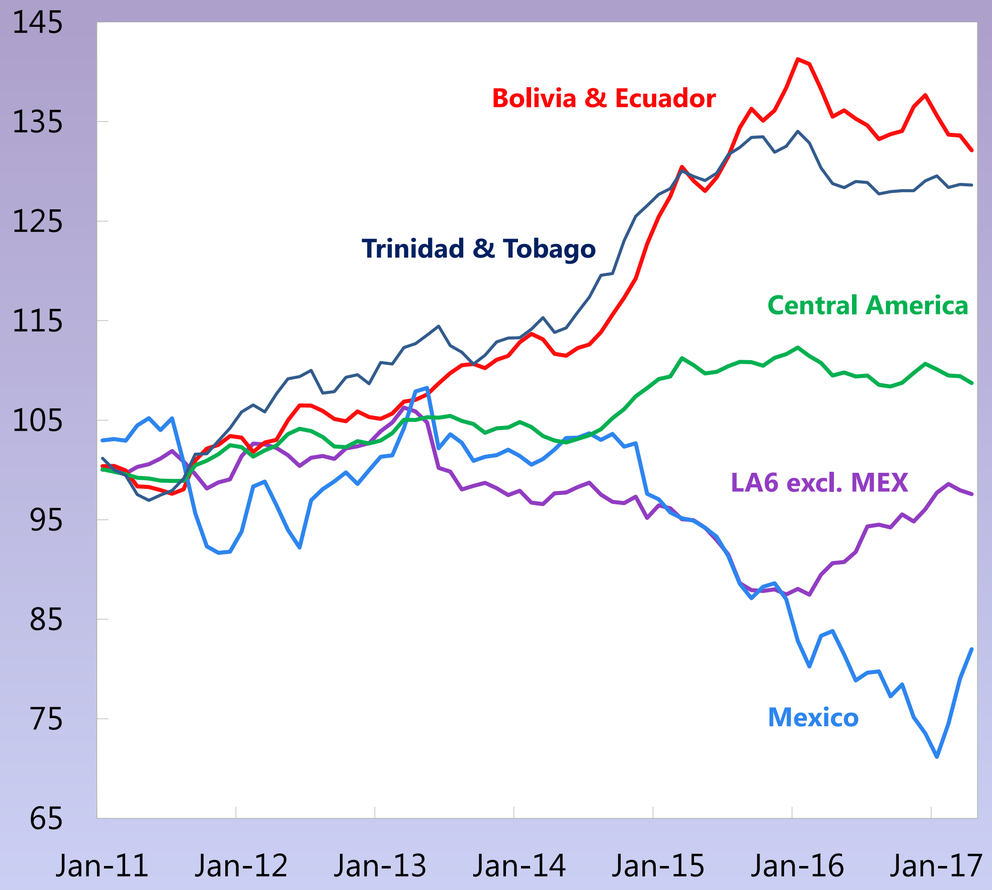

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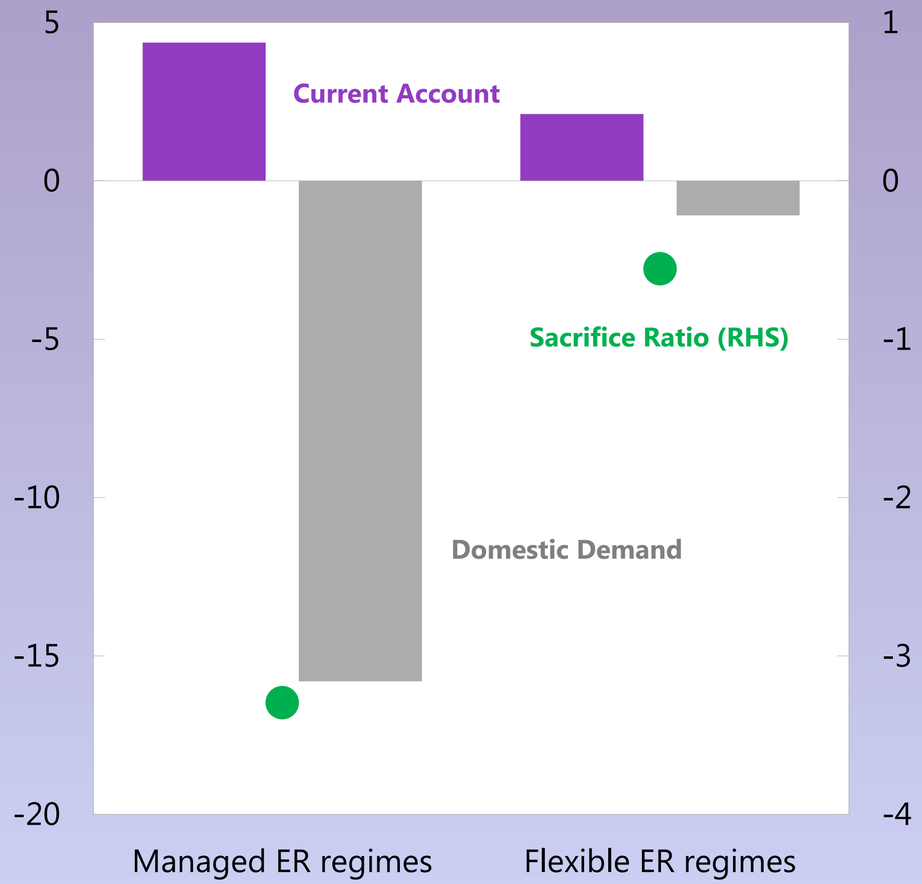


Fuentes: IMF, Information Notice System database; World Economic Outlook database; and IMF staff calculations.
Notes: LA6 = Brazil, Chile, Colombia, Mexico, Peru and Uruguay. Simple averages across countries.

Part II: Quantifying the mechanisms of adjustment

- What has been the relative strength of expenditure switching versus income effects?

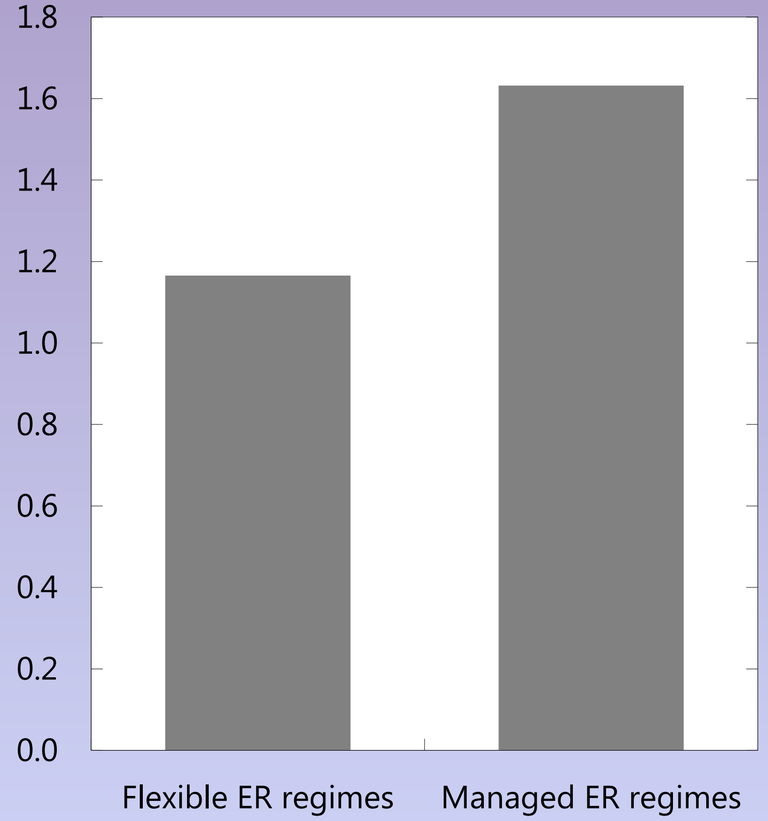
- Has exchange rate flexibility lowered the cost of external adjustment?

- Panel VAR estimation
  - Includes 38 economies; quarterly data from 2000 to 2016.
  - Exogenous variables: terms of trade; growth of domestic demand in trade partners.
  - Endogenous variables: trade balance; REER; domestic demand.
  - Interaction terms as in Towbin and Weber (2013) allow for impulse responses that are conditional on region and exchange rate regime.

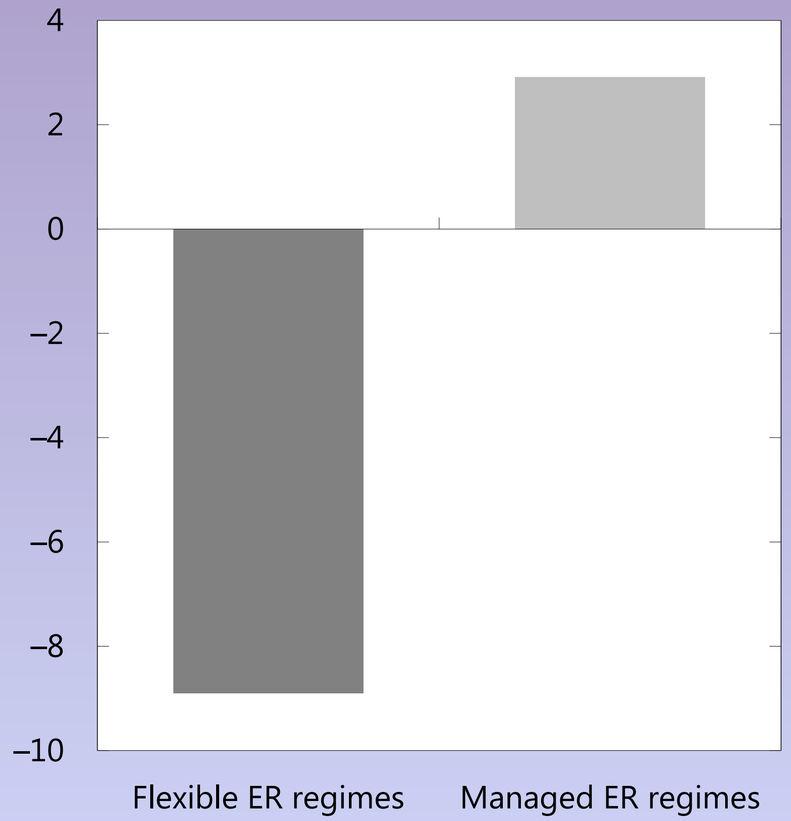
- Shocks to the terms of trade are identified using a Cholesky decomposition.

Panel VAR estimated responses following a 10 percent fall in the terms of trade

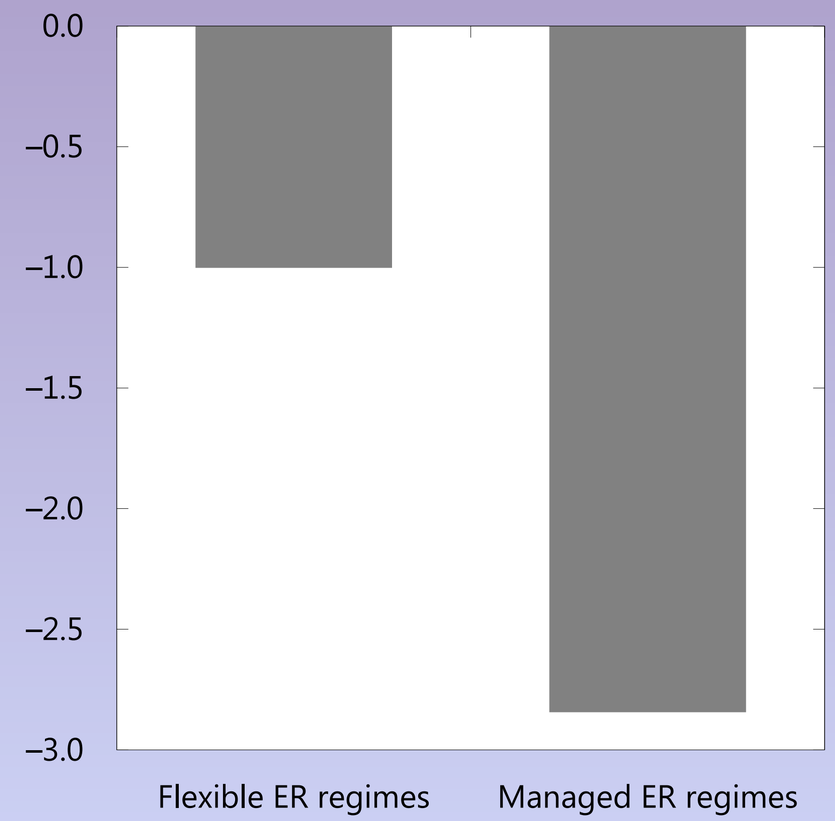
The trade balance adjusts strongly in all countries …
(Accumulated IRF at one year, percentage points of GDP)



… while real effective exchange rate responses diverge …
(Accumulated IRF at one year, percent)



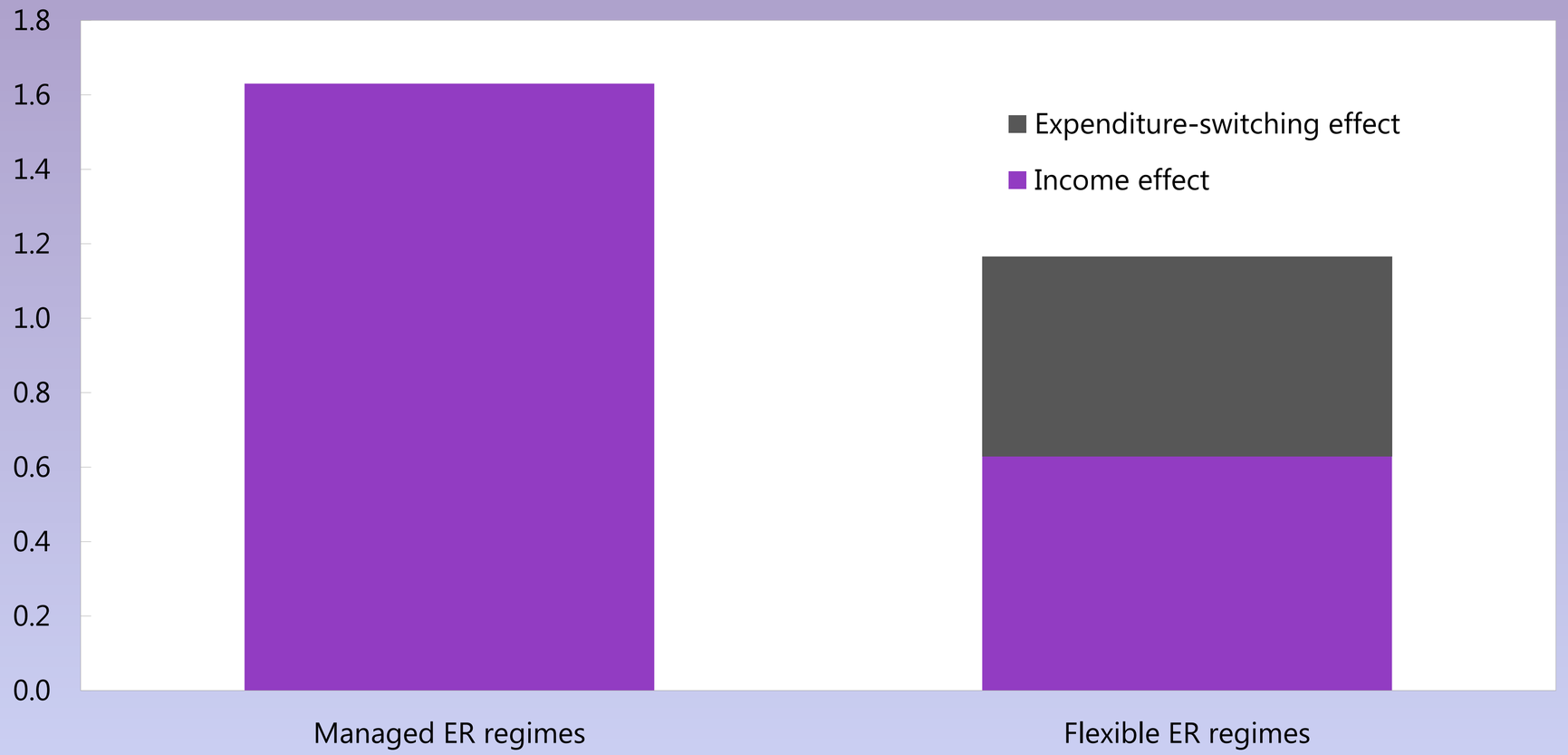
… with implications for the impact on domestic demand
(Accumulated IRF at one year, percent)



Sources: IMF, World Economic Outlook database; Haver Analytics; and IMF staff calculations.
Notes: Lighter bars correspond to responses that are statistically indistinguishable from zero. ER = Exchange rate.

Quantifying the role expenditure switching

Counterfactual exercise illustrates that expenditure switching can play an important role in trade balance adjustment
(Accumulated IRF at one year, percentage points of GDP)

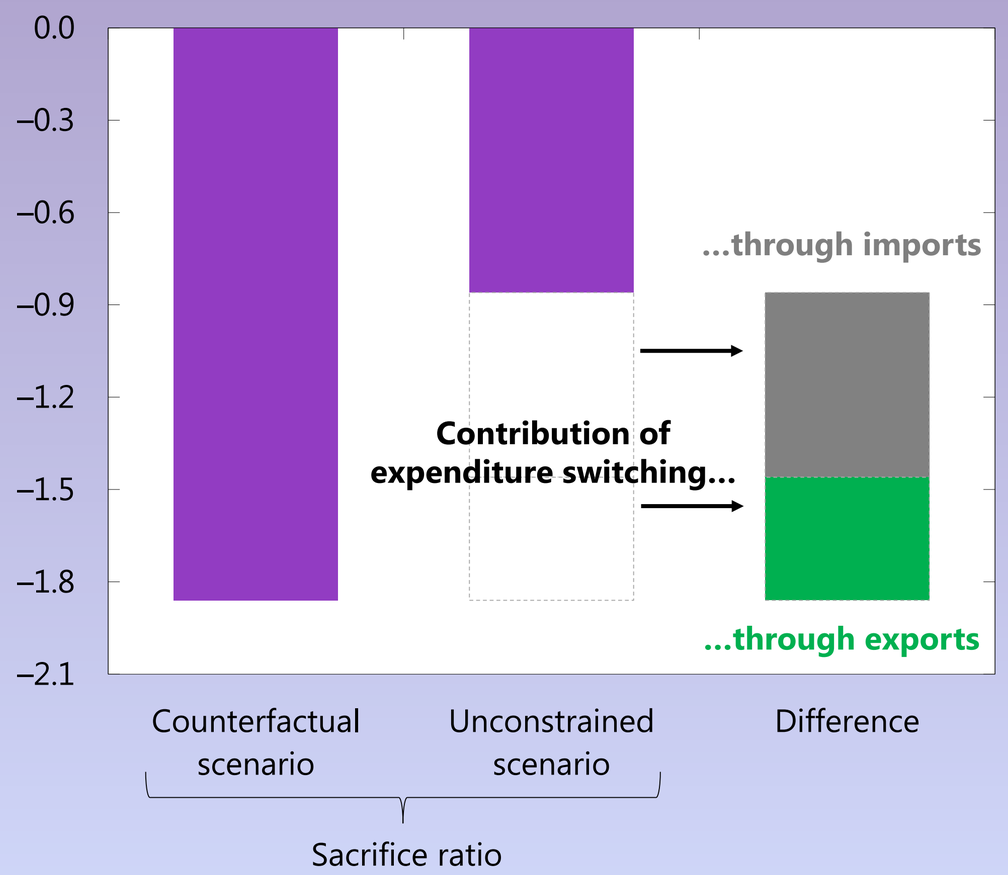


Sources: IMF, World Economic Outlook database; Haver Analytics; and IMF staff calculations.
Note: ER = Exchange rate.

Real depreciations lower sacrifice ratios through export and import channels

Fall in domestic demand needed to generate a 1-percent-adjustment in the trade balance…
(Accumulated IRF at one year, percentage points of GDP)

…a counterfactual exercise illustrates that expenditure switching acts largely through imports
(Accumulated IRF at one year, percentage points of GDP)



Sources: IMF, World Economic Outlook database; Haver Analytics; and IMF staff calculations.
Note: ER = Exchange rate.

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Estimating the link between the exchange rate and exports

- Do depreciations of the real effective exchange rate lead to better export performance in the short-run?

- The market share of country *i* in global exports of four-digit product *k* during year *t* is defined as:

$$s_{ikt} = \ln \frac{X_{ikt}}{\sum_{j \in J} X_{jkt}}$$

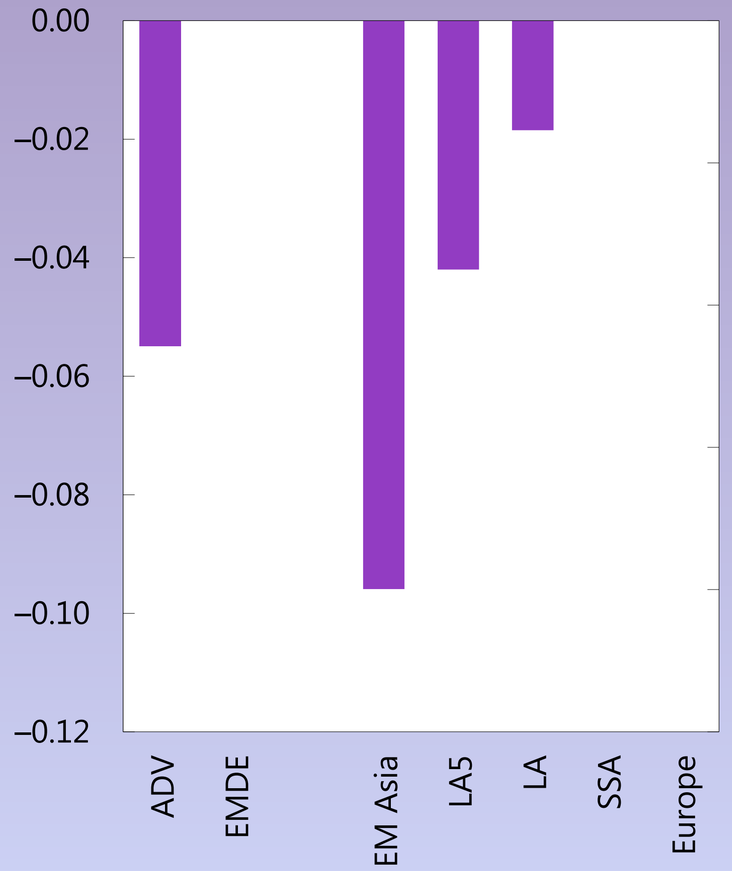
- Then, we estimate how the change in market share is determined by the lagged change in the REER:

$$\Delta s_{ikt} = \alpha_{ik} + \alpha_t + \beta \Delta q_{i,t-1} + \beta_C I_C \Delta q_{i,t-1} + \varepsilon_{ikt}$$

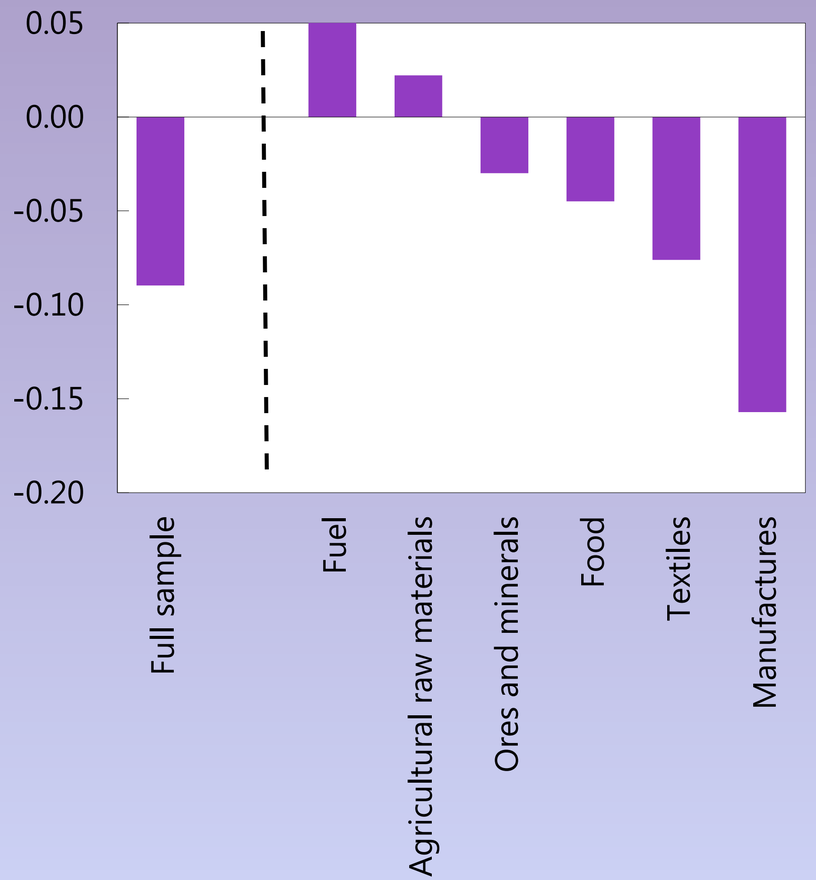
- Interaction dummies I_C allow us to estimate elasticities by region and product category.

Export elasticities vary across regions and products

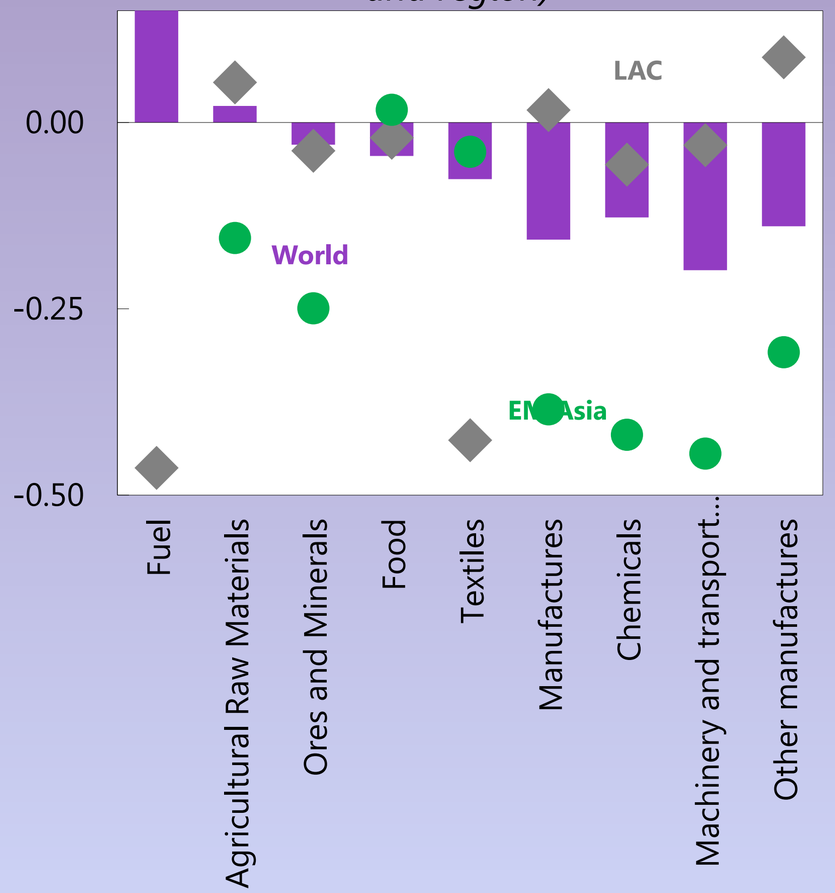
While exports respond to depreciations in LAC, sensitivity is higher in EM Asia…
(Elasticity pooled by region)



… partly reflecting the importance of commodities in LAC exports …
(Elasticity pooled by product category)



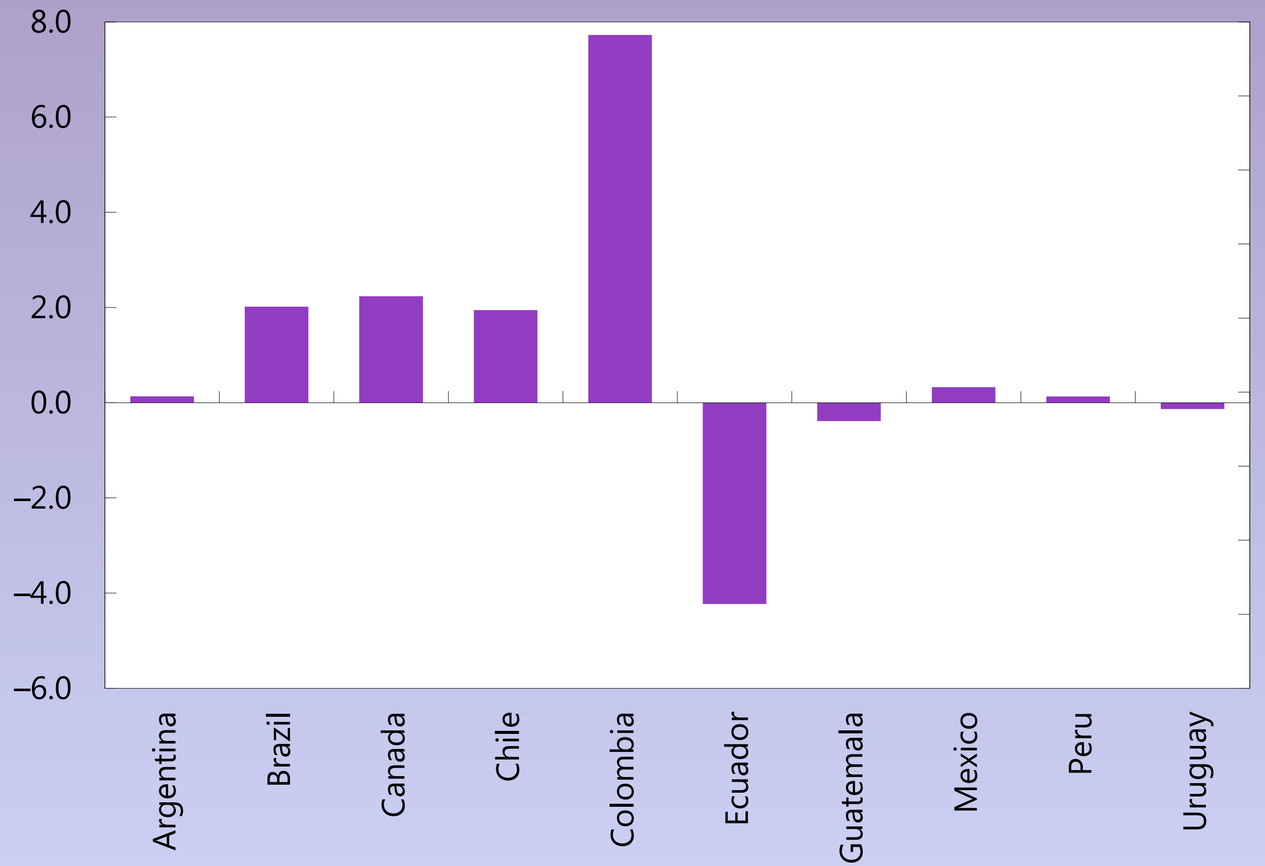
… but even for manufactures, LAC is less dynamic, suggesting structural bottlenecks.
(Elasticity pooled by product category and region)



Sources: IMF, Information Notice System database; UN Comtrade; and IMF staff calculations.
Note: ADV = advanced economies; LA5 = Brazil, Chile, Colombia, Mexico, and Peru; LA = Latin America.

Depreciations have had a moderate impact on exports…

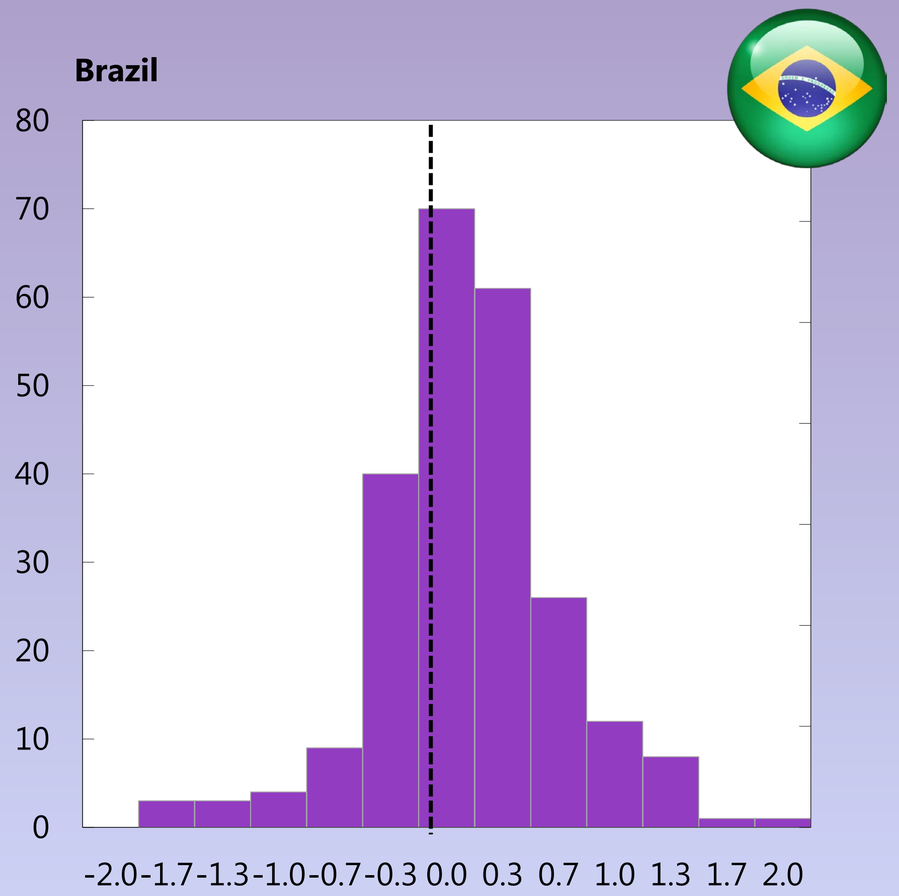
Estimated contribution of REER to export values, 2014-16
(Percent of 2012 export value; constant U.S. dollars)

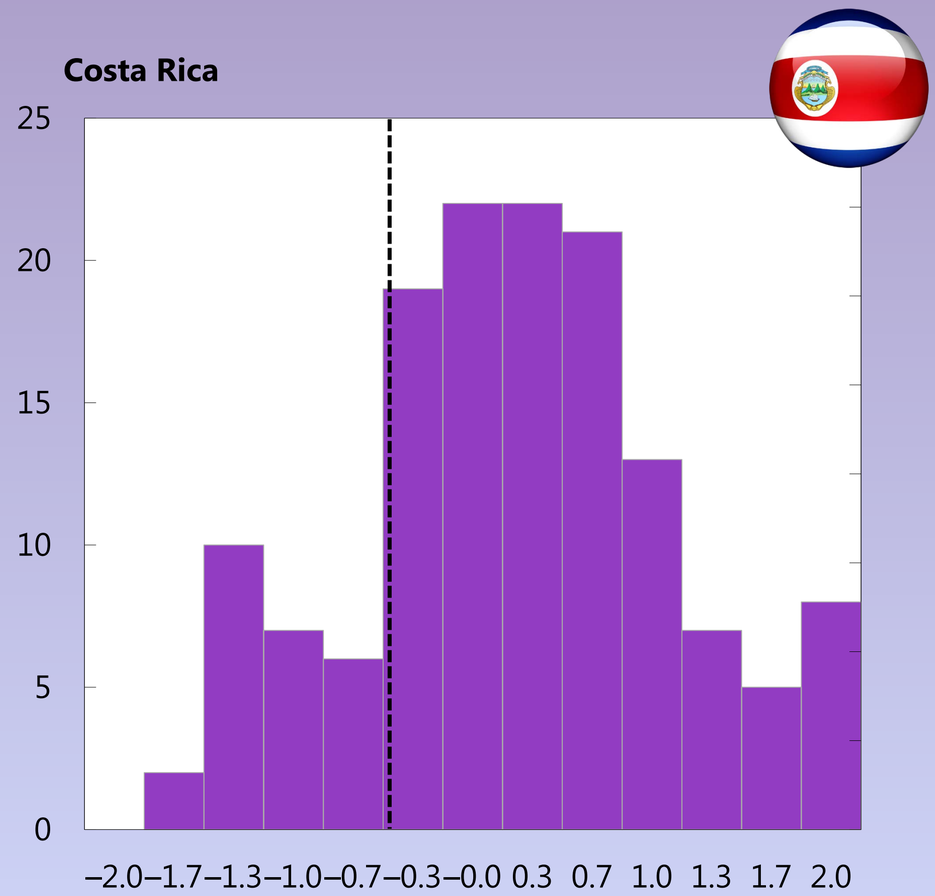


Sources: IMF, Information Notice System database; UN Comtrade; and IMF staff calculations.

… and have different impacts within countries across sectors

Within-country variation of export elasticities across products
(Number of four-digit SITC products)





Sources: IMF, Information Notice System database; UN Comtrade; and IMF staff calculations.
Note: Dashed lines correspond to the estimated pooled elasticity at the country level. SITC = Standard International Trade Classification.

An aside: The link between exchange rates and external competitiveness

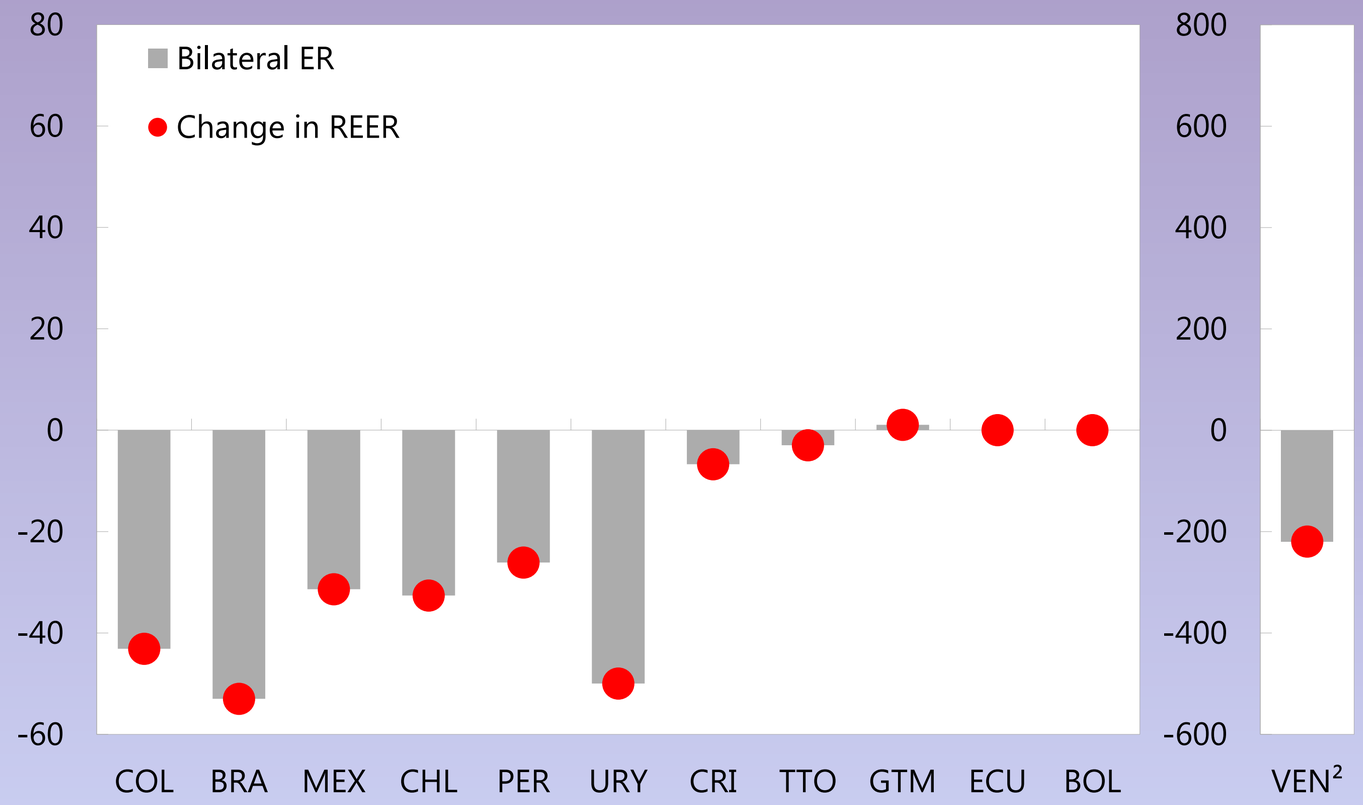
$$Q_i = \prod_j \left(\frac{P_i E_i}{P_j E_j}\right)^{w_{ij}}$$

Variation in the REER:

$$\dot{q}_i = \dot{e}_i - \sum_j w_{ij}\dot{e}_j + \sum_j w_{ij}(\dot{p}_i - \dot{p}_j)$$

- Change in bilateral exchange rate

Decomposition of Recent REER Movements
(Percent change from March 2013 to March 2016)



Sources: IMF, Information Notice System database; and IMF staff calculations.
Note: For International Organization for Standardization (ISO) country codes used in data labels, see page [x]. ER = nominal exchange rate versus the U.S. dollar; REER = real effective exchange rate.
[1]Captures the relative change in price deflators with respect to trading partners.
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- Change in bilateral exchange rate
- Change in trading partners' bilateral exchange rates

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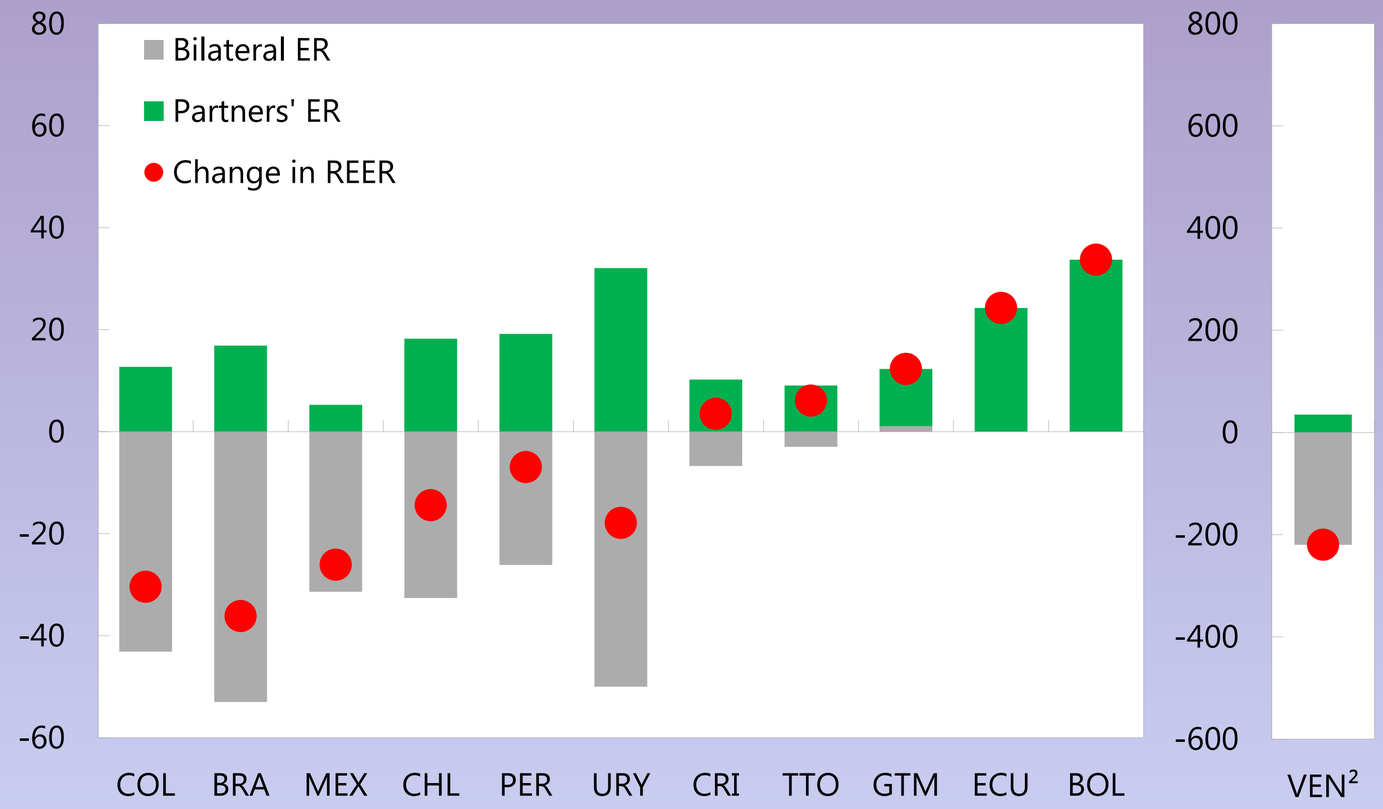

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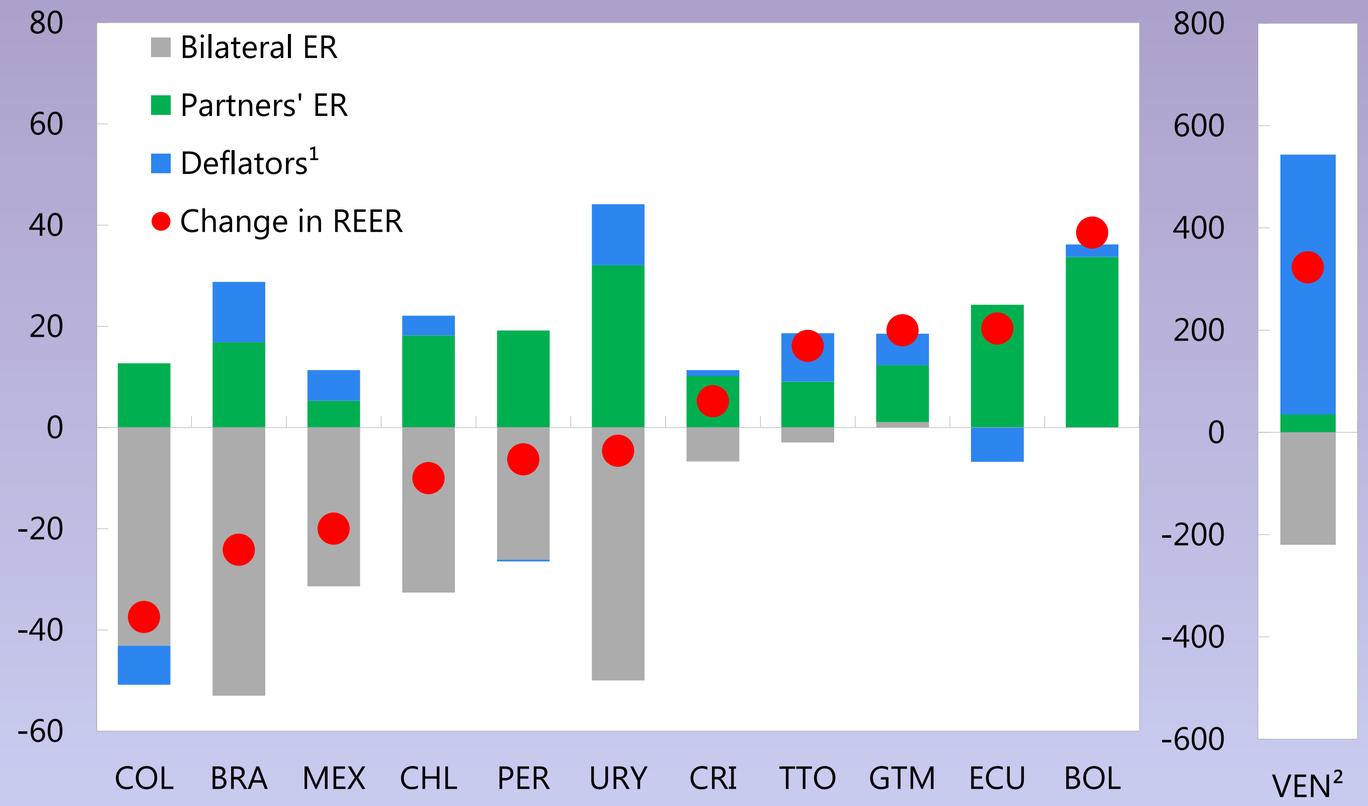
- Change in bilateral exchange rate
- Change in trading partners' bilateral exchange rates
- Change in relative price deflators

Decomposition of Recent REER Movements

(Percent change from March 2013 to March 2016)



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Policy implications

- Historically, terms-of-trade busts have led to adjustment of the trade balance through import compression;
- Following end of commodities supercycle, large depreciations among LAC economies with floating exchange rates allowed them to adjust their external accounts at lower cost to domestic demand and output:
  - Moderate boost to exports
  - Strong role of import-substitution
- Depreciations boost manufacturing more than commodities, so can help to spur diversification.

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