4. After the Boom—Commodity Prices and Economic Growth in Latin America and the Caribbean

This chapter takes another look at the commodity boom experienced by Latin America and the Caribbean (LAC) since the early 2000s and analyzes how the region will be affected by a more subdued outlook for commodity prices. The analysis suggests that growth in the years ahead could be significantly lower than during the commodity boom even if commodity prices were to remain stable at their current relatively high levels. The results caution against trying to offset the current economic slowdown with demand-side stimulus and underscore the need for ambitious structural reforms to secure strong growth over the medium term.

Introduction

Following a decade of rapid, broad-based gains, international commodity prices have been weakening since 2012. Many analysts now argue that the upward phase of the commodity super-cycle that started in the early 2000s has run its course.[1] Indeed, market futures show commodity prices softening further in the near term. This outlook reflects an anticipated increase in commodity supply along with weaker demand from some of the major commodity-importing economies, notably China.[2] What would this imply for the commodity exporters of LAC? Some observers claim that the recent slowdown in output growth across the region is primarily linked to the end of the upswing in commodity prices, raising obvious concerns for the future. Others have downplayed these concerns, pointing out that commodity prices are still higher than in the mid-2000s.

This chapter explores the possible consequences of weaker commodity prices on economic growth in the region in the next few years. We start by documenting the size of the recent commodity price boom in individual countries. We then investigate whether it is the lower *growth* of commodity prices or their still-high *levels* that will matter the most for output growth in the region.

The Commodity Boom in LAC and Its Aftermath

Global commodity prices measured in current U.S. dollars almost tripled between 2003 and 2013. Although the increase was generalized, its magnitude differed considerably across categories: oil prices almost quadrupled, and metals prices tripled, while prices of agricultural products rose by about 50 percent. As illustrated in past editions of this *Regional Economic Outlook*, the impact that the sharp rise in commodity prices has had on individual countries across LAC depends on the specific mix of commodities they export and import.[3] To capture these features, we construct country-specific net commodity price indices (NCPIs) by combining international prices and country-level trade data for individual commodities.[4]

The Mid-2000s Commodity Boom

NCPIs across LAC increased sharply starting in the mid-2000s. The annual rate of growth of the NCPI

Note: Prepared by Bertrand Gruss. Anayo Osueke, Carlos Rondon, and Ben Sutton provided excellent research assistance. See Gruss (forthcoming) for technical details.

[1] See, for instance, Erten and Ocampo (2013a), Goldman Sachs (2014), and Jacks (2013).

[2] See the "Commodity Market Review" in the October 2013 *World Economic Outlook* (IMF, 2013).

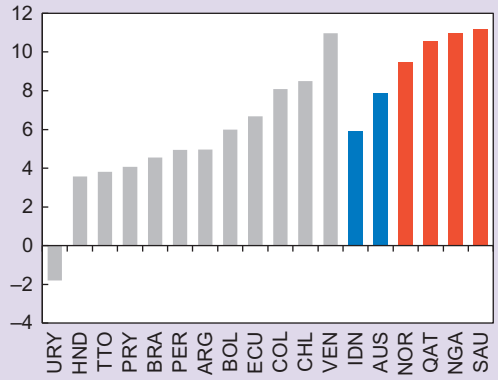
[3] See, for example, Chapter 3 of the October 2011 *Regional Economic Outlook: Western Hemisphere,* and Adler and Sosa (2011).

[4] The NCPI is constructed in relative terms—dividing individual commodity prices by international manufacturing prices—and in net terms—weighting prices by net exports of individual commodities (see Annex 4.1). Thus, a price increase that would imply a positive (negative) income shock if the economy is a net exporter (net importer) of that commodity would be captured by an increase (decrease) of its NCPI.

for the average commodity exporter in LAC turned positive in 2003, reached double digits in 2004, and remained positive and large until 2011 (with the exception of 2009).[5] Given this, it is appropriate to refer to 2003–11 as a "commodity boom" period for LAC.

During the commodity boom, NCPIs in the region grew on average by 5½ percent per year (Figure 4.1), an increase similar to that recorded in commodity exporters of other regions, such as Australia and Indonesia. Venezuela experienced the sharpest improvement in its NCPI among LAC commodity exporters, with average gains of over 10 percent per year, similar to oil producers in other regions. The only commodity exporter in the sample that did not experience NCPI gains in this period was Uruguay, reflecting its high reliance on oil imports.[6]

Figure 4.1
LAC: Commodity Price Growth, 2003–11[1]
(Average annual growth of NCPI; percent)



Sources: UN Comtrade; IMF, World Economic Outlook database; World Bank, *Global Economic Monitor*; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean; NCPI = net commodity price index. See page 63 for a list of country name abbreviations.
[1] See the text for a discussion of NCPI. The sample includes the 12 largest commodity exporters in LAC. Other commodity exporters outside LAC are reported for reference (blue and red bars, the latter corresponding to oil producers).

[5] Commodity exporters are defined as those countries whose share of commodity exports in total exports is higher than the average for a sample of 169 countries during 2000–12.

[6] The case of Uruguay underscores the importance of focusing on *net* commodity prices: Uruguay's NCPI decreased by 15 percent during 2003–11, but a purely export-based index would have shown a 23 percent increase.

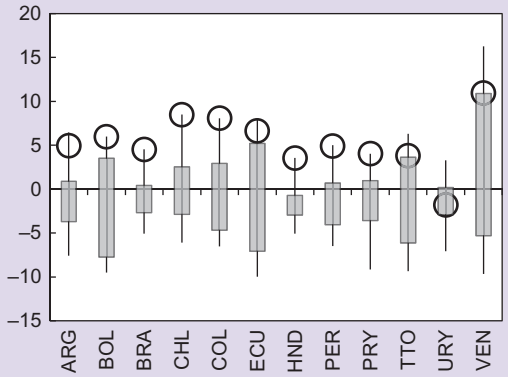
Historical Precedents

Comparing the increase in NCPIs in 2003–11 with comparable periods since 1970 suggests that the recent commodity boom was truly exceptional for most economies in the region. Figure 4.2 shows the distribution of average NCPI growth rates over rolling nine-year windows for the 12 largest commodity exporters in LAC. In all cases except Uruguay, the average annual NCPI growth rate during the recent boom was above the eighth decile of the distribution. Moreover, in many cases the average NCPI *growth* during 2003–11 was at, or very close to, the sample maximum. By contrast, the average NCPI *levels* observed during the last decade do not typically stand out in a historical perspective (Figure 4.3), except for Chile and Venezuela. In fact, in some countries (for example, Honduras and Uruguay) the average NCPI level in 2003–11 is close to the sample minimum.

Is the Commodity Boom Over?

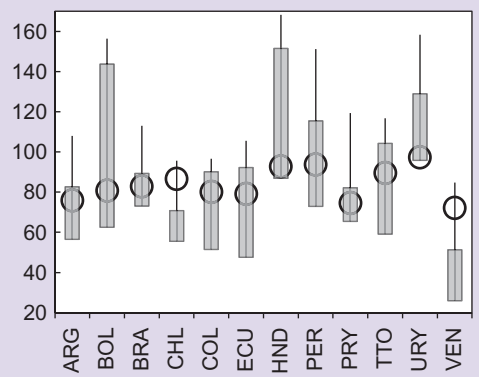
The uncertainty surrounding commodity price projections makes it difficult to be confident about future trends. However, most forecasts

Figure 4.2
LAC: Commodity Price Growth, 1970–2013[1]
(Average growth rate of NCPI over nine-year rolling windows; percent)



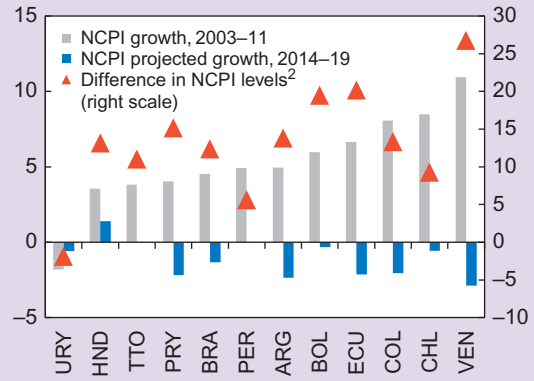
Sources: UN Comtrade; IMF, World Economic Outlook database; World Bank, *Global Economic Monitor*; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean; NCPI = net commodity price index. See page 63 for a list of country name abbreviations.
[1] The black lines denote the range for the nine-year window averages of annual NCPI growth rates; the rectangle denotes the second through eighth deciles of its distribution; the marker denotes the average NCPI growth rate in 2003–11.

Figure 4.3
LAC: Commodity Price Level, 1970–2013[1]
(Average NCPI level over nine-year rolling windows; 2012 = 100)



Sources: UN Comtrade; IMF, World Economic Outlook database; World Bank, *Global Economic Monitor*; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean; NCPI = net commodity price index. See page 63 for a list of country name abbreviations.
[1] The black lines denote the range for the nine-year window averages of the NCPI level; the rectangle denotes the second through eighth deciles of its distribution; the marker denotes the average NCPI level in 2003–11.

Figure 4.4
LAC: Commodity Price Outlook, 2014–19[1]
(Average annual growth of NCPI; percent)



Sources: UN Comtrade; IMF, World Economic Outlook database; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean; NCPI = net commodity price index. See page 63 for a list of country name abbreviations.
[1] NCPIs for 2014–19 are constructed from prices of commodity futures prevailing at end-February 2014.
[2] Percentage difference between average NCPI levels in 2014–19 vs. 2003–11.

suggest that commodity prices will soften in the coming years. Specifically, NCPI forecasts using current prices of commodity futures suggest that the peak of the ongoing commodity super-cycle has passed. The current market-based outlook for 2014–19 is characterized by a sharp decline in NCPI growth rates across LAC, with an annual growth rate (averaged over time and across economies) about 6½ percentage points lower than during the commodity boom—and actually negative for most countries (Figure 4.4). This notwithstanding, average NCPI levels during 2014–19 would remain more than 10 percent higher than during the boom years. This outlook puts a premium on understanding whether it is high prices per se, or steady increases in prices, that provide the greatest positive impulse to economic growth in commodity-exporting countries.

Growth in LAC after the Commodity Boom

What would be the effect of high but stable or softening commodity prices on economic growth in LAC? We seek to shed light on this question based on the historical evidence of the last four decades.

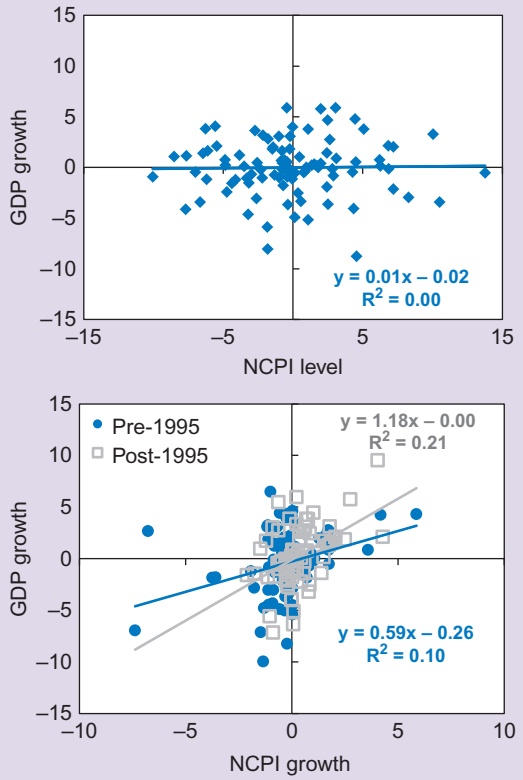
Benchmark

Before examining the evidence, it is useful to briefly review the potential links between commodity prices and growth. Consider a commodity exporter that is growing at its steady-state rate and suddenly faces a positive commodity price shock that is expected to persist. The higher income resulting from the improved terms of trade would boost demand for consumption, supporting domestic output (along with an increase in imports). This positive cyclical impulse would be reinforced by the rise of investment in the commodity sector in response to improved profitability. Higher investment, in turn, would expand the productive capacity of the economy. Thus, both potential and actual output would grow faster than in the absence of the commodity price shock. This effect, however, will be temporary. Once investment and consumption have adjusted to the new commodity price outlook, output *growth* would revert to its pre-shock level, unless the new investment leads to permanently higher productivity growth.

Commodity Prices and Growth—A First Look

Figure 4.5 plots the unconditional bivariate correlations between NCPIs and output growth in the commodity exporters of LAC.[7] The data in the upper panel of the figure do not point to any significant relationship between NCPI *levels* and output growth in LAC, at least since the 1970s. By contrast, the bottom panel suggests there may have been a positive relationship between the *growth* in NCPIs and output growth, especially since the mid-1990s. This simple pattern provides a prima facie indication that non-growing commodity prices could be a drag on growth in LAC in the next few years, even if they were to remain steady at their current high levels. However, a more careful multivariate analysis is necessary to investigate the underlying relationships and obtain quantitative predictions for concrete commodity price scenarios.

Figure 4.5
LAC: Commodity Prices and GDP Growth[1]
(Deviation from sample average; percent)



Sources: UN Comtrade; IMF, World Economic Outlook database; World Bank, *Global Economic Monitor*; and IMF staff calculations.
Note: LAC = Latin America and the Caribbean; NCPI = net commodity price index.
[1] NCPIs are adjusted by the share of commodity trade in GDP in order to identify the actual economic impact of commodity prices on output in a cross-country comparison. NCPI growth rates, NCPI levels, and GDP growth rates correspond to the average over three-year windows and are reported as deviations from their country-specific sample averages.

Multivariate Analysis

Our multivariate analysis of the relationship between commodity prices and output growth is based on a variant of the global vector autoregression (GVAR) model proposed by Pesaran, Schuermann, and Weiner (2004). In particular, we conduct the analysis using a formulation that combines country-specific vector-error correction models (VECMs) for 30 countries covering about 80 percent of world GDP, including 13 LAC economies.[8] The individual country VECMs are meant to capture the output effects of both commodity price *levels* and *changes* while also allowing for idiosyncratic factors. Combining the individual country VECMs into a global model, in turn, ensures that key cross-country interdependencies (owing to observed and unobserved common factors, but also to trade and policy spillover effects) and general equilibrium dynamics are taken into account. The model is estimated with annual data from 1970 to 2013 (to capture as many commodity cycles as possible). The following discussion focuses on results for a subset of commodity exporters of LAC, notably Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay.[9]

[7] We consider NCPIs instead of standard terms-of-trade measures because world commodity prices have been shown to be better at capturing exogenous terms-of-trade shocks for commodity exporters (see Chen and Rogoff, 2003).

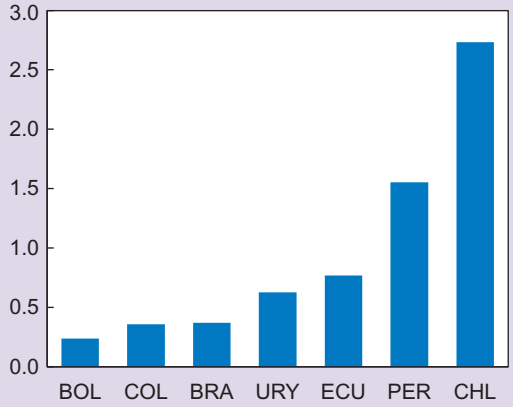
[8] See Annex 4.1 and Gruss (forthcoming) for more details.

[9] We exclude pure oil exporters from the analysis because their output dynamics are quite different from other commodity exporters. In particular, historical variation in oil prices tends to reflect idiosyncratic supply shocks (such as geopolitical shocks) that would distort the analysis. We also omit Argentina based on concerns about the quality of the official GDP data (see Annex 2.1).

Turning to the key implications from the model, we first consider the response of GDP to a shock to commodity prices. Figure 4.6 shows that a 10 percent increase in the country-specific NCPI would increase that country's output, on average, by about 1 percent after three years.[10] The estimated impact is about twice as large for Chile and Peru—a plausible finding, as these are very open economies for which commodities represent a large share of exports. For Brazil, with a much lower share of commodity exports in GDP, the estimated response is only half that of the average commodity exporter in LAC.

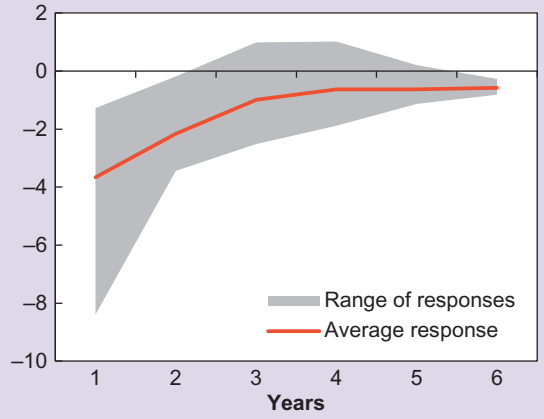
Demand from China has been a key driver of global commodity prices in recent years (see Erten and Ocampo, 2013b). In view of this, we examine the response of commodity prices to a hypothetical decline in China's GDP growth. Figure 4.7 shows the results: a 1 percent decline in China's GDP (relative to baseline) would lower the average NCPI of LAC countries by about 4 percent on impact. Moreover, the average NCPI would remain about 2 percent below trend two years after the shock. As before, these results appear quantitatively plausible and are in line with previous findings.[11]

Figure 4.6
Selected Latin America: GDP Response to a 10 Percent Increase in NCPIs
(Cumulative response after three years; percent)



Source: IMF staff calculations.
Note: NCPI = net commodity price index. See page 63 for a list of country name abbreviations.

Figure 4.7
Selected Latin America: NCPI Response to a 1 Percent Decrease in China's GDP Relative to Baseline[1]
(Percent)



Source: IMF staff calculations.
Note: NCPI = net commodity price index.
[1] Percentage deviation from trend of NCPIs for selected commodity exporters (Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, Uruguay).

The key question, however, is how different paths for commodity prices could affect output growth across LAC commodity exporters in the future. To answer this question, we use the GVAR model to produce forecasts for output growth over 2014–19, conditioning on projected NCPIs and oil prices under three alternative scenarios for commodity prices: (i) a "stable prices" scenario, which assumes that commodity prices will remain constant in U.S. dollar terms at their 2013 average levels; (ii) a "futures" scenario, where commodity prices evolve in line with the market prices of commodity

[10] Given the size of the model and following other studies using GVARs, we compute generalized impulse responses (Pesaran and Shin, 1998) in which the shocks are not identified (that is, we do not attempt to identify the ultimate source of the disturbance). For a discussion on the effects of supply- versus demand-driven shocks to commodity prices see Chapter 4 of the April 2012 *World Economic Outlook* (IMF, 2012b).

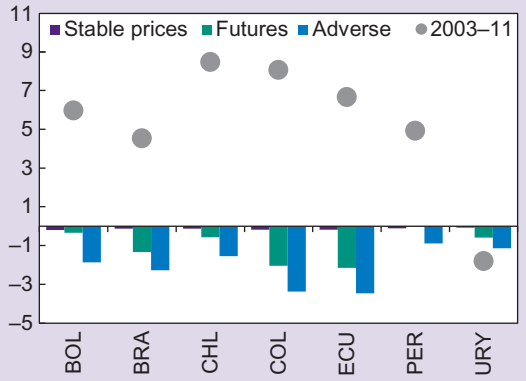
[11] For instance, the IMF Spillover Report on China (IMF, 2011) finds that a shock to real activity in China of 1 percent of GDP would lead to an increase in oil and metals prices of about 6 percent after six months.

futures prevailing at end-February 2014;[12] and (iii) an "adverse" scenario, in which all commodity prices are assumed to be 10 percent below those implied by the "futures" scenario by the end of the forecast horizon. The implications for the country-specific NCPIs are shown in Figure 4.8.

Results and Policy Implications

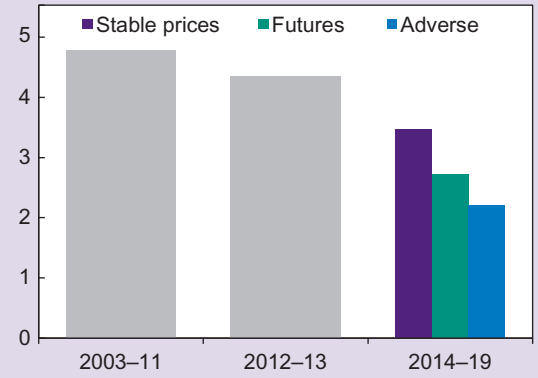
Overall, our results suggest that it is the lower projected *growth* of commodity prices, rather than their still-high *levels* per se, that will have a dominant effect on output growth in the next few years. Even if commodity prices were to remain stable at their current levels, average annual GDP growth in these seven LAC commodity exporters would be about 0.9 percentage points lower than in 2012–13 and 1.3 percentage points lower than during the commodity boom (Figure 4.9). The slowdown vis-à-vis the boom period would affect all countries, ranging from 0.8 percentage points in Chile to about 2 percentage points in Peru (Figure 4.10). The model also predicts lower average GDP growth in 2014–19 than in 2012–13 for all countries, except Brazil. Average growth under the "futures" and "adverse" scenarios would be about ¾ and 1¼ percentage points lower, respectively, than under the "stable prices" scenario, highlighting further downside risk.

Figure 4.8
Selected Latin America: Projected NCPI Growth Under Alternative Scenarios, 2014–19
(Average annual growth rate; percent)



Source: IMF staff calculations.
Note: NCPI = net commodity price index. See page 63 for a list of country name abbreviations.

Figure 4.9
Selected Latin America: Projected Average GDP Growth, 2014–19[1]
(Average annual growth rate; percent)

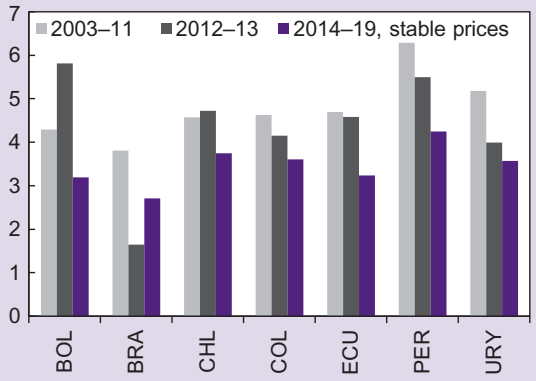


Source: IMF staff calculations.
[1] Simple average for Bolivia, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay.

While interesting, the results from this exercise are subject to important caveats. First, the estimated model assumes stable relations, including policy responses to external shocks, over the period 1970–2013. Most LAC economies have undergone important structural transformations over these four decades, and many have significantly strengthened their policy frameworks more recently (for instance, by allowing greater exchange rate flexibility and reducing the procyclicality of fiscal policy). To the extent that these changes have a direct bearing on future growth, the projections from the model used in this chapter are likely to have a downward bias. Second, the model does not take into account future developments that are already foreseen but not readily captured by key macroeconomic relationships (for example, planned structural reforms aimed at raising future potential output).

[12] Although this market-based scenario could be thought of as a neutral scenario, using futures to forecast spot prices may imply a downward bias (see "Special Feature: Commodity Price Forecasting" in the April 2014 *World Economic Outlook* [IMF, 2014a]).

Figure 4.10
Selected Latin America: Projected GDP Growth, 2014–19
(Average annual growth rate; percent)



Source: IMF staff calculations.
Note: See page 63 for a list of country name abbreviations.

Despite these caveats, the model results carry two important policy implications for LAC commodity exporters. First, to avoid the boom-bust dynamics often associated with commodity cycles, countries should work to weaken the link between commodity prices and economic activity. Fiscal policy needs to play a critical role in this regard, by striking the right balance between building buffers and frontloading capital spending to raise potential growth. A formal fiscal framework, potentially including a stabilization fund, can support this effort. Exchange rate flexibility, underpinned by credible monetary and macroprudential frameworks, provides an additional buffer for shocks to the terms of trade.[13] Second, the recent slowdown in many LAC economies could be the result, to a large extent, of having passed the peak of the commodity super-cycle. If that is indeed the case, using demand-side stimulus to keep growth at recent high rates can give rise to problematic macroeconomic imbalances. Policies should focus instead on structural reforms to raise productivity.

[13] See IMF (2012a) for a thorough discussion of suitable policy frameworks for resource-rich countries.

Annex 4.1. Technical Details[14]

Country-Specific Net Commodity Price Index

To construct the net commodity price index (NCPI) for individual countries, we follow Deaton and Miller (1996) and Cashin, Céspedes, and Sahay (2004). As the commodity mix of individual countries may have changed since the 1970s, our measure uses three-year rolling averages of trade weights. These, in turn, are based on the *net exports* of each commodity to capture net income effects from changes in their prices (similarly to Spatafora and Tytell, 2009). The weights are lagged one year, so that changes in the price index reflect changes in commodity prices rather than endogenous changes in volumes. The annual change in country *i*'s NCPI is given by:

$$\Delta \mathrm{Log}\left(\mathrm{NCPI}\right)_{i,t} = \sum_{j=1}^{J} \Delta P_{j,t} \cdot (x_{i,j,t-1} - m_{i,j,t-1}) / A_{i,t-1},$$

where $P_{j,t}$ is the logarithm of the relative price of commodity j at time t (in U.S. dollars and divided by the IMF's unit value index for manufactured exports);[15] Δ denotes first differences; $x_{i,j,t-1}$ ($m_{i,j,t-1}$) denotes the average *exports (imports)* value of commodity j by country i between $t-1$ and $t-3$ (in dollars, from UN Comtrade); and where $A_{i,t-1}$ is the lagged three-year moving average of country i's total commodity trade (exports plus imports), except for the indices used in Figure 4.5, where it is the lagged three-year moving average of country i's GDP in dollars.

[14] See Gruss (forthcoming) for more details.

[15] We use prices for 33 commodities (taken from the IMF's International Financial Statistics database) since 1970: aluminum, bananas, barley, beef, coal, cocoa, coconut oil, coffee, copper, corn, cotton, crude oil, fishmeal, hides, iron ore, lamb, lead, natural gas, natural rubber, nickel, palm oil, rice, shrimp, soybean meal, soybean oil, soybeans, sugar, sunflower, tea, tin, wheat, wool, and zinc.

The Global Vector Autoregression Model Setup

The model covers 30 economies, 5 of which are modeled as a group (France, Germany, Italy, Spain, the United Kingdom).[16] The other 25 economies include 13 LAC countries, covering the 12 largest commodity exporters (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Honduras, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela) and Mexico; other commodity exporters outside the region (Australia, Indonesia, Iran, Nigeria, Norway, Qatar, Saudi Arabia); and other large economies (Canada, China, India, Japan, the United States).

In a first step, a vector-error correction model (VECM) is estimated for each country/region, in which domestic variables are related with foreign-specific variables (that is, the trade-weighted cross-sectional average of domestic variables for the other economies) and global variables.[17] Most country models include real GDP, the real exchange rate (defined as the nominal exchange rate deflated by domestic consumer prices), and the current-account-to-GDP ratio (to proxy for changes in net foreign assets) as endogenous variables; and trade-weighted foreign real GDP and the country-specific NCPI (or the real price of oil for pure oil exporters or non-commodity exporters) as weakly exogenous variables. The global variables, that is, the oil price and the NCPIs, are modeled in three additional VECMs that include the trade-weighted output of all the economies in the model as a weakly exogenous variable. In a second step, the estimated country-VECMs are stacked into a global model and linked using a matrix of predetermined cross-country linkages based on the average trade flows over 2010–12.

To compute conditional output forecasts under alternative future paths for a set of endogenous variables in the model (all NCPIs and the oil price), we use the Kalman filter approach proposed by Camba-Mendez (2012).

[16] See Pesaran, Schuermann, and Weiner (2004) and Dees and others (2007) for a thorough description of global vector autoregressions. The model is estimated using the toolbox by Smith and Galesi (2011).

[17] To account for the significant changes in trade linkages over the sample period, we use three-year moving average trade shares to construct foreign-specific variables.