WP/18/52

IMF Working Paper

Growth Accelerations and Reversals in Emerging Market and Developing Economies: The Role of External Conditions

by Bertrand Gruss, Malhar Nabar, and Marcos Poplawski-Ribeiro

INTERNATIONAL MONETARY FUND

IMF Working Paper

Research Department

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Authorized for distribution by Oya Celasun

March 2018

Abstract

This paper investigates how country-specific external demand, external financial conditions, and terms of trade affect medium-term growth in Emerging Market and Developing Economies and the occurrence of growth accelerations and reversals. The importance of country-specific external conditions for medium-term growth has increased over time—in particular, the growing contribution of external financial conditions accounts for one-third of the increase in average income per capita growth between 1995–2004 and 2005–14. Stronger external demand and financial conditions significantly increase the probability of growth accelerations, while a strengthening of any of the three conditions significantly decreases the probability of reversals.

JEL Classification Numbers: O47, F43, F63

Keywords: Economic Growth, Emerging Markets, Developing Economies, External Conditions

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* We thank Oya Celasun, Giovanni Dell'Ariccia, Zsoka Koczan, Daniel Leigh, Weicheng Lian, Gian Maria Milesi-Ferretti, Maury Obstfeld, Petia Topalova, and seminar participants at the IMF's Research Department, NIPFP Delhi, RBI Mumbai, IGIDR Mumbai, JVI Vienna, National University of Singapore, Monetary Authority of Singapore, and Bank Negara Malaysia for helpful comments. Felicia Belostecinic, Mitko Grigorov, Meron Haile, Ava Hong and Jungjin Lee provided excellent research and production assistance. The opinions expressed herein are those of the authors and do not necessarily reflect those of the International Monetary Fund.

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I. INTRODUCTION

In recent decades, the contribution of emerging market and developing economies (EMDEs) to global growth of output and consumption has increased rapidly.[1] Despite the impressive gains for the group, per capita income levels of individual countries are still relatively low vis-à-vis those of advanced economies (AEs), pointing to room for further catch-up growth and income convergence.[2]

The historical record suggests, however, that steady, sustained catch-up growth spurred by income gaps relative to AEs is not automatic. Growth across EMDEs instead exhibits episodes of accelerations and reversals. Furthermore, the uneven record and variation over time in the speed of convergence point to a possible role for external conditions in influencing the growth process of these economies. The influence of external conditions may be particularly relevant in current times considering the potentially persistent shifts occurring in the global economy (slower potential growth across most AEs, a more subdued outlook for commodity prices than in the recent past, and the onset of monetary policy normalization in the U.S. and U.K.). EMDEs may therefore face a substantially different external environment going forward than they experienced for long stretches of the post-2000 period.

This paper investigates how external conditions affect growth patterns in EMDEs. It builds on previous studies that have constructed country-specific external demand conditions, external financial conditions, and terms of trade to examine how these three external conditions influence medium-term growth in EMDEs, their likelihood of experiencing growth accelerations or reversals, and thus how quickly they narrow income gaps vis-à-vis advanced economies.[3]

A large volume of work has studied the occurrence and determinants of episodes and structural breaks (or, alternatively, "growth regimes" and "spells") in the long-term time series of EMDEs' growth - see, for example, Ben-David and Papell 1998; Pritchett 2000; Hausmann, Pritchett, and Rodrik 2005; Pattillo, Poirson, and Ricci 2004; Hausmann,

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[1] In this paper, the emerging market and developing economy group comprises all economies currently classified as such by the IMF's *World Economic Outlook* as well as those that have been reclassified as "advanced" since 1996 (Cyprus, Czech Republic, Estonia, Hong Kong Special Administrative Region, Israel, Korea, Latvia, Lithuania, Macao Special Administrative Region, Malta, Puerto Rico, San Marino, Singapore, Slovak Republic, Slovenia, Taiwan Province of China). Economies with populations in 2010 below 1 million according to the Penn World Tables (PWT) 9.0 vintage are excluded from the sample.

[2] The paper uses data on cross-country real income, factors of production (physical and human capital, labor input), and population from the PWT 9.0 vintage. See Deaton and Aten 2016 and Inklaar and Rao 2016 for discussions on the methodology of the 2011 International Comparison of Prices, which underpins the calculations of purchasing-power-parity real income in the PWT 9.0.

[3] "Medium-term" growth in this paper refers to the average over five-year horizons - to smooth the influence of business cycle fluctuations.

Rodrigues, and Wagner 2006; Jerzmanowski 2006; Jones and Olken 2008; Reddy and Minoiu 2010; Berg, Ostry, and Zettelmeyer 2012; IMF (2012); and Eichengreen, Park, and Shin 2014. The lack of persistence in EMDEs' medium-term growth rates was documented by Easterly and others (1993) and revisited by Pritchett and Summers (2014).

The paper augments the growth episode analysis literature by distinguishing between *persistent* and *nonpersistent* accelerations—where the second category refers to accelerations associated with a subsequent growth reversal or a banking crisis.

The paper establishes that variation at the country level in external conditions, as well as global factors that affect all economies in a common manner during certain intervals, matter for medium-term growth outcomes of individual EMDEs. Another important finding of the paper is that the three country-specific external conditions also help explain the occurrence of growth accelerations and reversals. The results further indicate that the importance of country-specific external conditions for EMDEs' medium-term growth has increased over time, particularly in the case of external financial conditions. Their contribution to medium-term growth has increased by about ½ percentage point—or one-third of the increase in average income per capita growth—between 1995–2004 and 2005–14.

The rest of the paper is structured as follows. It starts with an overview of EMDEs' growth performance in recent decades. The paper then discusses the construction of country-specific external demand conditions, external financial conditions, and terms of trade and examines their role in shaping growth patterns observed across countries and over time. The analysis subsequently turns to episodic patterns of EMDEs' growth and explores the role of external conditions in affecting the likelihood of accelerations and reversals.

II. Data and Stylized Facts On EMDE Growth Performance

A. Data

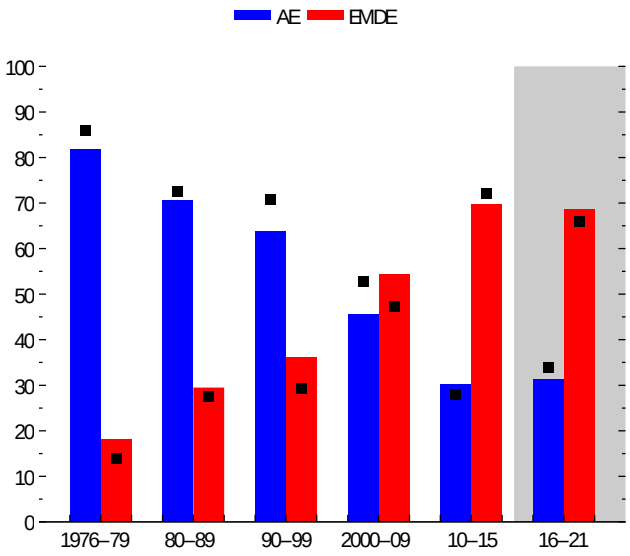
The primary data sources for this paper are the IMF World Economic Outlook (WEO) database, the Penn World Tables (version 9.0), and the World Bank World Development Indicators database. We also use several other databases to construct the external conditions variables and policy and other domestic attribute variables used in the empirical analyses. Annex Table 1 lists all indicators used in the paper as well as their sources.

The sample of countries included in the various analytical exercises varies due to data constraints. Annex Table 2 lists the sample of all EMDEs used in the various analytical exercises.

B. Emerging Market and Developing Economy Growth Performance over Time

During 2000–08, emerging market and developing economies on average accounted for 70 percent of global growth in output and consumption in purchasing power parity terms, nearly double their contribution during the 1980s. After the global financial crisis, with advanced economies experiencing a slow recovery, EMDEs' contribution to global growth rose to about 80 percent of output growth and 85 percent of consumption growth. In market exchange rate terms, EMDEs accounted for close to 70 percent of global output growth and just over 70 percent of global consumption growth during 2010–15 (Figure 1).

Figure 1. Contribution to Global Growth and Consumption
(Percent)



Source: Authors' calculations.
Note: Weighted averages are calculated using market exchange rates. Colored bars show percentage of contribution to growth; black squares show percentage of contribution to consumption. AE = advanced economies; EMDE = emerging market and developing economies.

However, income levels of individual countries within the group are still relatively low vis-à-vis those of AEs. In 90 percent of EMDEs current real income per capita (converted at purchasing power parity exchange rates that more accurately reflect differences in the cost of living across countries) is less than half what it is in the United States. In 85 percent of EMDEs real income per worker is less than half that in the United States (Figure 2).[4]

To the extent that labor productivity growth in EMDEs is in part a function of the relative productivity gap with AEs (proxied by the United States), these large gaps in output per worker suggest that there may still be significant room for catch-up (although some countries may be close to their own steady-state levels and unlikely to experience further catch-up growth).[5]

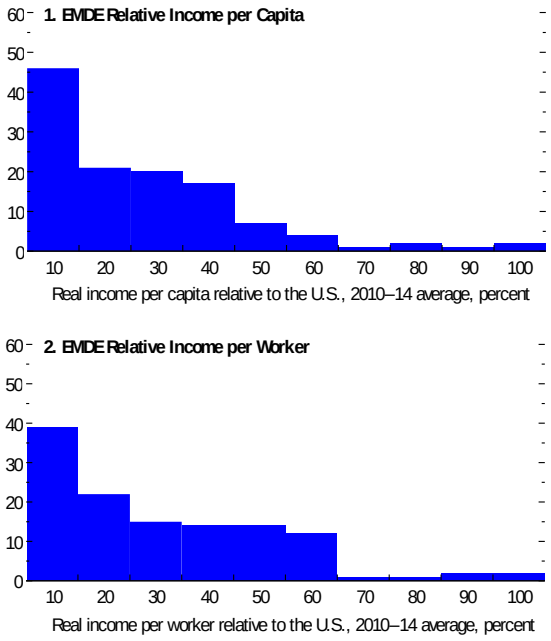
[4] The ratios are calculated based on average real income per capita over a five-year window, 2010–14, to smooth out business cycle and commodity price fluctuations that may affect the relative income levels. An important caveat is that some emerging market economies use the single-deflation method to calculate real GDP, but this approach may not fully capture relative price changes and may therefore affect the accuracy of the calculation (Alexander and others 2017).

[5] Some EMDEs have been experiencing a protracted slowdown in labor productivity growth in recent years (Adler and others, 2017), which would be consistent with these economies having reached per capita income levels close to their steady states.

In the past, the narrowing of income gaps has not been automatic. Other forces beyond the gap in productivity have shaped the pattern of EMDEs' growth. For example, consider the *bottom three quintiles* of the income distribution of these economies in the 1970s—that is, those with relative income per capita vis-à-vis the United States below the 60th percentile of the cross-country distribution of the period-average relative income per capita levels during the 1970s (Figure 3, panel 1). Convergence and the narrowing of relative income gaps would have been expected to be greatest among economies in this group; indeed, the best performers in this group (economies in the top decile) have seen some narrowing in income levels relative to the United States (from about 11 percent in the 1970s to about 21 percent in recent years). However, the median relative income level for that group has in fact *declined* over the past four decades. By way of comparison, within the *top two quintiles* of EMDEs' relative income distribution in the 1970s, the median relative income for the group has increased (Figure 3, panel 2).

Figure 2. Emerging Market and Developing Economies, Relative Income in Purchasing Power Parity Terms

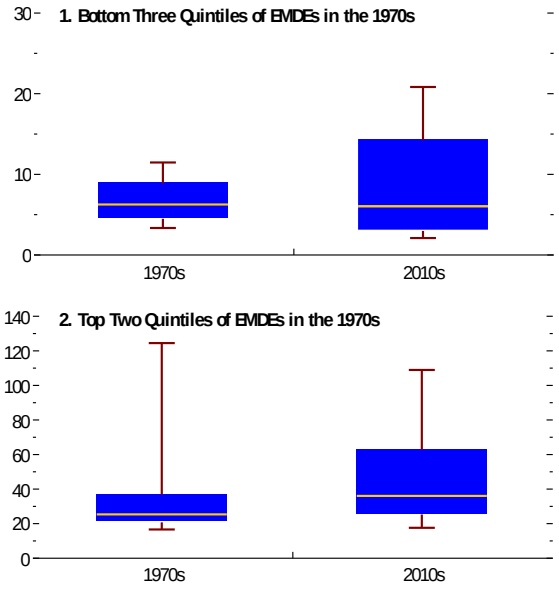
(Number of economies per interval)



Sources: Penn World Tables 9.0; and authors' calculations.
Note: EMDE = emerging market and developing economies; U.S. = United States.

Figure 3. Distribution of Income per Capita in EMDEs in the 1970s and the 2010s

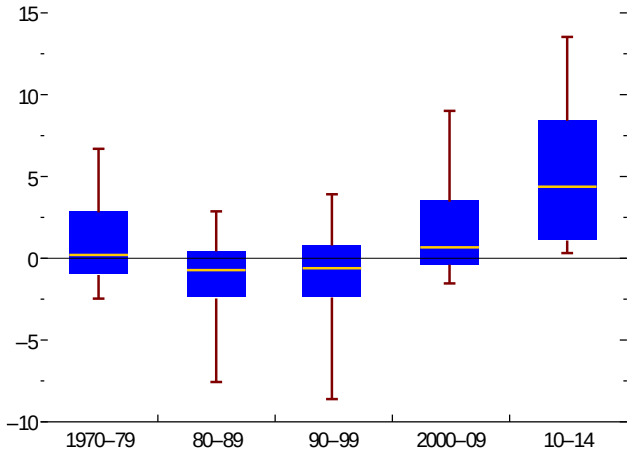
(Income per capita in PPP terms relative to the United States, percent)



Sources: Penn World Tables 9.0; and authors' calculations.
Note: The horizontal line inside each box represents the median; the upper and lower edges of each box show the top and bottom quartiles; and the red markers denote the top and bottom deciles of the average relative income during the decade. EMDEs = emerging market and developing economies; PPP = purchasing power parity.

The speed of convergence has varied over time as well and points to a role for external conditions in shaping EMDEs' growth patterns (Figure 4). During the 1970s, the median income gap remained broadly unchanged as the two oil shocks hurt oil-importing EMDEs while they lifted oil exporters' income levels. During the 1980s and 1990s income gaps widened (that is, the median income level declined relative to that of the United States) as EMDEs suffered a lost decade (Latin American and the Caribbean) and financial crises

Figure 4. Change in Real Income per Capita in EMDEs Relative to the United States over Decades
(Percentage points)



Sources: Penn World Tables 9.0; and authors' calculations.
Note: The horizontal line inside each box represents the median; the upper and lower edges of each box show the top and bottom quartiles; and the red markers denote the top and bottom deciles of the average change in relative income during the decade. *X*-axis labels denote decades. EMDEs = emerging market and developing economies.

(Latin America and the Caribbean, Asia). Income gaps subsequently narrowed in the wake of the commodity boom and other tailwinds in the 2000s and 2010s (IMF 2014 and 2015).

The narrowing of EMDEs' relative income gap with the United States since 2000 does not reflect "convergence from above": except during the global financial crisis, real GDP per capita in the United States did not decline in absolute terms during the 2000s and 2010s. While the relatively slow growth in the United States after the crisis has mechanically helped faster-growing EMDEs narrow their income gaps relative to the United States, for most of the period, this narrowing occurred in part because of exceptional tailwinds that supported synchronized accelerations (IMF 2014). And, in earlier periods when gaps widened, growth reversals in EMDEs appear to have played an important role. The time variation in the pace at which relative income gaps narrow and widen therefore reflects in part the episodic nature of growth in EMDEs, with a recurrence of accelerations and reversals.

In the rest of the paper, we investigate the role of external conditions in accounting for these patterns.

III. Country-Specific External Conditions

This section defines and describes a set of external conditions for EMDEs. It assesses their relevance for medium-term growth performance in those economies. Finally, it explores how the importance of external conditions varies across economies and over time.

A. Constructing Country-Specific and Exogenous Measures of External Conditions

The external conditions that EMDEs face comprise a complex mix of factors that do not always move in the same direction. For instance, weak external demand associated with low growth in key trading partners may go hand in hand with loose monetary conditions, low global interest rates, and strong capital flows to EMDEs.

To take this potential divergence into account, the paper focuses on three sets of external conditions—external demand conditions, external financial conditions, and terms of trade—

each of which can manifest itself differently for individual countries. We construct country-specific metrics of these external conditions that can capture the specificities of the global context for each economy, while at the same time being largely exogenous from the point of view of each individual economy.

External demand conditions – Country-specific external demand conditions are measured by the export-weighted growth rate of domestic absorption of trading partners, along the lines of Arora and Vamvakidis (2005) and IMF (2014). Thus, for an emerging market economy *j* in year *t*, the growth rate of external demand can be represented by

$$\sum_{i \in \Theta_j} \omega_{i,t} * da_{i,t} ,$$

in which $\omega_{i,t}$ is the share of economy *j's* exports accounted for by economy *i* (based on IMF Direction of Trade Statistics [DOTS] data); $da_{i,t}$ is the annual growth rate of real domestic absorption in economy *i* (at constant national prices, from Penn World Tables 9.0); Θ_j is the set of economy *j's* trading partners for which bilateral export data are reported in DOTS and collectively account for at least 50 percent of total exports.

External financial conditions – Country-specific external financial conditions are proxied by a quantity-based measure of capital flows to peer economies (other emerging market and developing economies within the same region) as a share of their aggregate GDP (constructed to be exogenous to each country along the lines of Blanchard, Adler, and de Carvalho Filho 2015).[6] More precisely, the country-specific *external financial conditions* are measured by the ratio of capital inflows to the region of the economy in question (excluding inflows to that economy) as a share of GDP of other economies in the same region. Thus, for economy *j* in year *t*, the external financial condition is measured by the ratio

$$\frac{\sum_{i \in \Theta \setminus j} K\_inflow_{i,t}}{\sum_{i \in \Theta \setminus j} GDP_{i,t-1}} ,$$

in which $K\_inflow_{i,t}$ is gross inflows to economy *i*, $GDP_{i,t-1}$ is GDP of economy *i* measured in U.S. dollars, and $\Theta \setminus j$ is the set of all related economies (within the same region) but excluding economy *j*. By excluding capital flows to the economy, itself and aggregating capital flows to related economies, the external financial conditions measure aims to capture push factors that are exogenous to the economy in focus.

Terms of trade – Country-specific changes in the terms of trade are based on international commodity prices as in Gruss (2014) and IMF (2015) to ensure that they are exogenous from the perspective of each economy. The country-specific commodity terms of trade (CTOT)

[6] A quantity-based metric is used to capture better the fluctuations in availability of diverse financial flows ranging from direct investment to cross-border bank lending. These fluctuations may be missed if price-based proxies for external financial conditions are used, such as those calculated from a narrow set of global interest rates.

index is constructed as a trade-weighted average of the world price of imported and exported commodities. It provides an indication of the income windfall gains and losses (as a share of GDP) associated with changes in international prices.

The annual change in the economy *i*'s CTOT index in year *t* is given by

$$\Delta logCTOT_t = \sum_{j=1}^{J} \Delta logP_{j,t}\tau_{i,j,t} ,$$

in which $P_{j,t}$ is 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), and Δ denotes the first difference. The commodity price series start in 1960.[7] Economy *i*'s weights for each commodity price, $\tau_{i,j,t}$, are given by

$$\tau_{i,j,t} = \frac{x_{i,j,t-1} - m_{i,j,t-1}}{\text{GDP}_{i,t-1}} ,$$

in which $x_{i,j,t-1}$ ($m_{i,j,t-1}$) denote the average export (import) value of commodity *j* by the economy *i* between *t* – 1 and *t* – 3 (in U.S. dollars, from the United Nations Comtrade database), and $\text{GDP}_{i,t-1}$ denotes the average GDP of the economy *i* between *t* – 1 and *t* – 3 (in U.S. dollars).

A possible concern is that these metrics reflect the influence of one single global factor rather than country-specific exposures to different external forces. To address this concern, we first explore the correlation between the three external condition variables. Table 1 shows the pairwise correlation between the three country-specific external condition measures. The

Table 1. Pairwise Correlation between External Conditions Variables

Variable	External Demand Conditions	External Financial Conditions	Commodity Terms of Trade
External Demand Conditions	1		
External Financial Conditions	0.1288	1	
Commodity Terms of Trade	0.0737	-0.0016	1

Source: Authors' calculations.

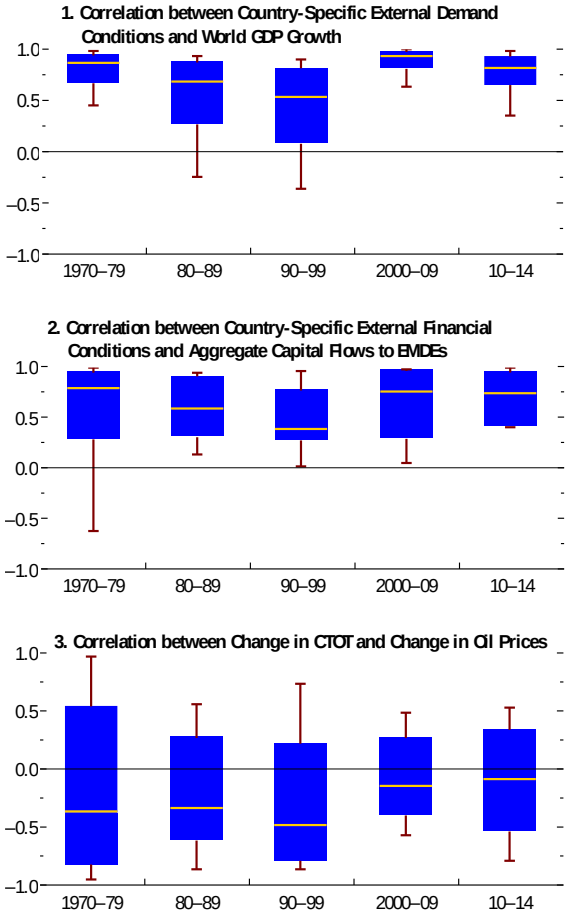
[7] Commodity price series starting in 1960 for 41 individual commodities are used, covering: energy (coal, crude oil–the simple average of the spot prices of Dated Brent, West Texas Intermediate, and Dubai Fateh–and natural gas); metals (aluminum, copper, iron ore, lead, nickel, tin, and zinc); food and beverages (bananas, barley, beef, cocoa, coconut oil, coffee, corn, fish, fish meal, groundnuts, lamb, oranges, palm oil, poultry, rice, shrimp, soybean meal, soybean oil, soybeans, sugar, sunflower oil, tea, and wheat); and agricultural raw materials (cotton, hardwood logs and sawn wood, hides, rubber, softwood logs and sawn wood, soybean meal, and wool). The primary source for international commodity prices is the IMF's International Financial Statistics database. The World Bank's Global Economic Monitor database is used to extend the price series of barley, iron ore, and natural gas from the IMF's Primary Commodity Price System back to 1960. The price of coal is the Australian coal price, extended back to 1960 using the World Bank's Global Economic Monitor database and U.S. coal price data from the U.S. Energy Information Administration.

correlation between external demand and financial conditions is only 0.13. The correlation between external demand conditions and CTOT is only 0.07, and it is basically zero between the latter and external financial conditions. The low correlation between these variables suggests that each dimension potentially exerts a separate influence from the other two. That is, the external environment emerging market and developing economies face comprises a complex mix of factors that do not always move in the same direction.

Second, for each external condition we explore to what extent the country-specific indices co-move with a global proxy for that external condition. The results in Figure 5 show that the country-specific measures of external conditions often deviate considerably from their corresponding global variables, suggesting that idiosyncratic variation is an important driver of the variability in external conditions at the level of individual economies:

- Exploring the time-varying correlation of individual country external demand conditions with aggregate world output growth shows that the external conditions that each faces often deviate significantly from average external conditions (Figure 5, panel 1).

Figure 5. Correlation between Country-Specific External Conditions Variables and Global Variables over Time
(Correlation coefficient)



Source: Authors' calculations.
Note: The figure shows the rolling correlation between country-specific variables and global variables over nonoverlapping five-year windows. The horizontal line inside each box represents the median; the upper and lower edges of each box show the top and bottom quartiles; and the red markers denote the top and bottom deciles. World GDP growth is the weighted average (using market exchange rates) of growth in individual economies. CTOT = commodity terms of trade; EMDEs = emerging market and developing economies.

- Since economies within a comparable group naturally have an important common element, external financial conditions exhibit, not surprisingly, a strong role for the common factor at the regional level. However, by restricting the set of related economies to those within the same geographical region, the country-specific measure nonetheless shows substantial variability. This is evident in the relatively wide variation in the correlation of individual economies' external financial conditions with aggregate capital flows to emerging market and developing economies (Figure 5, panel 2).

- The mix of commodity exports, as well as the reliance on commodity imports, varies significantly across countries. This is reflected in the high cross-country variability in

the rolling correlation of changes in country-specific CTOT indices with that of oil prices or aggregate commodity prices (Figure 5, panel 3).[8]

IV. EXTERNAL CONDITIONS AND MEDIUM-TERM GROWTH

Before turning to the role of external conditions around turning points in income per capita growth–growth acceleration and reversal episodes–we explore how the measures of country-specific external conditions presented above correlate with medium-term income growth. More precisely, we estimate a standard fixed-effects panel growth regression that is standard in the literature over 1970–2014 for a broad unbalanced sample of more than 80 economies (see country sample in Annex 1):[9]

$$g_{it} = \gamma Z_{it} + \beta X_{it} + \alpha_i + \mu_t + \epsilon_{it}, \quad (1)$$

in which g_{it} is the average annual growth rate of real GDP per capita in purchasing power parity terms in country i over period *t*–which corresponds to a five-year nonoverlapping window to smooth the influence of business cycles–and vector Z_{it} includes the main variables of interest, that is, the three country-specific external conditions.

The vector X_{it} includes a parsimonious set of control variables aimed at attenuating potential omitted variable bias that may affect the estimates. These include the initial level of income per capita measured by the average log GDP per capita over the previous five-year period; the average rate of inflation as a proxy for macroeconomic stability; the level of human capital; de jure measures of trade and financial openness (proxied by the level of average import tariffs and an index of restrictions to the capital account, respectively); and deep institutional characteristics (as captured by the combined Polity IV index of governance characteristics). α_i captures time-invariant country fixed effects; and μ_t is a time fixed effect that controls for common, global factors.[10] Given that lagged income may be correlated with the error term, and some of the other control variables are potentially endogenous, the model is estimated with the difference generalized method of moments (Arellano and Bond 1991;

[8] Figure 5 shows the correlation between changes in CTOT and changes in oil prices. But a similar pattern emerges if a global commodity price index is used instead of oil prices.

[9] See for instance Barro and Sala-i-Martin (2004). Related studies that include measures of external conditions in standard growth regression include, among others, Arora and Vamvakidis (2005) and Calderón, Loayza, and Schmidt-Hebbel (2006).

[10] The country-specific measures of external conditions in Z_{it} are derived from demand or financial conditions in trading partners and from global commodity prices. A priori, across the entire sample, there is no reason to expect that the external condition measures are systematically affected by growth outcomes or by other variables that also directly affect growth in ways that would introduce reverse causality or omitted variables bias in the estimations. Nevertheless, the analysis attempts to mitigate these concerns by simultaneously including all three external conditions in the specifications, together with time fixed effects that capture unobservable common factors.

Arellano and Bover 1995).

Table 2 reports the estimation results. Columns (1) to (3) report the results when one external conditions variable is included at a time and column (4) corresponds to results when all three external variables are included jointly. Columns 5-8 report the results of the corresponding fixed effects specifications.

All three external conditions have economically and statistically significant effects on EMDEs' medium-term growth. The coefficients are economically meaningful and statistically significant even when all three external variables are included jointly and when controlling for common global factors captured by the time fixed effect.[11]

Specifically, the results in column (4) show that a 1 percentage point increase in the growth rate of domestic absorption in trading partners is associated with a 0.4 percentage point increase in medium-term growth, equivalent to around one-fifth of the average annual growth rate of GDP per capita in the sample. An increase in the ratio of capital flows to GDP of EMDEs within the region of 1 percentage point raises medium-term growth by 0.2 percentage point. A 1 percentage point increase in commodity terms of trade increases medium-term growth by almost ½ percentage point.[12]

Table 2. Estimation Results from Linear Panel Growth Regression

Dependent Variable: GDP per Capita Growth Rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Explanatory Variables								
External Demand Conditions	0.524**			0.421**	0.331			0.243
	(0.203)			(0.192)	(0.199)			(0.189)
External Financial Conditions		0.266***		0.186**		0.339***		0.289***
		(0.099)		(0.085)		(0.096)		(0.086)
Commodity Terms of Trade			0.453*	0.481*			0.539**	0.538**
			(0.238)	(0.249)			(0.220)	(0.218)
Estimation Details								
Estimation Method	GMM	GMM	GMM	GMM	OLS	OLS	OLS	OLS
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	505	517	509	497	587	601	592	578
Number of Economies	81	84	83	80	82	84	83	81
R^2					0.411	0.422	0.417	0.432
Specification Tests (p-values)								
Second-Order Correlation Test	0.863	0.913	0.567	0.507				
Hansen Test	0.149	0.173	0.197	0.201				

Source: Authors' calculations.
Note: The dependent variable is the annual growth rate of GDP per capita in purchasing power parity terms, averaged over nonoverlapping five-year windows. One unit of external demand conditions corresponds to a 1 percentage point growth in domestic absorption of trading partners; one unit of external financial conditions corresponds to a 1 percentage point of GDP in capital flows to regional economies; one unit of the commodity terms of trade corresponds to a 1 percent increase in the commodity terms of trade index (akin to a windfall income gain of 1 percent of GDP). The sample period is 1970–2014. Robust standard errors are reported in parentheses. GMM = generalized method of moments; OLS = ordinary least squares. ***,**, and * denote significance at the 1, 5, and 10 percent level, respectively.

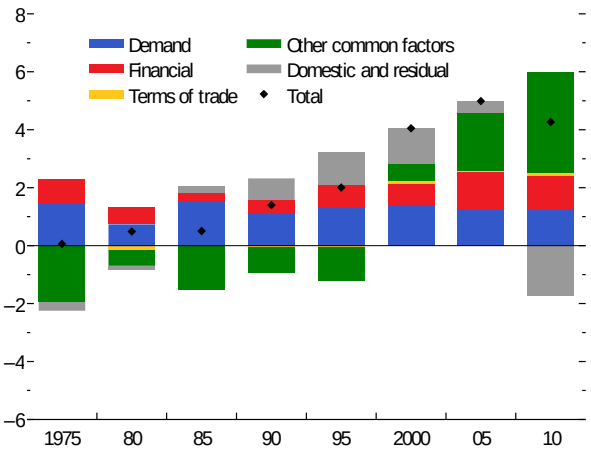
[11] Robustness exercises available upon request show that the results are largely unaffected if we exclude large countries (e.g. all G20 EMDEs) for which the exogeneity assumption of external conditions may be questioned.

[12] It should be noted that a 1 percentage point change in the commodity terms of trade index is akin to a windfall income gain of 1 percent of GDP—a relatively large amount. The interquartile range for the average annual change in the commodity terms of trade index across all countries and periods is –0.4 percent to 0.3 percent.

A. Contribution of country-specific external conditions to per capita income growth

The estimation results suggest that the three external condition variables have collectively contributed on average almost 2 percentage points to income per capita growth over 1975–2014 (Figure 6). The joint contribution of external conditions increased from about 1.7 percentage points over 1975–94 to about 2⅓ percentage points during 1995–2014, possibly reflecting increased openness to international trade, integration with global supply chains, and deeper integration with international capital markets (Leigh and others 2017). The change in the contribution of external financial conditions stands out, increasing by about ½ percentage point—or one-third of the increase in average income per capita growth—between 1995–2004 and 2005–14. This represents about half of the contribution from external factors since 2005, up from about one-third during 1995-2004.

Figure 6. Average Contribution to GDP per Capita Growth
(Percentage points)



Source: Authors' calculations.
Note: The figure shows, for each variable and period, the average contribution to fitted GDP per capita growth across economies. The results are based on the coefficient estimates from the baseline growth regression for the whole sample. "Other common factors" corresponds to the estimated time fixed effects (de-meaned). *X*-axis labels indicate start of a five-year period. EMDEs = emerging market and developing economies; LAC = Latin American and the Caribbean; MENAP = Middle East, North Africa, Afghanistan, and Pakistan; SSA = sub-Saharan Africa.

B. The Role of Common Factors

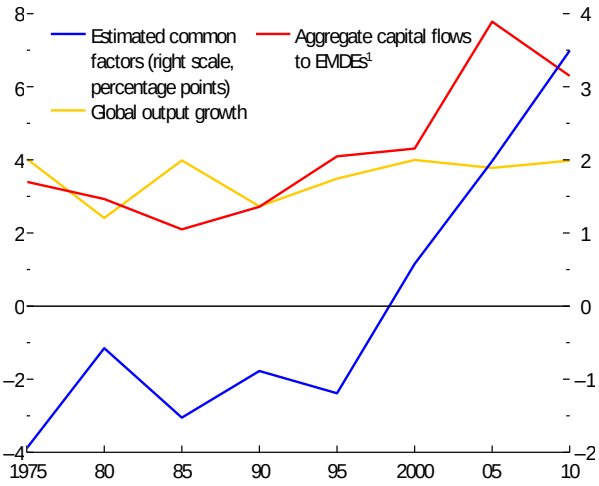
Above and beyond the influence of country-specific external conditions, Figure 6 shows an important role for other common factors. The shift in the contribution of other common factors may be capturing to some extent the influence of external conditions that are common across economies. The estimates presented above on the contribution of country-specific external conditions to EMDEs' medium-term growth could therefore be interpreted as a lower bound on the impact of external conditions.

The contribution of other common factors captured by the time fixed effects (which includes the influence of external conditions common across economies) appears to have been relatively stable during 1975–1999, but has increased sharply since the early 2000s. Comparing the estimated role of common factors with global activity and financial variables suggests that the overall contribution of external conditions—and, in particular, external financial conditions—to medium-term growth over the past 15 years may have been larger than what is captured by the country-specific external conditions variables (Figure 7).

The shift in the contribution of other common factors over the past few decades may reflect, in part, the synchronized increase of gross capital inflows to EMDEs.[13] By contrast, the association between estimated common factors and global economic activity is less clear. Economic activity in AEs slowed during 2000–14, largely offsetting the faster growth and higher influence in the global economy of large EMDEs. The demand implications from these developments are likely to be adequately captured by the country-specific external demand variable. But the transformation in trade linkages between EMDEs over the past few decades may have affected their growth through channels beyond external demand. EMDEs' participation in global value chains has also increased robustly since the mid-1990s (IMF, 2016), which may have affected the efficiency of resource use and productivity growth. The increasing contribution of estimated common factors during 2000–14 may, therefore, also reflect in part the productivity effects of changes in trade linkages among EMDEs.

Figure 7. Contribution of Other Common Factors to GDP per Capita Growth and Selected Global Variables

(Percent, unless noted otherwise)



Source: Authors' calculations.
Note: Estimated common factors correspond to the estimated time fixed effects (de-meaned) from the baseline growth regression for the whole sample. *X*-axis labels indicate start year of five-year period. EMDEs = emerging market and developing economies.
[1]Aggregate capital flows to EMDEs are expressed as a share of their aggregate GDP.

V. Growth Accelerations and Reversals

With the importance of external conditions for EMDEs' medium-term growth established, this section takes a closer look at their influence on the occurrence of growth accelerations and reversals—a key feature of the growth process in several EMDEs. As Hausmann, Pritchett, and Rodrik (2005) argue, studying the turning points of growth phases (represented by, for example, the onset of accelerations and reversals) can shed valuable light on the convergence process in EMDEs.

Previous research has documented the role of certain aspects of external conditions—in particular, external demand and term of trade—in influencing EMDEs' growth. IMF (2014), for example, demonstrates the importance of external demand and terms of trade for medium-term growth in EMDEs. Jones and Olken (2008) show that growth accelerations

[13] Since global asset prices and capital flows to emerging market and developing economies are affected by portfolio shifts in advanced economies, the rising importance of external financial conditions in EMDEs' medium-term growth may also indicate a change in how advanced economies influence EMDEs' growth, with the relative importance of the financial channel rising and that of the demand channel declining.

("upbreaks" in their terminology) are associated with increases in the trade share of GDP. Berg, Ostry, and Zettelmeyer (2012) document a positive association between terms-of-trade shocks and the duration of growth spells, while Hausmann, Pritchett, and Rodrik (2005) establish that very strong terms-of-trade realizations are associated with the onset of growth accelerations.

Building on this previous work, this section analyzes the role of country-specific external conditions in influencing the occurrence of growth accelerations and reversals.

A. Identifying Episodes of Growth Accelerations and Reversals

The procedure to identify growth acceleration episodes follows Hausmann, Pritchett, and Rodrik (2005). The trend growth rate of each economy at time *t* over horizon *h*, $g_{t,t+h}$, is defined as the least squares growth rate of real GDP per capita at constant national prices (*y*) from *t* to *t+h* described by the following equation estimated over rolling windows of six years [*t*,*t+h*]:[14]

$$\ln(y_{t+i}) = \alpha + g_{t,t+h} \times i, \qquad i = 0, \dots, h. \tag{2}$$

A growth acceleration episode is defined as a time interval spanning [*t*,*t+h*] with the following attributes (in which the horizon *h* is set at five years in the baseline case):

- the trend growth rate of real GDP per capita is at least 3.5 percent a year ($g_{t,t+h} \geq 3.5$);
- the trend growth rate during the episode exceeds the trend growth rate during the preceding equal-length interval by at least 2 percentage points ($g_{t,t+h} - g_{t,t-h} \geq 2$); and
- the level of real GDP per capita at the end of the episode is at least as large as the maximum level recorded prior to the onset of the episode ($y_{t,t+h} \geq \max\{y_i\}, \forall i \leq t$).

The set of acceleration episodes identified is in line with those in Hausmann, Pritchett, and Rodrik (2005) for the period during which the samples overlap.

Starting with the set of identified acceleration episodes, a *persistent* acceleration episode is defined as an acceleration that is not associated with a subsequent reversal (defined below) or a banking crisis (as defined by Laeven and Valencia 2013) within three years before or after the end of the acceleration episode.

[14] Episodes are identified up to the year 2010 using real income per capita from PWT 9.0 through 2014 and extended to 2015 using the growth rate of real income per capita from the WEO database.

A reversal episode, in turn, is defined as an interval spanning [*t*,*t*+*h*] during which

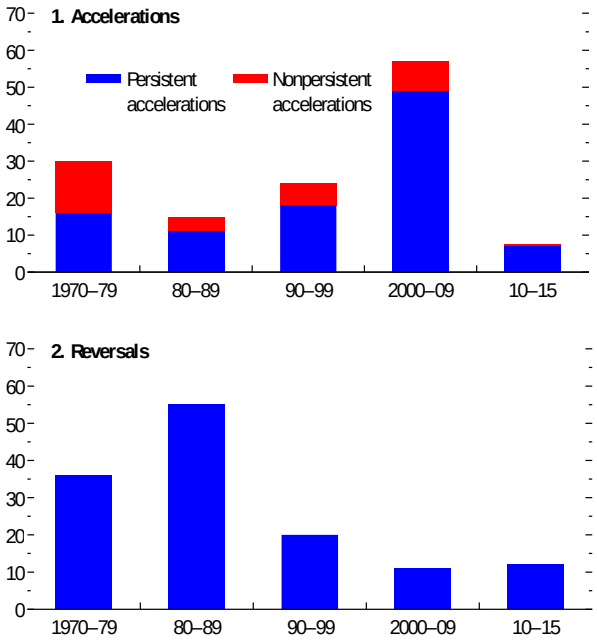
- the trend growth rate during the reversal is at least 2 percentage points lower than during the preceding interval ($g_{t,t-h} - g_{t,t+h} \geq 2$); and

- real GDP per capita declines such that the average level of real GDP per capita during the episode [*t*,*t*+*h*] is lower than the average level of real GDP per capita during [*t*−*h*,*t*], or ($\bar{y}_{t,t+h} \leq \bar{y}_{t-h,t}$).

B. Descriptive Statistics of the Episodes

These filters pick up substantial variation over time in the occurrence of growth episodes (Figure 8). In total, there are 127 growth acceleration episodes in the sample during 1970–2014. Of these, 95 represent persistent accelerations, and 32 represent nonpersistent accelerations (see Annex Table 2 for a list of country-year persistent acceleration episodes). Of the 32 nonpersistent accelerations, 12 are associated with subsequent reversals, 18 with banking crises, and 2 with both. The filter for reversals identifies 125 such episodes during 1970–2014. (Annex Table 3 lists the country-year reversal episodes.)

Figure 8. Growth Episodes in EMDEs, 1970–2015
(Number of episodes)

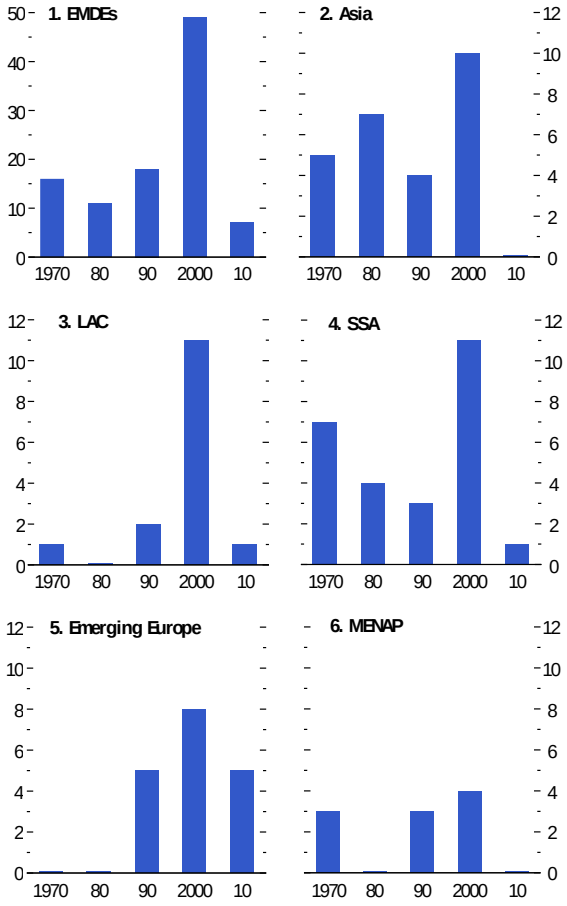


Source: Authors' calculations.
Note: Growth episodes are identified according to the criteria described in Section 5.A. *X*-axis labels indicate the start year of a 10-year period. EMDEs = emerging market and developing economies.

Accelerations picked up in the 2000s, but were relatively rare during other decades. More recent decades have also seen the balance of accelerations shift increasingly toward the persistent kind. There was a large number of reversals in the 1970s and 1980s as oil-importing EMDEs suffered during the decade of high oil prices, and other economies, particularly in Latin America and the Caribbean, experienced severe financial crises with persistent negative effects on income per capita. Reversals have declined in number since then.

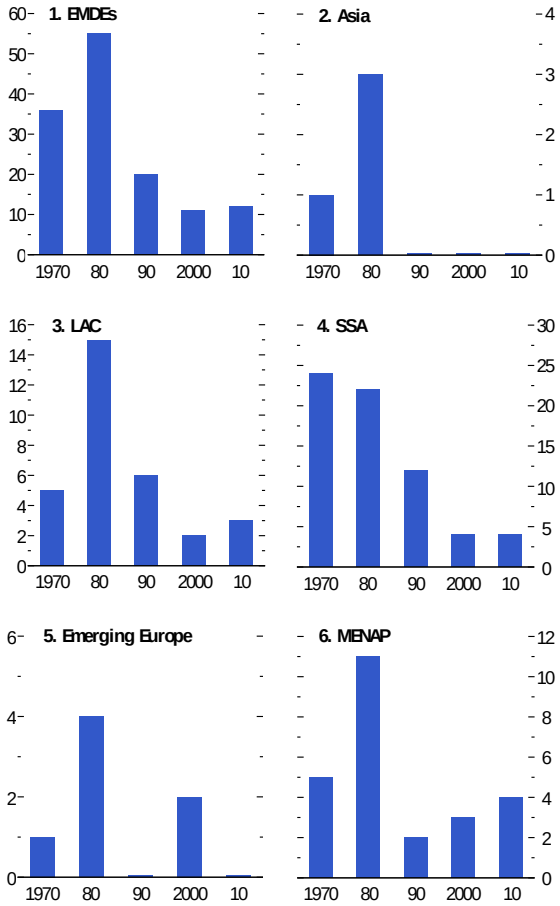
Across regions, accelerations have been relatively steady in Asia over time but they have been more variable elsewhere (Figure 9). It is important to note, though, that growth accelerations occur in all regions and are not largely restricted to EMDEs in one or two regions of the world. Reversals, on the other hand, are more concentrated geographically. They tend to occur mostly in the Middle East, North Africa, Afghanistan, and Pakistan; Latin America and the Caribbean; and sub-Saharan Africa. Asia and Europe have seen fewer of these episodes (Figure 10).

Figure 9. Persistent Acceleration Episodes by Region
(Number of episodes)



Source: Authors' calculations.
Note: *X*-axis labels indicate the start year of a 10-year period. EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; MENAP = Middle East, North Africa, Afghanistan, and Pakistan; SSA = sub-Saharan Africa.

Figure 10. Reversal Episodes by Region
(Number of episodes)

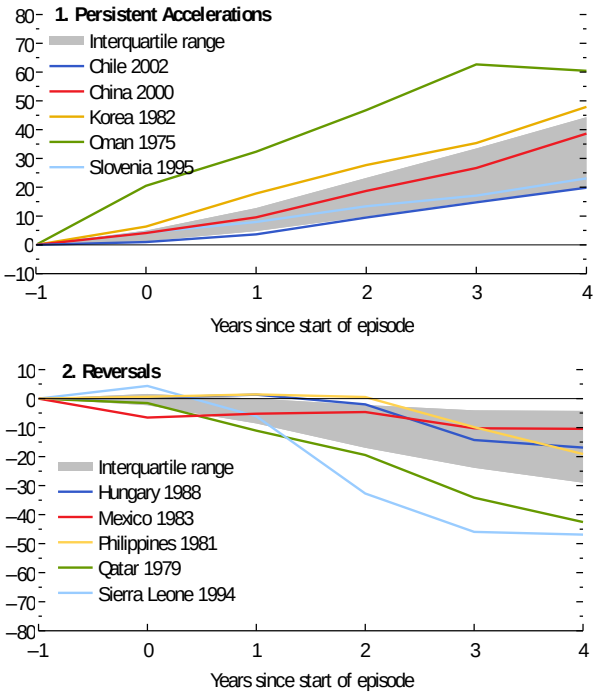


Source: Authors' calculations.
Note: *X*-axis labels indicate the start year of a 10-year period. EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; MENAP = Middle East, North Africa, Afghanistan, and Pakistan; SSA = sub-Saharan Africa.

The cumulative impact of episodes on per capita income levels appears to be large, with considerable variation across country experiences. Persistent accelerations are associated

with increases in real income per capita typically ranging from 15 to 40 percent above the starting level before the episode (Figure 11, panel 1). During reversals, real income per capita typically declines 5–30 percent relative to the initial starting level—with income drops as large as 50 percent in some cases, such as Sierra Leone in the mid-1990s (Figure 11, panel 2).

Figure 11. Cumulative Growth during Episodes, 1970– 2015
(Percent change relative to the initial level of income per capita)

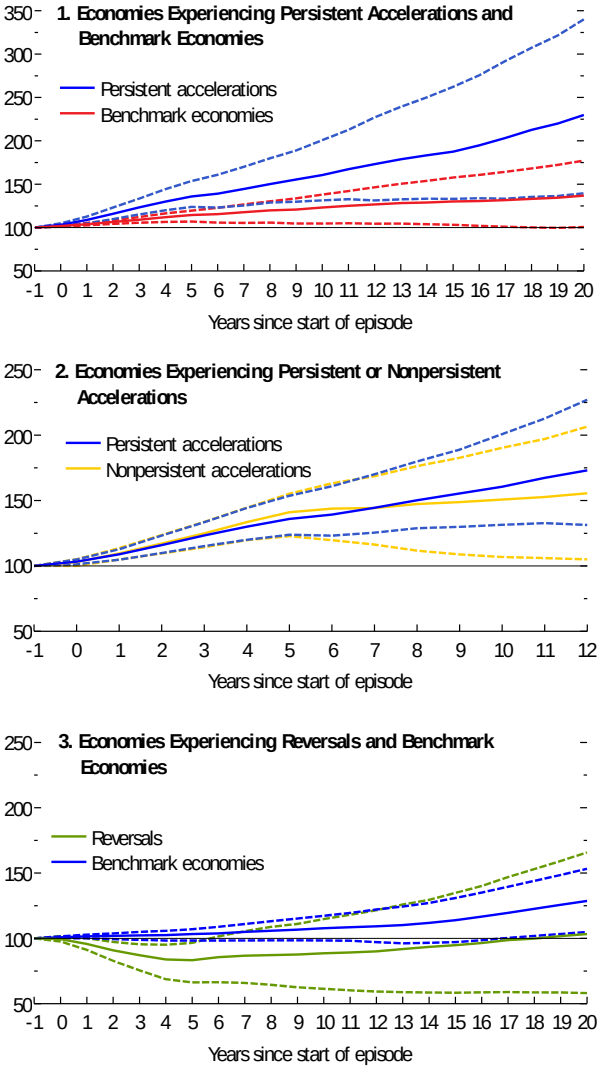


Source: Authors' calculations.
Note: Growth episodes are identified according to the criteria described in Section 5.A. For the full list of episodes, see Annex Tables 3 and 4. "Interquartile range" denotes the interquartile range of the distribution of cumulative growth for all country-year episodes.

Persistent accelerations and reversals also appear to have long-lasting effects on the level of real income per capita beyond the span of the episode. Persistent accelerations, for example, seem to be associated with permanent increases in income levels: during the two decades after the onset of a persistent acceleration, the median level of income per capita increases nearly twice as much as the median level of income per capita for economies that do not experience accelerations (Figure 12, panel 1). Moreover, comparing persistent with nonpersistent accelerations (Figure 12, panel 2), the level of real GDP per capita seems to increase in similar fashion during the first five years of both sets of episodes. The level of real GDP per capita then appears to increase at a slower rate in the case of nonpersistent accelerations, leading to a lower level eight years after the onset of the episode compared with that seen in the group of persistent accelerations. Reversals also appear to have persistent negative effects on real GDP per capita, with the level not returning to that attained at the start of the episode until around 15 years after the start of the episode (Figure 12, panel 3).

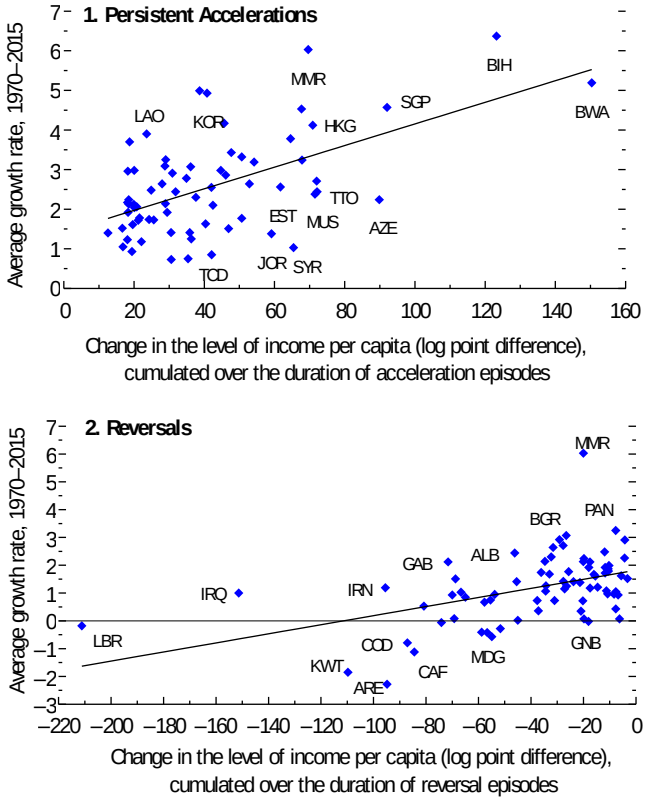
The persistent effects of episodes are also seen in the association between cumulative income gains during accelerations (or losses during reversals) and long-term average growth rates (Figure 13). Economies with larger increases in levels of per capita income during persistent accelerations tend to grow faster on average over the long term, while those with bigger decreases in income levels during reversals tend also to witness lower long-term average growth rates.

Figure 12. Normalized GDP per Capita during Growth Episodes and Their Aftermath, 1970–2015
(Scalar)



Source: Authors' calculations.
Note: Growth episodes are identified according to the criteria described in Annex 5.A. For the full list of episodes, see Annex Tables 3 and 4. *Y*-axis labels represent GDP per capita levels, normalized to be equal to 100 at t = –1. Solid lines denote the medians. Dashed lines denote the interquartile range of the distribution of the normalized GDP per capita for all country-years episodes.

Figure 13. Cumulative Growth Rate of Real Income per Capita during Episodes versus Average Growth Rate of Real Income per Capita during 1970–2015
(Percent)



Source: Authors' calculations.
Note: Growth episodes are identified according to the criteria described in Annex 5.A. For the full list of episodes, see Annex Tables 3 and 4. Data labels in the figure use International Organization for Standardization (ISO) country codes.

VI. The Role of External Conditions on Growth Accelerations and Reversals

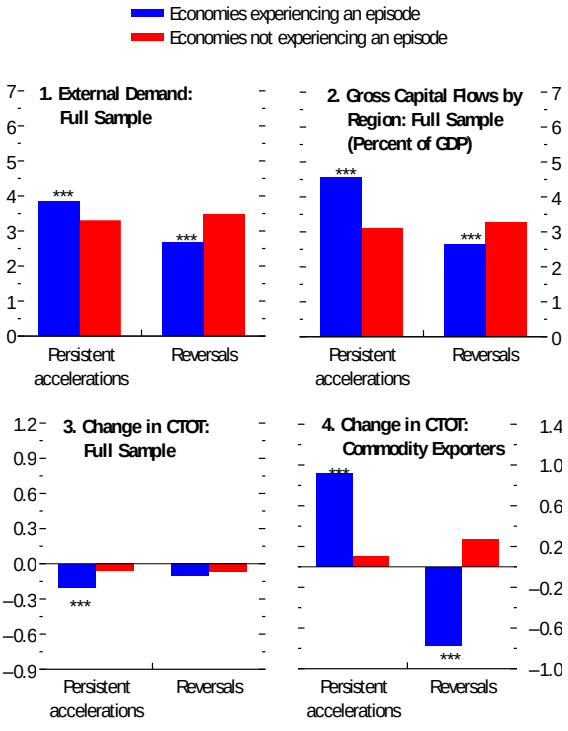
A. External Conditions during Episodes: How Different?

Before estimating the effect of external conditions on the likelihood of accelerations and reversals, the data are examined to explore how attributes of episodes differ from those of comparators spanning the same time interval.

The comparison is based on a test of equality of medians, and the results are robust to a Kolmogorov-Smirnov test of congruence of the distribution of the variable (Chakravarti, Laha, and Roy 1967) for the two sets of countries. The median annual growth rate during persistent acceleration episodes in the sample is about 5.5 percent (compared with 1.7 percent for comparator economies not in an episode over the same period), while the median growth rate during reversals is –3 percent (compared with 2.6 percent for comparators over the same period). External conditions during the episodes evolve differently from the comparator set not experiencing an episode (Figure 14) as well as across persistent and non-persistent accelerations (Figure 15). For persistent acceleration episodes, the median of trading partner growth is just above half a percentage point higher than the median trading partner growth for comparator economies not in an episode (Figure 14, panel 1). The difference in medians is statistically significant. External financing—the gross capital flow into the region—is about 1.5

Figure 14. Event Analysis: Persistent Accelerations and Reversals, 1970–2015

(Percent, unless noted otherwise)

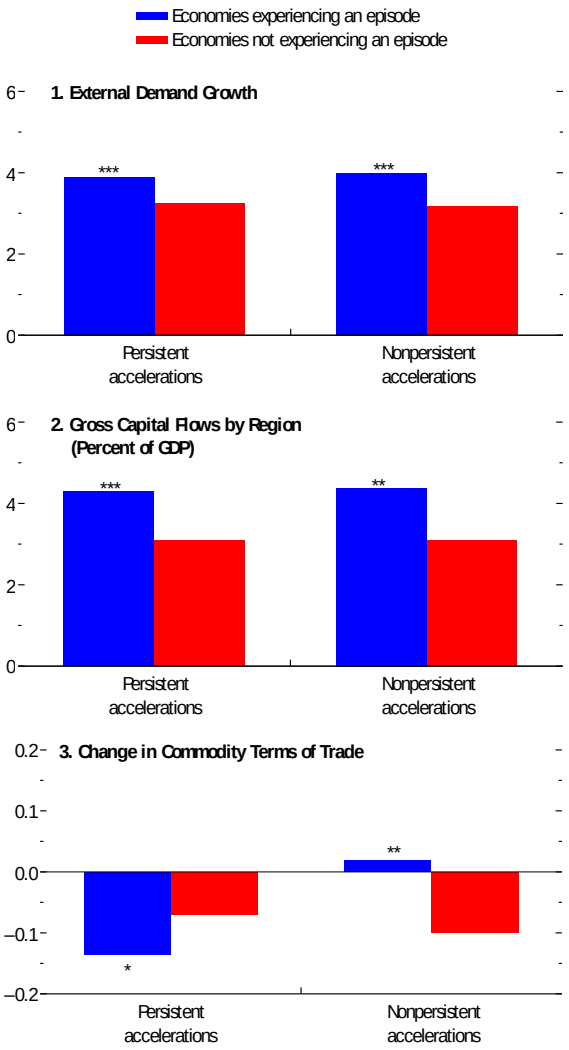


Source: Authors' calculations.

Note: The results are robust to a Kolmogorov-Smirnov test of congruence of the distribution of the variable for the two sets of economies. Each variable is measured as the average between t+1 and t+5, where t corresponds to the onset of the episode. ***, **, and * denote significance of an equality test of medians at the 1, 5, and 10 percent level, respectively. CTOT = commodity terms of trade.

Figure 15. Event Analysis: Persistent and Nonpersistent Accelerations, 1970–2015

(Percent, unless noted otherwise)



Source: Authors' calculations.

Note: The results are robust to a Kolmogorov-Smirnov test of congruence of the distribution of the variable for the two sets of economies. Each variable is measured as the average between t+1 and t+5, where t corresponds to the onset of the episode. ***, **, and * denote significance of an equality test of medians at the 1, 5, and 10 percent level, respectively.

percentage points higher than for comparator economies (Figure 14, panel 2).

The median change in commodity terms of trade is very close to zero and only marginally different between the two sets of economies (–0.2 percent for persistent accelerations episodes versus about –0.1 percent for the comparator countries), given that the full sample includes both commodity importers and exporters (Figure 14, panel 3). However, for commodity exporters only (Figure 14, panel 4), the median change in terms of trade is positive and significantly higher for those among them that experienced persistent accelerations than for the comparator group of commodity exporters (0.9 percent and 0.1 percent, respectively). The median change in terms of trade is also positive and significantly higher for those that experienced nonpersistent accelerations (Figure 15, panel 3).

For reversal episodes, trading partner growth is almost 0.7 percentage point lower than for nonepisodes spanning the same time interval (Figure 14). Capital flows to the region for reversal episodes are also roughly 0.7 percentage point lower compared with nonepisode countries over the same period. The median change in terms of trade for reversals is again very close to zero and with no statistically significant difference between the episode and nonepisode samples (–0.10 and –0.08 percent, respectively). However, among commodity exporters alone that difference becomes significant, with commodity exporters in reversal episodes experiencing a decline of about 0.75 percentage point in their terms of trade versus an increase of about 0.3 percentage point for commodity exporters that did not experience a reversal during the same period.

B. Logit regression

To assess how external conditions, affect the likelihood of accelerations and reversals, this subsection reports estimates from logit regressions (along the lines of Hausmann, Pritchett, and Rodrik 2005). Two dummy variables are constructed to implement the empirical analysis on growth episodes: one dummy takes a value of 1 for the economy-years identified as persistent acceleration episodes (Annex Table 3) and zero otherwise; and the other dummy takes a value of 1 for the economy-years identified as reversal episodes (Annex Table 4) and zero otherwise. Given the empirical challenge of accurately dating growth episodes, following Hausmann, Pritchett, and Rodrik (2005) the dummy variables also take a value of 1 in the first lead ($t + 1$) and lag ($t - 1$) around each identified episode.

The regressions are estimated with a dummy for the onset of the identified episodes as dependent variable. Given the challenge of accurately dating the beginning of the episodes, the dummy assumes the value 1 for the periods t, t - 1, and $t + 1$ of the episode (see Hausmann, Pritchett, and Rodrik 2005).

The specifications include as independent variables the moving average of each of the three external condition variables between periods *t* and *t* + 5.[15] As an additional control, the logit specification also includes country-fixed effects in the baseline estimations. The pattern of significance across coefficients is robust to the inclusion of additional controls, including time-fixed effects and measures of de jure integration and institutional variables, and controls for the quality of the policy framework.

Using these dummy variables, the influence of country-specific external conditions on the likelihood of growth episodes can be tested by the following distribution function:

$$\Pr(episode_{it} = 1) = \Phi(\gamma Z_{it}), \qquad (3)$$

in which Z_{it} is the vector of moving averages (between *t* + 1 and *t* + *h*) of the three country-specific external condition variables described above, and Φ is a nonlinear function representing how Z_{it} affects the probability $\Pr(episode_{it} = 1)$. The nonlinear binary dependent model is then empirically estimated using either a probit or a logit functional form to replace $\Phi(\cdot)$.[16] To establish an appropriate baseline specification, country- and time-fixed effects as well as additional control variables are considered. The benchmark specification is given by the following equation:

$$\log\left(\frac{\Pr(episode_{it}=1)}{1-\Pr(episode_{it}=1)}\right) = \gamma Z_{it} + \beta X_{it} + \alpha_i + \epsilon_{it}, \quad (4)$$

in which X_{it} is a vector of controls (using moving averages between *t* – 3 and *t* – 1) that includes domestic covariates associated with medium-term growth (for example, de jure integration, credibility of policy frameworks), and α_i captures time-invariant country fixed effects.

C. Logit Estimates: Odds Ratio

The coefficient estimates of several variations of Model (4) are reported in Table 3 (persistent accelerations) and Table 4 (reversals) and in Figure 16, panels 1 and 2. They indicate a robust positive association between the odds ratio of persistent accelerations and external demand and financial conditions in all specifications. In turn, the commodity terms-of-trade variable is not significant in any of the specifications estimated on the full sample of countries (including commodity exporters and noncommodity exporters).

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[15]Using leading moving averages implies that the external condition variables are contemporary to the output outcome used to identify episodes in the economy in question, raising concerns of potential endogeneity. However, these variables are based on measures of the external environment that are expected to be exogenous to the economy in question.

[16]As a robustness check, the linear probability model was also tested, and the significance of the variables are robust to this estimation method. Results available upon request.

Table 3. Logistic Estimates of the Effects of External Conditions Variables on the Odds Ratio of Persistent Accelerations

Specification	No Country or Time Fixed Effects	Country Fixed Effects and Other Controls	Time Fixed Effects Only	Country and Time Fixed Effects	Random Effects	Probit Random Effects	Baseline Country Fixed Effects
External Demand	1.248***	1.607***	1.095	1.158**	1.330***	1.165***	1.384***
	(0.087)	(0.151)	(0.097)	(0.085)	(0.119)	(0.052)	(0.088)
External Financial	1.209***	1.227***	1.103**	1.098**	1.243***	1.123***	1.240***
	(0.045)	(0.050)	(0.050)	(0.044)	(0.049)	(0.021)	(0.034)
Change in Terms of Trade	0.970	1.042	0.935	1.040	1.007	1.009	1.052
	(0.047)	(0.091)	(0.046)	(0.076)	(0.063)	(0.030)	(0.066)
Model Chi-Squared Test	43.4***	98.2***	31,482.8***	245.5***	45.8***	51.8***	103.6***
Country Fixed Effects	No	Yes	No	Yes	No	No	Yes
Time Fixed Effects	No	No	Yes	Yes	No	No	No
Other Controls	No	Yes	No	No	No	No	No
Number of Economies[1]	110	110	110	110	110	116	110
Number of Observations	4,176	1,325	4,176	2,279	4,176	4,322	2,279

Source: Authors' calculations.
Note: ***,**, and * denote significance at the 1, 5, and 10 percent level, respectively; other controls not reported include de jure measures of trade and financial openness, the level of inflation, and deep institutional characteristics. The coefficients report changes in the odds ratio of persistent accelerations. Value greater (smaller) than 1 indicates increase (decrease) in the odds ratio relative to the unconditional odds. Robust standard errors are reported in parentheses.
[1]Maximum number of economies. For estimations with country fixed effects, economies without episodes are excluded.

Table 4. Logistic Estimates of the Effects of External Conditions Variables on the Odds Ratio of Reversals

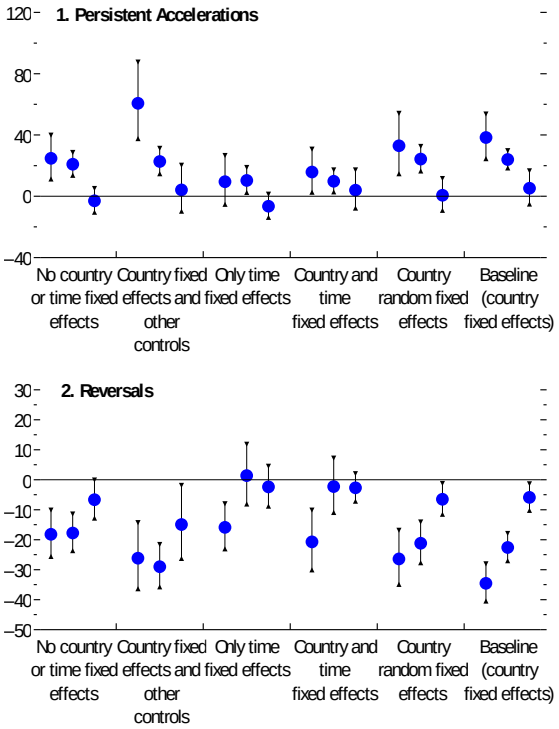
Specification	No Country or Time Fixed Effects	Country Fixed Effects and Other Controls	Time Fixed Effects Only	Country and Time Fixed Effects	Random Effects	Probit Random Effects	Baseline Country Fixed Effects
External Demand	0.818***	0.738***	0.841***	0.793***	0.736***	0.851***	0.655***
	(0.047)	(0.067)	(0.046)	(0.061)	(0.055)	(0.033)	(0.038)
External Financial	0.822***	0.710***	1.014	0.977	0.788***	0.876***	0.774***
	(0.037)	(0.043)	(0.061)	(0.055)	(0.041)	(0.023)	(0.028)
Change in Terms of Trade	0.933*	0.851*	0.976	0.973	0.935**	0.963**	0.941**
	(0.039)	(0.074)	(0.041)	(0.028)	(0.031)	(0.017)	(0.027)
Model Chi-Squared Test	36.9***	70.1***	59,017.7***	231.0***	44.6***	48.2***	124.9***
Country Fixed Effects	No	Yes	No	Yes	No	No	Yes
Time Fixed Effects	No	No	Yes	Yes	No	No	No
Other Controls	No	Yes	No	No	No	No	No
Number of Economies[1]	110	110	110	110	110	116	110
Number of Observations	4,176	1,184	4,176	2,835	4,135	4,322	2,835

Source: Authors' calculations.
Note: ***,**, and * denote significance at the 1, 5, and 10 percent level, respectively; other controls not reported include de jure measures of trade and financial openness, the level of inflation, and deep institutional characteristics. The coefficients report changes in the odds ratio of persistent accelerations. Value greater (smaller) than 1 indicates increase (decrease) in the odds ratio relative to the unconditional odds. Robust standard errors are reported in parentheses.
[1]Maximum number of economies. For estimations with country fixed effects, economies without episodes are excluded.

In the case of reversals, external financial conditions are not statistically significant when time-fixed effects are included in the regression (Columns (3) and (4) in Table 4 and Figure 16, panel 2). This is likely due to the importance of common factors in explaining capital flows to emerging markets, as documented in IMF (2016) and Figure 7 above. The effect of commodity terms of trade on the likelihood of reversals is also statistically insignificant when time-fixed effects are included, which likely capture common drivers of commodity prices, while they are statistically significant in all other specifications.

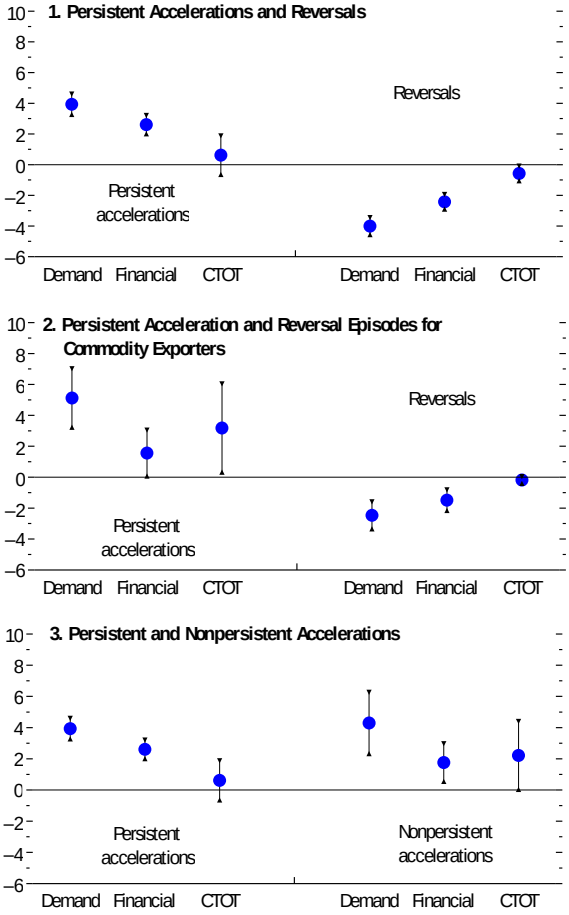
In sum, Tables 3 and 4 and Figure 16 show that the statistically significant association between external conditions and the change in the odds ratio of persistent accelerations and reversals is robust to different specifications, including when country-fixed effects are not included (Column (1) of the tables), or estimating the model with random effects using logit

Figure 16. Change in the Odds Ratio of Occurrence of Growth Episodes, 1970–2015
(Percent)



Source: Authors' calculations.
Note: For each estimation procedure, the first estimation point refers to external demand conditions; the second estimation point refers to external financial conditions; and the third estimation point refers to commodity terms of trade. "Other controls" include de jure measures of trade and financial openness, the level of inflation, and deep institutional characteristics. Vertical lines denote 90 percent confidence intervals.

Figure 17. Change in the Probability of Occurrence of Growth Episodes, 1970–2015
(Percentage points)



Source: Authors' calculations.
Note: Estimates are from a logistic regression with a dummy for the identified episodes as dependent variable and including country fixed effects and the three external conditions variables. No additional controls are included in the estimates. The vertical lines denote 90 percent confidence intervals. EMDEs = emerging market and developing economies. CTOT = commodity terms of trade.

or probit approaches (Columns (5) and (6) of the tables). The baseline specification used in the analysis (Equation 4) includes only country-fixed effects.[17]

D. Marginal Effects Based on the Logit Estimates

The logit estimates of the previous section can be used to compute the average *marginal effect* of a one-unit change in a given variable on the likelihood of a growth episode. Using Equations (3) and (4), the average marginal effects can be represented by

[17] As a robustness exercise, the baseline results for the effects of external conditions on the likelihood of growth episodes are compared with those based on different country samples. The tests (not shown here and available upon request) show that the results of the baseline specification are robust to the sample splits (that is, samples excluding China or Group of Twenty economies).

$$\frac{\partial \Pr(episode_{it}=1)}{\partial z_{1,it}} = \gamma_1 \Phi'\left(\gamma_1 z_{1,it} + \gamma_2 z_{2,it} + \gamma_3 z_{3,it} + \beta_1 x_{1,it} + \cdots + \beta_n x_{n,it} + \alpha_1 + \cdots + \alpha_N\right). \quad (5)$$

Marginal effects in nonlinear binary dependent models depend not only on γ_1, but also on the value of $z_{1,it}$ and all other variables in equation (4)—and hence the need for parsimony in the number of explanatory variables. Figure 17 reports marginal effects based on a specification that includes only the external conditions variables, which are evaluated at their sample means. The coefficients represent the impact of a one-unit increase in the external conditions variable on the likelihood of experiencing persistent accelerations, nonpersistent accelerations, and reversals.

In the case of accelerations, a 1 percentage point increase in trading partner demand evaluated at the mean of all external conditions significantly raises the probability of acceleration by 3.9 percentage points (Figure 17, panel 1). Compared with the unconditional probability, this represents a near-doubling—to 9.7 percent—of the probability of acceleration. The persistent effect of external demand conditions in this instance may reflect the favorable impact of higher exports on productivity growth via technology upgrades and scale efficiencies associated with an expansion in production.

In turn, a 1 percentage point of GDP increase in regional capital flows raises the probability of persistent acceleration by 2.6 percentage points, possibly reflecting that greater availability of funding facilitates investment and capital deepening.

Finally, an improvement in the terms of trade is not significantly associated with a change in the likelihood of persistent accelerations in the entire sample of emerging market and developing economies. However, there are two exceptions. First, for commodity exporters (Figure 17, panel 2), the increase in the terms of trade is significantly associated with an increase in the likelihood of persistent accelerations. This is in line with IMF (2015) and Aslam and others 2016, which find a significant effect of changes in the terms of trade on potential output. Second, for the subset of 32 nonpersistent accelerations (Figure 17 panel 3), the increase in the terms of trade is significantly associated with the occurrence of such episodes, reflecting that terms-of-trade windfalls may trigger accelerations with an initial surge in growth that is not sustained over a longer horizon.[18]

Turning to reversals, all three external conditions have a statistically significant effect on the probability of a reversal (Figure 17, panel 1).

[18]This finding is consistent with Collier and Goderis 2012, which finds that commodity price booms do not necessarily have positive effects on output growth over long-term horizons.

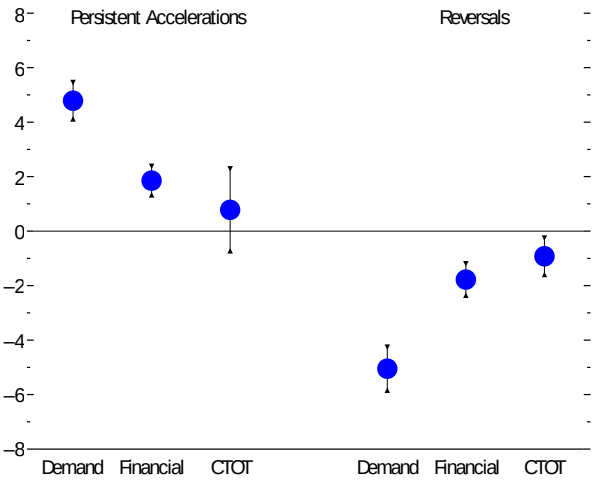
With all external conditions evaluated at the mean, a 1 percentage point increase in external demand lowers the probability of a reversal by 4 percentage points (about 50 percent of the unconditional probability). Similar patterns emerge for external financial conditions: a 1 percentage point of GDP increase in capital flows to the region is associated with a 2.4 percentage point decrease in the probability of a reversal. The change in terms of trade is associated with a statistically-significant reduction in the likelihood of reversals of 0.6 percentage point.

Alternative horizon for growth episodes

As a robustness test, we extend the horizon of the growth episode identification criteria to seven years. The logit model (4) and its marginal effects represented by equation (5) are reestimated using the seven-year span for episodes. Figure 18 reports the marginal effects of those reestimations. It shows that the marginal effects of external conditions are robust in terms of statistical significance to the change in the span of the episode. The point estimates change slightly relative to those for the five-year episodes, but the pattern of statistical significance of the results is unchanged.

Figure 18. Change in the Probability of Occurrence of Growth Episodes (Marginal Effect) Using Seven-Year Durations, 1970–2015

(Percentage points)



Source: Authors' calculations.
Note: Vertical lines denote 90 percent confidence intervals. CTOT = commodity terms of trade.

VII. Conclusion

Emerging market and developing economies (EMDEs) have become increasingly important in the global economy, not just as centers of production but also as final destinations for consumer goods and services. They now account for more than three-fourths of global growth in output and consumption, almost double the share of just two decades ago. Although domestic elements (changes to policy frameworks, structural reforms, and accumulation of factors of production) have no doubt been crucial for this transformation, the external environment has also played an important role in shaping these economies' medium-term growth.

This paper demonstrates that country-specific external conditions are significant and increasingly influential determinants of EMDEs' growth over time as these economies have become more integrated into the global economy. It does this by constructing exogenous external conditions that proxy for external demand, external financial conditions, and terms of trade shocks and examining the role of these external conditions in influencing the growth process in EMDEs.

We also find that the increasing influence of the exogenous external conditions reflects the important role played by external financial conditions more recently. Comparing the post-2005 period with 1995–2004, for instance, their contribution to EMDEs' medium-term growth has increased by about ½ percentage point—or one-third of the increase in average income per capita growth for the group over this time.

Importantly, the paper finds a significant role for external conditions in influencing the growth process in EMDEs through their effect on the probability of persistent growth acceleration and reversal episodes. These episodes of acceleration and reversal matter for growth outcomes over horizons beyond the medium-term focus of this paper. As far as two decades after the onset of acceleration or reversal episodes, real income per capita still appears to diverge from a benchmark path of economies that do not experience the episodes.

The importance of external conditions for EMDE growth patterns varies across types of economies. Terms-of-trade windfalls are particularly influential for the medium-term growth outcomes of commodity exporters, but less so for the broader sample of EMDEs.

By contrast, across all EMDEs, a favorable impulse from external demand and financial conditions helps medium-term growth outcomes by making growth accelerations more likely and by reducing the likelihood of growth reversals.

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ANNEX

DATA SOURCES

Annex Table 1. Data Sources

Indicator	Source
Banking Crisis Indicator	Laeven and Valencia 2013
Bilateral Cross-Border Bank Claims	Bank for International Settlements
Capital Account Openness	Quinn 1997; Aizenman, Chinn, and Ito 2010
Capital Inflows	IMF, Financial Flows Analytics database
Capital Stock	Penn World Tables 9.0
Commodity Terms of Trade	Gruss 2014
Commodity Export Weights	United Nations Commodity Trade Statistics (Comtrade) Database; IMF, World Economic Outlook database
Credit Boom Episodes	Dell'Ariccia and others 2016
Current Account Balance	IMF, World Economic Outlook database
Deposit Money Banks' Assets Ratio to GDP (Percent)	World Bank, World Development Indicators database
Employment	Penn World Tables 9.0
Exchange Rate Stability Index	Aizenman, Chinn, and Ito 2010
Export Value of Goods (Bilateral)	IMF, Direction of Trade Statistics database
External Debt Liabilities as a Share of GDP	Lane and Milesi-Ferretti 2007
Free Trade Agreements by Year of Signature of Agreement	DESTA, Free Trade Area database; October 2016 *World Economic Outlook*
Free Trade Agreements Coverage	WTO Regional Trade Agreements Database; October 2016 *World Economic Outlook*
Human Capital	Penn World Tables 9.0
Legal System and Property Rights Quality Index	Gwartney, Hall, and Lawson 2016
Nominal GDP	IMF, World Economic Outlook database
Nominal Interest Rate	IMF, World Economic Outlook database
Oil Price in U.S. Dollars	IMF, Global Assumptions database
Polity Score (Combined)	Polity IV/Transparency International
Population	Penn World Tables 9.0; United Nations Population database
Public Debt as a Share of GDP	Mauro and others 2013; IMF, World Economic Outlook database
Real GDP at Constant National Prices	IMF, World Economic Outlook database; Penn World Tables 9.0
Real GDP in Purchasing Power Parity Terms	Penn World Tables 9.0
Real Domestic Absorption	Penn World Tables 9.0
Regulation Quality Index	Gwartney, Hall, and Lawson 2016
Sound Monetary Framework	Gwartney, Hall, and Lawson 2016
Tariffs	UNCTAD, Trade Analysis Information System; WTO Tariff Download Facility; IMF, Structural Reforms database; October 2016 *World Economic Outlook*

Source: Authors' compilation.
Note: DESTA = Design of Trade Agreements database; UNCTAD = United Nations Conference on Trade and Development; WTO = World Trade Organization.

Annex Table 2. Sample of Emerging Market and Developing Economies Included in the Analyses

Albania, Algeria*, Angola*, Argentina, Armenia, Azerbaijan*, Bahrain*, Bangladesh, Belarus, Benin, Bolivia*, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon*, Central African Republic, Chad, Chile*, China, Colombia, Democratic Republic of the Congo, Republic of Congo*, Costa Rica, Côte d'Ivoire*, Croatia, Czech Republic, Dominican Republic, Ecuador*, Egypt, El Salvador, Estonia, Ethiopia, Gabon*, The Gambia, Georgia, Ghana, Guatemala, Guinea*, Guinea-Bissau, Haiti, Honduras, Hong Kong SAR, Hungary, India, Indonesia*, Islamic Republic of Iran*, Iraq*, Israel, Jamaica, Jordan, Kazakhstan*, Kenya, Korea, Kuwait*, Kyrgyz Republic, Lao P.D.R., Latvia, Lebanon, Lesotho, Liberia, Lithuania, FYR Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritania*, Mauritius, Mexico, Moldova, Mongolia*, Morocco, Mozambique, Myanmar, Namibia, Nepal, Nicaragua, Niger, Nigeria*, Oman*, Pakistan, Panama, Paraguay, Peru*, Philippines, Poland, Qatar*, Romania, Russia*, Rwanda, Saudi Arabia*, Senegal, Serbia, Sierra Leone, Singapore, Slovak Republic, Slovenia, South Africa, Sri Lanka, Sudan, Swaziland, Syria, Taiwan Province of China, Tajikistan*, Tanzania, Thailand, Togo, Trinidad and Tobago*, Tunisia, Turkey, Turkmenistan*, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Venezuela*, Vietnam, Yemen*, Zambia*, Zimbabwe

Source: Authors' compilation.
Note: The classification of emerging market and developing economies includes economies considered emerging markets before 1996. * denotes commodity exporters, which are economies for which commodity exports constitute the main source of export earnings during the sample period (commodity exports exceed 65 percent of total exports of goods, and net commodity exports account for at least 6 percent of GDP).

COUNTRY-YEAR GROWTH EPISODES – PERSISTENT ACCELERATIONS AND REVERSALS

Annex Table 3. Persistent Acceleration Episodes

Economy	Year
Albania	1995
Algeria	2000
Argentina	2003
Armenia	2000
Azerbaijan	2003
Belarus	1999, 2002
Benin	1977
Bosnia	1995
Botswana	1970, 1986, 1994, 2003
Bulgaria	2003
Burkina Faso	1994
Cambodia	2003
Cameroon	1970, 1976
Chad	2000
Chile	2002
China	1980, 2000
Colombia	2004
Costa Rica	2003
Czech Republic	2003
Dominican Republic	1994, 2004
Ecuador	1970
Egypt	2004
Estonia	2002, 2010
Ethiopia	2003
Ghana	2008
Honduras	2003
Hong Kong SAR	1976, 2003
Hungary	1997
India	1993, 2002
Indonesia	1988, 2002
Jordan	1975, 2001
Korea	1982
Lao P.D.R.	1979
Lesotho	1987, 2005
Lithuania	2002
FYR Macedonia	2003
Malawi	2005
Malaysia	2002
Mali	1974
Mauritius	1973, 1985
Mozambique	1994
Myanmar	1993, 1998
Namibia	2002
Nigeria	2000
Oman	1975
Pakistan	2002
Panama	2003
Paraguay	2000, 2009
Peru	2003
Philippines	2003
Poland	1995, 2003
Rwanda	1975, 2003
Sierra Leone	2009
Singapore	1977, 1986, 2003
Slovak Republic	2003
Slovenia	1995
Sri Lanka	1976, 1990, 2003
Sudan	1997
Swaziland	1985
Syria	1972, 1993
Taiwan Province of China	1984
Tanzania	2000
Thailand	1986, 2002
Trinidad and Tobago	1996, 2001
Tunisia	1995
Turkey	2002
Turkmenistan	2004
Uzbekistan	2003
Vietnam	1975, 1981

Source: Authors' calculations.

Annex Table 4. Reversal Episodes

Economy	Year
Albania	1988
Algeria	1985
Angola	1976, 1989
Argentina	1980, 1999
Bahrain	1981, 2006
Bangladesh	1971
Bolivia	1981
Brazil	1989
Bulgaria	1989
Burkina Faso	1981
Burundi	1992
Cameroon	1985
Central African Republic	1970, 1978, 2000, 2010
Chad	1977, 1991
Chile	1971
Democratic Repulbic of the Congo	1974, 1989
Republic of Congo	1986
Costa Rica	1980
Croatia	2009
Côte d'Ivoire	1979, 1989, 1999
El Salvador	1978
Ethiopia	1973, 1982, 1988
Gabon	1978, 1983, 1997
The Gambia	1984
Ghana	1973, 1979
Guatemala	1982
Guinea	1989
Guinea-Bissau	1978, 1997
Haiti	1981, 1990, 2000
Honduras	1981
Hungary	1988
Iran	1976, 1984
Iraq	1980, 1987
Jamaica	1975, 1996, 2007
Jordan	1986
Kenya	1990
Kuwait	1979, 1986, 1998, 2007
Lebanon	1987
Lesotho	1980
Liberia	1979, 1989, 2003
Madagascar	1973, 1979, 1990, 2009
Malawi	1980, 1999
Mauritania	1979
Mexico	1983
Mongolia	1989
Mozambique	1981
Myanmar	1985
Namibia	1981
Nicaragua	1976, 1985
Niger	1971, 1982
Nigeria	1979
Oman	2010
Panama	1985
Paraguay	1983, 1996
Peru	1980, 1987
Philippines	1981
Poland	1979, 1988
Qatar	1979
Rwanda	1985, 1990
Saudi Arabia	1980, 1994
Senegal	1976, 1989
Sierra Leone	1994
Slovenia	2009
South Africa	1982
Sudan	1978
Syria	1985, 2010
Tanzania	1979
Togo	1972, 1979, 1989, 1998
Trinidad and Tobago	1982
Uganda	1976
United Arab Emirates	1984, 2005
Uruguay	1981, 1999
Venezuela	1979, 1998
Zambia	1970, 1976, 1990
Zimbabwe	1974, 1983, 2001

Source: Authors' calculations.