

When China Sneezes Low-Income Countries Cough (Hard)*

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Abstract

This paper explores how growth in low-income countries (LICs) is associated with growth in their trading partners. The empirical investigation reveals three findings: i) one percent change in China's growth alone accounts for half percent change in LICs' growth; ii) this is a new phenomenon and coincides with a marked diversion in growth comovement of LICs away from advanced economies and towards emerging markets in the mid-90s; iii) the observed growth comovement is generated by China's investment-driven demand for commodities from commodity exporting LICs, especially those in Sub-Saharan Africa. In light of these findings, this paper draws policy implications for LICs in the context of rebalance of economy model in China, broadly economic slowdown in emerging markets, and as a result sharp declines in commodities prices.

JEL Classification: O14, O41

Keywords: Growth comovements, trading partners, commodity exports, low-income countries, China

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1 Introduction

Low-income countries (LICs) may experience spillovers from the rest of the world via direct and indirect channels. The former includes trade, capital flows, productivity, exchange rate while the latter includes global demand, global interest rates and commodity prices. This paper examines how growth movements in LICs are associated with growth movements in their trading partners.

LICs are increasingly interconnected with the emerging countries through trade and financial linkages. Bilateral trade between LICs and BRICs has grown exponentially in recent years, making BRICs collectively a trade partner that is comparable to the United States (IMF 2011b). In addition, FDI and development assistance has also grown rapidly. Samake and Yang (2011) find that trade shocks from BRIC countries exert the strongest effect on growth in LICs compared to other shocks. They also find that the growth ties between LICs and emerging markets, especially BRICs, have contributed to the relatively mild deceleration of LIC economic growth during the global financial crisis. Diallo and Tapsoba (2014) provide evidence that SSA's business cycle has gradually drifted away from the G7 in favor of the BRICs; trade with the BRICs turns out to be the strongest driver of this shift. Further, the rise of BRICs in the global economy has been associated with significant indirect effects via goods and financial markets, resulting in an impact on the terms of trade and the cost of financing for LICs. Dabla-Norris et al. (2012) show that for commodity-exporting LICs in Sub-Saharan Africa (SSA), terms of trade shocks and demand from the emerging market leaders are the main channels of transmission of foreign shocks.

LICs today are grappling with continued softness in commodity prices, tighter external funding conditions, and trading partners' growth prospects having become more uncertain. The ongoing rebalancing of the Chinese growth path likely carries implications for growth in LICs. This link may be more pronounced for the resource-rich LICs, that have been receiving FDI flows from China in metals and energy, which tend to get channeled back to China through LICs' exports of metals and minerals (see Nkunde et al., 2015). Given how open and interconnected countries have become during the latest wave of globalization, understanding this co-movement in growth has become vital for researchers and policy makers alike. It is, therefore, no surprise that the issue has also been covered extensively in the financial press.¹ Government policies, markets for each others exports, Africas demand for infrastructure, and Chinas differential approach to financing have together moved trade and investment to the center of China-Africa economic relations (see Wang (2007)). Given the predominance of China in global commodity markets and the export

¹Please see Financial Times articles in the References section.

structure of LICs, trade is an important channel by which macroeconomic developments in China create spillovers for LICs. This paper uses an appropriately weighted measure of trading partner growth to delineate the association between growth in LICs and growth in trading partners.

While many papers have been concerned with the question of growth co-movement in advanced economies and emerging markets (see e.g. Kose, Prasad, and Terrones (2003); Kose and Prasad (2010)), less attention was paid to LICs in the period before the Global Financial Crisis (GFC). Drummond and Ramirez (2009) estimate the slowdown in sub-Saharan African countries associated with a slowdown in rest of the world. Gurara and Ncube (2013) suggest that there is a significant growth spillover effect to African economies from both the Euro zone economies and BRICs. Anderson et al. (2015), to measure economic spillovers from China on SSA, distinguish between a scenario with a reduction in China's potential output from a scenario with rebalancing in China via reforms.

The main findings of this paper are three-fold: First, it is shown that changes in LICs' growth exhibit a high co-movement with BRICs growth but mainly contributed by that of China. Second, this co-movement is stronger for commodity exporters, which in turn is driven by China's investment-driven demand for commodities. Third, mid 90s onwards - the co-movement between LICs and advanced economies (AEs) decreases while that between LICs and emerging markets (EMs) increases, which is a new finding. These findings suggest that China's emergence as a global economic powerhouse likely contributed to the unprecedented growth acceleration in many LICs and their resilience during the GFC. The transition being made by China from being an investment-driven to an innovation-driven and consumption-based economy, and the concomitant deceleration in commodity -intensive industries, thus poses a challenge to the growth trajectory of LICs.

The rest of the paper is organized as follows. Section 2 highlights changing patterns of LICs' export shares with key trading partners over the last few decades. A formal empirical investigation based on regression analysis is presented in Section 3 while Section 4 checks if the baseline results are robust to alternative country samples, time periods and empirical specifications. Section 5 discusses policy implications of the main findings and concludes.

2 Shifting Trade Patterns

In this section, we analyze the changing patterns of LICs' export shares with key trading partners. We then present basic facts on trading partner growth which motivate a more formal investigation of growth co-movements between LICs and their trading partners.

After an extended period of stagnation, instability, and conflict in many constituent countries,

LICs as a group saw a period of high and sustained growth from about mid-1990s onwards. Over the next two decades, LICs recorded real GDP growth rates that were faster than those in the previous decades on an average, and at par or higher than the performance of emerging markets (EMs), as seen in Figure 1. The growth pick-up was particularly marked for countries in SSA. LIC growth showed notable resilience during the 2009 global financial crisis, in contrast to growth outcomes in the wake of previous global shocks. Growth in 2009 remained positive in over 80 percent of LICs, and the rebound in 2010 was sharper than that in EMs and AEs.² LICs' improved growth performance was likely associated with favorable external conditions resulting from high commodity prices, and the emergence of China as an important trade and investment partner, particularly in SSA.

Figure 2 shows the type of goods exported by different categories of countries. Commodities comprise around 80 percent of LICs' exports, which is considerably higher than the share of commodities in the exports of EMs and AEs. It is equally important to know the source of demand for commodity exports. Figure 3 shows that China's commodity imports have accelerated from about 2 percent of world imports in 1990s to about 15 percent in the 2010s. This coincides with China's massive scaling up of public investment projects.³

Figure 4 illustrates changes in the share of destinations for LIC exports and growth among trading partners (shares in blue bars, average real per capita growth of trading partners in red bullets). The destinations for LIC exports over the last three decades have shifted from AEs towards EMs, particularly China. AEs share has shown a marked decline from around 65 percent of total LICs exports in 1990s to about 50 percent in the 2010s - associated, in part, with slowdown in the growth of AEs. In contrast, China's share of imports has risen from less than 1 percent to about 10 percent over the same period.

3 Data and Methodology

The empirical model in this paper builds on the standard growth regression used in the literature.⁴ In addition to the usual control variables, additional variables to capture conditions exogenous to LICs have also been included.⁵ To measure growth co-movement, export-share weighted trading partners' growth has been used.

²See IMF (2014) for details.

³See Arvind Subramanian's book *Eclipse: Living in the Shadow of China's Economic Dominance* for a detailed description of the investment-driven demand for commodities in China which paved the way for the country to become a leading economic power.

⁴See Barro and Sala-i-martin (1995); Sala-i-Martin, Doppelhofer, and Miller (2004); Barro (2013).

⁵The sources of all the variables can be found in Table A1 of the Appendix.

The following baseline specification has been estimated:

$$G_{i,t} = \alpha_i + \beta X_{i,t} + \gamma Z_{i,t} + \delta TPG_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $G_{i,t}$ the dependent variable, is the real per capita GDP growth rate of country i in year t .

$X_{i,t}$ are the control variables that represent domestic correlates of growth, namely - real per capita GDP five years earlier (a measure of convergence); gross fixed capital formation as a percent of GDP (physical capital); gross primary school enrollment in percent (human capital), inflation (macroeconomic stability); dependency ratio in percent (to capture demographics); exports plus imports in percent of GDP (to measure trade openness); real interest rates (to capture financial condition); armed conflicts dummy and disaster affected population ratio in percent - the latter two being quite relevant for growth in LICs.

$Z_{i,t}$ are the additional control variables to capture external conditions, namely - growth in country-specific terms of trade; oil export in percent of GDP and historical average (last five years) of oil export in percent of GDP.⁶

$TPG_{i,t}$ is real per capita GDP growth in trading partners of country i at time t , and δ is the parameter of interest representing the growth co-movement between a country and its trading partner. Central to the empirical investigation of this paper is an appropriate measure of trading partners' growth. To calculate this, we follow Arora and Vamvakidis (2005, 2010). Trading partners' growth is the weighted average of country i 's trading partners' real per capita GDP growth rate using each partner j 's share in the reporting country i 's export basket as the weight. Using data from UNCTAD, these export share weights at time t are averaged over past three years. Formally,

$$TPG_{i,t} = \sum_j \left[\left(\frac{GDP_{j,t}}{GDP_{j,t-1}} - 1 \right) * \left(\frac{1}{3} \sum_{s=t-2}^t \frac{Exports_{i,j}}{Exports_i} \right) \right] \quad (2)$$

where $t = 1980$ to 2014 and $j =$ export partners. Further, this weighted average trading partner growth can be decomposed into AE partners' growth, EM partners' growth and LIC partners' growth. EM partners' growth can be decomposed into China's growth and Non-China EMs' growth, as shown in Figure 5.⁷ α_i is the country fixed-effect, which allows controlling for any time-invariant characteristics that could affect growth. The sample comprises an annually unbalanced panel of maximum 71 EMs and 49 LICs from 1980 to 2014.⁸

⁶Many LICs are commodities exporters, oil exports and historical oil exports capture the short-term and long-term impact of the natural resource curse (Sacks and Warner, 2001).

⁷The classification of countries into AEs, EMs and LICs is based on IMF (2015).

⁸See Table A2 in the Appendix for the list of EMs and LICs used in the regression.

4 Baseline Results

Table 1 reports the baseline results for the growth co-movement of EMs or LICs with their respective trading partners. Column 1 shows that 1 percent change in trading partners' growth is associated with a 0.76 percent change in EMs' growth. Column 2 shows that 1 percent change in trading partners' growth is associated with a 0.28 percent change in LICs' growth. The higher coefficient for EMs may be explained by their higher trade integration, compared to LICs. For the sample under consideration, the median value of trade openness in percent of GDP is 85 for the former and 60 for the latter.

However, the coefficient estimate for LICs reported above masks heterogeneity across the type of trading partners. Table 2 reports the results of the co-movement between LICs and their trading partners classified by income groups. Specifically, the growth co-movement for LICs is driven primarily by trading partners that are AEs (coefficient estimate of 0.31) and EMs (coefficient estimate of 0.23), but not their peer LICs, as seen in column 1. This result confirms that south-south trade has not been a key external source of economic activity for LICs. More interesting is the finding that within EMs, 1 percent change in China's growth rate alone is associated with 0.52 percent change in LICs' growth rate, as seen in column 2. The impact of the other EMs is no longer significant while the coefficient estimate for AEs increases slightly to 0.35, compared to that in column 1. The preponderance of China as a trading partner has also been reported by an earlier exercise which also suggests that the export complementarity is generally higher between LICs and China than between LICs and the United States or the European Union (see IMF (2011a)).

There is heterogeneity in the co-movement between trading partner growth and LIC growth, depending on whether the LIC is a commodity exporter.⁹ As seen in Table 3, the co-movement for commodity exporters is driven by China with a coefficient estimate of 0.45 (column 1) while the co-movement for non-commodity exporters is driven by AEs with a coefficient estimate of 0.55 (column 2). Previous work, for e.g. by Dabla-Norris et al. (2012), also shows that demand from emerging market leaders has been the main driver of growth in commodity-exporting LICs. Like Table 1, the coefficient estimate for the LIC trading partners continues to be not significant.

A useful subsequent question is whether the high growth co-movement between China and LIC is driven by Chinese investment in public infrastructure or consumption expenditure. Figure 6 illustrates how the imports of consumption-driven and investment-driven commodities by different economies have changed over time. Chinas imports of consumption-driven commodities (e.g. food,

⁹The classification of LICs into Commodity Exporters and Non-Commodity Exporters is based on IMF (2015), and can be found in Table A2.

agricultural materials, and fuel) have increased from 1.8 percent to 9.6 percent of total world imports in 20 years. More strikingly, Chinas imports of investment-driven commodities (e.g. ores and metals) has increased from 3.0 percent to 30.6 percent surpassing EU as the biggest importer of investment-driven commodities.

Empirically, to identify this difference, commodity exporters have been further split into investment-driven and consumption-driven commodity exporters, depending on whether the exports of investment-driven commodities are larger than the exports of consumption-driven commodities.¹⁰ The results in Table 3 suggest that the co-movement is driven by the former - coefficient estimate for investment-driven commodity exporters is 0.52 (column 3) while that for consumption-driven commodity exporters (column 4) is not significant. The above result is consistent with the massive scaling up of public infrastructure investments in China during the last two decades which created a large demand for extractives to serve as inputs in these projects.

It is also imperative to understand if the importance of trading partners has changed over time. In Table 4, the overall time-period under consideration has been split into 1980 - 1997 and 1998 - 2014. Columns 1 and 2 suggest that for LICs overall, growth in AE trading partners has become less important while growth in China has become more important and relevant. This ties closely with an earlier finding that the impact of rise in demand and productivity in BRICS on LICs output has risen in the post-crisis period (IMF (2011a)). The same result holds when the exercise is repeated for commodity exporters.

Several robustness checks of the baseline specification have been performed. A country may itself exporting commodities but importing commodities even more at the same time which could confound the association between trading partner growth and the given countrys growth. An alternative definition of commodity exporters has been used - a country is classified as a commodity exporter if the *net* exports of commodity is positive.¹¹ The split of net commodity exporters, into investment-driven and consumption-driven categories is again based on the *net* exports of either types of commodities. Like Table 3, Table 5 shows that the co-movement with trading partner growth for *net* commodity exporters is driven by China with a coefficient estimate of 0.48 (column 1) while the co-movement for *net* non-commodity exporters is driven by AEs with a coefficient estimate of 0.57 (column 2). However, when this alternative definition is used, the high co-movement with Chinese growth holds for both investment-driven as well as consumption-driven commodity exporters, the magnitude for the former being twice that for the latter. Like Table

¹⁰The split of LIC commodity exporters into investment-driven and consumption-driven can be found in Table A2.

¹¹Table A3 shows the classification of LICs into *net* commodity exporters and *net* non-commodity exporters, and split of the former into *net* investment-driven and net consumption-driven commodity exporters.

4, Table 6 shows that the growth co-movement between *net* commodity exporters and China has become more relevant in the recent period.

5 Discussion

Calderon et al. (2007) show that on average, higher trade integration leads to higher business cycle synchronization, though the strength of this relation is weaker for developing countries compared to industrial countries. While close trade ties with China cushioned growth in LICs after the crisis, the rebalancing of China is a potential headwind to their growth outlook. In this light, diversification of not only the LIC export basket but also diversification across trading partners could potentially dampen the co-movement between Chinese growth and LIC growth.

The size of the impact of China's activity on the prices of specific commodities varies with China's footprint in that market (Kolerus et al. (2015)). As China rebalances, co-movement of its growth with LICs which export consumption-driven commodities could rise, while that with LICs which export investment-driven commodities could dampen. The macroeconomic policy stance of countries that would likely experience closer trade integration with China may need to factor in this relation.

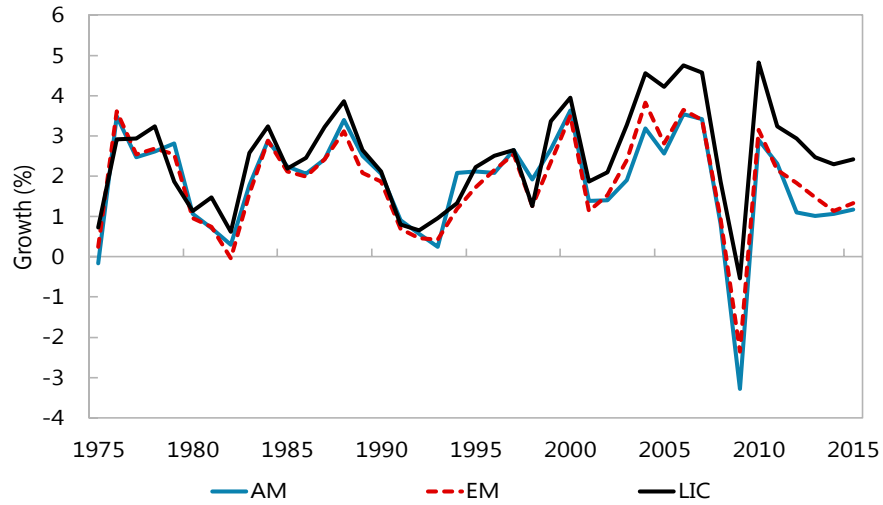
Given that LICs are increasingly exposed to volatility and shocks originating in the output volatility of trade partners (IMF (2011b)), an issue for future research could be to understand if the volatility of LIC growth is affected by this rising co-movement with China's growth. It could also be examined whether China affects the growth prospects of *net commodity-importing* LICs, depending on the basket of commodities being imported given the propensity of consumption for different commodities is different facing shocks.

The results in this paper need to be qualified by the fact that while China represents substantial final demand, its integration in global supply chains means that it can also transmit shocks from other countries (Blagrove et al. (2015)). Nonetheless, it remains vital to understand the growth co-movement between China and LICs, as research suggests that external shocks contribute to large output losses and protracted growth slowdowns in LICs (IMF (2011b)). A recent study by Furceri et al. (2016) shows that a negative shock to China's growth is associated with a greater short-term reduction in output in LICs, compared to EMs and AEs.

6 Conclusion

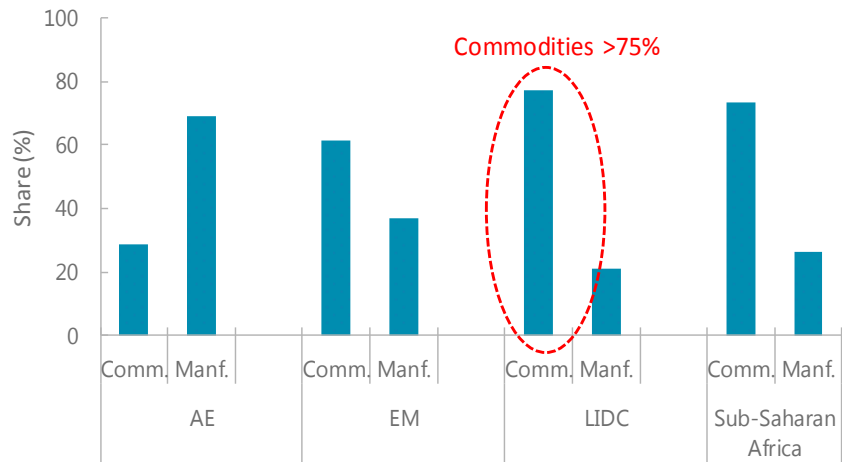
The paper uses a simple empirical estimation method to assess how low-income countries' growth is affected by movement in the growth rates of their trading partners. What emerges from this analysis is that China has a very significant effect on low-income countries especially those that are commodity exporters and even more so those that are located in Africa. In light of this finding, a highly-anticipated transition of China to lower and more sustainable growth rates along with rebalancing from external investment to domestic consumption, can have devastating effects to low-income commodity exporters that are already feeling the impact from the sharp decline of commodity prices.

Figure 1: Growth in Real GDP Per Capita: By Country Groups



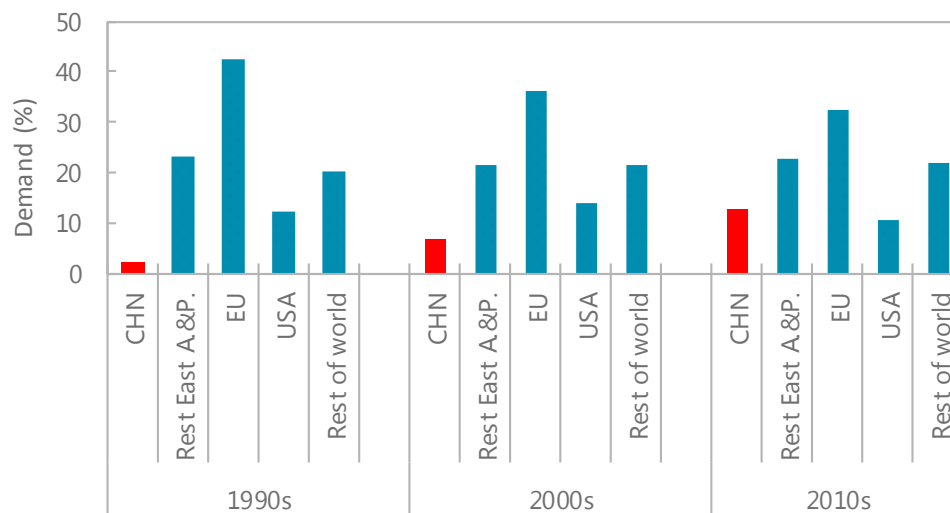
Source: WEO and IMF staff estimates

Figure 2: Shares of Merchandise Exports by Categories



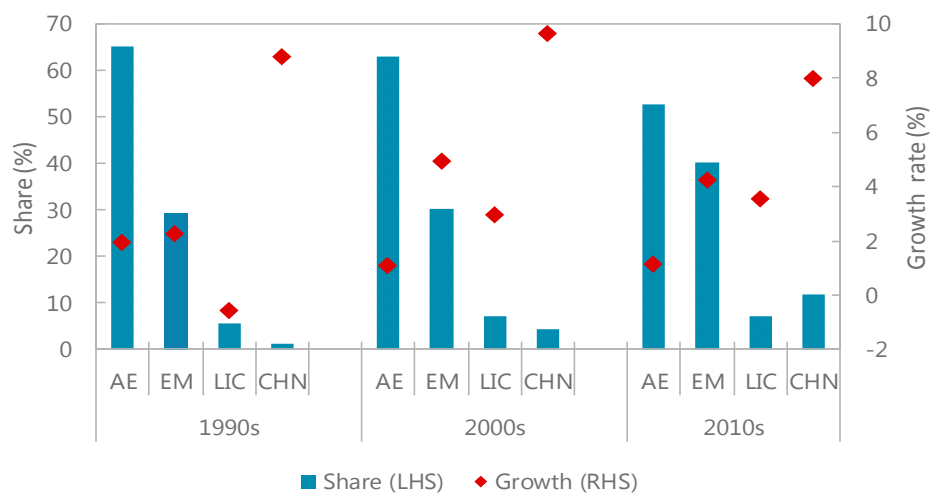
Source: WDI and IMF staff estimates

Figure 3: Demand for Commodity Imports: By Country Groups

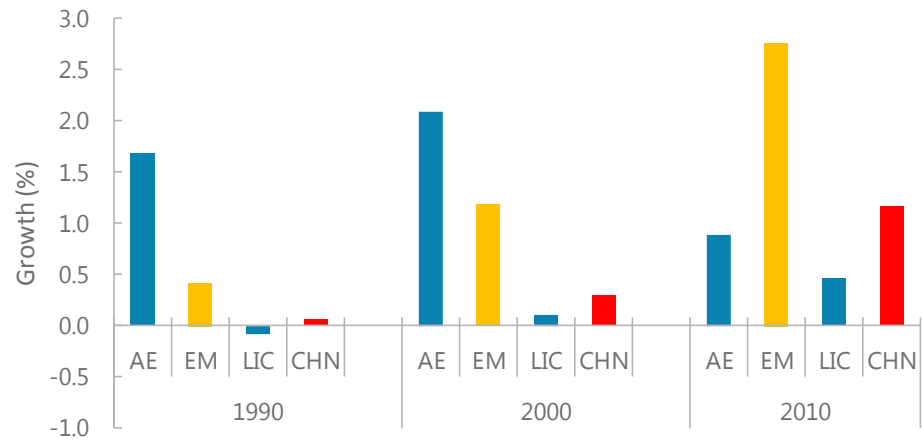


Source: WDI and IMF staff estimates

Figure 4: Share of Export Destinations for LICs and Growth of Partners

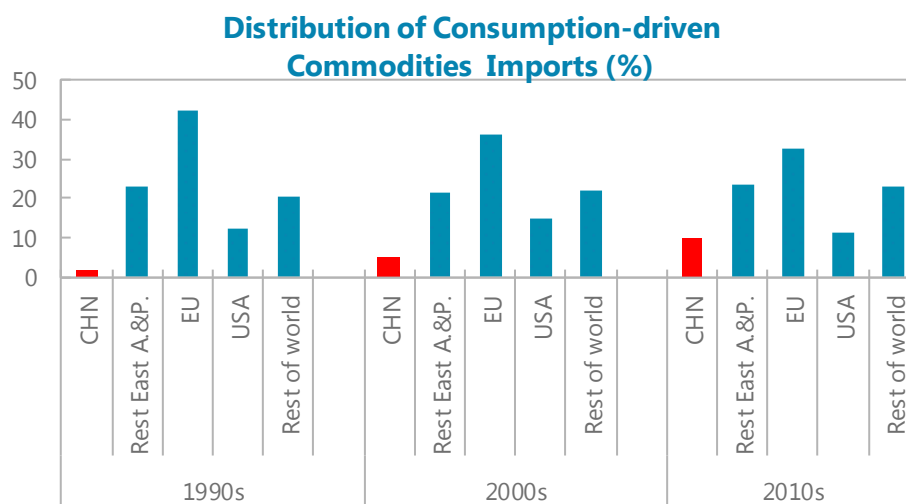


Source: WEO, UNCTAD and IMF staff estimates

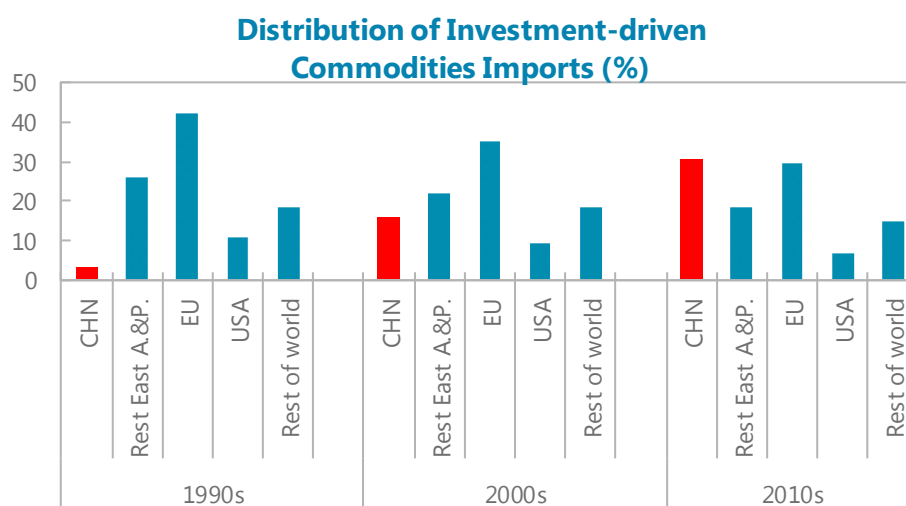
Figure 5: Weighted Average Real Per-Capita Growth of LIC Trading Partners

Source: WEO, WDI and IMF staff estimates

Figure 6: Imports of Consumption-driven and Investment-driven Commodities by Different Economies



Source: WDI and IMF staffs estimate



Source: WDI and IMF staffs estimate

Table 1: EMs and LICs: Overall

Dependent variable: Real per-capita GDP growth rate (%)	EM	LIC
Explanatory variables:	(1)	(2)
Initial real per-capita GDP (5 year before)	-5.03*** (0.66)	-4.86*** (0.78)
Gross fixed capital formation (% GDP)	0.13*** (0.03)	0.08*** (0.03)
Primary school enrollment (gross %)	0.00 (0.02)	0.01 (0.01)
Inflation (%)	-0.21*** (0.04)	-0.02*** (0.00)
Dependency ratio (%)	0.00 (0.02)	-0.06** (0.02)
Trade openness	0.00 (0.00)	0.02* (0.01)
Growth in country specific CToT (%)	-0.00 (0.05)	0.01 (0.05)
Real interest rates	-0.60*** (0.10)	-0.21* (0.11)
Armed conflicts dummy	-0.67 (0.62)	-0.95 (0.61)
Disaster affected population ratio (%)	-0.01 (0.01)	-0.06*** (0.01)
Oil export (% of GDP)	0.15*** (0.05)	0.18** (0.07)
Historical (avg. last 5 years) oil export (% GDP)	-0.04 (0.05)	-0.23*** (0.05)
Trading partners' real per-capita GDP growth (%)	0.76*** (0.09)	0.28*** (0.07)
Country fixed effect	Y	Y
R ² adjusted	0.31	0.24
Observations	1803	1329

Table 2: LIC by Trading Partners

Dependent variable: Real per-capita GDP growth rate (%)	LIC	
	(1)	(2)
Explanatory variables:		
Initial real per-capita GDP (5 year before)	-4.88*** (0.78)	-4.83*** (0.77)
Gross fixed capital formation (% GDP)	0.08*** (0.03)	0.07*** (0.03)
Primary school enrollment (gross %)	0.01 (0.01)	0.01 (0.01)
Inflation (%)	-0.02*** (0.00)	-0.02*** (0.00)
Dependency ratio (%)	-0.06** (0.02)	-0.06** (0.02)
Trade openness	0.02* (0.01)	0.02** (0.01)
Growth in country specific CToT (%)	0.01 (0.05)	0.00 (0.05)
Real interest rates	-0.22* (0.11)	-0.22* (0.11)
Armed conflicts dummy	-0.95 (0.62)	-0.97 (0.61)
Disaster affected population ratio (%)	-0.06*** (0.01)	-0.05*** (0.01)
Oil export (% of GDP)	0.18** (0.07)	0.17** (0.07)
Historical (avg. last 5 years) oil export (% GDP)	-0.22*** (0.05)	-0.24*** (0.04)
Trading partners' real per-capita GDP growth (%)		
AE partners' growth (%)	0.31** (0.14)	0.35** (0.14)
EM partner's growth (%)	0.23** (0.11)	
China's growth (%)		0.52*** (0.14)
Non-China EM's growth (%)		0.07 (0.14)
LIC partners' growth (%)	0.32 (0.19)	0.29 (0.19)
Country fixed effect	Y	Y
R ² adjusted	0.24	0.24
Observations	1329	1329

Table 3: LICs by Commodity Categories

Dependent variable: Real per-capita GDP growth rate (%)				
Explanatory variables:	<i>IMF (2015) definition</i>			
	Commodity Exporters	Non Commodity Exporters	Investment-driven Commodity Exporters	Consumption-driven Commodity Exporters
Initial real per-capita GDP (5 year before)	-5.80*** (1.11)	-4.52*** (0.95)	-1.77 (2.89)	-6.85*** (1.35)
Gross fixed capital formation (% GDP)	0.11*** (0.03)	0.02 (0.03)	0.11** (0.04)	0.12*** (0.04)
Primary school enrollment (gross %)	0.01 (0.02)	0.02 (0.01)	-0.01 (0.04)	0.00 (0.02)
Inflation (%)	-0.02** (0.01)	-1.68 (1.03)	0.32 (1.50)	-0.02* (0.01)
Dependency ratio (%)	-0.05 (0.05)	-0.09** (0.03)	-0.02 (0.08)	-0.05 (0.07)
Trade openness	0.02 (0.02)	0.02* (0.01)	0.01 (0.04)	0.02 (0.02)
Growth in country specific CToT (%)	0.04 (0.05)	-0.06 (0.09)	-0.01 (0.07)	0.05 (0.06)
Real interest rates	-0.31** (0.15)	-0.18 (0.11)	-0.49 (0.50)	-0.21 (0.18)
Armed conflicts dummy	-1.41 (0.86)	-0.87 (0.56)	1.47 (1.31)	-2.66** (1.08)
Disaster affected population ratio (%)	-0.08*** (0.02)	-0.04*** (0.01)	-0.05* (0.03)	-0.08*** (0.02)
Oil export (% of GDP)	0.16** (0.07)	0.43*** (0.14)	0.18*** (0.04)	0.17* (0.08)
Historical (avg. last 5 years) oil export (% GDP)	-0.21*** (0.04)	-1.29*** (0.15)	-0.43* (0.20)	-0.22*** (0.05)
AE partners' growth (%)	0.09 (0.22)	0.55*** (0.19)	0.33 (0.38)	0.03 (0.32)
China's growth (%)	0.45*** (0.15)	0.20 (0.37)	0.52* (0.24)	0.36 (0.21)
Non-China EM's growth (%)	-0.16 (0.16)	0.21 (0.17)	-0.15 (0.36)	-0.17 (0.19)
LIC partners' growth (%)	0.49 (0.32)	0.08 (0.22)	0.57 (0.38)	0.54 (0.42)
Country fixed effect	Y	Y	Y	Y
R ² adjusted	0.22	0.29	0.33	0.18
Observations	609	720	189	420

Note: Standard errors cluster at the country level are in parentheses. *** p<0.01, **p<0.05, *p<0.10 (two-tailed tests)

Table 4: LICs by Time Periods

Dependent variable: LIC's Real per-capita GDP growth rate (%)				
	LIC		Commodity Exporters	
Explanatory variables:	80-97	98-14	80-97	98-14
Initial real per-capita GDP (5 year before)	-7.50*** (2.61)	-5.98*** (1.25)	-6.87* (3.45)	-6.63*** (2.07)
Gross fixed capital formation (% GDP)	0.08** (0.03)	0.04 (0.03)	0.08 (0.05)	0.07* (0.04)
Primary school enrollment (gross %)	0.03 (0.02)	0.01 (0.01)	0.04 (0.03)	0.01 (0.02)
Inflation (%)	-0.02*** (0.00)	-5.71* (3.00)	-0.02** (0.01)	-9.34** (4.01)
Dependency ratio (%)	-0.23*** (0.08)	-0.05* (0.03)	-0.32 (0.19)	-0.04 (0.07)
Trade openness	-0.01 (0.02)	0.05*** (0.01)	-0.05 (0.04)	0.04*** (0.01)
Growth in country specific CToT (%)	-0.01 (0.09)	-0.03 (0.03)	0.01 (0.09)	-0.00 (0.04)
Real interest rates	0.01 (0.16)	-0.29** (0.12)	-0.10 (0.25)	-0.29 (0.19)
Armed conflicts dummy	-1.02 (1.03)	-0.89 (0.57)	-1.71 (1.20)	-0.87 (0.84)
Disaster affected population ratio (%)	-0.07*** (0.02)	-0.05*** (0.01)	-0.10*** (0.03)	-0.07*** (0.02)
Oil export (% of GDP)	0.21* (0.11)	0.16*** (0.05)	0.23* (0.12)	0.17** (0.06)
Historical (avg. last 5 years) oil export (% GDP)	-0.52** (0.22)	-0.19*** (0.05)	-0.45** (0.21)	-0.18*** (0.06)
AE partners' growth (%)	0.51* (0.26)	0.15 (0.16)	0.29 (0.44)	-0.16 (0.25)
China's growth (%)	3.02 (3.97)	0.38** (0.18)	3.61 (4.54)	0.37* (0.19)
Non-China EM's growth (%)	0.14 (0.41)	0.19 (0.12)	-0.36 (0.38)	0.15 (0.16)
LIC partners' growth (%)	0.64 (0.50)	0.07 (0.20)	0.55 (0.59)	-0.20 (0.46)
Country fixed effect	Y	Y	Y	Y
R ² adjusted	0.13	0.34	0.09	0.31
Observations	545	784	249	360

Note: Standard errors cluster at the country level are in parentheses. *** p<0.01, **p<0.05, *p<0.10 (two-tailed tests)

Table 5. LICs by *Net* Commodity Categories

Dependent variable: Real per-capita GDP growth rate (%)				
Explanatory variables:	Robust Definition			
	<i>Net</i> Commodity Exporters	<i>Net</i> Non- Commodity Exporters	Investment-driven <i>Net</i> Commodity Exporters	Consumption-driven <i>Net</i> Commodity Exporters
Initial real per-capita GDP (5 year before)	-5.57*** (0.91)	-5.68*** (1.48)	-2.39 (2.31)	-5.96*** (1.17)
Gross fixed capital formation (% GDP)	0.09*** (0.03)	0.01 (0.03)	0.09** (0.04)	0.11*** (0.03)
Primary school enrollment (gross %)	0.01 (0.01)	0.04 (0.04)	0.01 (0.02)	0.01 (0.01)
Inflation (%)	-0.02*** (0.00)	6.75 (8.98)	0.46 (1.62)	-0.02*** (0.00)
Dependency ratio (%)	-0.05** (0.02)	-0.20*** (0.06)	-0.04 (0.05)	-0.03 (0.03)
Trade openness	0.02* (0.01)	0.02 (0.02)	-0.01 (0.02)	0.03*** (0.01)
Growth in country specific CToT (%)	0.04 (0.05)	-0.15 (0.15)	0.02 (0.05)	0.04 (0.06)
Real interest rates	-0.25** (0.11)	0.25 (0.37)	-0.36 (0.27)	-0.17 (0.12)
Armed conflicts dummy	-0.98 (0.71)	-0.04 (0.84)	0.01 (0.65)	-2.15* (1.19)
Disaster affected population ratio (%)	-0.07*** (0.01)	-0.01 (0.01)	-0.05* (0.03)	-0.07*** (0.01)
Oil export (% of GDP)	0.11* (0.05)	0.23** (0.09)	0.20*** (0.06)	0.06 (0.05)
Historical (avg. last 5 years) oil export (% GDP)	-0.22*** (0.06)	-0.21*** (0.05)	-0.31** (0.10)	-0.17** (0.07)
AE partners' growth (%)	0.27 (0.17)	0.57** (0.22)	0.21 (0.37)	0.31 (0.20)
China's growth (%)	0.48*** (0.13)	3.24 (3.26)	0.62* (0.28)	0.30* (0.16)
Non-China EM's growth (%)	0.12 (0.18)	0.09 (0.17)	0.47 (0.54)	0.06 (0.19)
LIC partners' growth (%)	0.45* (0.23)	0.03 (0.27)	0.76** (0.33)	0.38 (0.29)
Country fixed effect	Y	Y	Y	Y
R ² adjusted	0.22	0.34	0.18	0.24
Observations	1090	239	329	761

Note: Standard errors cluster at the country level are in parentheses. *** p<0.01, **p<0.05, *p<0.10 (two-tailed tests)

Table 6. Net Commodity Exporters by Time Periods

Dependent variable: Real per-capita GDP growth rate (%)		
	<i>Net Commodity Exporters</i>	
Explanatory variables:	80-97	98-14
Initial real per-capita GDP (5 year before)	-7.08** (3.13)	-6.47*** (1.42)
Gross fixed capital formation (% GDP)	0.09** (0.04)	0.05 (0.03)
Primary school enrollment (gross %)	0.03 (0.02)	0.01 (0.01)
Inflation (%)	-0.02*** (0.00)	-5.81* (3.20)
Dependency ratio (%)	-0.26** (0.10)	-0.03 (0.04)
Trade openness	-0.02 (0.02)	0.04*** (0.01)
Growth in country specific CToT (%)	0.02 (0.08)	-0.02 (0.04)
Real interest rates	-0.07 (0.18)	-0.35*** (0.12)
Armed conflicts dummy	-1.21 (1.07)	-0.94 (0.81)
Disaster affected population ratio (%)	-0.07*** (0.02)	-0.06*** (0.02)
Oil export (% of GDP)	0.23** (0.11)	0.09* (0.05)
Historical (avg. last 5 years) oil export (% GDP)	-0.55** (0.22)	-0.12** (0.05)
AE partners' growth (%)	0.29 (0.31)	0.15 (0.20)
China's growth (%)	2.86 (4.09)	0.29* (0.17)
Non-China EM's growth (%)	0.16 (0.42)	0.21 (0.15)
LIC partners' growth (%)	0.69 (0.57)	0.05 (0.35)
Country fixed effect	Y	Y
R ² adjusted	0.12	0.31
Observations	460	630

Note: Standard errors cluster at the country level are in parentheses. *** p<0.01, **p<0.05, *p<0.10 (two-tailed tests)

APPENDIX

Table A1. Data and Sources

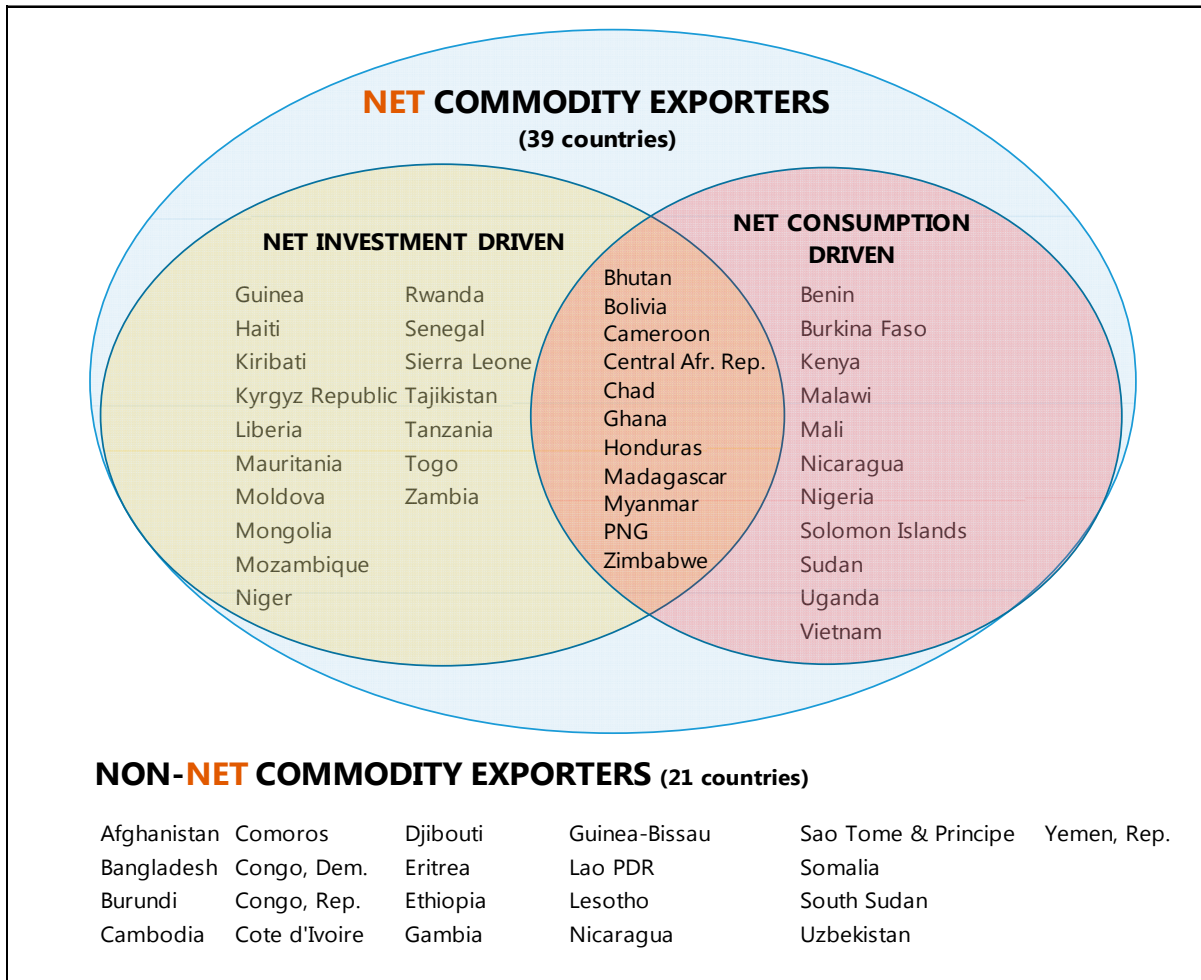
Variable	Source
Real GDP	World Bank World Development Indicators (WDI)
Real GDP growth	IMF World Economic Outlook (WEO)
Population	IMF WEO
Gross fixed capital formation, % GDP	IMF WEO
Gross primary school enrollment, %	World Bank WDI
Inflation	IMF WEO
Dependency ratio, %	United Nations Population Projections
Trade openness, % GDP	IMF WEO
Growth in country-specific terms of trade	Gruss (2014)
Real interest rates (10-Year US treasury bond yield minus US CPI inflation rate)	IMF WEO
Armed conflicts dummy	Uppsala Conflict Data Program/Peace Research Institute Oslo Armed Conflict Dataset
Disaster affected population ratio	International Disaster Database by Université Catholique de Louvain
Oil export and import	IMF WEO
Bilateral export values between country and trade partner	United Nations Conference on Trade and Development

Table A2. List of countries

EM				LIDC		
Albania	Algeria	Angola	Argentina	Afghanistan ⁺	Bangladesh	Benin
Armenia	Azerbaijan	Bahamas, The	Bahrain	Bhutan	Bolivia ⁺	Burkina Faso ⁺
Barbados	Belarus	Belize	Botswana	Burundi ⁺	Cambodia	Cameroon
Brazil	Brunei Darussalam	Bulgaria	Cabo Verde	Central African Republic ⁺ *	Chad ⁺	Comoros
Chile	China	Colombia	Costa Rica	Congo, Republic of ⁺	Côte d'Ivoire	Djibouti
Croatia	Dominican Republic	Ecuador	Egypt	Eritrea ⁺	Ethiopia	Gambia, The
El Salvador	Gabon	Georgia	Grenada	Ghana	Guinea ⁺ *	Guinea-Bissau ⁺
Guatemala	Guyana	Hungary	India	Honduras	Kenya	Kyrgyz Republic
Indonesia	Iran	Jordan	Kazakhstan	Lesotho	Madagascar	Malawi ⁺
Kuwait	Lebanon	Libya	Lithuania	Mali ⁺	Mauritania ⁺ *	Moldova
Malaysia	Maldives	Mauritius	Mexico	Mongolia ⁺ *	Mozambique ⁺ *	Nepal
Morocco	Namibia	Oman	Pakistan	Nicaragua	Niger ⁺	Nigeria ⁺ *
Panama	Paraguay	Peru	Philippines	Papua New Guinea ⁺	Rwanda	Senegal
Qatar	Romania	Russia	Saudi Arabia	Sierra Leone ⁺	Solomon Islands ⁺	São Tomé and Príncipe
South Africa	Sri Lanka	St. Lucia	St. Vincent and the Grenadines	Tajikistan	Tanzania	Togo
Swaziland	Syria	Thailand	Trinidad and Tobago	Uganda	Yemen ⁺	Zambia ⁺ *
Tunisia	Turkey	Ukraine	United Arab Emirates	Zimbabwe ⁺		
Uruguay	Vanuatu	Venezuela				

Note: + denotes commodity exporters based on IMF (2015). Within the group of commodity exporters, * denotes investment-driven commodity exporter and the rest are consumption-driven commodity exporters.

Table A3. Classification of Commodity Exporters, Net



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