Growing in China's shadow

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Abstract

This paper analyses the trade channels through which China's rapid expansion has affected growth in other developing economies. The empirical strategy exploits variation across countries in the exposure of their exports to China's import demand and export supply in global markets. The paper shows that China's rising demand for commodities and intermediate goods has had a favorable impact on other developing countries' growth, while intensified competition from its manufacturing exports has had an adverse effect. The former effect is stronger and therefore the net effect has been positive for most countries. The positive impact is, however, becoming weaker as China's growth slows down. Developing countries' longer term growth may also be slower because of the changes in their economic structures induced by China's trade expansion.

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Keywords: unconditional convergence, China, export-import similarity, primary goods

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I. Introduction

Over the past four decades, developing economies have undergone a remarkable transformation. The median GDP per capita growth rate rose from close to zero in the early 1980s to about 4 percent in the late 2000s, with a notable period of convergence toward advanced economies in the 1990s and 2000s — coinciding with China's emergence as a dominant force in global trade.[1] [2] However, this impressive growth began to taper off around 2010, as China's unprecedented growth rates started to slow down.[3]

We argue that China's rise has been a defining feature of the global economic environment for developing countries, creating powerful but conflicting forces that operate through global trade. The core intuition behind our analysis can be interpreted through the lens of classical trade theory: the growth of a dominant economy affects world prices which generates terms-of-trade externalities, raising the world price of the goods it demands and lowering the world price of those it exports. China's rapid growth generated, on the one hand, enormous demand for raw materials and intermediate inputs, boosting commodity prices and export revenues, especially for many resource-rich countries. On the other hand, China's expansion in global manufacturing markets increased competition in labor-intensive industries, reducing export prices and displacing some producers. These two channels created opposing effects—demand enhancement versus export competition—that we aim to disentangle empirically.[4]

We estimate the association between China's per capita GDP growth and growth in other developing countries between 1995 and 2019, conditioning on each country's export similarity with China's import (complementarity) and export (competition)

[1] These trends extended beyond a few large economies and included numerous smaller developing economies that have seen significant growth (Diao et. al. 2019; Appendix A1).
[2] See Patel et al. (2021) and Kremer et al. (2022). The observed catch-up aligns with the neoclassical convergence theory posited by Robert Solow's seminal work in 1956 which suggests that, given similar preferences and technology, poorer countries tend to grow faster and would eventually catch up to the per-capita GDP levels of wealthier economies.
[3] China's GDP per capita accelerated from about 4 percent in the early 1990s to nearly 10 percent by the late 2000s. But by the late 2010s, growth slowed to around 4 percent. The global convergence of incomes per capita has also recently stalled (See Appendix Figure A1.2).
[4] Garred and Pessoa (2016); Alvarez and Claro (2009); Iacovone et al. (2013).

baskets. These indices, constructed from detailed product-level trade data, allow us to assess how a country's exposure to China affects its growth trajectory.

Our results suggest that 1 percentage point increase in China's per capita GDP growth is associated with a 0.2 percentage point increase in per capita GDP growth on average in other developing economies. However, the average effect masks substantial heterogeneity across countries related to their trade structure. The more a country's export basket matches China's global import profile—as is the case, for example, for commodity exporters—the more it benefits from positive growth shocks in China. By contrast, the more a country's exports resemble China's global export profile, the more it is adversely affected by China's expansion. The overall impact of China's growth on a particular country therefore depends on the relative strength of these two channels. We find that a country is likely to gain from China's growth when the index of similarity of its exports to China's global import profile is at least half as large as index of similarity to China's global export profile. This condition is satisfied for most countries, implying that China's growth has a positive and statistically significant impact on their growth.

The results show that commodity exporters experience the largest benefit. For example, a one percentage point increase in China's GDP growth has contributed to 0.40 and 0.45 percentage point increases in GDP growth of net commodity exporters Angola and Brazil, respectively. The gains are more modest for the exporters of basic manufactured goods. For example, a one percentage point increase in China's GDP growth is associated with GDP growth increases of only 0.1 percentage points in Bangladesh and the Philippines, respectively.

Our findings help reconcile seemingly conflicting results in the literature. Prior studies have documented China's positive spillovers on other developing economies (Huidrom et al., 2020), including through its role in the commodity boom (Jenkins, 2011; Drummond and Liu, 2015).[5] Others have argued that developing countries with established

[5] By 2010, China accounted for about 20% of global non-renewable energy consumption, 23% of major agricultural crops, and 40% of world base metals consumption. Jenkins et al. (2008) estimates that China's demand between 2002 and 2007 alone raised Latin America's commodity export earnings by about $56 billion—three-quarters of which came from oil and copper.

manufacturing sectors found themselves competing head-to-head with Chinese goods, often losing market share in industries such as textiles, apparel, electronics, and light manufacturing (Freund and Özden, 2006; Costa et al., 2016;).[6] [7]

We contribute to the literature by integrating these perspectives into an empirical framework that brings together the dual trade channels through which China's growth affects other economies. We utilize the Bastos (2020) measure of export and import similarities with China to show that the structure of a country's trade with China—whether complementary or competitive—helps explain variation in growth outcomes, and that China's influence extends far beyond its immediate trade partners.[8] While Bastos (2020) focuses on trade outcomes of the countries involved in China's Belt and Road Initiative, our paper integrates the similarity of export and imports with China in an empirical framework that captures the broader macroeconomic spillovers of China's rise on a global sample of developing countries.[9]

We also suggest that China's rise has influenced the economic structure of developing economies. Many developing countries appear to have specialized in producing and exporting primary commodities and basic manufacturing inputs to meet China's demand, shifting away from more complex and diversified production structures. In Latin America and Africa, for example, the 2000s saw a reversal of earlier diversification

[6] For example, Mexico—whose manufacturing exports had grown under NAFTA—saw its export growth stagnate in the early 2000s (Hanson 2010; Hason and Robertson, 2007, 2010). Costa et al. (2016) find that Brazilian regions more exposed to Chinese import penetration experienced significantly slower wage growth for manufacturing workers between 2000 and 2010, while regions specializing in China-demanded commodities (e.g., soybeans, iron ore) saw faster wage growth and rising formal employment during the same period. Lederman et al., 2008 studies the impact of China's exports in Latin American countries while Pavcnik et al., 2005 study the labor market impacts of trade liberalization in Colombia, and they report similar findings.

[7] A separate literature finds economically significant negative effects on US industries with greater exposure to trade with China (Bernard et al., 2006; Pierce and Schott, 2016; Acemoglu et al., 2016; Galle et al., 2023; Caliendo et al., 2019; Autor et al., 2013; Feler and Senses, 2017).

[8] Bastos (2020) studies the sectoral export response of Belt and Road (B&R) countries to China's demand and competition shocks—measured through export and import similarity indices. The response of a country's exports to China's demand shocks were stronger in more upstream industries, while those of competition shocks were stronger in industries that produce goods that are closer to final use.

[9] In addition, in our baseline results we adopt a different index of a country's export and import similarity with China that captures ordinal alignment and is less sensitive to extreme trade values or outliers. Results are robust to other measures of a country's export and import similarity with China, including Bastos (2020).

efforts, as commodities' share in exports and GDP surged in response to Chinese demand. Their exports to China shifted overwhelmingly to raw materials (ores, hydrocarbons, soybeans, etc.), while their imports from China were almost entirely of manufactured goods.

The remainder of the paper is structured as follows: Section II describes the data and empirical framework. Section III presents the results on the channels through which China's growth affects other developing economies. Section IV concludes.

II. Data and Empirical Framework

a. Data

We assemble a panel of annual data for developing countries (excluding China) to analyze how China's rise relates to other countries' growth outcomes. Our primary macroeconomic indicators are drawn from the Penn World Tables (PWT) and the World Development Indicators (WDI). We restrict the sample to sufficiently large developing economies (for example, excluding microstates with populations below one million) to ensure robust comparisons. The final sample includes 109 countries.

For trade data, we draw on two complementary datasets: the BACI International Trade Database and the International Trade Data (SITC Rev. 2).[10] BACI, developed by CEPII, provides harmonized bilateral trade data from 1995 to 2022 and includes product-level classifications that support the identification of final versus intermediate goods based on the Broad Economic Categories (BEC) framework.[11] To construct export similarity measures over a longer time horizon, we use the International Trade Data compiled by the Growth Lab at Harvard University, which spans 1962 to 2021. This dataset, based on UN-COMTRADE and cleaned by the Growth Lab, enables consistent analysis at the SITC 4-digit level.

[10] Gaulier, G. and Zignago, S. (2010) BACI: International Trade Database at the Product-Level. The 1994-2007 Version. CEPII Working Paper, N˚2010-23

[11] HS-BEC concordance is from WITS (https://wits.worldbank.org/product_concordance.html)

In addition, we incorporate data on export complexity from the Growth Lab's 2019 Economic Complexity rankings, which summarize the sophistication of each country's export basket (based on the diversity of products exported and their ubiquity across countries). This will aid our discussion of how China's growth might influence not just the pace of growth abroad but the composition of economic activity.

A key innovation in our empirical approach is to quantify each country's exposure to China's growth through trade structure similarity indices. We construct two complementary indices that capture different channels:

Export-Import Similarity (Complementarity Index): This index measures how closely a country's export basket aligns with the goods that China imports. A higher export-import similarity means the country is effectively "supplying what China is demanding," which should confer positive spillovers in terms of higher export revenues and growth.

Export-Export Similarity (Competition Index): This index measures how similar a country's exports are to the goods that China itself exports. This captures the degree of overlap and thus competition a country faces from China in global markets. A higher export-export similarity indicates that the country is "exporting what China exports," implying greater exposure to competitive challenges from China's presence.

Measuring the indices: We quantify each similarity index using two complementary methods – one rank-based and one value-based – to ensure robustness:

Rank Correlation Index: Our primary measure is a Spearman rank correlation coefficient comparing the country's export profile with China's trade profile.

Formally, the rank correlation coefficient between the exports structure of country i and China's global market footprint is defined as:

$$\sigma(i, China) = \text{corr}(\text{R}(X(i), R(\text{GX}(China))), \qquad (1)$$

where $R(\mathrm{X}(i))$ represents the rank of export values for country i across products (at the SITC 4-digit level), and $R(\mathrm{GX}(China))$ denotes the rank of China's global exports (or imports) market share in each product.

For the export-import index, we rank the importance of each product in the country's export basket and in China's share in global imports (using detailed product-level data, e.g. at the 4-digit SITC level or equivalent). The Spearman correlation between these two rankings yields an index between –1 and +1. A value near +1 indicates that the products which dominate the country's exports are largely the same products for which China's import share is highest – a strong positive alignment. Conversely, a negative correlation would imply the country's top exports correspond to products that China imports relatively little (or vice versa). We rescale this measure to lie between 0 and 1 in the empirical estimates. We construct an analogous rank correlation for export-export similarity, ranking products by their share in the country's exports and in China's share in global exports and then correlating the two lists. The appeal of the rank-based measure is that it captures ordinal alignment and is less sensitive to extreme trade values or outliers. In other words, even if China's scale is enormous in an absolute sense, what matters for this index is the pattern of specialization. It tells us whether a country is specializing in the types of goods China heavily buys (or produces), regardless of absolute volumes. This helps capture the notion of indirect exposure through global prices: for example, if China's surge in demand drove up prices of oil and copper, then a country highly ranked in those exports will score high on the export-import similarity index and likely saw a terms-of-trade boost.

Finger–Kreinin Similarity Index: As a complementary metric, we also compute an index based on Finger and Kreinin (1979) for each pair of trade profiles. This is a more traditional value-share overlap measure, employed also by Bastos (2020). It essentially sums the minimum of each product's share in two trade baskets, producing an index between 0 and 100 (100 indicating identical composition of trade, and 0 indicating no overlap at all). For example, if country allocates 10% of its exports to product X and China's imports also devote 10% to product X, the overlap contribution for that product is 10%. We do this across all products to gauge overall similarity. We calculate

one such index comparing a country's export shares to China's import shares (for the export-import similarity), and another comparing a country's export shares to China's export shares. A higher Finger–Kreinin index means a greater overlap in trade patterns by value. This measure gives more weight to the magnitude of trade in each product, as opposed to just the rank.[12]

The two measures tend to tell a consistent story.[13] For the regression analysis, our baseline similarity indices are constructed for an initial year (1995) to capture the country's pre-existing trade structure before China became a dominant global trader. By fixing the similarity measures at the mid-1990s, we avoid conflating the subsequent influence of China with adjustments countries may have made in response to China's growth. However, we have also verified that using time-varying indices yields similar qualitative results (we discuss this further below and in the robustness checks).

b. Empirical Framework

We begin by examining the average relationship between China's growth and economic outcomes in other developing economies. To do so, we estimate the correlation between China's per capita GDP growth and that of other developing countries using the following baseline specification:

$$\Delta y_{i,t} = \alpha + \beta * \Delta x_t^{China} + \Delta y_{i,t-1} + \delta_i + u_{i,t} \qquad (2)$$

where $\Delta y_{i,t}$ represents annual GDP per capita growth in a developing economy (excluding China). Here, Δx_t^{China} denotes China's annual GDP per capita growth (or, in alternative specifications, growth in its manufacturing exports), $\Delta y_{i,t-1}$ is the one-year lag of the dependent variable, δ_i controls for country fixed effects, and $\Delta u_{i,t}$ is the idiosyncratic error term.

To capture the heterogenous role of China on global export markets, we utilize our index of export-import similarity between each country i and China. Specifically, we consider two indices: the export-import similarity index (between a country's exports

[12] See also Bastos et al. (2020).
[13] Appendix A2 provides country rankings based on the two indices.

and China's imports) and the export-export similarity index (between a country's exports and China's exports). These indices, described in the previous section, capture not merely direct trade links with China, but also the effect of global trade as affected by the change in global prices of goods.

We estimate the following extended specification:

$$\Delta y_{i,t} = \alpha + \gamma_1 \sigma_i^{import} \Delta x_t^{China} + \gamma_2 \sigma_i^{export} \Delta x_t^{China} + \theta \Delta y_{i,t-1} + \delta_i + \delta_t + u_{i,t} \qquad (3)$$

where σ_i^{import} and σ_i^{export} represent indices of country i's export similarity to China's imports and exports at the beginning of the period (1995), respectively. The interaction terms capture how the effect of China's growth on a given country's growth depends on its trade structure.[14] All other variables mirror those in Equation (2).

This framework allows us to test whether the gains from China's growth are concentrated among countries that supply goods China demands, and whether countries competing with China in global export markets experience dampened growth as a result of China's expanding export footprint. We interact time-invariant structural exposure (the share: 1995 similarity Indices) with a time-varying global shock (the shift : China's growth). This allows us to capture the full general equilibrium effects - including price spillovers and third-market competition.

Our empirical approach aims to identify how China's economic expansion has differentially affected growth in other developing economies, depending on each country's trade structure. This interaction-based design allows us to go beyond average correlations and uncover the mechanisms through which China's rise has produced asymmetric spillovers across countries.

[14] Taking partial derivatives with respect to China's growth shows that a developing economy will benefit from China's growth $iff \frac{\sigma_i^{import}}{\sigma_i^{export}} > -\frac{\gamma_2}{\gamma_1}$. The ratio matters, not just absolute values – for example many countries in South-East Asia have high similarity in both exports and imports.

III. Empirical Findings: China as a driver of growth in developing economies

In this section, we first present some stylized facts about growth patterns in developing countries, and then more rigorously explore the role of trade-based links with China's growth.

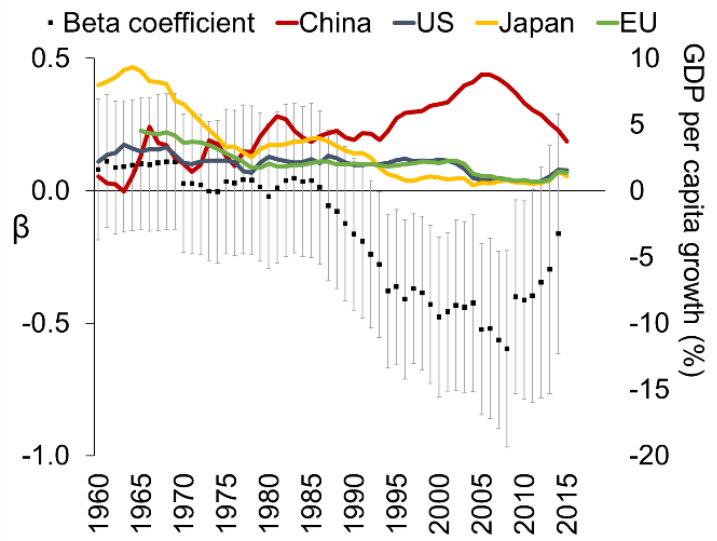
a. Unconditional convergence and China's GDP growth

We begin by documenting patterns of economic growth and convergence between developing and advanced economies, following Patel, Sandefur, and Subramanian (2021). Most developing countries experienced a marked acceleration in GDP per capita growth from the 1990s, narrowing the income gap with high-income countries. This convergence peaked between the mid-1990s and late 2000s but has slowed over the past decade.

Figure 1 illustrates this trend plotting annual estimates of the unconditional convergence coefficient, β.[15] A negative β indicates convergence—i.e., poorer countries growing faster than richer ones. From the mid-1990s, β turns negative and statistically significant, signaling a period of rapid catch-up growth. However, after the Global Financial Crisis (GFC) of 2008–09, β weakens and loses statistical significance, suggesting a halt in convergence.

[15] Estimation tests the equation, $\left(\frac{1}{T-t}\right) * log\left(\frac{y_{i,T}}{y_{i,t}}\right) = \alpha + \beta * log(y_{i,t}) + u_{i,t}$ where i represents the country, T the end year (2019), t the start year, $y_{i,T}$ the per capita GDP (PPP terms), and $u_{i,t}$ the error term. See Appendix A3 for details.

Figure 1. Patterns of convergence correlate with China's growth rates



Source: Penn World Tables 11
Notes: Black dots indicate annual unconditional convergence coefficients (β), with 95% confidence intervals. The yellow line represents China's 10-year moving average GDP per capita growth. Sample excludes oil-rich countries and includes countries with populations over one million.

Notably, the convergence patterns align closely with China's growth trajectory. China's per capita growth accelerated from about 4 percent per year in the early 1990s to nearly 10 percent by the late 2000s, coinciding with the global convergence phase. Conversely, as China's per capita growth decelerated in the 2010s (back to 4 percent), global convergence slowed. Notably, the convergence pattern tracks more closely with China's growth than with the growth of other major economies, such as the United States, Japan, or the European Union.

China's rise combined with its sheer size has the potential to translate into significant spillovers for developing countries through both direct trade links and global prices. China's share of global GDP increased from 6 percent in 1970 to 18 percent by 2022. Between 1995 and 2023, China's share of global manufacturing exports rose from 5 percent to 23 percent and its share of global commodity imports climbed from 2 percent to 20 percent (Appendix Figure A3.1).

China's growth has been positively correlated with export prices of commodity exporting countries and negatively correlated with export prices of non-commodity

exporting ones. For 42 developing economies from 1995 to 2024, after controlling for country and year fixed effects, the correlation of China's growth with growth of export prices of non-commodity exporters is about negative 0.6, whereas the correlation of its growth with the export prices of commodity exporting countries is about positive 0.5. [16] Higher export prices for commodity exporters suggest that through the price channel China's growth has bolstered terms of trade and economic activity in resource-rich economies.

b. Complementarity and competition: How China shapes growth in developing economies

We next examine the extent to which and the mechanisms through which China's growth affects GDP growth in other developing economies, focusing on the role of trade structure as captured by export similarity with China's imports and exports, following the specifications in Equations (2) and (3). The use of export similarity indices is empirically novel.[17] We calculate the similarity indices based on trade structures in 1995—well before the acceleration of China's export boom and its accession to the WTO in 2001. This timing is critical: using predetermined (baseline) trade patterns mitigates concerns of reverse causality, wherein China's growth might otherwise influence the composition of other countries' exports.

Panel regression results show that, on average, a 1 percentage point increase in China's GDP per capita growth is associated with a 0.2 percentage-point increase in per capita GDP growth across other developing economies (Table 1, column 1).

However, the impact is not uniform, and the effect varies based on export similarity. Countries whose exports closely resemble the goods China imports benefit more from China's growth (Table 1, columns 2–3). In contrast, countries whose export baskets are

[16] Appendix Table A3.1 reports significant positive correlations between China's GDP growth and commodity price increases between 1992–2024, with coefficients often above 0.3. Appendix Table A3.2 presents panel regression estimates linking China's growth to developing countries' export prices.
[17] Bastos (2020) studies the sectoral export response of Belt and Road (B&R) countries to China's demand and competition shocks—measured through export and import similarity indices but does not study the effects on aggregate growth.

more similar to China's exports experience a negative impact on growth (Table 1, columns 4–5). This contrast highlights the dual nature of China's spillovers: complementarity boosts growth; competition constrains it.

Table 1. Export similarities and the impact of China's GDP growth on developing economies

	Dependent variable: GDP per-capita growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
China's per-capita GDP growth	0.212***	-1.357***		1.285***		-0.284	
	(0.0312)	(0.522)		(0.355)		(0.712)	
[China's per-capita GDP growth] X		3.161***	3.170***			2.544**	2.552**
[Export similarity with China's imports (1995)]		(1.075)	(1.056)			(1.107)	(1.092)
[China's per-capita GDP growth] X				-1.913***	-1.919***	-1.367**	-1.371**
[Export similarity with China's exports (1995)]				(0.613)	(0.609)	(0.617)	(0.617)
Lag of GDP per capita growth	25.69***	25.50***	25.06***	25.54***	25.10***	25.43***	24.98***
	(5.691)	(5.688)	(5.777)	(5.672)	(5.764)	(5.675)	(5.765)
Constant	0.603***	0.607***	-7.130**	0.606***	7.946***	0.608***	-1.004
	(0.218)	(0.217)	(2.939)	(0.217)	(2.011)	(0.216)	(4.058)
Observations	2,625	2,625	2,625	2,625	2,625	2,625	2,625
R-squared	0.224	0.226	0.250	0.226	0.250	0.227	0.251
country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	Yes	No	Yes

Note: Regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** p<0.01, ** p<0.05, * p<0.1.

Importantly, even when accounting for these opposing channels, the net effect of China's growth remains positive and statistically significant (Table 1, columns 6–7). Our results suggest that 1 percentage point increase in China's per capita GDP growth is associated with a 0.2 percentage point increase in per capita GDP growth on average in other developing economies (Appendix Table A4.1). However, the average effect masks substantial heterogeneity across countries related to their trade structure. The more a country's export basket matches China's global import profile—as is the case, for example, for commodity exporters—the more it benefits from positive growth shocks in China. By contrast, the more a country's exports resemble China's global export profile,

the more it is adversely affected by China's expansion. The overall impact of China's growth on a particular country therefore depends on the relative strength of these two channels. We find that a country is likely to gain from China's growth when the index of similarity of its exports to China's global import profile is at least half as large as index of similarity to China's global export profile. This condition is satisfied for most countries, implying that China's growth has a positive and statistically significant impact on their growth.[18]

The results show that commodity exporters experience the largest benefit. For example, a one percentage point increase in China's GDP growth has contributed to 0.40 and 0.45 percentage point increases in GDP growth of net commodity exporters Angola and Brazil, respectively. The gains are more modest for the exporters of basic manufactured goods. For example, a one percentage point increase in China's GDP growth is associated with GDP growth increases of only 0.1 percentage points in Bangladesh and the Philippines, respectively.

These results are robust to using growth in China's manufacturing exports and imports—in place of GDP growth (Table 2). The higher the similarity with China's imports the greater the growth benefits from China's rising manufacturing imports, and the higher the similarity with China's exports, the greater the drag on growth. These results highlight the importance of the trade channel in explaining the differential effects of China's growth spillovers across countries.

[18] For the countries in our sample, the average rank similarity index with China's exports is 0.558, whereas the average rank similarity index with China's imports is 0.498.

Table 2. Impact of China's manufacturing trade growth on developing country per capita GDP growth

	Dependent variable: GDP per capita growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
China's manufacturing import growth	0.0395***	-0.356**					-0.354**	
	(0.00837)	(0.144)					(0.143)	
[China's manu. import growth] X		0.797***	0.798***				0.656**	0.657**
[Export similarity with China's imports (1995)]		(0.297)	(0.292)				(0.297)	(0.295)
China's manufacturing export growth				0.0661***	0.368***		0.324***	
				(0.00850)	(0.0848)		(0.0858)	
[China's manu. export growth] X					-0.538***	-0.539***	-0.417***	-0.418***
[Export similarity with China's exports (1995)]					(0.143)	(0.143)	(0.140)	(0.140)
Lag of GDP per capita growth	26.12***	26.03***	25.16***	25.85***	25.69***	25.08***	25.45***	25.04***
	(5.738)	(5.719)	(5.763)	(5.664)	(5.637)	(5.755)	(5.622)	(5.745)
Constant	1.372***	1.374***	-2.437	0.986***	0.990***	5.560***	1.000***	1.217
	(0.209)	(0.208)	(1.507)	(0.199)	(0.198)	(1.050)	(0.198)	(1.963)
Observations	2,625	2,625	2,625	2,625	2,625	2,625	2,625	2,625
R-squared	0.221	0.226	0.252	0.235	0.238	0.251	0.243	0.254
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes	No	Yes

Note: Panel regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Commodity-exporting countries experience particularly strong benefits from China's growth. Empirical estimates confirm that growth benefits from China's expansion are twice as big for commodity exporters compared to other countries (Table 3). Further, both China's manufacturing imports and exports have a positive and statistically significant effect on GDP growth of commodity exporting developing country, suggesting that both the direct import demand from China and the indirect linkages through China's own exports contribute positively and significantly to their growth performance.

Table 3. Differential effects for commodity exporters

	Dependent variable: GDP per capita growth					
	(1)	(2)	(3)	(4)	(5)	(6)
China's per-capita GDP growth	0.151***					
	(0.0343)					
[China's per-capita GDP growth] X [Commodity exporters]	0.165**	0.167**				
	(0.0679)	(0.0672)				
China's manufacturing import growth			0.0267***			
			(0.0102)			
[China's manu. import growth] X [Commodity exporters]			0.0362**	0.0371**		
			(0.0176)	(0.0174)		
China's manufacturing export growth					0.0526***	
					(0.0102)	
[China's manu. export growth] X [Commodity exporters]					0.0398**	0.0405**
					(0.0179)	(0.0179)
Lag of GDP per capita growth	25.24***	24.80***	25.80***	24.88***	25.45***	24.81***
	(5.646)	(5.752)	(5.676)	(5.733)	(5.613)	(5.747)
Constant	0.594***	1.460***	1.367***	1.672***	0.974***	1.635***
	(0.213)	(0.207)	(0.206)	(0.178)	(0.196)	(0.180)
Observations	2,700	2,700	2,700	2,700	2,700	2,700
R-squared	0.224	0.249	0.222	0.250	0.236	0.250
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes

Note: Panel regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). "Commodity exporters" is a dummy indicating the countries with commodity rents greater than 30% of GDP as of 2010. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

We recognize the limitations of any observational cross-country panel in cleanly establishing causality. A primary endogeneity concern is that China's growth itself may be correlated with unobserved global factors—such as a worldwide commodity boom or synchronized global demand conditions—that also affect growth in other developing economies. In such cases, the coefficient on China's growth in a simple panel regression might conflate China-specific effects with broader global co-movements.

To address this issue (even if partially), we introduce specifications that include year fixed effects, which control for common global shocks affecting all countries in a given

year, including commodity price cycles, monetary conditions, and other global factors that may affect growth in all countries. These fixed effects allow us to isolate the differential effect of China's growth across countries based on their export structure, rather than picking up general global co-movements. We also experiment with other controls such as commodity prices, US interest rates, as well as terms of trade and the results are similar (Appendix A4; Table A4.2-A4.4).

We also confirm that the core results hold when using alternative similarity indices (the Finger–Kreinin index), when allowing similarity to vary over time, and when extending the sample to include additional (smaller) countries (Appendix Tables A4.5-A4.7), and post-COVID period (2020-23; Appendix Tables A4.8-A4.9).

In addition, to strengthen causal inference, we exploit a quasi-natural experiment: China's accession to the World Trade Organization (WTO) in 2001. This event marked a significant shift in China's trade integration and export competitiveness, generating a discrete and exogenous shock to China's position in global trade. We implement a difference-in-differences (DiD) identification strategy, comparing countries with high baseline export similarity to China's trade structure (i.e., those more exposed) to countries with lower similarity, before and after China's WTO accession.[19] This strategy allows us to assess whether countries more exposed to China experienced systematically different growth trajectories following China's trade liberalization. The results from this DiD framework are consistent with the main findings and lend additional support to our interpretation of the China-specific effects (Appendix Table A4.10-A4.11).

These patterns echo earlier findings by Arora and Vamvakidis (2011), but our results extend further to capture the structural weakening of spillovers. Two key risks emerge

[19] Specifically, we estimate the following equations: $\Delta y_{i,t} = \alpha + \gamma_1 Post * Com * \Delta x_t^{China} + \theta \Delta y_{i,t-1} + \delta_i + \delta_t + u_{i,t}$, where $Post$ takes the value of 1 after China enters WTO and 0, otherwise, whereas Com refers to a country being a commodity exporter. All other variables are as in equation (3).

And, $\Delta y_{i,t} = \alpha + Post * (\sum_{a \in \{imp,exp\}} \gamma_a \sigma_i^a) \Delta x_t^{China} + \theta \Delta y_{i,t-1} + \delta_i + \delta_t + u_{i,t}$

for developing countries going forward. First, a further slowdown in China's growth could substantially reduce the positive spillovers; for example, a one-percentage-point decline in China's growth could lower growth in other developing economies by 0.14-0.21 percentage points.[20] Second, if China's export growth continues to outpace its import growth, competitive pressures in global markets may outweigh the benefits of demand-driven trade, particularly for countries with overlapping manufacturing profiles.

Taken together, these trends underscore the growing importance for developing countries to diversify their sources of growth and reduce reliance on external demand from China. Structural reforms that enhance domestic productivity, innovation, and export sophistication will be increasingly critical for sustaining long-term growth in a changing global environment.

c. What does this all mean for longer-term growth in developing economies

The previous sections argued that developing economies have benefited from supplying the intermediate goods and raw materials demanded by China's manufacturing sector. This integration into China-driven supply chains supported higher and more stable growth, particularly during the global convergence period of the 1990s and 2000s. However, this dependence has also introduced new vulnerabilities. As China's growth has slowed since the 2008–09 Global Financial Crisis (GFC), convergence has similarly decelerated, suggesting that developing economies are increasingly exposed to fluctuations in China's economic performance.

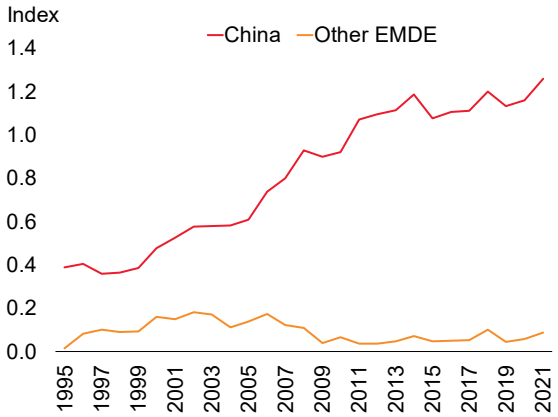
Trade integration with China has reshaped production and trade structures in many developing economies.[21] Since the early 1990s, their exports to China have expanded dramatically—from negligible levels to over $600 billion (constant 2010 prices) at their

[20] The benefits of China's growth appear to have diminished in recent years. During the 1995–2007 period, China's boom contributed approximately 0.4–0.5 percentage points to annual growth in developing economies. By 2008-19, this contribution had shrunk, primarily due to slower growth in China itself (Appendix Figure A4.1).
[21] Amiti and Freund (2010) study the changing structure of China's exports after its WTO accession.

peak in 2020—driven largely by intermediate goods (Appendix Figure A4.2). In contrast, China's exports to developing economies have mostly comprised final goods.[22]

These patterns reflect China's central role in global supply chains, particularly during its industrial boom. Developing countries—particularly those exporting commodities—benefited from China's resource demand, but their specialization has tilted toward raw and intermediate goods. The stagnation in export sophistication is evident in Figure 2. While China's economic complexity index (ECI) rose sharply, the ECI of other developing countries has remained flat or declined since the early 2000s. China's own ECI has plateaued only recently but remains far above that of most peers. The stagnation in complexity among developing economies suggests limited progress in expanding production capabilities and innovation.

Figure 2. Economic complexity of developing economies' exports has generally been flat or declining, whereas that of China has been increasing.



Source: The Growth Lab at Harvard University, 2019, "Growth Projections and Complexity Rankings", https://doi.org/10.7910/DVN/XTAQMC, Harvard Dataverse. Hidalgo and Hausmann (2009).
Note: GDP-weighted averages.

Heavy reliance on China's demand may also have slowed domestic reform momentum. Table 4 shows that countries with greater export intensity to China (especially in

[22] Additionally, there are very few goods that China does not export. About 80 percent of its export products hold a global share of more than 1 percent and about 60 percent of China's export products have a global share of more than 10 percent.

intermediate goods) tend to have slower progress on key domestic reforms. These include financial liberalization, product and labor market reform, and institutional development. This pattern is robust to controlling for lag exports (Appendix Table A5.1).

Table 4. Correlation between exports to China and policy reforms

		Domestic reforms			External reforms	
	Reforms index (aggregate)	Product market reforms	Domestic finance reforms	Labor market reforms	Trade reforms	External finance reforms
	(1)	(4)	(5)	(6)	(2)	(3)
Exports of intermediate goods to China (% of GDP)	-0.00691***	-0.0280***	-0.0168***	-0.000128	0.000646	0.00799
	(0.00192)	(0.00390)	(0.00307)	(0.00159)	(0.00274)	(0.00696)
Constant	0.649***	0.479***	0.692***	0.699***	0.738***	0.627***
	(0.00214)	(0.00409)	(0.00306)	(0.00209)	(0.00292)	(0.00668)
Observations	1,138	1,155	1,155	1,151	1,141	1,155
R-squared	0.885	0.879	0.840	0.826	0.846	0.787
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: reform indices adopted from Alesina et al. (2020) and discussed in detail in World Bank's East Asia and Pacific Economic Update April 2023. Overall and sectoral reform indices are continuous indicators taking a value in the [0-1] interval. A higher value indicates greater degree of liberalization (lower intensity of restrictions). Trade reforms is a composite index capturing the degree of liberalization in tariffs and the current account. Domestic finances reform captures the degree of liberalization in credit and interest rate controls, banking entry and supervisions, privatization, and security markets. Product market reform captures the degree of liberalization in two representative sectors of electricity and telecommunication. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

In summary, while China's economic ascent has created significant opportunities for developing economies through trade linkages, it has also posed challenges that could hinder long-term development. The alignment of developing economies exports structures with China's demands, combined with stalled structural reforms, risks trapping these economies in a cycle of low complexity and limited diversification.

IV. Concluding remarks

China's rapid rise as a global manufacturing and export powerhouse has had far-reaching implications for developing economies. As China grew and its share of global trade expanded, so too did its influence on the trade structures and growth dynamics of

other countries. Many developing economies increasingly aligned their export baskets with China's import demand—primarily through the export of intermediate goods—and away from competing directly with China in final goods markets. As we showed, this pattern of trade specialization brought growth benefits, which were especially large for commodity and intermediate goods exporters. Developing countries on average experienced robust catch-up growth in the 1990s and 2000s.

Yet, the reliance on external demand—particularly from China—also presents risks. First, the slowdown in China's growth in the 2010s also saw a deceleration in growth of developing countries whose export structures were oriented towards the products China imported. Second, the reorientation of trade patterns has slowed structural transformation in developing countries. In many, the share of manufacturing in GDP has declined since the 1990s, potentially affecting productivity growth. Furthermore, countries more exposed to Chinese import demand tend to export less complex goods, and their economic complexity—measured by the diversity and sophistication of exports—has remained stagnant or even declined in recent decades. Finally, overdependence on China as a growth engine may have delayed necessary domestic reforms. The implementation of deeper domestic reforms may be the most durable route for autonomous growth in the longer term.

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Appendix

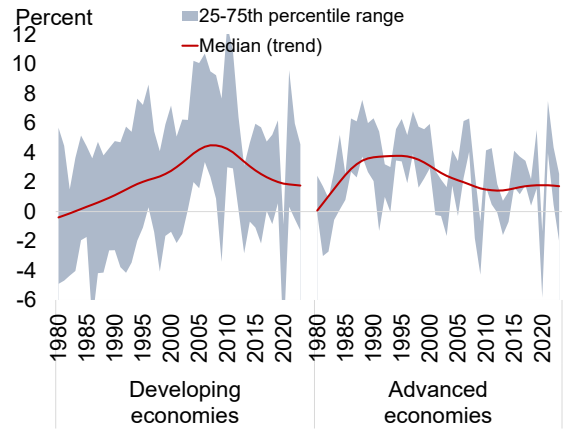
A1. Growth in developing economies

The median GDP per capita growth rate across emerging market and developing economies (EMDEs) rose from about 0 percent per year in the early 1980s to about 4 percent in late 2000s (Figure A1). This period was characterized by rapid and often unprecedented development, which contributed to substantial improvements in the living standards of their populations. However, this impressive growth began to taper off around 2010, as these economies faced new challenges and a shifting global landscape.

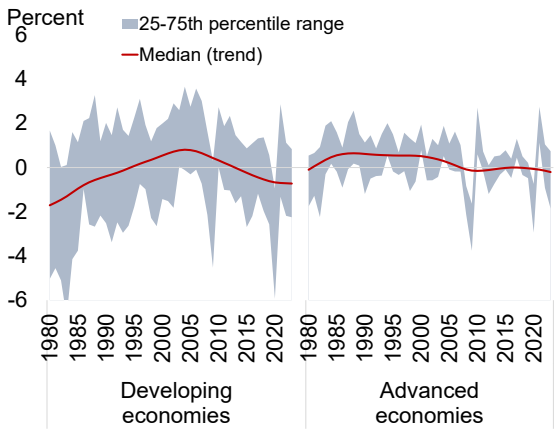
Advanced economies (AEs) experienced their peak growth in GDP per capita earlier, mainly during the 1990s, and the median growth rate in AEs began to decelerate in the early 2000s. This contrast in the timing of peak growth between EMDEs and AEs highlights the changing dynamics of the global economic landscape, with EMDEs emerging as a significant force in driving global economic growth. Total Factor Productivity (TFP) growth, which represents the efficiency and technological progress in an economy, has also experienced similar trends.

Figure A1.1. Growth in GDP per capita and total factor productivity has been declining in recent years

A. GDP per capita growth



B. TFP growth



Source: Penn World Table, version 11.
Note: Figures show the median and the range of 25 – 75th percentile of 98 developing economies (70 for B.) and 25 AEs' annual GDP per capita growth (constant PPP), and TFP growth. Median line removes

cyclical component computed by HP filter. Countries with less than 1 million population is excluded from the sample.

Unconditional Convergence

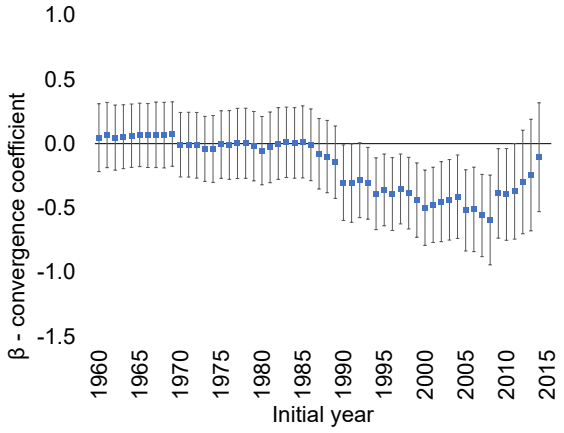
a. Unconditional convergence framework.

Following Patel et al. (2021), we estimate convergence coefficients using data from 1960 to 2019 for a large sample of countries. Specifically, we estimate linear regressions of average GDP per capita growth on the log of initial income:

$$\left(\frac{1}{T-t}\right) * log\left(\frac{y_{i,T}}{y_{i,t}}\right) = \alpha + \beta * log(y_{i,t}) + u_{i,t} \qquad (A1.1)$$

where i represents the country, T the end year (2019), t the start year, $y_{i,T}$ *the per capita GDP*, and $u_{i,t}$ the error term. A negative and statistically significant β coefficient indicates that higher initial output per capita (i.e., being closer to the steady state) correlates with a lower growth rate, supporting the neoclassical idea of unconditional convergence.

Figure A1.2: Unconditional Convergence



Notes: GDP per capita in PPP. The sample of countries used was restrained to those whose population is larger than one million people. Also, oil-rich countries were excluded.

Appendix A2. Indices of export-import similarity with China

Table A2.1 Countries with high *Rank* correlation coefficient with China

	Rank correlation with China's global share							
	Similarity with China's imports				Similarity with China's exports			
RANK	1995		2015		1995		2015	
1	Ukraine	0.16	Brazil	0.14	Viet Nam	0.39	Viet Nam	0.37
2	Kazakhstan	0.15	Malaysia	0.13	Pakistan	0.34	Bangladesh	0.30
3	Georgia	0.15	Korea, Dem.	0.12	Thailand	0.33	Cambodia	0.29
4	Korea, Dem.	0.14	Kazakhstan	0.10	Korea, Dem.	0.32	Korea, Dem.	0.28
5	Iraq	0.13	Bolivia	0.08	Bangladesh	0.32	Tunisia	0.28
6	Malaysia	0.11	Chad	0.08	Indonesia	0.32	Sri Lanka	0.26
7	Brazil	0.11	Guinea-Bissau	0.07	Sri Lanka	0.32	Mauritius	0.25
8	Belarus	0.10	South Sudan	0.07	India	0.30	El Salvador	0.25
9	Venezuela	0.09	Afghanistan	0.07	Philippines	0.29	Nepal	0.24
10	India	0.08	Nigeria	0.06	Haiti	0.29	Haiti	0.24
11	Eritrea	0.08	Timor-Leste	0.06	Madagascar	0.27	Lesotho	0.23
12	Thailand	0.06	Argentina	0.06	Nepal	0.27	Thailand	0.21
13	Angola	0.06	Thailand	0.05	Albania	0.25	West Bank & Gaza	0.21
14	Congo, Rep.	0.06	Philippines	0.05	Mauritius	0.24	Turkiye	0.21
15	Yemen	0.06	Sudan	0.05	Egypt	0.24	Indonesia	0.21
16	Azerbaijan	0.06	Libya	0.05	Tunisia	0.24	Albania	0.20
17	Libya	0.05	Congo, Rep	0.04	Myanmar	0.23	India	0.20
18	Peru	0.05	PNG	0.04	Morocco	0.22	Syria	0.20
19	Algeria	0.05	Guinea	0.03	Dominican Rep.	0.22	Morocco	0.19
20	Nigeria	0.05	Somalia	0.03	Syria	0.20	Pakistan	0.19
21	South Africa	0.04	South Africa	0.03	Tajikistan	0.20	Mexico	0.19
22	Iran	0.04	India	0.03	El Salvador	0.20	Armenia	0.18
23	Pakistan	0.04	Mozambique	0.03	Turkiye	0.19	North Macedonia	0.17
24	Indonesia	0.04	Myanmar	0.03	Guatemala	0.19	Philippines	0.17
25	Uzbekistan	0.04	Central Africa	0.03	Lao PDR	0.19	Ethiopia	0.17
26	Gabon	0.04	Mongolia	0.02	Jamaica	0.18	Jordan	0.16
27	Gambia	0.04	Gambia	0.02	Cambodia	0.18	Uzbekistan	0.16
28	Mauritania	0.03	Tanzania	0.02	Senegal	0.18	Sierra Leone	0.15
29	Turkmenistan	0.03	Venezuela	0.01	North Macedonia	0.18	Lebanon	0.15
30	Sudan	0.03	Tajikistan	0.01	Malaysia	0.17	Egypt	0.15

Source: Author's calculations

Table A2.2 Countries with high *Finger-Krenin* similarity index with China

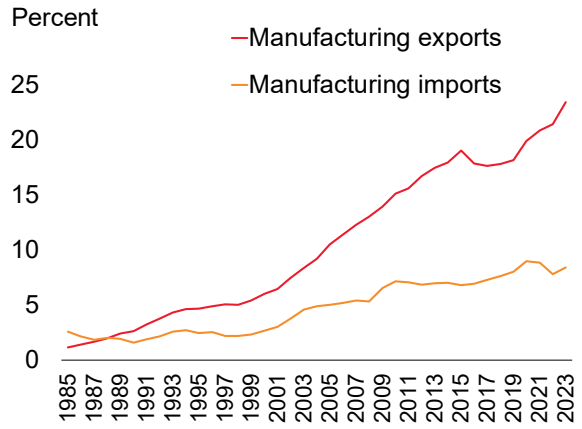
	Similarity with China's domestic share (FK)							
	Similarity with China's imports				Similarity with China's exports			
RANK	1995		2015		1995		2015	
1	Malaysia	37	Malaysia	47	Thailand	48	Viet Nam	55
2	Mexico	36	Thailand	45	Turkiye	41	Thailand	46
3	Brazil	35	Brazil	44	Philippines	40	Turkiye	44
4	Argentina	34	Philippines	40	Indonesia	38	Malaysia	42
5	Thailand	33	Mexico	38	India	38	Tunisia	38
6	Korea, Dem.	33	Indonesia	35	Mexico	37	Mexico	37
7	India	30	South Africa	35	Tunisia	35	Philippines	37
8	Indonesia	30	Turkiye	35	Malaysia	35	India	37
9	Belarus	29	India	34	Korea, Dem.	34	Indonesia	36
10	South Africa	28	Viet Nam	32	Viet Nam	34	Serbia	35
11	Turkiye	28	Argentina	32	Sri Lanka	33	Bosnia and Herzegovina	32
12	Ukraine	27	Serbia	31	North Macedonia	32	Egypt	28
13	Jordan	24	Colombia	31	Morocco	30	Lebanon	27
14	Tunisia	24	Egypt	30	Brazil	27	El Salvador	26
15	Philippines	23	Iran	29	El Salvador	27	Belarus	26
16	Colombia	21	Costa Rica	28	Pakistan	25	Morocco	25
17	North Macedonia	21	Georgia	27	Bosnia and Herzegovina	25	Moldova	25
18	Egypt	19	Belarus	26	Guatemala	25	Jordan	25
19	Venezuela	18	Tunisia	26	Dominican Rep.	25	North Macedonia	24
20	Bosnia and Herzegovina	18	Ukraine	26	Mauritius	25	Mauritius	24
21	Lebanon	18	Kazakhstan	25	Albania	25	Dominican Rep.	24
22	Zimbabwe	17	Lebanon	25	Costa Rica	24	South Africa	23
23	Kyrgyz Republic	17	Albania	25	Haiti	24	Sri Lanka	23
24	Georgia	17	Bosnia and Herzegovina	25	Bangladesh	24	Albania	23
25	Peru	16	Kyrgyz Republic	24	Egypt	23	Costa Rica	23
26	Togo	16	Peru	23	Lebanon	23	Ukraine	22
27	Kenya	15	Ghana	23	Belarus	22	Guatemala	22
28	Moldova	15	Ecuador	23	Colombia	22	West Bank and Gaza	22
29	Costa Rica	15	Dominican Rep.	22	Honduras	21	Kenya	21
30	Morocco	15	Mongolia	22	Madagascar	20	Brazil	21

Source: Author's calculations

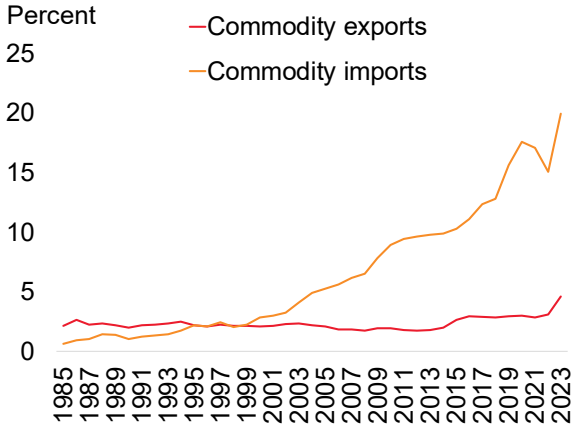
A3. China's growth and global prices

Figure A3.1. China's growing role in global trade

A. China's share of global manufacturing exports and imports



B. China's share of global commodity exports and imports



Source: BACI

Table A3. 1. China's GDP growth is correlated with commodity prices

	Correlation with China's GDP growth
Commodity index (weighted)	0.30
Energy	0.24
Non-energy	0.42
Agriculture	0.35
Beverages	0.17
Food	0.31
Oils & Meals	0.33
Grains	0.26
Other Food	0.18
Raw Materials	0.40
Timber	0.30
Other raw materials	0.38
Fertilizer	0.08
Metals & Minerals	0.44
Base metals (ex iron)	0.40
Precious metals	0.33

Source: World Bank Commodity Price data, Pink Sheet; World Bank Economic Monitoring Macroeconomic Data.
Note: Correlations are based on year-on-year growth rates of commodity prices and China's GDP growth.

Table A3. 2. China's growth has supported export prices of commodity exporters

	Growth in export price			
	(1)	(2)	(3)	(4)
China's GDP growth	-0.360**	-0.619***		
	[0.141]	[0.142]		
China's GDP growth		1.110***		
* commodity exporter		[0.315]		
China's manufacturing export growth			0.0760*	-0.0783
			[0.0407]	[0.0511]
China's manufacturing export growth				0.522***
* commodity exporter				[0.108]
Constant	0.0698***	0.0719***	0.0338***	0.0394***
	[0.0108]	[0.0129]	[0.00452]	[0.00594]
Observations	2,895	2,540	2,895	2,540
R-squared	0.327	0.356	0.326	0.403
country FE	YES	YES	YES	YES
year FE	YES	YES	YES	YES

Source: Haver Analytics.

Note: Estimation tests the equation $\Delta p_{i,t} = \alpha + \beta \Delta y_t^{China} * commodity + \delta_i + \delta_t + u_{i,t}$, where $p_{i,t}$ denotes the export price of country i and time t (quarterly), y_t^{China} is the GDP (manufacturing export) in China in time t, commodity is a dummy variable for commodity exporters (commodity rents are greater than 30% of GDP), and u is the error term. Panel fixed effect estimation using quarterly data between 1995-2024. Growth is in year-on-year terms. The sample includes 42 emerging markets and developing economies.

A4. Robustness check of growth regressions

Table A4.1. Similarity ratio and net growth effect

Country	Ratio of similarity indices	Net growth effect	90% lower bound	90% upper bound	Country	Ratio of similarity indices	Net growth effect	90% lower bound	90% upper bound
Jamaica	0.68	-0.07	-0.23	0.08	North Macedonia	0.87	0.21	0.14	0.28
Vietnam	0.68	-0.03	-0.16	0.09	Tanzania	0.87	0.19	0.14	0.24
Sri Lanka	0.68	-0.04	-0.14	0.06	Zambia	0.92	0.22	0.14	0.30
Nepal	0.71	-0.01	-0.10	0.08	Bahrain	0.88	0.20	0.15	0.25
Haiti	0.72	0.01	-0.08	0.09	Croatia	0.88	0.22	0.16	0.27
Madagascar	0.72	0.02	-0.07	0.10	Uruguay	0.89	0.21	0.16	0.26
Dominican Republic	0.74	0.03	-0.06	0.11	Guinea-Bissau	0.89	0.22	0.16	0.27
Guatemala	0.75	0.04	-0.04	0.12	Colombia	0.89	0.22	0.16	0.27
Zimbabwe	0.81	0.09	-0.02	0.20	Bulgaria	0.89	0.24	0.16	0.32
Pakistan	0.77	0.12	-0.02	0.26	Mexico	0.89	0.22	0.17	0.27
Bangladesh	0.77	0.10	-0.01	0.21	Burundi	0.91	0.23	0.17	0.29
Benin	0.78	0.08	0.00	0.15	Hungary	0.89	0.23	0.17	0.29
Myanmar	0.76	0.07	0.01	0.14	Cameroon	0.91	0.23	0.17	0.29
Oman	0.81	0.10	0.01	0.19	Peru	0.91	0.26	0.18	0.35
Indonesia	0.79	0.14	0.01	0.26	Bosnia and Herzegovina	0.90	0.24	0.18	0.29
Thailand	0.80	0.16	0.01	0.31	Iran, Islamic Rep	0.91	0.26	0.18	0.34
Albania	0.77	0.08	0.02	0.15	Armenia	0.93	0.25	0.18	0.31
Honduras	0.81	0.10	0.02	0.18	Nigeria	0.92	0.27	0.19	0.35
Philippines	0.78	0.12	0.02	0.22	Niger	0.95	0.26	0.19	0.33
Burkina Faso	0.82	0.11	0.02	0.19	Liberia	0.92	0.25	0.19	0.31
Egypt, Arab Rep	0.77	0.09	0.03	0.15	Malaysia	0.95	0.33	0.19	0.48
Bolivia	0.81	0.10	0.03	0.18	Gambia, The	0.93	0.27	0.19	0.34
Malawi	0.79	0.09	0.03	0.16	Kyrgyz Republic	0.94	0.26	0.20	0.32
Central African Republic	0.87	0.15	0.04	0.27	Cote d'Ivoire	0.95	0.27	0.20	0.34
Lao PDR	0.79	0.10	0.04	0.15	Mongolia	0.94	0.27	0.20	0.34
Panama	0.79	0.11	0.04	0.18	Guinea	0.97	0.28	0.20	0.35
Syrian Arab Republic	0.79	0.10	0.04	0.15	Kenya	0.95	0.27	0.20	0.34
Mozambique	0.89	0.17	0.05	0.29	Qatar	0.95	0.29	0.21	0.36
Tunisia	0.79	0.11	0.05	0.18	Mauritania	0.95	0.29	0.22	0.37
Morocco	0.79	0.11	0.05	0.17	Jordan	0.96	0.29	0.22	0.36
Trinidad and Tobago	0.86	0.15	0.05	0.24	Rwanda	1.02	0.31	0.22	0.41
Chile	0.85	0.14	0.06	0.23	Uzbekistan	0.98	0.31	0.23	0.40
India	0.83	0.20	0.06	0.35	Chad	1.04	0.33	0.23	0.44
Nicaragua	0.89	0.17	0.06	0.29	Argentina	1.07	0.35	0.24	0.47
Sierra Leone	0.82	0.12	0.06	0.18	Gabon	1.02	0.34	0.25	0.44
El Salvador	0.80	0.12	0.07	0.17	Algeria	1.02	0.35	0.25	0.44
Togo	0.82	0.13	0.07	0.18	Azerbaijan	1.01	0.35	0.25	0.45
Costa Rica	0.82	0.13	0.08	0.19	Sudan	1.04	0.35	0.25	0.45
Moldova	0.86	0.15	0.08	0.23	Belarus	1.02	0.38	0.26	0.51
Senegal	0.81	0.13	0.08	0.18	Kuwait	1.03	0.37	0.26	0.47
Mauritius	0.82	0.17	0.08	0.25	South Africa	1.08	0.38	0.27	0.50
Lebanon	0.82	0.14	0.09	0.19	Iraq	1.06	0.42	0.27	0.57
Paraguay	0.83	0.15	0.11	0.20	Yemen, Rep	1.08	0.39	0.28	0.51
Ecuador	0.87	0.17	0.11	0.24	Saudi Arabia	1.08	0.40	0.28	0.52
Tajikistan	0.84	0.17	0.11	0.24	Congo, Rep	1.09	0.40	0.28	0.52
Poland	0.84	0.16	0.11	0.20	Venezuela, RB	1.07	0.41	0.29	0.53
Mali	0.84	0.16	0.11	0.20	Angola	1.09	0.40	0.29	0.52
Uganda	0.89	0.19	0.11	0.26	Ukraine	1.10	0.47	0.30	0.64
United Arab Emirates	0.85	0.17	0.12	0.22	Brazil	1.11	0.45	0.31	0.59
Ghana	0.87	0.18	0.12	0.24	Georgia	1.14	0.49	0.32	0.65
Turkey	0.85	0.19	0.12	0.25	Kazakhstan	1.18	0.51	0.34	0.68
Cambodia	0.85	0.19	0.13	0.25	Russian Federation	1.30	0.61	0.39	0.82
Ethiopia	0.88	0.19	0.13	0.25	**Average**	**0.89**	**0.21**	**0.13**	**0.30**

Note: Ratio of similarity indices refers to $\frac{\sigma_i^{import}}{\sigma_i^{export}}$ in equation (3). Net growth refers to the estimated $\frac{\partial \Delta y_{i,t}}{\partial \Delta x_t^{China}} = \gamma_1 \sigma_i^{import} + \gamma_2 \sigma_i^{export}$.

Table A4.2. Robustness check - Export similarities and the impact of China's GDP growth on developing economies (controlling for global macro indicators)

Dependent variable: GDP per-capita growth						
	(1)	(2)	(3)	(4)	(5)	(6)
China's per-capita GDP growth	0.213***		0.213***		-0.283	
	(0.0311)		(0.0311)		(0.715)	
[China's per-capita GDP growth] X		3.170***			2.548**	2.552**
[Export similarity with China's imports (1995)]		(1.056)			(1.109)	(1.092)
[China's per-capita GDP growth] X				-1.919***	-1.369**	-1.371**
[Export similarity with China's exports (1995)]				(0.609)	(0.619)	(0.617)
Energy price (index)	0.00504		0.00504		0.00509	
	(0.00338)		(0.00338)		(0.00336)	
US real interest rate	0.130*		0.130*		0.130*	
	(0.0721)		(0.0721)		(0.0718)	
Lag of GDP per capita growth	25.48***	25.06***	25.48***	25.10***	25.22***	24.98***
	(5.684)	(5.777)	(5.684)	(5.764)	(5.669)	(5.765)
Constant	-0.229	-7.130**	-0.229	7.946***	-0.229	-1.004
	(0.489)	(2.939)	(0.489)	(2.011)	(0.485)	(4.058)
Observations	2,625	2,625	2,625	2,625	2,625	2,625
R-squared	0.225	0.251	0.225	0.250	0.229	0.252
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	Yes	No	Yes

Note: Regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4.3. Robustness check - Impact of China's manufacturing trade growth on developing country per capita GDP growth (controlling for global macro indicators)

Dependent variable: GDP per capita growth						
	(1)	(2)	(3)	(4)	(5)	(6)
China's manufacturing import growth	-0.348**				-0.348**	
	(0.144)				(0.145)	
[China's manu. import growth] X	0.797***	0.798***			0.656**	0.657**
[Export similarity with China's imports (1995)]	(0.296)	(0.292)			(0.297)	(0.295)
China's manufacturing export growth			0.368***		0.319***	
			(0.0849)		(0.0863)	
[China's manu. export growth] X			-0.539***	-0.539***	-0.417***	-0.418***
[Export similarity with China's exports (1995)]			(0.143)	(0.143)	(0.140)	(0.140)
Energy price (index)	0.0122***		0.00601*		0.00313	
	(0.00329)		(0.00334)		(0.00381)	
US real interest rate	0.243***		0.121*		0.0650	
	(0.0690)		(0.0718)		(0.0735)	
Lag of GDP per capita growth	25.54***	25.16***	25.42***	25.08***	25.35***	25.04***
	(5.708)	(5.763)	(5.633)	(5.755)	(5.613)	(5.745)
Constant	-0.448	-2.437	0.130	5.560***	0.543	1.217
	(0.494)	(1.507)	(0.479)	(1.050)	(0.539)	(1.963)
Observations	2,625	2,625	2,625	2,625	2,625	2,625
R-squared	0.230	0.252	0.239	0.252	0.243	0.254
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes

Note: EMDE: Emerging Market and Developing Economies. Panel regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4.4. Robustness check - Differential effect for commodity exporters

	Dependent variable: GDP per capita growth					
	(1)	(2)	(3)	(4)	(5)	(6)
China's per-capita GDP growth	0.145***					
	(0.0342)					
[China's per-capita GDP growth] X [Commodity exporters]	0.170**	0.171**				
	(0.0689)	(0.0682)				
China's manufacturing import growth			0.0340***			
			(0.0105)			
[China's manu. import growth] X [Commodity exporters]			0.0369**	0.0377**		
			(0.0178)	(0.0177)		
China's manufacturing export growth					0.0517***	
					(0.0105)	
[China's manu. export growth] X [Commodity exporters]					0.0404**	0.0414**
					(0.0183)	(0.0182)
Energy price (index)	0.00656**		0.0134***		0.00694**	
	(0.00334)		(0.00330)		(0.00334)	
US real interest rate	0.126*		0.243***		0.123*	
	(0.0728)		(0.0705)		(0.0726)	
Lag of GDP per capita growth	24.79***	24.63***	25.13***	24.72***	25.05***	24.64***
	(5.681)	(5.779)	(5.718)	(5.760)	(5.667)	(5.774)
Constant	-0.263	1.488***	-0.510	1.706***	0.0662	1.667***
	(0.480)	(0.211)	(0.494)	(0.185)	(0.473)	(0.185)
Observations	2,700	2,700	2,700	2,700	2,700	2,700
R-squared	0.226	0.250	0.227	0.250	0.238	0.250
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes

Note: EMDE: Emerging Market and Developing Economies. Panel regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). "Commodity exporters" is a dummy indicating the countries with commodity rents greater than 30% of GDP as of 2010. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4.5. Robustness check with time-varying rank correlation similarity-index

	Dependent variable: EMDE's GDP per-capita growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
China's per-capita GDP growth	0.225***	0.257***		0.223***	0.305***		0.318***	
	(0.0311)	(0.0379)		(0.0318)	(0.0547)		(0.0551)	
Export similarity with China's imports	6.111**	0.292	-2.990				1.544	-3.133
	(2.481)	(3.204)	(3.037)				(4.020)	(4.105)
[China's per-capita GDP growth] X [Export similarity with China's imports]		0.985**	1.275***				0.663	1.039**
		(0.432)	(0.433)				(0.504)	(0.501)
Export similarity with China's exports				-4.356	-0.551	-1.344	0.319	-2.073
				(2.941)	(2.852)	(3.176)	(3.442)	(3.965)
[China's per-capita GDP growth] X [Export similarity with China's exports]					-0.738**	-0.770**	-0.607*	-0.514
					(0.305)	(0.307)	(0.351)	(0.350)
Lag of GDP per capita growth	25.51***	25.51***	24.88***	25.44***	25.45***	24.99***	25.48***	24.84***
	(5.609)	(5.609)	(5.732)	(5.615)	(5.588)	(5.692)	(5.586)	(5.697)
Constant	0.743***	0.560**	1.988***	1.032***	0.618	2.477***	0.549	2.503***
	(0.229)	(0.252)	(0.219)	(0.390)	(0.384)	(0.475)	(0.390)	(0.479)
Observations	3,264	3,264	3,264	3,264	3,264	3,264	3,264	3,264
R-squared	0.218	0.219	0.247	0.219	0.220	0.249	0.221	0.250
country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes	No	Yes

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Note: Panel regressions using annual data from EMDE countries where data are available, between 1995-2019. The table introduces two alternative measures of EMDE's export similarity to China's imports and exports, including the Finger-Kreinin index (columns 1 and 2), and the China's global share index (columns 3 and 4). Both indices are constructed with detailed product-level data at the 4-digit level. The Finger-Kreinin index takes values between zero and one, and the higher its value the closest is the product distribution of exports in the two countries. Description of China's global share index. Whiskers represent 90-percent confidence intervals.

Table A4.6. Similarity exercise -- robustness check: different similarity-index measures

Dependent variable: EMDE's GDP per-capita growth		
	Finger-Kreinin similarities	
	(1)	(2)
China's per-capita GDP growth	0.187***	
	(0.0660)	
[China's per-capita GDP growth] X	0.0138***	0.0138***
[Export similarity with China's imports (1995)]	(0.00411)	(0.00395)
[China's per-capita GDP growth] X	-0.0107***	-0.0107***
[Export similarity with China's exports (1995)]	(0.00359)	(0.00353)
Lag of GDP per capita growth	25.59***	25.16***
	(5.692)	(5.783)
Constant	0.605***	1.677***
	(0.217)	(0.376)
Observations	2,625	2,625
R-squared	0.225	0.249
country FE	Yes	Yes
Year FE	No	Yes

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Note: Panel regressions using annual data from EMDE countries where data are available, between 1995-2019. Export similarity to China's exports and imports are measured using time-varying rank correlation index with detailed product-level data at the 4-digit level. Description of rank correlation index. Whiskers represent 90-percent confidence intervals.

Table A4.7. Similarity exercise -- robustness check: including countries with population less than 1 million

	Dependent variable: GDP per-capita growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
China's per-capita GDP growth	0.188***	-1.375***		1.058***		-0.598	
	(0.0283)	(0.489)		(0.338)		(0.654)	
[China's per-capita GDP growth] X		3.162***	3.172***			2.755***	2.763***
[Export similarity with China's imports (1995)]		(1.007)	(0.988)			(1.026)	(1.011)
[China's per-capita GDP growth] X				-1.560***	-1.565***	-1.032*	-1.036*
[Export similarity with China's exports (1995)]				(0.590)	(0.587)	(0.588)	(0.589)
Lag of GDP per capita growth	27.01***	26.83***	26.36***	26.92***	26.45***	26.79***	26.32***
	(5.036)	(5.032)	(5.106)	(5.022)	(5.098)	(5.023)	(5.098)
Constant	0.666***	0.670***	-7.168***	0.668***	6.711***	0.671***	-2.734
	(0.196)	(0.194)	(2.744)	(0.195)	(1.909)	(0.194)	(3.718)
Observations	3,175	3,175	3,175	3,175	3,175	3,175	3,175
R-squared	0.219	0.222	0.248	0.220	0.246	0.222	0.248
country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Note: Panel regressions using annual data from EMDE countries where data are available, between 1995-2019. Export similarity to China's exports and imports are measured using baseline (1995) rank correlation index with detailed product-level data at the 4-digit level. Description of rank correlation index. Whiskers represent 90-percent confidence intervals.

Table A4.8. Robustness check - Export similarities and the impact of China's GDP growth on developing economies (sample expanded to post-COVID years)

	Dependent variable: GDP per-capita growth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
China's per-capita GDP growth	0.569***	-0.887		1.433***		-0.0930	
	(0.0428)	(0.681)		(0.471)		(0.893)	
[China's per-capita GDP growth] X		2.936**	2.867**			2.484*	2.430*
[Export similarity with China's imports (1995)]		(1.396)	(1.281)			(1.411)	(1.270)
[China's per-capita GDP growth] X				-1.539*	-1.495**	-1.016	-0.983
[Export similarity with China's exports (1995)]				(0.819)	(0.722)	(0.812)	(0.693)
Lag of GDP per capita growth	19.92***	19.76***	22.12***	19.81***	22.17***	19.71***	22.07***
	(4.941)	(4.945)	(5.417)	(4.942)	(5.417)	(4.945)	(5.420)
Constant	-2.409***	-2.407***	-8.870*	-2.408***	8.123***	-2.406***	-3.092
	(0.327)	(0.326)	(4.745)	(0.327)	(3.101)	(0.327)	(5.763)
Observations	3,074	3,074	3,074	3,074	3,074	3,074	3,074
R-squared	0.224	0.226	0.277	0.225	0.277	0.226	0.278
country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	Yes	No	Yes

Note: Regressions use annual data from developing economies countries available between 1995-2023, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A4.9. Robustness check - Impact of China's manufacturing trade growth on developing country per capita GDP growth (sample expanded to post-COVID years)

	Dependent variable: GDP per capita growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
China's manufacturing import growth	0.0442***	-0.322**					-0.345**	
	(0.00825)	(0.143)					(0.142)	
[China's manu. import growth] X		0.739**	0.741**				0.618**	0.618**
[Export similarity with China's imports (1995)]		(0.294)	(0.288)				(0.293)	(0.292)
China's manufacturing export growth				0.0771***	0.343***		0.313***	
				(0.00856)	(0.0884)		(0.0910)	
[China's manu. export growth] X					-0.473***	-0.477***	-0.363**	-0.366**
[Export similarity with China's exports (1995)]					(0.149)	(0.147)	(0.149)	(0.146)
Lag of GDP per capita growth	25.99***	25.94***	24.11***	25.68***	25.55***	24.03***	25.28***	24.01***
	(5.968)	(5.952)	(5.900)	(5.888)	(5.870)	(5.899)	(5.857)	(5.889)
Constant	1.171***	1.172***	-2.225	0.718***	0.721***	4.918***	0.741***	0.900
	(0.220)	(0.219)	(1.474)	(0.208)	(0.207)	(1.070)	(0.208)	(1.958)
Observations	2,756	2,756	2,756	2,756	2,756	2,756	2,756	2,756
R-squared	0.205	0.208	0.293	0.222	0.225	0.292	0.230	0.294
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	No	No	Yes	No	Yes

Note: EMDE: Emerging Market and Developing Economies. Panel regressions use annual data from developing economies countries available between 1995-2023, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

One way to evaluate how China's expansion in output and trade has influenced emerging markets and developing economies (EMDEs) is by examining shifts following its accession to the World Trade Organization (WTO) in 2001. Table A5.9 presents findings from an empirical analysis assessing the differential effects of China's growth during the post-accession period. Relative to the baseline years of 1995–2000, both the import-driven complementarity gains and the export-driven competitive pressures associated with China's growth—across output and manufacturing trade—intensified. Notably, the estimated coefficient on the triple-interaction terms involving export similarity is negative and statistically significant, indicating that EMDEs with export profiles closely aligned with China's experienced stronger adverse competition effects on growth after China's formal integration into global trade.

Table A4.10 Robustness check - Differential effect after China's WTO accession in 2001 (for commodity exporters)

Dependent variable: GDP per capita growth		
	(1)	(2)
Post_2001	0.191	
	(0.585)	
China's pcGDP growth	0.203*	
	(0.108)	
[China's pcGDP growth] X [Post_2001]	-0.0620	
	(0.113)	
[China's pcGDP growth] X [Commodity exporters]	-0.110	-0.110
	(0.176)	(0.176)
[Post_2001] X [Commodity exporters]	-2.345**	-2.352**
	(1.003)	(1.002)
[China's pcGDP growth] X [Post_2001] X [Commodity exporters]	0.371*	0.372*
	(0.192)	(0.192)
Lag of GDP per capita growth	25.00***	24.62***
	(5.643)	(5.737)
Constant	1.087**	2.116***
	(0.456)	(0.389)
Observations	2,700	2,700
R-squared	0.226	0.251
country FE	Yes	Yes
Year FE	No	Yes

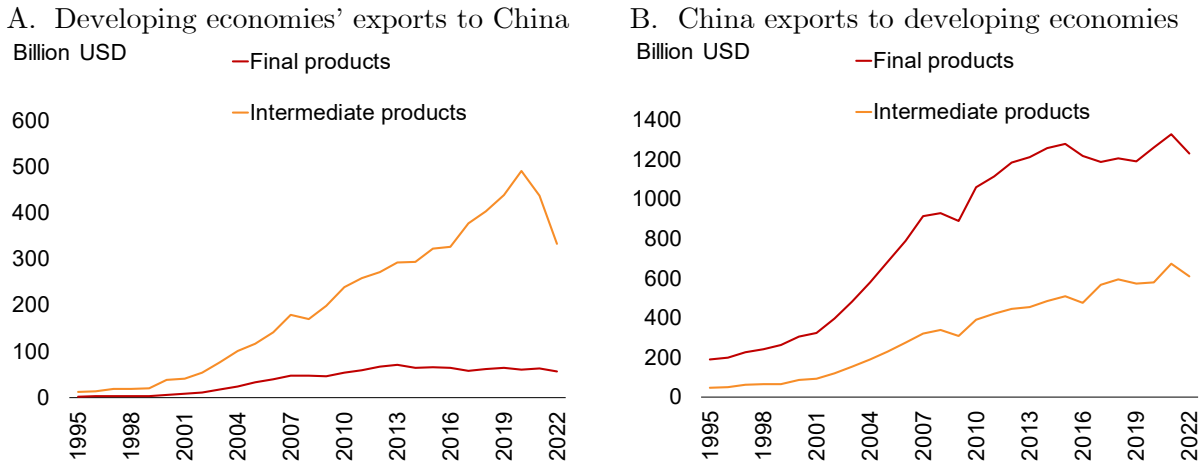
Table A4.11 Robustness check - Differential effect after China's WTO accession in 2001

	Dependent variable: GDP per-capita growth					
	(1)	(2)	(3)	(4)	(5)	(6)
[Panel A] China's GDP per-capita growth						
[China's pcGDP growth] X [Export similarity with China's imports (1995)]	0.113		0.306			
	(1.426)		(1.542)			
[China's pcGDP growth] X [Export similarity with China's imports (1995)] X [Post_2001]	2.104		1.387			
	(1.555)		(1.652)			
[China's pcGDP growth] X [Export similarity with China's exports (1995)]		0.396	0.469			
		(0.842)	(0.916)			
[China's pcGDP growth] X [Export similarity with China's exports (1995)] X [Post_2001]		-1.937**	-1.649*			
		(0.886)	(0.945)			
[Panel B] China's manufacturing trade growths						
[China's manu. import growth] X [Export similarity with China's imports (1995)]				0.167		0.247
				(0.258)		(0.265)
[China's manu. import growth] X [Export similarity with China's imports (1995)] X [Post_2001]				0.305		0.127
				(0.312)		(0.316)
[China's manu. export growth] X [Export similarity with China's exports (1995)]					0.360	0.399
					(0.289)	(0.296)
[China's manu. export growth] X [Export similarity with China's exports (1995)] X [Post_2001]					-0.697**	-0.666**
					(0.296)	(0.300)
Observations	2,625	2,625	2,625	2,625	2,625	2,625
R-squared	0.227	0.229	0.256	0.254	0.255	0.258
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: Regressions use annual data from developing economies countries available between 1995-2019, excluding countries with populations under one million (as of 2010). Export similarity to China's trade is measured using the baseline (1995) rank correlation index at the detailed 4-digit product level. *Post_ 2001* is a dummy indicating all periods after 2001. Robust standard errors are in parentheses, with significance levels denoted as *** p<0.01, ** p<0.05, * p<0.1.

Effects of China's growth on developing economies over time

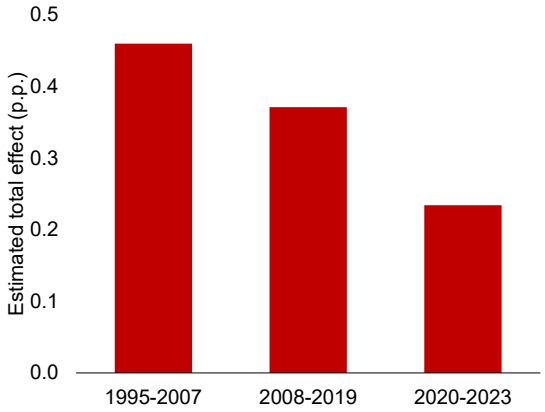
Figure A4.1. Developing economies export primarily intermediate goods to China, whereas China exports primarily final goods to other developing economies.



Source: BACI.
Note: Values deflated using global price indicators (constant 2010 price).

We further assess how these effects have evolved over time. Figure A5.1 plots the estimated net contribution of China's growth to the average growth of developing economies through trade similarity channels. During the 1995–2007 period, China's per capita GDP growth is estimated to have contributed approximately 0.46 percentage points to annual growth in developing economies. However, this contribution declined by nearly half—to just 0.23 percentage points—over the 2020–2023 period. This decline reflects primarily the slowdown in China's growth itself, rather than structural changes in structural similarity.

Figure A4.2 Estimated net effect of China's growth on developing economies over time.



Note: Net effects are calculated as the product of average China growth and the effect of the rank similarities of import and export.

Appendix A5. Exports to China and reforms

Table A5.1. Correlation between lag of exports of intermediate goods to China and policy reforms

		Domestic reforms			External reforms	
	Reforms index (aggregate)	Product market reforms	Domestic finance reforms	Labor market reforms	Trade reforms	External finance reforms
	(1)	(4)	(5)	(6)	(2)	(3)
Exports of intermediate goods to China (lag; % of GDP)	-0.00602***	-0.0281***	-0.0141***	-0.00105	0.000741	0.00989
	(0.00194)	(0.00377)	(0.00325)	(0.00153)	(0.00266)	(0.00711)
Constant	0.649***	0.479***	0.692***	0.699***	0.738***	0.627***
	(0.00214)	(0.00409)	(0.00306)	(0.00209)	(0.00292)	(0.00668)
Observations	1,091	1,101	1,101	1,100	1,092	1,101
R-squared	0.887	0.883	0.839	0.833	0.851	0.797
country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: reform indices adopted from Alesina et al. (2020) and discussed in detail in World Bank's East Asia and Pacific Economic Update April 2023. Overall and sectoral reform indices are continuous indicators taking a value in the [0-1] interval. A higher value indicates greater degree of liberalization (lower intensity of restrictions). Trade reforms is a composite index capturing the degree of liberalization in tariffs and the current account. Domestic finances reform captures the degree of liberalization in credit and interest rate controls, banking entry and supervisions, privatization, and security markets. Product market reform captures the degree of liberalization in two representative sectors of electricity and telecommunication. Robust standard errors are in parentheses, with significance levels denoted as *** $p<0.01$, ** $p<0.05$, * $p<0.1$.