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GLOBAL TRADE SLOWDOWN IN THE 2010S: SIGN OF DEGLOBALISATION?

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Global Trade Slowdown in the 2010s: Sign of Deglobalisation?

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Abstract

Global trade has experienced a persistent slowdown since the Global Financial Crisis (GFC), mainly driven by the deceleration in growth of goods trade. This study aims at identifying the reasons behind the persistent trade slowdown by using a panel regression model with data of 22 Advanced Economies (AEs) and 17 Emerging Market Economies (EMEs). Our study suggests that the slowdown in global exports is mainly driven by: (i) the loosening in domestic income elasticity to exports among EMEs; (ii) the decline in foreign demand elasticity to goods exports amid the deceleration of global investment; (iii) the deglobalisation momentum amid the declining global value chain (GVC) activities and the uncertainty in trade policies since the China-US trade war; and (iv) the supply side factors including the narrowing AEs-EMEs wage gap and the diminishing US dollar trade finance condition. Moreover, these negative factors have affected mainly goods exports rather than services exports, which by comparison remained resilient until the Covid-19 pandemic. The results imply that the trend of global trade, especially goods trade, is unlikely to rebound to the pre-GFC level, as the above negative factors are likely to prolong in the post-pandemic era.

Keywords: global trade, deglobalisation, panel data regression
JEL classification: F14

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1. INTRODUCTION

Global trade has dwindled after the Global Financial Crisis (GFC). Chart 1A shows that average exports growth declined from 7.1% in the pre-GFC period to 3.3% in the post-GFC period. Meanwhile, global trade integration has also weakened[1]. Chart 1B shows the Grubel-Lloyd index (GLI), which measures the degree of intra-industry trade (IIT) integration (Grubel and Lloyd, 1975). The index shows that global IIT integration peaked in early-2000s but weakened and reached a trough in 2012 before recovering moderately in recent years.

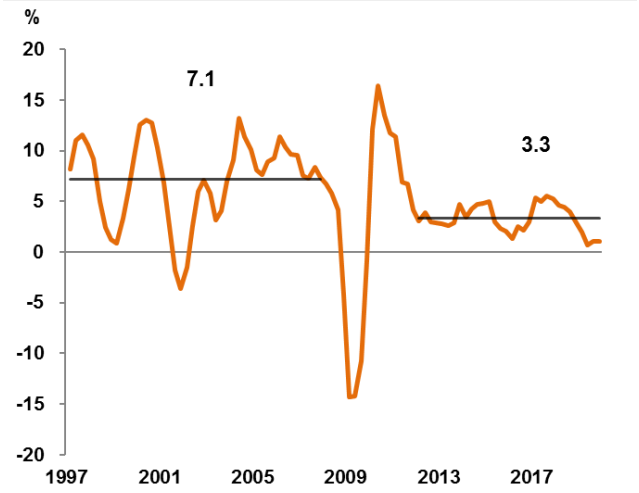
More recently, global trade faced an unprecedented slump during the Covid-19 pandemic. Total merchandise exports value plummeted by 21% year-on-year in the second quarter of 2020, with North America one of the hardest-hit regions (down 32%) followed by Europe (down 23%). Asia-Pacific also experienced a significant trade decline (down 10%) despite many economies in the region managing the virus infection relatively better than other parts of the world.[2] Such pandemic-induced trade collapse and the still-elevated trade tensions between China and the US have intensified concerns over the prospects for global trade.

The key policy question is whether the global trade slowdown was driven by cyclical factors or structural factors. One of the most cited reasons for the global trade slowdown in post-GFC period is the persistent decline in global economic growth over the same period (See Chart 1C), but the recent literature suggests the true picture is likely to be more complicated.

[1] In this study, trade integration refers to the vertically integrated production process where different economies specialise in a particular stage of the production chain (See Athukorala et al, 2006).

[2] Merchandise exports values were retrieved from the World Trade Organisation (WTO). Asia-Pacific includes Australia, Mainland China, Hong Kong, India, Indonesia, Japan, Malaysia, New Zealand, the Philippines, South Korea, Singapore and Thailand.

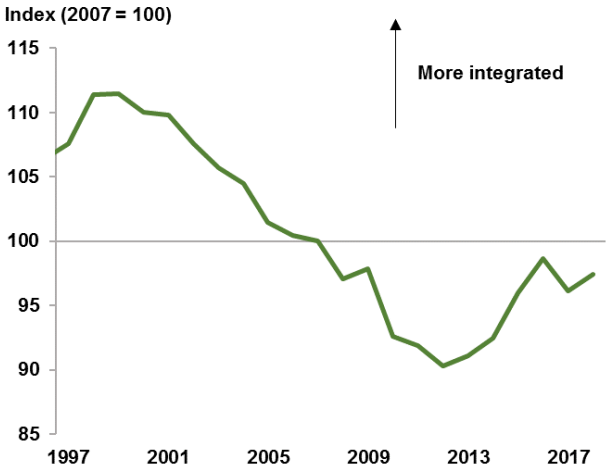
Chart 1A. Growth of global exports (%yoy)



Note: 39 economies.[3] Constant price and exchange rate in USD.

Sources: Oxford Economics and author calculation.

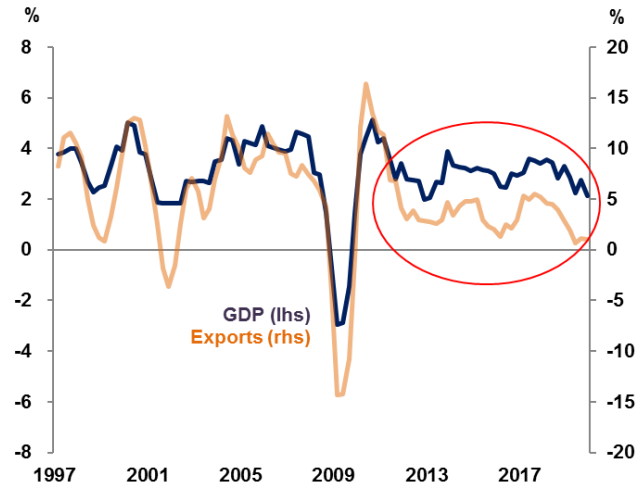
Chart 1B. Global Grubel-Lloyd Index



Note: GLI measures the IIT integration of granular products.[4] 39 economies using Harmonized System (HS) 4-digit level bilateral annual trade data.

Sources: UN Comtrade and author calculation.

Chart 1C. Growth of global GDP (%yoy)



Note: 39 economies. Constant price and exchange rate in USD.

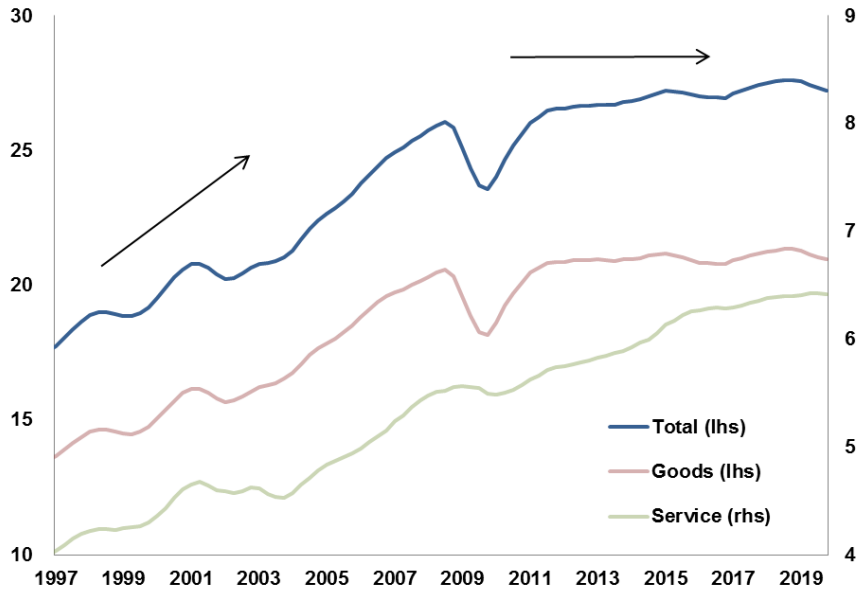
Sources: Oxford Economics and author calculation.

[3] See Appendix 1 for the 39 economies covered in this study.

[4] It is calculated by $GLI_t = 1 - \frac{\sum_i \sum_j \sum_k |EX_{i,j,k,t} - IM_{i,j,k,t}|}{\sum_i \sum_j \sum_k (EX_{i,j,k,t} + IM_{i,j,k,t})}$, where $EX_{i,j,k,t}$ and $IM_{i,j,k,t}$ denote the exports and imports of product k from reporting economy i to partner economy j at time t. A higher value of GLI indicates a more comparable level of exports and imports of similar products among the economies, reflecting a higher level of international fragmentation of production.

Constantinescu et al. (2020) suggested that the trade slowdown was not only caused by cyclical factors, but also by the structural change in the relationship between trade and income after the GFC (i.e. the income elasticity of trade). This means that, even if global economic growth were to recover to the pre-GFC level, global trade activity would not resume its previous growth momentum. This hypothesis is supported by the trend of the global exports-to-GDP ratio (See the blue line in Chart 2). There was a decade-long expansion in the ratio before 2007, followed by a plummet during the GFC. After a post-crisis pickup in 2011, the upward momentum vanished and the exports-to-GDP ratio has remained flat in recent years.

Chart 2. Global exports to GDP (%, 4-quarter average)



Note: 39 economies. Constant price and exchange rate in USD.

Sources: Oxford Economics and author calculation.

A breakdown by the type of exports shows a divergence between the exports of goods and services. While the trend of exports of goods (pink line in Chart 2) was flat after the GFC and consistent with that of total exports, the trend of exports of services (green line in Chart 2) showed a stronger upward momentum over the same period. In this regard, the slowdown in global exports in the post-GFC period was primarily driven by the weakened exports of goods.

In view of these observations, the literature suggested several reasons behind the global trade slowdown, especially for goods exports. For example, Arslan

et. al (2018) suggested that the decline in the income elasticity of trade is mainly observed in emerging market economies (EMEs) which could be a result of technological advancements or changes in consumer preference. This finding underscores the fact that although some of the EMEs have transformed into systemically important exporters over the past two decades,[5] their export growth was much weaker than their income growth. Arslan et al. (2018) also discussed other possible reasons, including: (1) the reduction in the investment share in GDP in advanced economies (AEs), given that investment is more trade-intensive than other GDP components; and (2) the stagnant development of global value chain (GVC) in the post-GFC period. Shin (2019) proposes that GVC activities and global trade are dependent on short-term bank credit as the banking system contributed 35% of trade finance. Among these trade financing activities, 80% was denominated in the US dollar given its global invoicing currency status. As such, bank funding conditions for US dollar trade finance could crucially influence global trade.

In this study, we examine the slowdown in global trade using panel data of 22 AEs and 17 EMEs.[6] Using both descriptive statistics and econometric models, we empirically ascertain the reasons behind the global trade slowdown. Our results suggest that the global trade slowdown was mainly driven by the **decline in EMEs' domestic income elasticity of exports** and the decline in **foreign demand elasticity of goods exports**. In addition, we found that the deglobalisation momentum indicated by the **intensity of GVC activities and trade policy uncertainty**, alongside the supply side hindering factors from the **narrowing AEs-EMEs labour cost gap** and the **US dollar trade finance condition** are also the key drivers of the global trade slowdown. Our results also suggest that, compared to goods exports, **services exports** have been less affected by these negative factors.

The rest of the paper is organised as follows. Section 2 reviews the literature. Section 3 outlines the stylised facts on trade slowdown. Section 4 discusses the econometric model and data. Section 5 reports the empirical results and Section 6 checks their robustness. Section 7 concludes the study and discusses the policy implications.

[5] For example, Mainland China's share of global goods exports increased from 4.1% in 2000 to 13.9% in 2018, helping it become the largest goods exporter in the world. See Appendix 2 for the world distribution of goods exports for details.

[6] See Appendix 1 for the classification.

2. LITERATURE REVIEW

While there are number of review studies that examine the collapse in global trade during the GFC, including Bems et. al (2013), Constantinescu et al. (2020)[7] were one of the pioneers who documented the sluggishness in global trade after the GFC watershed. Using an error-correction model, they found that the trade slowdown could be attributed to both the slow growth in income and the loosening in income elasticity of trade. Based on their findings, Hong et al. (2017) argued that the subdued investment and rebalancing of aggregate demand in Mainland China spilled over to its importers and thus undermined global trade. Meanwhile, Aslam et al. (2018) argued that the decline in trade growth was primarily caused by weaker investment. They also hinted the slowdown was associated with a shift in demand from tradable goods to non-tradable goods.

Besides the relationship between trade and GDP, some studies examined the effect of change in economic activities after the GFC on international trade. Ferrantino and Taglioni (2014) examined GVC activities in three industrial sectors – apparel and footwear, electronics, and motor vehicles. They found that the trade of complex products in GVC is more correlated with global downturns than simpler products. In addition, Arslan et al. (2018) hypothesized that the benefit gained from GVCs was close to its limit as the wage level in EMEs increased in recent years. They further proposed a possibility that the rapid trade growth before the GFC was merely a bubble and the post-GFC "slowdown" more "normal". Furthermore, Shin (2019) suggested that as the US dollar dominated the role of invoicing currency in international trade, a deteriorating US dollar credit condition would suppress worldwide credit condition and hamper GVCs.[8]

More recently, the China-US trade war and the Brexit raised concerns over the reversal of globalisation – i.e. deglobalisation. In particular, the US administration imposed multiple trade restrictions to reduce trade deficits (Stiglitz, 2018), including a withdrawal from the Trans-Pacific Partnership (TPP) and launching the trade war with China. These policies could create long-lasting damage to global trade.

[7] Earlier version was published in 2015 as World Bank Policy Research Working Paper.
[8] Gopinath (2015) pointed out that about 50% of international trade was invoiced in the US dollar despite the US share of world trade being only about 10%.

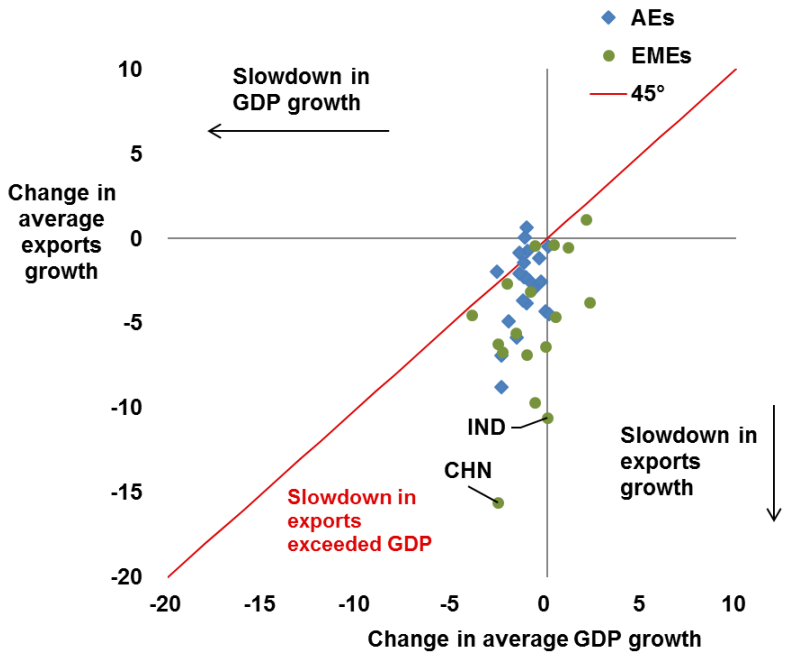
3. THE GLOBAL TRADE SLOWDOWN: SOME STYLISED FACTS

3.1 *Decline in exports relative to GDP*

Chart 3 compares the change in average exports growth against the change in average GDP growth before and after the GFC by economies. The y-axis is the difference between the average growth rate of exports before and after the GFC, while the x-axis is that of the GDP.

As shown, most of the AEs experienced a simultaneous and systemic decline in both exports and GDP growth after the GFC, with their data points clustering in the south-western quadrant and close to the 45° line. Meanwhile, EMEs' data points were relatively scattered, with most of them lying below the 45° line, implying that decline in exports growth in EMEs was more prominent than that of GDP growth. This observation echoes Arslan et. al. (2018) that EMEs experienced a larger decline in the income elasticity of trade. In particular, the fall in exports growth in the two largest EMEs – China and India – were most substantial in the sample and acted as the major drag on global exports growth in recent years.

Chart 3. Change in average growth of exports and GDP in the pre-GFC and post-GFC period



Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. 22 AEs and 17 EMEs. Constant price and exchange rate in USD.

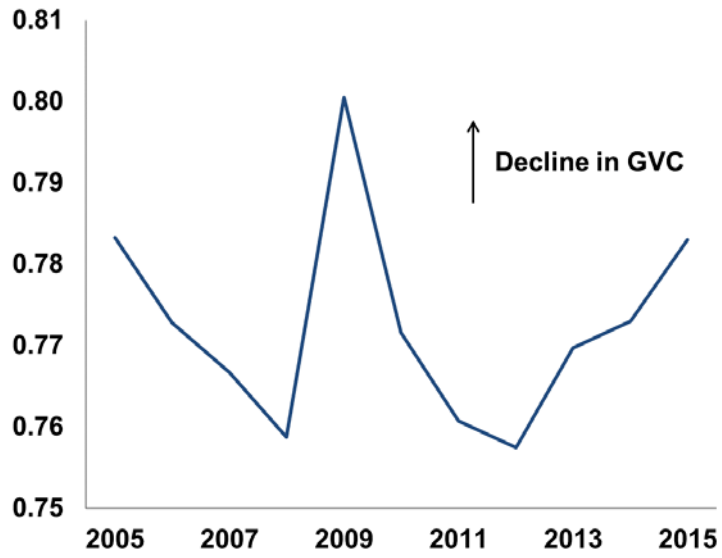
Sources: Oxford Economics and author calculation.

3.2 *Deglobalisation factors*

Many researchers have associated the slowdown in global trade with the trend of deglobalisation. Indeed, global GVC activities have dwindled after the GFC, and the change is often attributed to EMEs' technology advances which has allowed them to substitute imported intermediate goods with domestically-produced goods – i.e. a more domestically inclusive production chain. Recently, more research suggested that the China-US decoupling since 2016, especially in the context of technology, has accelerated the degeneration of GVC (García-Herrero and Tan, 2020).

Domestic value added to gross exports (VAX) ratio is often used to gauge GVC activities. A smaller ratio indicates a lengthening global supply chain as products cross borders more than once (Johnson, 2014). Chart 4 shows the median VAX ratio of the sample economics between 2005 and 2015, where a larger number reflects a decline in GVC participation. The chart shows that GVC activities declined persistently after 2011. Table 1 lists the VAX ratio of all economies in 2012 and 2015 which ranges from about 0.5 – 0.9. About 80% of the economies experienced an increase in VAX ratio during the period, indicating a broad-based decline in GVC activities in the post-GFC period.

Chart 4: VAX Ratio (Sample median)



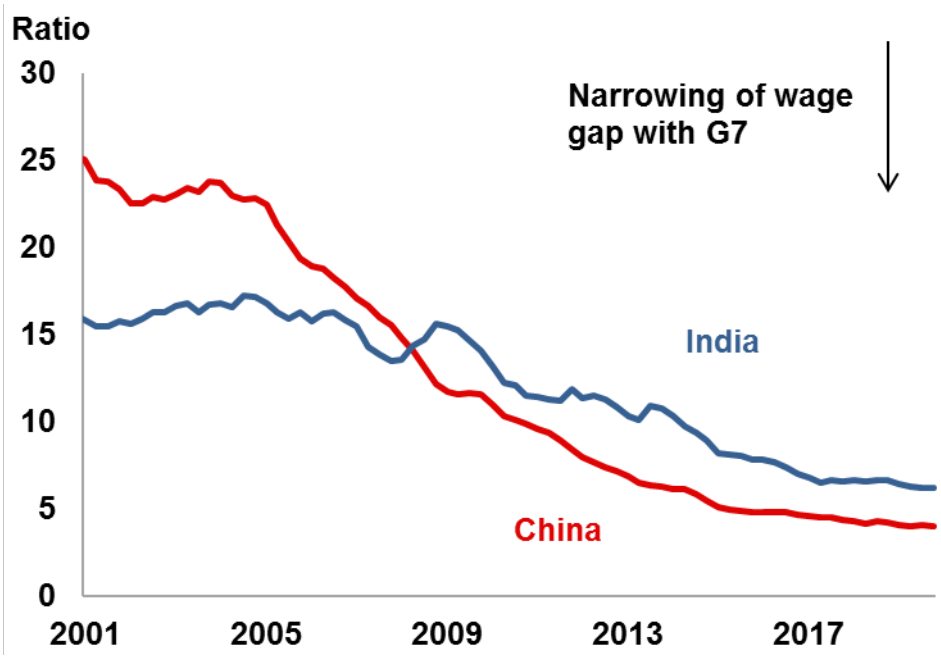
Note: 38 economies. Data for UAE is unavailable.

Sources: OECD TiVA and author calculation.

3.3 *Supply side factors*

In addition to the demand side factors arising from the expenditure of international trade, supply side factors of global trade were lacklustre in the post-GFC period. First, wage differentials between AEs and EMEs have been a prominent driving factor for the expansion in international production line. Nonetheless, the AEs-EMEs wage gap has narrowed in the past couple of decades and therefore reduced firms' incentive to outsource production lines to EMEs. Chart 5 shows the wage ratio between G7, as a benchmark of AEs, and China and India. As shown in the chart, the wage ratios were relatively steady in early-2000s, followed by a lingering decline since mid-2000s for China and 2010s for India. Such taper in labour cost gap narrowed the profit of maintaining an international production line, and hence discouraged GVC activities or other forms of outsourcing to EMEs.

Chart 5. Wage ratio between G7 and selected EMEs

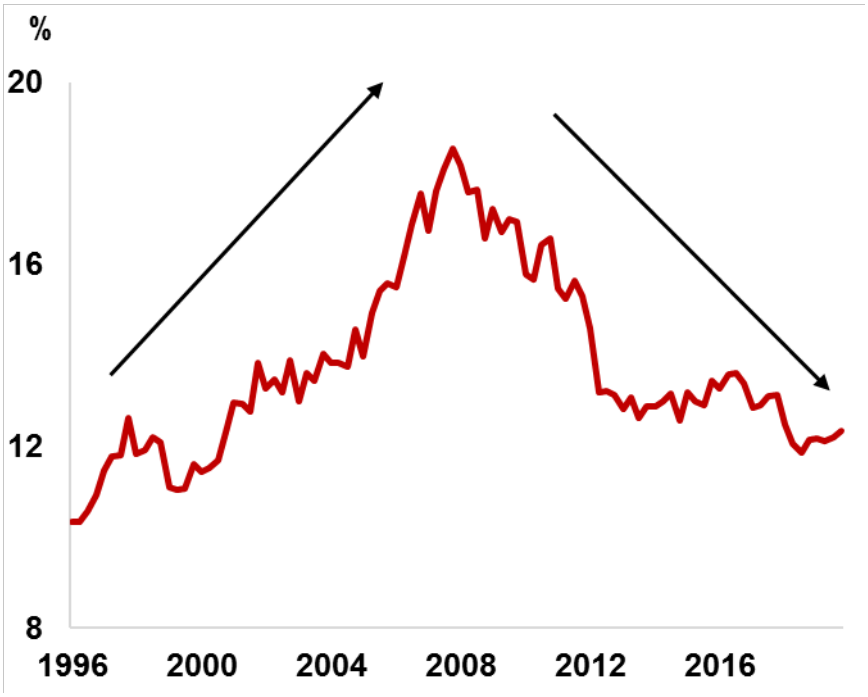


Note: Ratio of the nominal hourly wage (in US dollar) of G7 average to selected EMEs.

Sources: Oxford Economics and author calculation.

Second, the decline in the relative size of cross-border US dollar bank loans after the GFC due to global regulatory reform has tightened firms' access to US dollar trade finance in the post-GFC period. Chart 6 shows the cross-border bank loans denominated in US dollar relative to global GDP, which peaked before the GFC and declined afterwards.[9] That said, while the decline in US dollar loan size due to regulatory reform may hamper global trade, a plausible explanation could also be that a reduction in global trade subdued the demand for US dollar loans.

Chart 6. Cross-border US dollar bank loan (% global GDP)



Note: Cross-border bank loans and deposits denominated in US dollar in all parent and reporting countries.

Sources: BIS locational banking statistics, World Bank and author calculation.

4. METHODOLOGY AND DATA

4.1 *Model specification*

To examine the relationship between exports and GDP of an economy, we expand the model of Constantinescu et al. (2020) to a panel data dynamic fixed effect (DFE) estimator[10] as follows:

[9] The strengthened regulatory requirement after the GFC requires banks to improve their liquidity and risk management practice (BIS, 2020).

[10] In this study, we use DFE estimator which restricts the short run coefficient equal to the coefficient of speed of adjustment (Blackburne et al., 2007). This estimator allows the calculation of robust standard error using clustering by economy. Alternatively, we can obtain similar conclusion by repeating the same set of estimation using PMG estimator, which does not assume equal coefficients of speed of adjustment and that of short run

$$\Delta \ln(EX_{i,t}) = \alpha_i + \beta \Delta \ln(GDP_{i,t}) + \gamma \ln(EX_{i,t-1}) + \delta \ln(GDP_{i,t-1}) + \sum_m \theta^m Ctrl_{i,t}^m + e_{i,t} \quad (1)$$

where $EX_{i,t}$ and $GDP_{i,t}$ are exports and GDP in constant price and exchange rate of economy i in quarter t, $Ctrl_{i,t}^m$ is the m-th control variable. α_i is the fixed-effect constant and $e_{i,t}$ is the error term. Under the framework, the short-run and long-run **domestic income elasticity of exports** are β and $-\delta/\gamma$ respectively.

To further assess the impact of global demand, deglobalisation factor and supply side factors on exports, we follow Olczyk and Kordalska (2017) and incorporate foreign demand $FD_{i,t}$ and other variables $V_{i,t}$, which include the share of each component of global demand, deglobalisation factors and supply side factors, into the following extended model:

$$\Delta \ln(EX_{i,t}) = \alpha_i + \varphi \Delta \ln(FD_{i,t}) + \gamma \ln(EX_{i,t-1}) + \omega \ln(FD_{i,t-1}) + \mu V_{i,t} + \sum_m \theta^m Ctrl_{i,t}^m + e_{i,t} \quad (2)$$

where foreign demand of economy i $FD_{i,t}$ is the sum of consumption $C_{j,t}$, government expenditure $G_{j,t}$ and investment $I_{j,t}$ of other economies j:

$$FD_{i,t} = \sum_{\substack{j=1 \\ j \neq i}}^{N} C_{j,t} + G_{j,t} + I_{j,t} \quad (3)$$

Under the specification, φ and $-\omega/\gamma$ are the short-run and long-run **foreign demand elasticity of exports** respectively, and μ captures the effect of other factors.

Note that extra caution has to be taken when interpreting the estimated coefficients under the above reduced-form specification. In particular, the relationships obtained from Equations (1) and (2) should be treated as merely correlations but not any assertive implications on the direction of causation. In addition, subject to the potential multi-collinearity issue, the elasticities estimated from Equations (1) and (2) should be viewed as a comparison between different sample economy groups and periods. Readers should remain vigilant when interpreting their nominal values.

4.2 *Data*

All real exports and real GDP[11] data are retrieved from Oxford

(Blackburne et al., 2007).

[11] Constant price and exchange rate in US dollar, constructed by the data source using price deflator and exchange rate.

Economics. There are 39 economies in our sample, including 22 AEs and 17 EMEs, running from the first quarter of 1996 to the fourth quarter of 2019. The sample covers almost 90% of world GDP. These economies contributed to more than 87% of world goods exports in 2018, which makes it a representative sample of global trade.

Five variables are included to capture the deglobalisation factors and supply side factors in the estimation. They are:

Deglobalisation factors

i. VAX ratio: The ratio gauges the economy's GVC activities. A smaller ratio indicates a longer global supply chain as products cross borders more than once to multiple economies (See Section 2 for details). An increase in VAX implies a reduction in GVC activities. Therefore, the expected sign of its coefficient is negative.

ii. World trade uncertainty index: The index measures the trade uncertainty which is constructed by counting the frequency of a set of words related to trade certainty in Economist Intelligence Unit (EIU) reports, which particularly gauges the policy uncertainties since the China-US trade war. Its coefficient is expected to be negative.

Supply side factors

iii. Hourly wage[12]: Arslan et al. (2018) suggested that the increase in EMEs' wage level in recent years hampered the GVC length (See Section 2 for details). As such, the wage coefficient is expected to be negative.

iv. US dollar credit to non-bank borrowers (% GDP): This is a measurement of the US dollar funding size to non-bank corporates of EMEs which proxies the US dollar trade finance condition for international invoicing. As GVC activities depend heavily on short-term US dollar credit, an easier US funding condition would facilitate global trade (Shin, 2019), therefore its coefficient is expected to be positive.

v. US dollar index: The index is included as an alternative measure of the US

[12] In 10 US dollar.

dollar credit condition faced by non-financial corporates, as not every economy in the sample has data on US dollar credit. A larger value represents tighter US dollar funding for international invoicing therefore its sign is expected to be negative.

For control variables, following Vieira and MacDonald (2016), real effective exchange rate (REER) and terms of trade (ToT) are used to control for international price competitiveness of individual economies and relative price of exports (to imports) respectively. Both coefficients are expected to be negative. Quarter dummies are also included to capture the seasonal effect of economic activities.

Details of data and their descriptive statistics are reported in Table 2A and 2B respectively. Note that these variables are available at different frequencies, ranging from daily for financial data to yearly for some macroeconomic data. To align with the quarterly frequency of the dependent variable (i.e. real exports data), independent variables with higher frequency are transformed into quarterly data by taking the quarterly average, while those in lower frequency are assumed to stay constant at the latest available observation level between two data points.

5. EMPIRICAL RESULTS

5.1 *Domestic Income Elasticity of Exports*

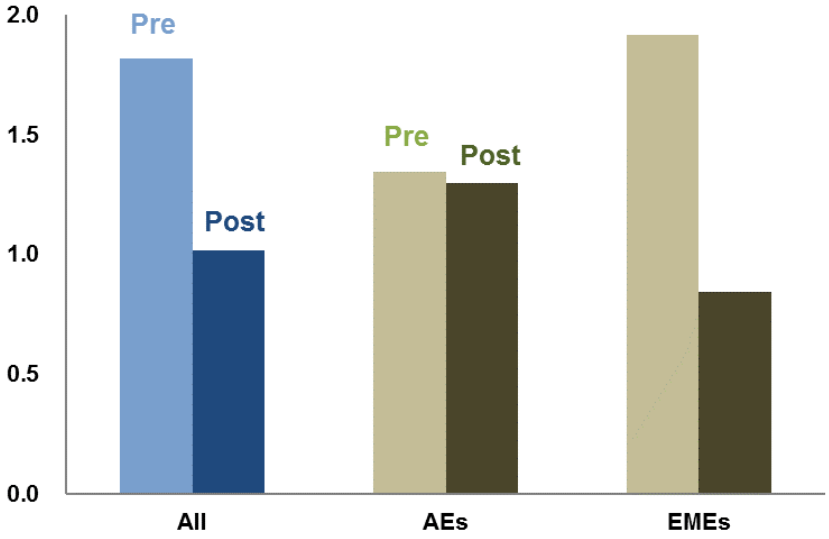
Table 3 shows the regression results of Equation (1). Column (1) shows the estimation of the whole sample, while columns (2) and (3) divide the sample into the pre-GFC and post-GFC periods. Columns (4) to (7) further divide the sample into AEs and EMEs. All significant variables are in expected signs.

The estimated long run domestic income elasticity on exports is reported in Table 3 and depicted in Chart 7. Considering the economies as a whole the elasticity halved after GFC from 1.8 to 0.95. By further breaking down the sample into AEs and EMEs, it is clear the elasticity of AEs did not decline significantly after the GFC and levelled at around 1.3. In contrast, the elasticity of EMEs plummeted from 1.9 to 0.83.

The estimation results suggest that the domestic income elasticity of exports has declined significantly in EMEs after the GFC. A possible explanation is that the production process in EMEs has become more inclusive after the GFC such that

their industrial and technological advancement allowed them to substitute imported intermediate goods with locally manufactured components (Arslan, 2018).

Chart 7. Estimated long run domestic income elasticity on exports



Note: Reflecting the estimated long run elasticity of columns (2) – (7) in Table 3.

Source: Author estimation.

5.2 *Foreign Demand Elasticity of Exports and the Role of Investment Content*

Columns (1) - (3) of Table 4 reports the regression results of Equation (2) using data of the whole period, pre-GFC and post-GFC respectively. The overall foreign demand elasticity of exports throughout the sample period is 1.3, which is similar to Constantinescu et al. (2020)'s estimate of long run elasticity of global income to trade in 2001Q1 – 2013Q4. For the sub-sample of pre-GFC and post-GFC periods, the elasticities are 2.0 and 1.1 respectively.

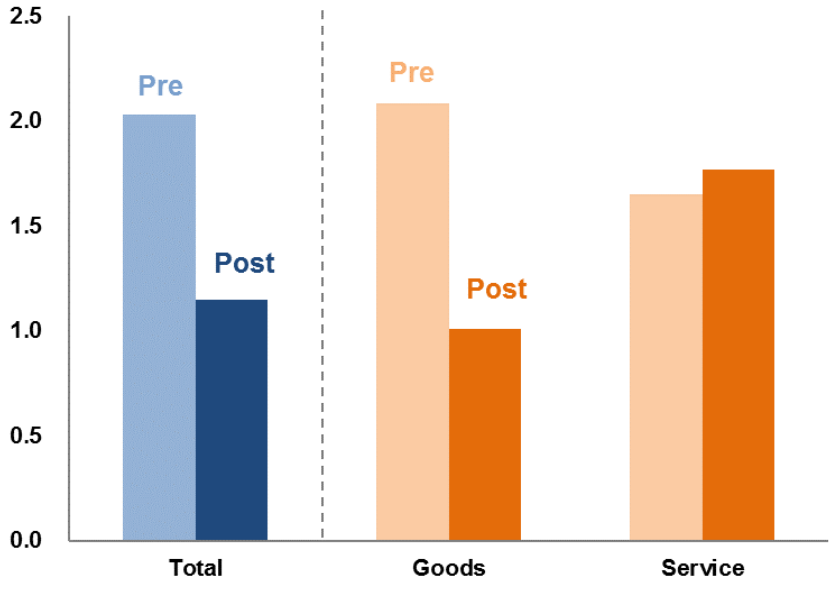
To further access the effect of each component of foreign demand (i.e. consumption, investment and government expenditure, present as a share of GDP), we augmented Equation (2) by including these components one by one in three separated estimations. Columns (4) – (6) reports the results. The coefficient of the consumption share is statistically insignificant while that of investment share and government expenditure share are significant with expected signs.

These findings are consistent with the hypothesis that **the deceleration of the growth of investment component in global income is a key driver of the global exports slowdown due to its heavy trade content.** The results

also suggest that consumption does not significantly stimulate exports, which is sensible given that intermediate goods and capital goods have played an increasingly important role – and thus consumption goods' role diminished – in the global trade along with the intensified GVC activities since the 1990s. Furthermore, the results also reveal that government expenditure has a negative effect on trade activities.

To ascertain the shift in global demand from tradable goods to non-tradable, we re-estimate Equation (2), but using (i) goods exports and (ii) services exports as the dependent variables instead of the total exports. The regression results and the corresponding long run foreign demand elasticity of goods exports and services exports are reported in Table 5A and 5B respectively. Chart 8 compares the elasticity by product type and period. As shown, the elasticity of goods exports declined by half after the GFC from about 2.0 to 1.0, which is similar to that of total exports. On the contrary, that of service exports almost remained the same at around 1.7. These findings echo Chart 2 that the **relationship between exports and foreign demand has diminished after the GFC** and the change is largely **driven by goods exports**. Meanwhile, **services exports have remained robust** after the GFC.

Chart 8. Estimated long run foreign demand elasticity on exports



Note: Reflecting the estimated long run elasticity of columns (2) – (3) in Table 4, 5A and 5B respectively.

Source: Author estimation.

5.3 *Deglobalisation factors and supply side factors*

To examine the effect of deglobalisation factors and supply side

factors on global exports, we re-estimate Equation (2) with the variables introduced in Section 4.2. Table 6 shows the coefficients of these factors. Results of the estimation with total exports as the dependent variable are mixed as only World Trade Uncertainty Index and hourly wage have significant impact on total exports (Columns (1) – (5)). However, the separated estimations of goods and service exports show that all deglobalisation and supply side factors have significant impacts on goods trade (Columns (6) – (10)), but none of them is significant for service trade (Columns (11) – (15)).

These results provide empirical evidence that the decline in GVC activities after the GFC, the elevated trade policy uncertainty since the China-US trade war, the rise in relative wage in EMEs and the tightening in US dollar trade finance have negative effects on global goods exports. We also found that **while the wave of deglobalisation has hindered goods exports in the post-GFC period, services exports have been relatively unaffected.** This is possibly due to the support stemming from technology advancement and the fact that service exports do not rely on a long supply chain and are therefore comparatively invulnerable to the deglobalisation. In fact, as shown in Chart 2, services exports grew persistently after the GFC when goods exports decelerated.

Again, the above results should be cautiously interpreted as the correlations between economic factors and global trade, rather than an outcome which remains muted due to the nature of reduced-form model structure.

6. ROBUSTNESS CHECKS

6.1 *Robustness to the sample of economies*

The sample in the study comprises 39 of the world's largest economies which in theory is representative and allows us to generalise the econometric findings. In reality, nonetheless, the results could be distorted by the two largest economies in the world (i.e. the US and China) which together account for about 40% of world GDP (or 23% of world exports). To check the robustness of the findings, we exclude the US and China in the sample economies and re-estimate Equation (1) and (2).

The results of the robustness check are reported in Table 7 and confirm that the findings are largely consistent with that from Chart 7 and Chart 8. These reflect that the structural changes in elasticity of exports are robust to the rest

of the world.

6.2 *Robustness to the role of US dollar as invoicing currency*

In columns (3) and (4) of Table 6, we use USD credit to non-bank borrowers and the DXY index to proxy the US dollar trade finance conditions and show that the availability of US dollar, as the common invoicing currency in international trade, has a positive effect on global goods exports. In this section, we further check the robustness of the statement by showing that the above results are irrelevant with the general financial market and banking sector condition which may plausibly be encompassed in the two variables above. Table 8 presents the results on the robustness check:

Column (1) and (3) replicate that of columns (3) and (4) in Table 6 for convenient comparison. The factor variables in columns (2) and (4) to (7) are replaced by the following variables: Column (2): Change in bank credit to non-bank corporates as % of GDP, representing general credit conditions of banking sector; Column (4): Quarterly return of local currency per US dollar exchange rate, representing movement in spot exchange rate; Column (5): Change in the VIX index, representing stock market implied volatility; Column (6): Change in credit spread, representing risk premium perceived by the market; and Column (7): Change in central bank policy rate, representing local monetary policy.

The coefficients of these replacement variables are statistically insignificant, which indicates that, after controlling for fundamental variables, general financial market and banking sector conditions do not have a substantial relationship with exports. This robustness check further confirms that the significance of US dollar credit to non-bank and DXY index in Table 6 reflects the **unique status of US dollar as the international invoicing currency but not the general financial market condition**.

7. CONCLUSION AND DISCUSSION

Using a panel data regression model of 22 AEs and 17 EMEs, this study provides empirical evidence that the slowdown in global exports in the post-GFC period is associated with (i) the loosening in domestic income elasticity to exports among EMEs; (ii) the decline in foreign demand elasticity to goods exports, linked with the deceleration of global investment; (iii) the deglobalisation momentum amid the declining GVC activities and the uncertainty in trade policies

since the China-US trade war; and (iv) the supply side factors including the narrowing AEs-EMEs wage gap and the diminishing US dollar trade finance condition. Moreover, these negative factors have affected mainly goods exports while service exports remained resilient and were less affected.

Our findings have multiple important policy implications. As the slowdown in global trade involved an observed change in the income elasticity of economies, a systemic decline in GVC activities throughout the 2010s and the intensifying policy uncertainties between China and the US, growth of global goods trade is unlikely to recover to the pre-GFC level, absenting any major economic breakthrough.

Under these circumstances, there are several ways to stimulate trade. First, as service exports have been more resilient in the post-GFC period, policymakers may put more effort into promoting service trade. For instance, along with lowering tariffs for goods trade, the recently signed Regional Comprehensive Economic Partnership (RCEP)[13] enhances the access to service providers (e.g. telecommunications and financial services) among the members' markets. Such liberalisation of trade in service could be further expanded going forward.

Second, to facilitate trade, central banks should maintain a stable US dollar trade finance condition. The availability of offshore US dollar short-term credit by the banking sector should be closely monitored to facilitate cross-border trade (especially GVC activities). On the other hand, regional trading partners can also foster the use of local currencies to invoice bilateral trade.

[13] RCEP was established by 15 Asia-Pacific economies including ASEAN 10, Australia, China, Japan, New Zealand and South Korea in November 2020, which forms the largest free trade agreement of the world.

Tables and Appendices

Table 1. Domestic value added to gross exports (VAX) ratio for sample economies (%)

Economy	2012	2015	Change
KOR	58.0	67.4	9.42
IND	74.9	80.9	6.01
HKG	68.1	73.4	5.28
THA	61.6	66.4	4.86
SWE	75.2	79.3	4.05
HUN	53.0	56.9	3.90
GBR	81.2	84.9	3.72
TUR	79.6	83.2	3.67
CHN	79.2	82.7	3.52
AUT	70.1	73.5	3.36
BEL	63.0	65.9	2.94
USA	87.6	90.5	2.93
SGP	56.2	59.1	2.83
ARG	90.4	93.1	2.73
IRL	57.2	59.8	2.65
NZL	83.6	86.2	2.57
ITA	75.3	77.8	2.46
ESP	75.0	77.3	2.28
DEU	76.9	79.0	2.11
FRA	76.8	78.6	1.87
SVK	53.4	55.2	1.83
PHL	76.1	78.0	1.82
CHE	73.7	75.4	1.73
MYS	61.9	63.1	1.15
DNK	69.9	70.7	0.81
JPN	86.1	86.8	0.72
CAN	78.3	78.8	0.51
CHL	84.5	84.9	0.41
IDN	86.7	87.1	0.40
ZAF	77.3	77.4	0.15
CZE	60.7	60.7	-0.01
AUS	88.8	88.4	-0.41
NLD	73.4	72.1	-1.28
SAU	96.9	95.4	-1.49
BRA	89.4	87.5	-1.89
RUS	91.3	89.2	-2.09
MEX	66.2	63.9	-2.32
NOR	89.3	86.1	-3.15
Minimum	53.0	55.2	-3.15
Median	75.7	78.3	1.99
Maximum	96.9	95.4	9.42

Source: OECD TiVA.

Table 2A. Data description and source

Variable	Notation	Description	Source
Total exports (USD million)	EX	Real total exports in constant price and exchange rate in US dollar.	Oxford Economics
Goods exports (USD million)	EXg	Real goods exports in constant price and exchange rate in US dollar.	Oxford Economics
Service exports (USD million)	EXs	Real service exports in constant price and exchange rate in US dollar.	Oxford Economics
GDP (USD million)	GDP	Real GDP in constant price and exchange rate in US dollar.	Oxford Economics
Foreign demand (USD million)	FD	Sum of consumption, investment and government expenditure in constant price and exchange rate in US dollar of other 38 sample economies.	Oxford Economics
Consumption share of FD (%)	C/FD	Ratio of foreign real consumption to foreign demand.	Oxford Economics
Government share of FD (%)	G/FD	Ratio of foreign real investment to foreign demand.	Oxford Economics
Investment share of FD (%)	I/FD	Ratio of foreign real government expenditure to foreign demand.	Oxford Economics
Real effective exchange rate	REER	Trade-weighted average of bilateral exchange rates adjusted by relative consumer prices. An increase indicates an appreciation.	BIS
Terms of trade	ToT	Ratio of an economy's export price to import price.	Oxford Economics
Domestic value-added share of gross exports	VAX	Ratio of domestic value-added content of exports to gross exports.	OECD TiVA
World Trade Uncertainty Index	WTUI	Constructed by counting the number of times a list of words related to trade uncertainty appears in the Economist Intelligence Unit (EIU) country reports.	Economic Policy Uncertainty
Hourly wage (10 USD)	Wage	Average nominal hourly wage in the economies, in US dollar.	Oxford Economics
US dollar credit to non-bank borrowers to GDP	USD credit	Ratio of US dollar-denominated credit to non-banks borrowers to GDP.	BIS
US dollar index	DXY	Index of value of US dollar relative to a basket of other currencies. An increase indicates a strengthening of US dollar.	Bloomberg

Table 2B. Descriptive statistics

Variable	Notation	N	Mean	SD	Min	p25	p50	p75	Max
Total exports (USD million)	EX	3744	85053	102543	3733	27021	50886	104993	730594
Goods exports (USD million)	EXg	3744	66253	81087	2509	21052	41735	82234	668654
Service exports (USD million)	EXs	3728	19064	26734	61	4438	10059	23062	199678
GDP (USD million)	GDP	3744	348007	694276	10495	67040	123602	320901	5032170
Foreign demand (USD million)	FD	3744	1.33E+07	2.85E+06	6.28E+06	1.09E+07	1.33E+07	1.55E+07	1.90E+07
Consumption share of FD (%)	C/FD	3744	58.1	0.9	53.5	57.3	58.1	58.8	60.8
Government share of FD (%)	G/FD	3744	18.0	0.7	16.5	17.4	18.0	18.6	19.8
Investment share of FD (%)	I/FD	3744	24.0	1.4	20.7	22.6	23.9	25.3	28.3
Real effective exchange rate ^	REER	3744	0.98	0.19	0.42	0.90	0.98	1.04	2.82
Terms of trade	ToT	3744	1.01	0.15	0.23	0.97	1.01	1.05	2.03
Domestic value-added share of gross exports	VAX	1716	0.76	0.11	0.52	0.68	0.77	0.85	0.97
World Trade Uncertainty Index	WTUI	96	0.07	0.25	0.00	0.00	0.00	0.02	1.74
Hourly wage (10 USD)	Wage	2848	1.91	1.29	0.04	0.85	1.81	2.75	6.54
US dollar credit to non-bank borrowers	USD credit	1001	0.45	0.36	0.02	0.19	0.36	0.56	2.97
US dollar index ^	DXY	96	0.91	0.11	0.73	0.82	0.90	0.98	1.18

Note ^: REER and DXY are multiplied by 0.01 in this study.

Source: Author calculation.

Table 3. Estimation results on Equation (1)

	Dependent variable: D(log EX)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Economy	All	All	All	AEs	AEs	EMEs	EMEs
Period	Full	Pre-GFC	Post-GFC	Pre-GFC	Post-GFC	Pre-GFC	Post-GFC
D(log GDP) (β)	0.676***	0.704***	0.657***	1.404***	1.197***	0.684***	0.610***
	[7.12]	[7.08]	[8.66]	[10.61]	[15.46]	[6.70]	[7.63]
L(log EX) (γ)	-0.042***	-0.081***	-0.183***	-0.026**	-0.115***	-0.115**	-0.253***
	[-4.25]	[-3.92]	[-3.84]	[-3.17]	[-5.90]	[-3.60]	[-4.28]
L(log GDP) (δ)	0.045**	0.147***	0.186**	0.035*	0.149***	0.220**	0.214**
	[3.01]	[3.67]	[2.91]	[2.38]	[4.55]	[3.75]	[2.97]
D(REER)	-0.112*	-0.144^	-0.138^	-0.165**	-0.157**	-0.157	-0.116
	[-2.07]	[-1.85]	[-1.88]	[-3.19]	[-3.52]	[-1.61]	[-1.27]
D(ToT)	-0.364*	-0.401**	-0.243	-0.079	-0.033	-0.407**	-0.243
	[-2.64]	[-3.37]	[-1.22]	[-1.21]	[-0.71]	[-3.43]	[-1.15]
Q2	0.011*	0.009	0.006	0.003	0.003	0.014	0.013
	[2.49]	[1.66]	[1.58]	[1.05]	[0.76]	[1.23]	[1.40]
Q3	0.008	0.006	0.005	0.00	0.002	0.007	0.007
	[1.59]	[0.94]	[0.86]	[0.07]	[0.69]	[0.57]	[0.64]
Q4	-0.006	-0.006	-0.007	-0.002	-0.002	-0.015	-0.013
	[-1.21]	[-1.28]	[-1.14]	[-0.93]	[-1.23]	[-1.55]	[-0.99]
Constant	-0.077	-0.855**	-0.207	-0.138	-0.504*	-1.345**	0.174
	[-0.99]	[-3.18]	[-0.57]	[-1.34]	[-2.18]	[-3.51]	[0.35]
Long run domestic income elasticity (-δ/ γ)	1.07	1.81	1.02	1.35	1.30	1.91	0.85
No. of observations	3705	1911	1404	1078	792	833	612
No. of economies	39	39	39	22	22	17	17
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R-squared	0.363	0.397	0.374	0.462	0.512	0.43	0.402
Overall R-squared	0.208	0.037	0.014	0.156	0.006	0.071	0.033

Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 4. Estimation results of total exports on Equation (2)

	Dependent variable: D(log EX)					
	(1)	(2)	(3)	(4)	(5)	(6)
Economy	All	All	All	All	All	All
Period	All	Pre-GFC	Post-GFC	All	All	All
D(log FD) (φ)	3.406***	2.659***	0.270	3.314***	2.047***	2.335***
	[15.85]	[7.71]	[0.76]	[14.71]	[8.35]	[9.65]
L(log EX) (γ)	-0.037***	-0.061***	-0.220**	-0.037***	-0.039***	-0.037***
	[-5.56]	[-4.08]	[-3.27]	[-5.58]	[-5.64]	[-5.61]
L(log FD) (ω)	0.049***	0.124***	0.253***	0.049***	0.048***	0.048***
	[4.51]	[4.28]	[3.69]	[4.49]	[4.35]	[4.46]
D(C/FD)				-0.008		
				[-0.93]		
D(I/FD)					0.049***	
					[6.46]	
D(G/FD)						-0.066***
						[-6.01]
D(REER)	-0.152*	-0.159^	-0.189*	-0.151*	-0.152*	-0.154*
	[-2.30]	[-1.71]	[-2.17]	[-2.29]	[-2.31]	[-2.33]
D(ToT)	-0.284*	-0.367**	-0.067	-0.284*	-0.283*	-0.283*
	[-2.22]	[-2.96]	[-0.42]	[-2.22]	[-2.22]	[-2.23]
Long run foreign demand elasticity (-ω / γ)	1.32	2.03	1.15	0.64	0.64	0.65
No. of observations	3705	1911	1404	3705	3705	3705
No. of economies	39	39	39	39	39	39
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Within R-squared	0.178	0.193	0.153	0.178	0.184	0.185
Overall R-squared	0.056	0.038	0.001	0.056	0.057	0.059

Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. Quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 5A. Estimation results of goods exports on Equation (2)

	Dependent variable: D(log EXg)					
	(1)	(2)	(3)	(4)	(5)	(6)
Economy	All	All	All	All	All	All
Period	All	Pre-GFC	Post-GFC	All	All	All
D(log FD) (φ)	3.705***	2.342***	0.206	3.624***	2.222***	2.503***
	[14.87]	[8.18]	[0.51]	[13.67]	[7.76]	[8.98]
L(log EXg) (γ)	-0.039***	-0.058***	-0.248**	-0.039***	-0.041***	-0.039***
	[-5.62]	[-4.22]	[-3.03]	[-5.65]	[-5.74]	[-5.68]
L(log FD) (ω)	0.049***	0.121***	0.250***	0.049***	0.048***	0.049***
	[4.68]	[4.40]	[3.64]	[4.67]	[4.52]	[4.64]
D(C/FD)				-0.007		
				[-0.89]		
D(I/FD)					0.054***	
					[6.86]	
D(G/FD)						-0.074***
						[-5.87]
D(REER)	-0.149**	-0.150*	-0.193*	-0.148**	-0.149**	-0.152**
	[-3.23]	[-2.40]	[-2.09]	[-3.23]	[-3.26]	[-3.28]
D(ToT)	-0.222^	-0.315*	0.026	-0.222^	-0.221^	-0.221^
	[-1.76]	[-2.26]	[0.24]	[-1.76]	[-1.75]	[-1.76]
Long run foreign demand elasticity (-ω / γ)	1.26	2.09	1.01	1.26	1.17	1.26
No. of observations	3705	1911	1404	3705	3705	3705
No. of economies	39	39	39	39	39	39
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Within R-squared	0.16	0.16	0.165	0.16	0.165	0.167
Overall R-squared	0.05	0.037	0.002	0.05	0.051	0.054

Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. Quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 5B. Estimation results of service exports on Equation (2)

	Dependent variable: D(log EXs)					
	(1)	(2)	(3)	(4)	(5)	(6)
Economy	All	All	All	All	All	All
Period	All	Pre-GFC	Post-GFC	All	All	All
D(log FD) (φ)	1.440**	3.719*	3.453^	2.012*	2.302	1.107*
	[3.46]	[2.65]	[1.81]	[2.42]	[1.65]	[2.12]
L(log EXs) (γ)	-0.324*	-0.283*	-1.023***	-0.324*	-0.324*	-0.324*
	[-2.15]	[-2.50]	[-4.50]	[-2.15]	[-2.15]	[-2.15]
L(log FD) (ω)	0.542*	0.467*	1.809***	0.545*	0.544*	0.542*
	[2.25]	[2.53]	[3.59]	[2.25]	[2.24]	[2.25]
D(C/FD)				0.051		
				[1.14]		
D(I/FD)					-0.031	
					[-0.76]	
D(G/FD)						-0.02
						[-0.81]
D(REER)	0.139	0.108	0.175	0.138	0.139	0.138
	[1.25]	[1.26]	[0.94]	[1.24]	[1.25]	[1.24]
D(ToT)	-0.586*	-0.560**	-0.156	-0.585*	-0.586*	-0.585*
	[-2.36]	[-2.84]	[-0.88]	[-2.36]	[-2.36]	[-2.36]
Long run foreign demand elasticity (-ω / γ)	1.67	1.65	1.77	1.68	1.67	1.68
No. of observations	3689	1895	1404	3689	3689	3689
No. of economies	39	39	39	39	39	39
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Within R-squared	0.196	0.162	0.545	0.197	0.196	0.196
Overall R-squared	0.014	0.006	0.016	0.014	0.014	0.014

Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. Quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 6. Estimation results of exports with deglobalisation factors on Equation (2)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Total exports: D(log EX)					Goods exports: D(log EXg)					Service exports: D(log EXs)				
D4(VAX)	-0.032					-0.048^					-0.048				
	[-1.49]					[-1.79]					[-0.95]				
D(WTUI)		-0.013**					-0.012*					-0.012			
		[-3.16]					[-2.48]					[-0.99]			
L(Wage)			-0.006***					-0.007***					-0.029		
			[-3.70]					[-3.82]					[-1.50]		
L4(USD credit)				-0.037					-0.078*					0.094	
				[-1.25]					[-2.34]					[1.44]	
D(DXY)					0.007					0.010*					0.004
					[1.62]					[2.22]					[0.08]
No. of obs.	1560	3705	2818	3705	988	1560	3705	2818	3705	988	1560	3689	2818	3689	988
No. of economies	39	39	30	39	13	39	39	30	39	13	39	39	30	39	13
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R-sq	0.250	0.179	0.191	0.179	0.203	0.251	0.160	0.175	0.161	0.191	0.332	0.196	0.218	0.196	0.309
Overall R-sq	0.004	0.055	0.067	0.056	0.026	0.006	0.05	0.060	0.050	0.023	0.019	0.014	0.012	0.014	0.051

Note: Whole sample economies and sample period. D(log FD), L(log EX) or L(log EXg) or L(log EXs), L(log FD), D(REER), D(ToT), quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 7. Robustness check excluding the US and Mainland China in the sample economies

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	D(log EX)	D(log EX)	D(log EXg)	D(log EXg)	D(log EXs)	D(log EXs)
Economy	All	All	All	All	All	All
Period	Pre-GFC	Post-GFC	Pre-GFC	Post-GFC	Pre-GFC	Post-GFC
L(log EX)	-0.085***	-0.193***				
	[-4.00]	[-3.92]				
L(log EXg)			-0.064**	-0.230**		
			[-3.33]	[-2.88]		
L(log EXs)					-0.292*	-1.030***
					[-2.46]	[-4.56]
D(log GDP)	0.625***	0.612***				
	[5.73]	[5.95]				
L(log GDP)	0.156***	0.214**				
	[3.80]	[3.12]				
D(log FD)			2.232***	0.247	3.809*	3.558^
			[8.74]	[0.55]	[2.59]	[1.84]
L(log FD)			0.130***	0.233**	0.469*	1.869***
			[3.59]	[3.54]	[2.47]	[3.63]
D(REER)	-0.141^	-0.12	-0.132*	-0.140^	0.125	0.166
	[-1.81]	[-1.60]	[-2.39]	[-1.96]	[1.52]	[0.90]
D(ToT)	-0.400**	-0.232	-0.321*	-0.029	-0.566**	-0.205
	[-3.29]	[-1.18]	[-2.25]	[-0.31]	[-2.80]	[-1.18]
Long run elasticity:						
Domestic income	1.84	1.11				
Foreign demand			2.03	1.01	1.61	1.81
No. of observation	1813	1332	1813	1332	1797	1332
No. of economies	37	37	37	37	37	37
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Within R-squared	0.325	0.302	0.156	0.143	0.168	0.551
Overall R-square	0.019	0.006	0.043	0.002	0.008	0.02

Note: Pre-GFC = 1996 Q1 – 2008 Q1 and post-GFC = 2011 Q1 – 2019 Q4. Quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

Table 8. Robustness check on the role of US dollar funding on goods exports

	Dependent variable: Goods exports D(log EXg)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
L4(USD credit)	0.010*						
	[2.22]						
L4(Bank credit)		0.000					
		[-1.43]					
D(DXY)			-0.078*				
			[-2.34]				
Return of FX				0.000			
				[-1.42]			
D(VIX)					0.000		
					[-0.74]		
D(Credit spread)						0.000	
						[0.18]	
D(Policy rate)							0.001
							[0.49]
No. of obs.	988	3404	3705	3705	3705	3609	2532
No. of economies	13	37	39	39	39	38	30
Fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R-sq	0.191	0.152	0.161	0.161	0.16	0.169	0.163
Overall R-sq	0.023	0.042	0.050	0.050	0.051	0.055	0.029

Note: Whole sample economies and sample period. D(log FD), L(log EXg), L(log FD), D(REER), D(ToT), quarter dummies and constant term are included in the estimations but not reported for simplicity. All regressions are estimated in quarterly frequency with economy fixed effect using robust standard error. T-values are in parentheses. ***, **, * and ^ denote significance at the 0.1%, 1%, 5% and 10% levels respectively.

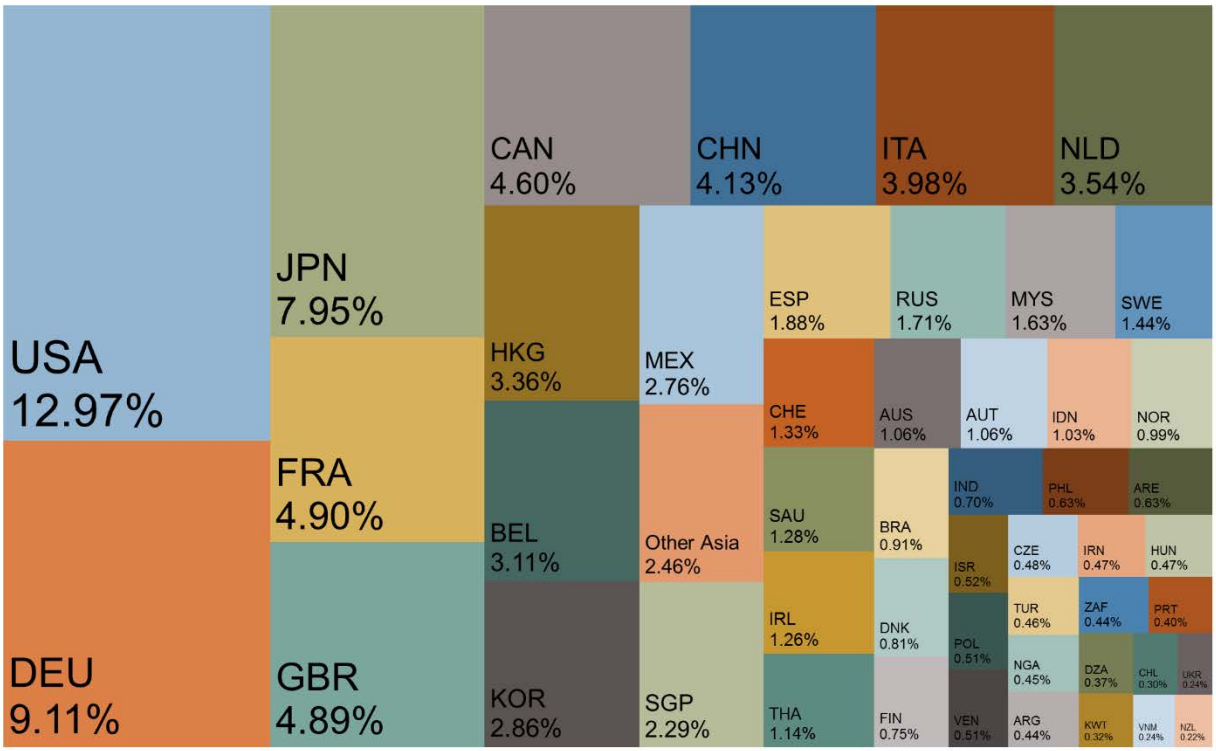
Appendix 1. Sample economies by classification

Classification	Economy
AEs (22)	Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Singapore, Slovakia, Spain, Sweden, Switzerland, United Kingdom, United States
EMEs (17)	Argentina, Brazil, Chile, Mainland China, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, The Philippines, Russia, Saudi Arabia, South Africa, Thailand, Turkey, United Arab Emirates

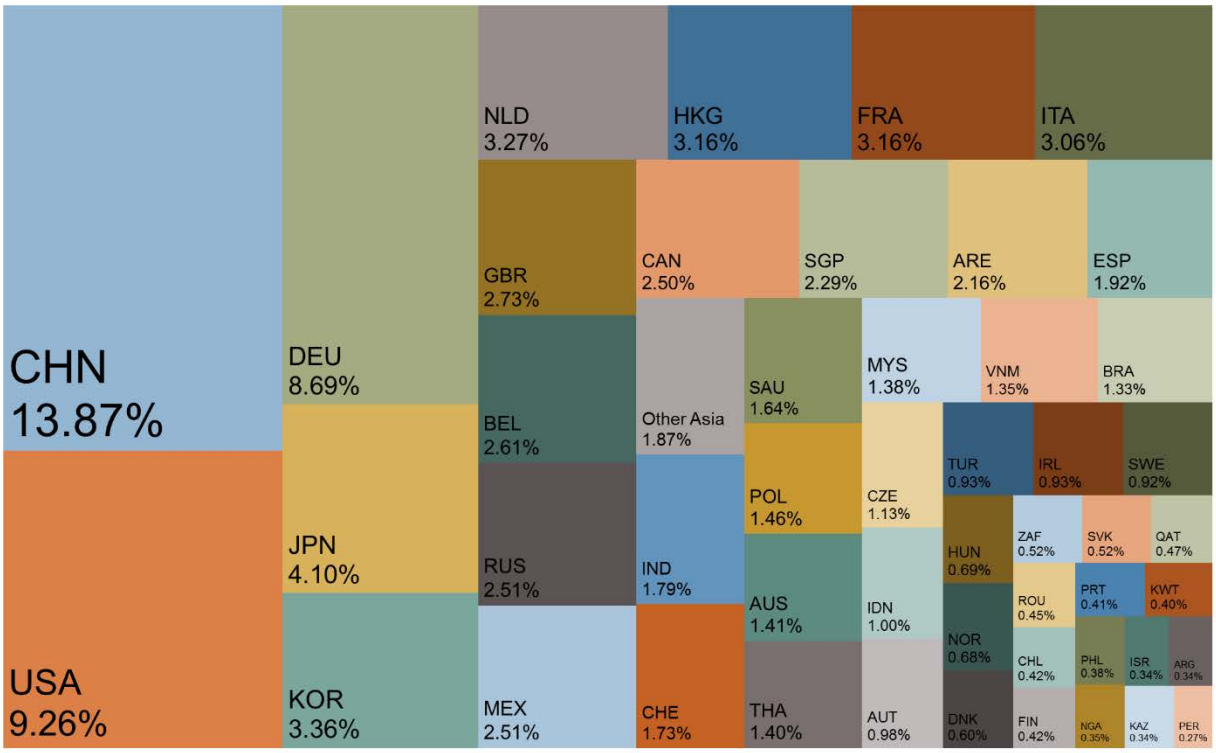
Source: IMF.

Appendix 2. Share of global goods exports by economy

A. 2000



B. 2018



Sources: UN Comtrade and author calculation.

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