

INTERNATIONAL MONETARY FUND

ASEAN-5: Further Harnessing the Benefits of Regional Integration amid Fragmentation Risks

Nuri Baek, Kaustubh Chahande, Kodjovi M. Eklou, Tidiane Kinda, Vatsal Nahata, Umang Rawat, and Ara Stepanyan

WP/23/191

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WORKING PAPER

IMF Working Paper
Asia and Pacific Department

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Prepared by Nuri Baek, Kaustubh Chahande, Kodjovi M. Eklou, Tidiane Kinda, Vatsal Nahata, Umang Rawat, Ara Stepanyan*

Authorized for distribution by Lamin Leigh
September 2023

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ABSTRACT: The ASEAN-5 region, which comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand, has benefited substantially from its integration to the world economy, particularly through trade. Rising risks of geoeconomic fragmentation could reverse some gains reaped from globalization over the past decades. In this context, advancing regional integration among ASEAN-5 members has the potential to enhance the region's resilience against external headwinds. This paper shows that despite sizeable progress, particularly in regional trade integration, there is room to advance financial integration, which also lags trade integration in ASEAN-5. Empirical findings from the paper illustrate that a higher degree of regional financial integration could generate sizeable output gains for the region. Using firm-level data, the paper highlights that digitalization, an area where the region is thriving, can support regional integration by helping firms better integrate into global value chains, with the benefits being stronger for small and medium sized enterprises. The results also suggest that digitalization can help firms move up the value chain through the production of more sophisticated products, often coined as higher export sophistication.

JEL Classification Numbers:	F13, F15, O31
Keywords:	Trade integration; financial integration; digitalization; fragmentation risks
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* The authors would like to thank Melih Firat, Yan Carriere-Swallow, and Maria Gonzalez for helpful comments as well as Justin Flinner for excellent production assistance.

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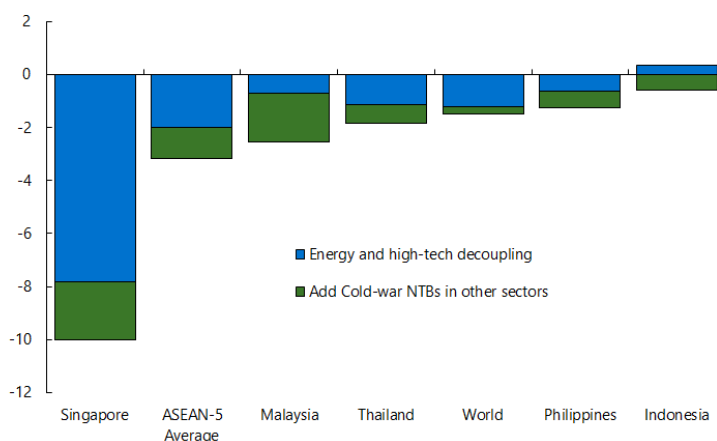
Introduction

The ASEAN-5 region, which comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand, is an important player in the global economy. The region made significant improvements in living standards, in part, thanks to substantial benefits from its integration to the world economy, particularly through trade. ASEAN-5 economies have also achieved considerable progress in trade integration within the region. Intra-regional trade has benefited from trade liberalization across the region, with almost all goods currently trading at zero tariff within the region, and from increased participation in global value chains (GVCs). Financial integration, on the other hand, has progressed relatively less in the region, reflecting among others regulatory and institutional constraints.

Like most countries, the ASEAN-5 economies have faced several headwinds that can hinder global and regional integration. The COVID-19 pandemic and associated protectionism measures at the onset of the health crisis have exposed vulnerabilities of GVCs, though they tended to be mostly short-lived. Recent rises of geopolitical tensions since Russia's invasion of Ukraine have further increased risks of geoeconomic fragmentation.¹ ASEAN-5 economies are highly vulnerable to global economic fragmentation, particularly through trade-related channels, as supply chains disruptions could adversely impact important sectors of their economies that are highly integrated into GVCs, for example electronics.

Geoeconomic fragmentation could also impact cross-border capital allocation, financial interconnectedness, technological diffusion, and cross-border migration, with potential macro-financial and structural effects. For instance, financial fragmentation could increase the misallocation of capital, impact US dollar funding costs, and reduce opportunities for diversification of cross-border exposure, thereby increasing countries' vulnerability to adverse shocks and exacerbating macro-financial volatility. Technological fragmentation and restrictions on cross-border migration could hinder innovation and productivity by reducing technological diffusion across countries, including through FDI, increasing the cost of high-tech inputs and services, and constraining the available pool of high-skilled workers. In a nutshell, geoeconomic fragmentation can induce large economic costs and reduce the benefits of trade integration that have been widely documented in the theoretical and empirical literature, including on productivity growth, knowledge sharing, and economies of scale (Grossman and Helpman, 1991; Melitz, 2003; Verhoogen, 2008; Bustos, 2011). Recent studies (IMF, 2022; Cerdeiro et al, 2021; and Goes and Bekker, 2022; Bolhuis et al., 2023) estimate that a global trade fragmentation could cost up to 12 percent loss in GDP. The APD October 2022 REO estimates an average output loss from global trade fragmentation of about 3.2 percent in ASEAN-5 economies through trade

ASEAN5: Long-Term GDP Losses (in percent) in Fragmentation Scenarios



Source: IMF (2022), based on the model by Caliendo and others (2023). The scenario consists in trade fragmentation between the group that voted positive in the UN resolution and the group that voted negative or abstained. NTB = nontariff barrier.

¹ Geo-economic fragmentation (GEF) is defined as policy-driven or policy-induced reversal of global economic integration.

fragmentation scenarios.² The blue bars show the GDP losses resulting from a scenario where global trade in energy and high-tech goods divides between those countries that (A) voted for the March 2, 2022, UN General Assembly motion to condemn Russia's invasion of Ukraine, and (B) those countries that voted against the motion or abstained. The green bars show the result from an even more severe fragmentation scenario, in which trade barriers are extended to all sectors. Specifically, non-tariff barriers in other sectors (non-high-tech, non-energy) are increased between blocs until they reach a level equivalent to the maximum restrictiveness that prevailed at the height of the Cold War.

Regional integration, which is at the forefront of the policy agenda in ASEAN economies, has the potential to enhance the region's resilience to external headwinds, including geoeconomic fragmentation.³ Despite sizeable progress on trade through tariff reduction, ASEAN-5 economies continue to have notable non-tariff barriers that constraint further integration of regional trade. Beyond Singapore, the region presents significant scope to further integrate into the global financial system and to foster further financial integration at the regional level. The region could build on its recent efforts and achievements in digitalization and innovation, including during the pandemic, to further boost broad-based digitalization to boost both financial and trade integration. For instance, improving digital connectivity across ASEAN-5 countries and harmonizing standards and interoperability of payment systems could facilitate SME's integration in digital trade and help enhance cross-border e-commerce, thereby increasing the potential market reach for businesses in the region.

In this context, this paper aims to contribute to the literature on regional integration, particularly in ASEAN-5 through three main points. First, it briefly analyzes the landscape of trade and financial integration in the region and highlights that despite progress, notable challenges remain in advancing financial integration. Second, it quantifies potential gains from financial integration that the region could benefit from, highlighting possible large growth impact that varies across countries and sectors. Third, it stresses that digitalization can facilitate firms' integration into GVCs and help them move up the value chain through higher export sophistication.

The rest of the paper is organized as follows. Section 2 describes the landscape and recent trends of trade and financial integration in ASEAN-5. Section 3 assesses potential gains from financial integration, including the role of policies and regional trade integration in shaping these gains. Section 4 investigates the role that digitization could play in promoting greater regional integration and enhancing value creation. The last section discusses the policy implications of the findings and provides concluding remarks.

Trade and Financial Integration in ASEAN-5

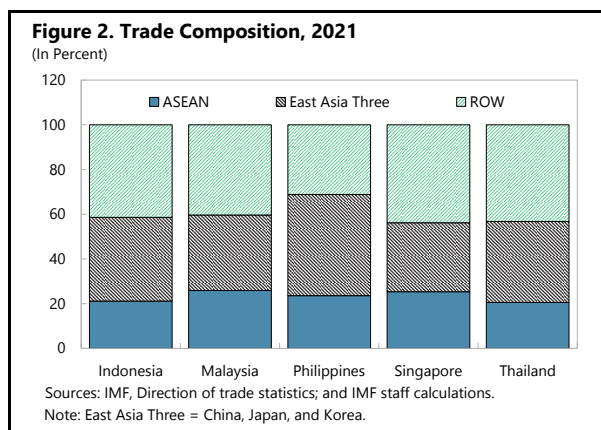
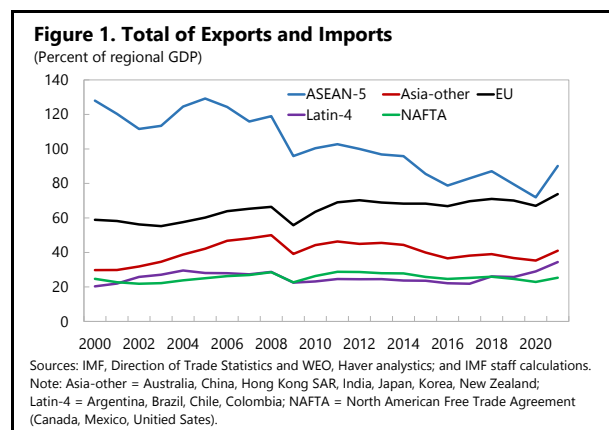
A. Recent Developments in Trade Integration

ASEAN-5 economies have achieved substantive progress in trade integration over the past two decades. These countries integration to global trade, proxied by the ratio of total trade to regional GDP, reached 90 percent in 2021 (Figure 1). This ratio is higher than in comparable regional economic blocks (EU and NAFTA) and other integrated regions (Asia and Latin-4). ASEAN-5 economies' trade within the region is also significant, accounting for about a quarter of their total trade (Figure 2). Intra-regional trade has benefited from trade liberalization across the region and from participation in GVCs. Average tariffs in Asia declined sharply from

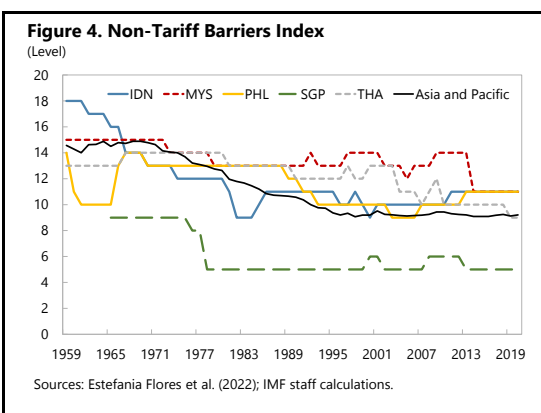
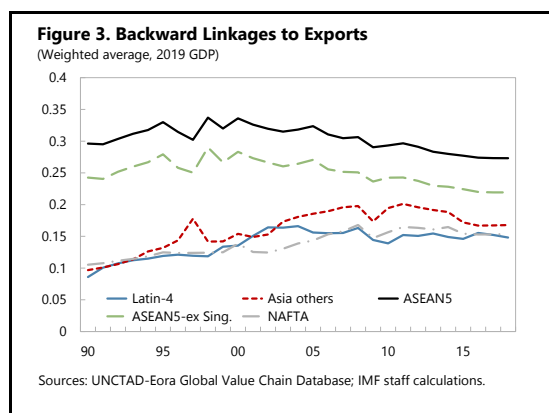
² This average is driven by large output losses in Singapore owing to restrictions in high-tech goods.

³ Regional integration is center in ASEAN authorities' priorities in line with the three strategic objectives of the ASEAN financial sector integration vision for 2025 (financial integration, financial stability, and inclusion) and the prominent role of trade facilitation in the Initiative for ASEAN Integration Work Plan (2021-2025).

more than 50 percent in the 1970s to single digits in the 2000s, boosting trade.⁴ In the ASEAN region, almost all goods in the region are currently traded at zero tariff.⁵



The momentum of trade in value-added has however stalled in recent years, driven first by persistent non-tariff barriers. While the degree of GVC integration remains high at the regional level, backward linkages⁶ to exports have decreased faster in Asia including ASEAN-5 countries since the global financial crisis (Figure 3). Rising protectionism partly explains this decline as backward linkages have trended downwards worldwide since the global financial crisis. Non-tariff barriers remain prevalent in the region (Figure 4), imposing a significant impediment to regional trade (Estefania-Flores et al, 2022).

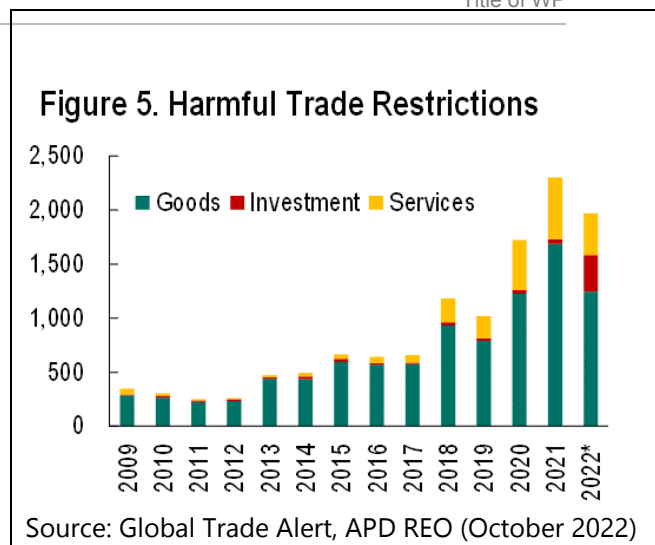


⁴ See Chapter 4 of the Asia and Pacific Regional Economic Outlook, October 2021.

⁵ As of 2020, ASEAN is virtually tariff-free, with tariffs on 98.6 percent of products fully eliminated under the ASEAN Trade in Goods Agreement (ATIGA), signed in 2010.

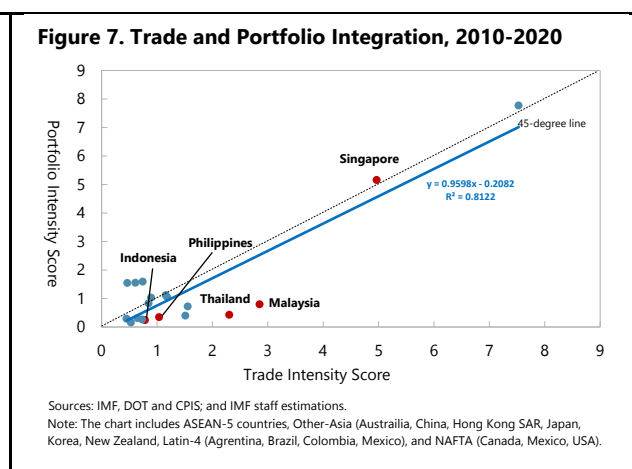
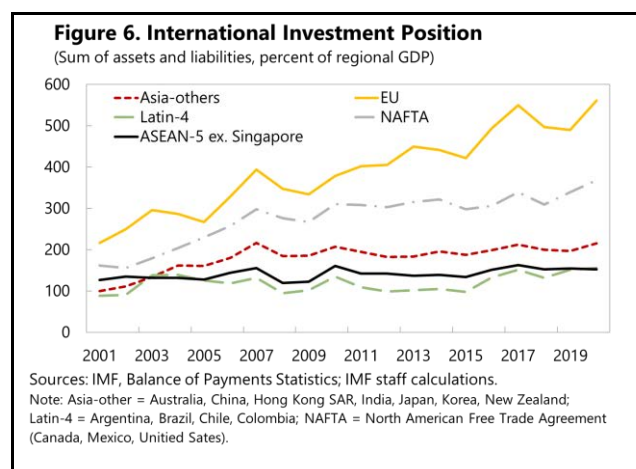
⁶ Backward GVC participation refers to the share of foreign value added in gross exports.

The COVID-19 pandemic, the war in Ukraine, and rising geopolitical tensions between the United States and China have further intensified concerns over geo-economic fragmentation and led to a sharp increase of trade restrictions during 2020-22 across the world (Figure 5). At the height of the pandemic, many countries imposed export restrictions, particularly on medical goods and food, with exports bans accounting for about 90 percent of trade restrictions (IMF, 2023). The war in Ukraine and related sanctions led to major dislocations in energy and agricultural commodity markets, including through export bans on agricultural goods and fertilizers. The rise of geopolitical tensions has led to some reconfiguration of supply chains by companies.



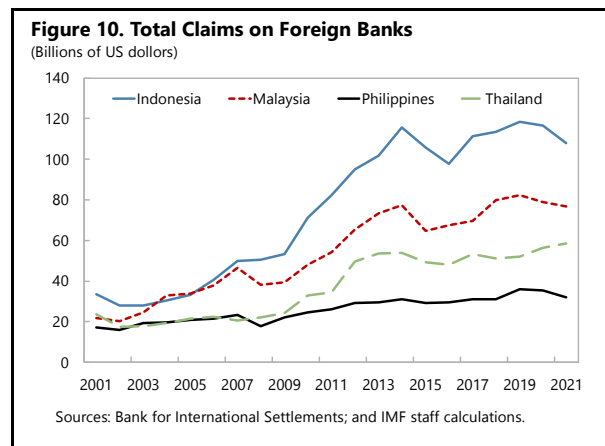
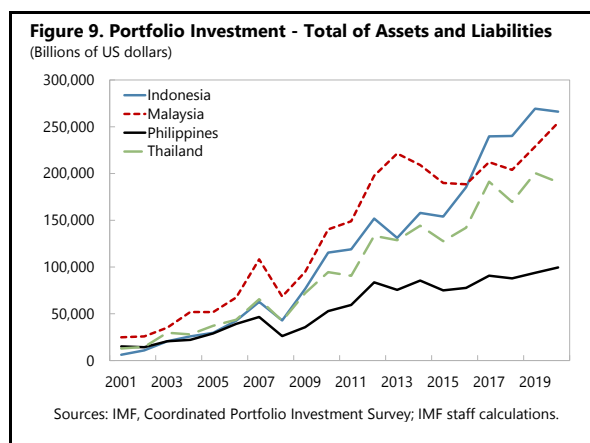
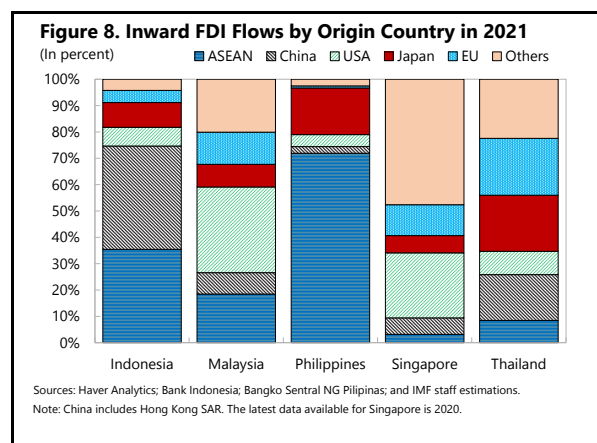
B. Recent Developments in Financial Integration

Financial integration in most ASEAN-5 countries is relatively low, with the exception of Singapore, which is a financial center. Financial integration – measured by the sum of cross-border assets and liability holdings – in other ASEAN-4 countries lags most comparable regions except Latin America (Figure 6). In terms of intensity, captured by a country’s share in the world’s portfolio assets and liabilities as a proportion of its GDP, countries in the ASEAN-5 region, with the exception of Singapore, also trail comparable countries (Figure 7). In addition, the intensity of financial integration lags that of trade, with the latter being relatively higher than in comparable countries.⁷



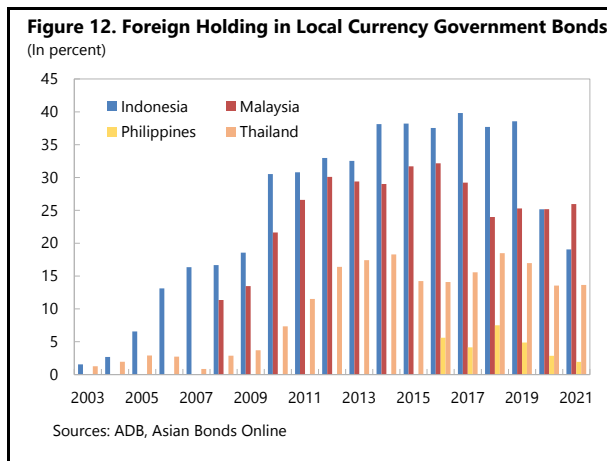
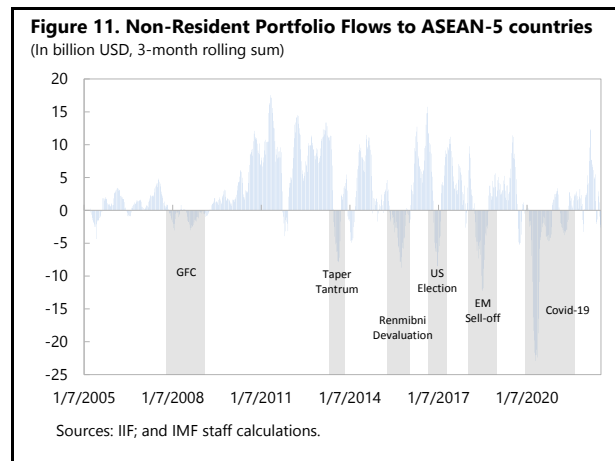
⁷ The trade intensity score is calculated as a country’s share in global trade as a proportion of its GDP share in world GDP. Portfolio investment intensity score is calculated as a country’s share in the world’s portfolio assets and liabilities as a proportion of its GDP share in the world.

That said, the region has made some recent progress with the adoption and implementation of the Strategic Action Plan (SAP) for ASEAN Financial Integration 2016–2025 (Ariyasajakorn et al., 2020). FDI and portfolio investments have been the main drivers of financial flows in ASEAN-5 countries with FDI, the largest component, accounting for 38 percent of the total. FDI flows have supported trade and financial integration in the region with Singapore being a key source country for other ASEAN-5 countries (Figure 8). FDI inflows from Singapore accounted for about 20 percent of total FDI in ASEAN-4 countries in 2021. Portfolio flows doubled over the past two decades, from 12 percent in 2001 to 24 percent in 2021, while cross-border banking transactions have risen steadily since the global financial crisis (Figure 9 and Figure 10).



However, integration to global financial markets has made ASEAN-5 economies more exposed to global risk-on/risk-off factors. ASEAN-5 countries have faced structurally high volatility of capital flows, driven by portfolio debt flows as well as money market flows. The region experienced significant outflows during recent crisis episodes including the 2013 Taper tantrum, Renminbi devaluation in 2015, US Election in 2016 and Emerging market sell-off in 2018, and Covid-19 pandemic in 2020 (Figure 11). Recent capital outflows from the region were driven by non-resident deposit and interbank lending, and portfolio investments. Foreign holdings of local currency government bonds also declined sharply, particularly in Indonesia and Malaysia who have higher non-resident share of local currency debt prior to pandemic (Figure 12). Regional financial integration could help tame the volatility of financial flows as intra-region flows have been more resilient to global shocks (Corbacho

et al, 2018). The next section quantifies potential gains from financial integration in the ASEAN-5 region and explores the role of policies to maximize these gains.



Quantifying Potential Gains from Financial Integration in ASEAN-5

Financial integration can affect financial development through its effect on domestic financial markets and access to foreign financial markets. There is limited literature on the linkages between financial integration and financial development (see for instance Guiso et al., 2004, and Sen and Laha, 2019).⁸ First, financial integration could spur domestic financial market development by increasing competition with foreign intermediaries that are more sophisticated and with lower cost and, through requirement of improvement in national regulations to align with best practices. Kose et al. (2009) argue that financial integration can induce discipline in policymaking by preventing the adoption of unsound policies that may have undesirable market consequences. Second, financial integration can increase access to finance by expanding funding opportunities as regional intermediaries enter the domestic market, which could enhance inclusion and resilience by reducing reliance on non-regional funding sources (Park and Shin, 2016). Financial integration can also help develop a twin-engine financial system and reduce excessive reliance on banks in a bank-centric system by deepening domestic financial markets (Racoma et al. 2018).

This section estimates the potential impact of financial integration on growth following an approach similar to Guiso et al. (2004). Building on the positive and mutually reinforcing link between financial development and financial integration, we estimate gains of the latter in two steps. First, we estimate the impact of financial development at the country level on non-financial firm growth. Second, using these estimates, we derive estimates of gains from financial integration under different scenarios.

⁸ Sen and Laha (2019) show a positive correlation between financial development and financial integration and mutually reinforcing relationship between the two in a sample of Asian countries including ASEAN countries (Indonesia, Malaysia and Philippines).

A. The Impact of Financial Development on Growth

We estimate empirically the impact of financial development on growth using firm level data.⁹ To this end, we employ non-financial firm level data on output (proxied by sales) for ASEAN-5 from the Thompson WorldScope Database over the period 2000-2019, country level indicators of financial development from the IMF Financial development index database, and an indicator of external finance dependence à la Rajan and Zingales (1998). The financial development index captures the multidimensional features of financial development in terms of depth, access, and efficiency and is normalized between 0 and 1, with higher values indicating greater financial development. We compute the external finance dependence (EFD) of an industry using firm level data following Rajan and Zingales (1998). First, we obtain a firm's EFD as the sum of its use of external finance (borrowings and equity issues, that is equivalent to total capital expenditure less cash flow from operations) over a 10-year period divided by the sum of capital expenditure over the same period. Second, industry level of EFD is obtained as the median across all firms in the same industry.¹⁰

Let Y_{fict} be the growth of firm f , in industry i , in country c at time t . Following Rajan and Zingales (1998) and Guiso et al. (2004), we estimate the following equation:

$$Y_{fict} = \theta_1 Y_{fict-1} + \delta(EFD_i \times FD_c) + \alpha_c + \alpha_i + \alpha_t + \xi_{fict} \quad (1)$$

Where $(EFD_i \times FD_c)$ is the interaction between the level of external finance dependence of industry i (EFD_i) and the level of financial development of country c (FD_c). α_c , α_i and α_t are respectively country, industry, and time fixed effects. We estimate Equation (1) using the GMM estimator (Arellano Bond, 1991).

Equation (1) can be used to estimate the differential impact of financial integration on growth. δ is the coefficient of interest and captures the differential impact of financial development across industries depending on their level of external finance dependence. Following Rajan and Zingales (1998), we test $\delta > 0$, that is, industries with large external finance dependence will gain more from financial development and thus financial integration. More specifically, $\hat{\delta}(EFD_i \times FD_c)$ is the potential impact of changes in the degree of financial development of ASEAN-5 countries.

Equation (1) can also be used to simulate the impact of financial integration on growth under different scenarios. Let FD^* be the level of financial development implied by a given financial integration scenario. The impact of financial integration under this scenario is therefore given by $\hat{\delta}(EFD_i \times (FD^* - FD_c))$. This suggests that countries with the largest financial development gaps, that is those that have the lowest level of financial development compared to the implied level under a financial integration scenario would be the main beneficiaries. This specification also allows us to estimate the overall impact of financial development without taking into account the role of policy or other determinants, which we will account for subsequently in scenario 2 below. Using weighted averages, with v_{ic} being the total sales of industry i in country c , one can summarize the impact of financial integration on growth at the :

⁹ We winsorized firm level growth at 2 percent to remove potential effects of outliers.

¹⁰ At the exception of mature firms that may have a large initial stock of cash in the beginning of the sample, the sum of cash flow over 10 years is a good proxy for cumulative cash stock. Using the median of the industry following Rajan and Zingales (1998) allows to prevent large firms' cash flow from masking the potential of cash constraints faced by small firms. We have also standardized the measure of external finance dependence between 0 and 1.

- country level by: $\sum_i \left[\frac{v_{ic}}{\sum_i v_{ic}} \times \hat{\delta}(EFD_i \times (FD^* - FD_c)) \right]$ (2)
- sector level by: $\sum_c \left[\frac{v_{ic}}{\sum_i v_{ic}} \times \hat{\delta}(EFD_i \times (FD^* - FD_c)) \right]$ (3)
- ASEAN-5 level by: $\sum_c \left\{ \frac{\sum_i v_{ic}}{\sum_c v_{ic}} \sum_i \left[\frac{v_{ic}}{\sum_i v_{ic}} \times \hat{\delta}(EFD_i \times (FD^* - FD_c)) \right] \right\}$ (4)

The results show that financial development matters for the growth of industries or sectors with external finance dependence, particularly SMEs in ASEAN countries (Table 1.1).¹¹ Columns (1)-(2) show results for using the overall index of financial development (FD) while columns (3)-(4) and (5)-(6) focus respectively on the sub-index of financial institutions development (FI) and the sub-index of financial markets development (FM).¹² Our results show that $\delta > 0$ and statistically significant across specifications, suggesting that financial development tends to facilitate the growth of firms operating in industries that rely more intensively on external finance.¹³ Column (2) shows that this effect is particularly strong for SMEs. Overall, our findings suggest that the corporate sector in ASEAN-5 countries may be facing financial constraint.¹⁴ These results are also robust to using net sales rather than gross sales (Appendix Table 3).¹⁵

¹¹ This Table shows results excluding Singapore from the sample as the country will be used as a benchmark in scenario analysis below. However, results remain similar when the sample includes Singapore.

¹² Financial institutions include banks, insurance companies, mutual funds, pension funds, and other types of nonbank financial institutions while financial markets include mainly stock and bond markets. Our results are similar using indicators of financial development such as stock market capitalization and domestic credit to private sector as share of GDP.

¹³ While we do not find any statistically significant effect for the development of financial institutions (FI), the effect on SMEs is positive and statistically significant.

¹⁴ The importance of financial constraint is confirmed by our finding that younger firms, known to face more financial constraint (Cloyne et al, 2023), also benefit more from financial development. Results are available upon request.

¹⁵ Net sales represent gross sales and other operating revenue less discounts, returns and allowances.

Gross Sales Growth, External Finance Dependence and Financial Development						
	(1)	(2)	(3)	(4)	(5)	(6)
Sales Growth (t-1)	0.038*** (0.013)	0.039*** (0.013)	0.038*** (0.013)	0.038*** (0.013)	0.038*** (0.013)	0.038*** (0.013)
EFD x FD	0.123*** (0.037)	0.103*** (0.037)				
EFD x FD x SME		0.146*** (0.046)				
SME		-0.070*** (0.021)		-0.059*** (0.021)		-0.069*** (0.022)
EFD x FI			-0.012 (0.033)	-0.026 (0.034)		
EFD x FI x SME				0.118*** (0.044)		
EFD x FM					0.207*** (0.039)	0.182*** (0.039)
EFD x FM x SME						0.150*** (0.049)
Observations	25027	25027	25027	25027	25027	25027
Companies	1875	1875	1875	1875	1875	1875

Notes: The dependent variable is the growth of gross sales at the firm level. The sample includes Indonesia, Malaysia, Philippines and Thailand. Clustered standard errors at the firm level in parentheses. * p<0.10, ** p<0.05, *** p<0.01

B. Estimating the Impact of Financial Integration on Growth

This section draws on the estimates in the previous section to assess the effect of financial integration on economic performance and how benefits from integration would be distributed among ASEAN-5 countries. To assess the impact of financial integration on GDP growth, we simulate two scenarios¹⁶:

Scenario 1: The ASEAN-5 converge towards the most advanced in the region.¹⁷

¹⁶ It is important to caveat our estimates of gains as these are likely driven by firms included in the sample which may not be necessarily representative of the population of firms in the region.

¹⁷ Using a frictionless financial market as the US as benchmark leads to gains that are twice larger compared to the convergence to the most advanced country in the region. However, the current scenario seems more plausible. Scenario 1 could be seen as an upper bound estimate of potential gains from financial integration.

In this scenario, we estimate the impact of financial integration on country and sectoral growth using firm level data on gross and net sales, as we hypothetically raise financial development to the best standard in the ASEAN-5. We thus estimate the growth effect of raising financial development in the other ASEAN-5 countries (Indonesia, Malaysia, Philippines, and Thailand) to the level in Singapore, which presumably could take a long time to achieve.¹⁸

Overall, our findings show that the potential growth benefits from financial integration in the ASEAN-5 region are non-negligible and would vary across countries and sectors. The computation of the growth impact of financial integration is obtained using the coefficients of column (1) of Table 1. Under this scenario, the estimated growth impact of financial integration using Equation (3) implied a growth impact at the regional (ASEAN-5) level of 2 percentage points on average. This overall impact hides disparities across countries reflecting the level of financial development and sectors depending on the external finance dependence. Figure 13 shows the estimates across ASEAN-5 countries and some sectors. While all countries have potential gains from financial integration, Indonesia, and Philippines, which have the lowest level of financial development, would gain more with an average growth impact of about 3.5 percentage points. Thailand and Malaysia that have a smaller financial development gap compared to Singapore have lower gains albeit non-negligible, at an average of about 1.2 percent additional growth. At the sectoral level, the gains vary from 0.2 percentage points in sectors with the lowest level of financial external dependence (Electronics- Instruments, Gauges and Meters) to about 4 percentage points for metal producers, which rely more on external finance.¹⁹

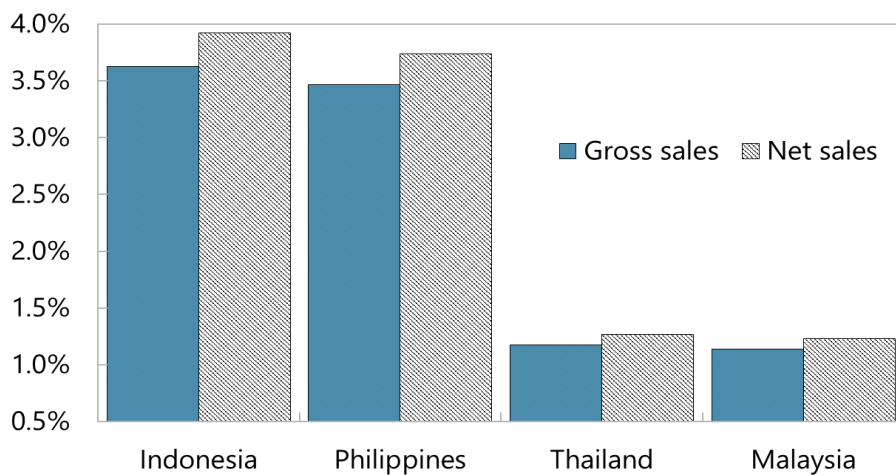
¹⁸For instance, European Central Bank Committee on Financial Integration (April 2022) shows that significant progress in financial integration in the euro area took about a decade.

¹⁹ These gains are estimated using gross sales. Estimates using net sales are slightly larger. See Guiso et al (2004) and Gabaix et al. (2011) for discussion on sales as proxy for output.

Figure 13: ASEAN-4: The Potential Impact of Financial Integration on Growth Under the Scenario of Convergence of Financial Development Toward the Most Advanced in the Region

Potential Growth Impact of Financial Integration at Country level

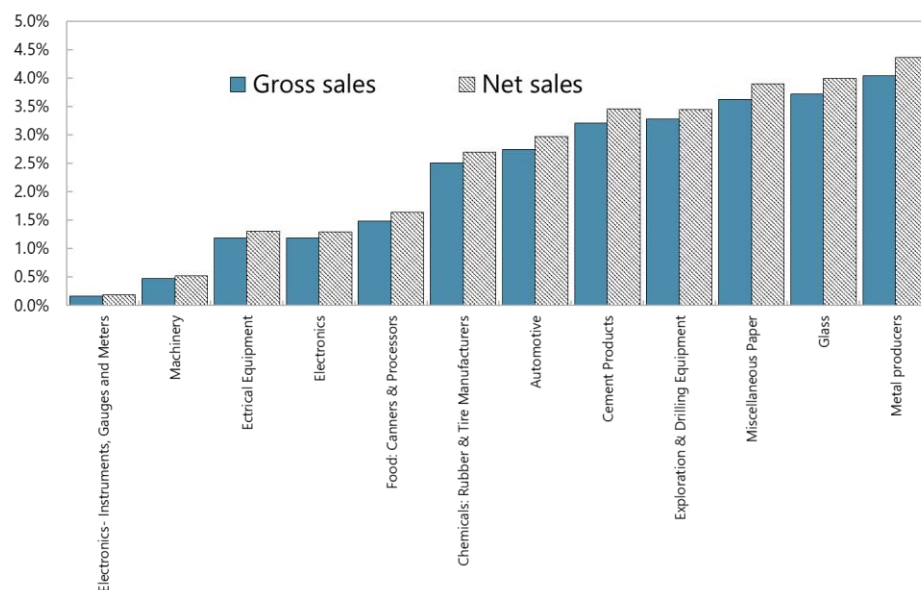
(In percent)



Sources: Thomson WorldScope Database, Financial Development Index Database, IMF Staff Calculations.

Potential Growth Impact of Financial Integration at The Sectoral Level

(In percent)



Sources: Thomson WorldScope Database, Financial Development Index Database, IMF Staff Calculations.

Scenario 2: Improving the policy and institutional determinants of financial development (integration) in ASEAN-5.

The previous scenario assumes that all parameters are under the control of policymakers to bring the financial development level at the desired level, ignoring that these changes can also stem from spontaneous market developments and other factors. In this scenario, we will consider a more realistic scenario by isolating some determinants of financial development under the control of policymakers and assuming that these converge toward the highest standard of the region, keeping other determinants constant. To this end, we will regress financial development on its determinants, including identified determinants of financial integration at the country level. Corbacho and Peiris (2018) showed using a bilateral gravity model that improvements in institutional quality as measured by the rule of law or regulatory quality, market size, and trade integration promote regional financial integration. However, they find that restrictions on capital flows undermine financial integration.²⁰ We therefore investigate the role of policy variables such as the degree of restriction of capital flows, governance quality, and corporate tax level, by simultaneously setting them at their desirable level in ASEAN-5.²¹

This simulation relies on a panel of 32 economies over 1990-2019, consisting of ASEAN economies together with comparable emerging and advanced countries.²² Data on financial development index is from the IMF Financial Development Database as discussed in the previous section. We proxy market size by real GDP per capita and the size of the population from the World Development Indicator (WDI) of the World Bank. We use the government stability indicator from the International Country Risk Guide (ICRG) as proxy of the quality of governance.²³ This indicator captures the ability of the government to carry out declared programs and to stay in office, with greater values indicating higher quality of governance. Data on trade openness, measured as the share of total trade in GDP is taken from the WDI. We use the Chinn-Ito index of capital account openness to capture the degree of restriction of capital flows.²⁴ Finally, data on corporate income tax rates are from the Tax Foundation Database.²⁵

Our estimates of the determinants of financial development are similar to previous findings (Table 2). In order to reduce potential endogeneity issues, we estimate a model with lagged controls including policy variables. For instance, capital account openness, trade openness, greater quality of governance and market size are positively correlated to financial development. Focusing on ASEAN-5 countries, the results in column (2) show that capital account openness has a larger positive impact on financial development (and thus financial integration) in this group of countries. This finding is consistent with Corbacho and Peiris (2018) who found that restrictions on capital flows impede financial integration in the ASEAN group, suggesting that a gradual liberalization of capital flows, with due regard to market conditions, would promote financial integration. While the level of corporate income tax is negatively correlated with financial development, differences in corporate income taxation seems to have no particular implications for financial integration in the region compared to the

²⁰ See also Lane and Milesi-Ferretti (2003), Devereux et al (2008) who show that tax policy is an important factor which may influence financial integration as governments compete over the tax rate to attract investment.

²¹ This scenario can be seen as the one eliminating tax competition while improving on governance and relaxing capital flow restriction in the region.

²² This sample excludes USA and Singapore as the two countries are used as benchmarks. The estimates including both countries in the sample are very similar. See (Appendix Table 7) for a summary statistic as well as countries included in the sample.

²³ Our findings using alternative measures of the quality of institutions such as the rule of law are similar. ICRG has a larger coverage compared to rule of law.

²⁴ Our results using the capital control data from Fernández et al. (2016) are very similar.

²⁵ The dataset captures standard top statutory corporate income tax rates levied on domestic businesses.

average country in the sample. Finally, the estimates suggest that gains from governance and trade integration for financial integration are lower compared to the average country in the sample.

Using the estimates of the determinants of financial development, we simulate the impact of financial integration on growth. Based on our estimates in Table 1 and Table 2, we compute the impact of financial integration on growth as $\hat{\delta}(EFD_i \times (FD^* - FD_c))$. FD^* is derived in this context as the predicted level of financial development assuming that financial integration leads to the adoption of the highest policy standard in ASEAN-5, found in Singapore. Also, FD_c is obtained as the predicted level of financial development by country-specific fundamentals as shown in Table 2. In this scenario we investigate the role of policy variables such as the degree of restriction of capital flow, the quality of governance, trade integration, and the level of corporate tax by keeping the change in the corporate tax at the lowest value in ASEAN-5 in addition to considering the following variants,²⁶:

- i. setting the degree of capital account openness to the highest in ASEAN-5 – scenario 2a
- ii. setting the quality of governance to the highest in ASEAN-5 – scenario 2b
- iii. setting both the degree of capital account openness and the quality of governance to the highest in ASEAN-5 – scenario 2c
- iv. setting the degree of trade openness to the highest in the region in addition to iii)²⁷ – scenario 2d

²⁶ These can be seen as the impact of eliminating tax competition in ASEAN-5 while improving on governance, relaxing capital flow restriction in the region and increasing trade integration. The highest desirable level in ASEAN-5 for all these policy variables are found in Singapore.

²⁷ This alternative allows to test for the role of trade integration in shaping the gains from financial integration.

Table 2. Determinants of Financial Development

	(1)	(2)	(3)	(4)	(5)
Log Real GDP per capita (t-1)	0.134*** (0.011)	0.133*** (0.011)	0.134*** (0.011)	0.131*** (0.011)	0.131*** (0.011)
Change in Corporate Income Tax rate (t-1)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002* (0.001)	-0.002** (0.001)
Capital Account Openness (t-1)	0.071*** (0.013)	0.074*** (0.013)	0.071*** (0.013)	0.072*** (0.013)	0.069*** (0.013)
Government Stability (t-1)	0.009*** (0.001)	0.009*** (0.001)	0.009*** (0.001)	0.010*** (0.002)	0.010*** (0.001)
Log Population (t-1)	0.195*** (0.034)	0.193*** (0.033)	0.194*** (0.033)	0.188*** (0.033)	0.190*** (0.033)
Log Trade Openness (t-1)	0.064*** (0.014)	0.064*** (0.014)	0.064*** (0.014)	0.068*** (0.014)	0.088*** (0.017)
Capital Account Openness (t-1) x ASEAN5 Dummy		0.096* (0.055)			
Change in Corporate Income Tax rate (t-1) x ASEAN5 Dummy			0.003 (0.003)		
Government Stability (t-1) x ASEAN5 Dummy				-0.008** (0.004)	
Log Trade Openness (t-1) x ASEAN5 Dummy					-0.113*** (0.029)
Observations	824	824	824	824	824
R-Squared	0.444	0.446	0.445	0.448	0.455

Source: IMF Staff Calculations.

Robust standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

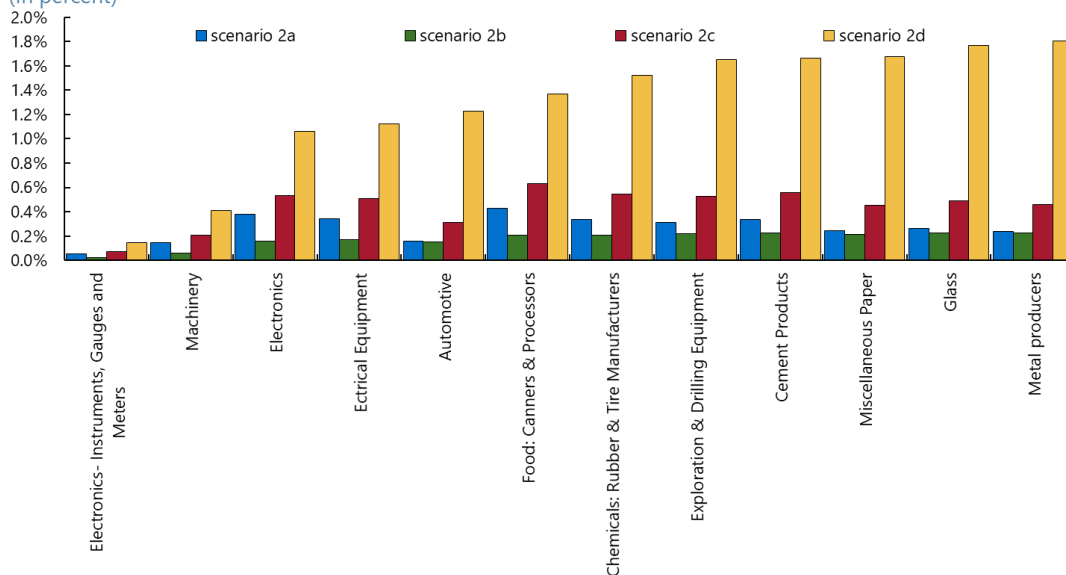
Our scenario analysis illustrates the role of liberalization of capital flows, trade integration and governance in shaping the gains of financial integration in ASEAN-5. Figure 14 shows the potential gains from financial integration across countries and sectors looking at the role of capital account openness (scenario 2a), the role of governance (scenario 2b), the role of capital account openness and governance together (scenario 2c) and, the role of trade integration in addition to both capital account openness and governance (scenario 2d).²⁸ This scenario focusing on the role of policy yields more modest gains from financial integration compared to the first scenario that implied that financial integration in ASEAN-5 converges to the most advanced country in the region. The estimated growth impact for ASEAN-5 at the regional level is 0.4 percentage point additional growth in scenario 2a, 0.2 in scenario 2b, 0.5 in scenario 2c and 1.3 in scenario 2d. This finding shows that capital account liberalization plays an important role in shaping the gains from financial integration in the region. Excluding the role of trade integration, which is a powerful complement to financial integration, capital account liberalization represents about 64 percent of the implied gains on average in the region. Country level estimates following equation (2) shows similarly to our finding in scenario 1, Philippines and Indonesia, countries with lowest level of financial development, would benefit more from financial integration in the region overall. Further, the role of capital account liberalization in shaping the gains from financial integration is particularly prominent in countries with relatively high degree of restriction in capital flows (Thailand, Philippines and Malaysia). Finally, the distribution of gains at the sectoral level are very similar to those in scenario 1 albeit smaller in magnitude.

Financial integration does not necessarily guarantee net benefits if sound institutional and policy frameworks are not in place. In addition to the overall positive effect of financial integration on growth estimated in this section, Corbacho et al (2018) also highlighted that regional financial integration would help ASEAN countries better weather external shocks and spillovers while promoting external rebalancing. They showed that intra-regional portfolio inflows were less likely to experience sudden stop compared to capital flows from outside the region, and that the influence of global shocks on regional equity markets declined. However, there is a need to proceed cautiously given risks related to financial integration including increased inequality (Furceri and Loungani, 2018; Furceri et al., 2019) and exposure to financial crises through contagion effects (Devereux and Yu., 2020). Our findings also suggest that financial integration could allowing SMEs to access finance potentially mitigating redistribution concerns. Further, to minimize risks of financial crises contagion, domestic financial systems and macroeconomic fundamentals should be strengthened.

Figure 14: The Potential Impact of Financial Integration on Growth Under the Scenario of Improvement in Policy and Institutional Determinants of Financial Integration

Potential Growth Impact of Financial Integration at The Sectoral Level

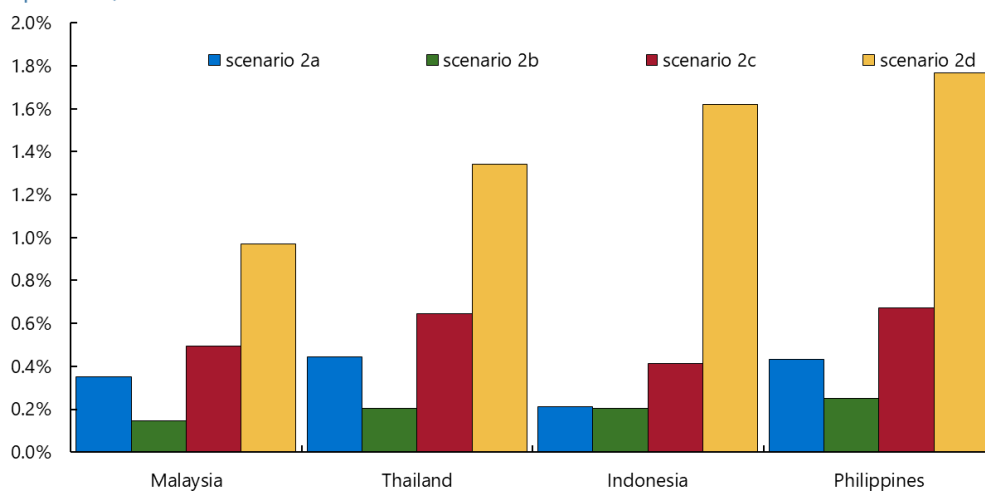
(In percent)



Sources: Sources: Thomson WorldScope Database, Financial Development Index Database, IMF Staff Calculations.

Potential Growth Impact of Financial Integration at The Country Level

(In percent)

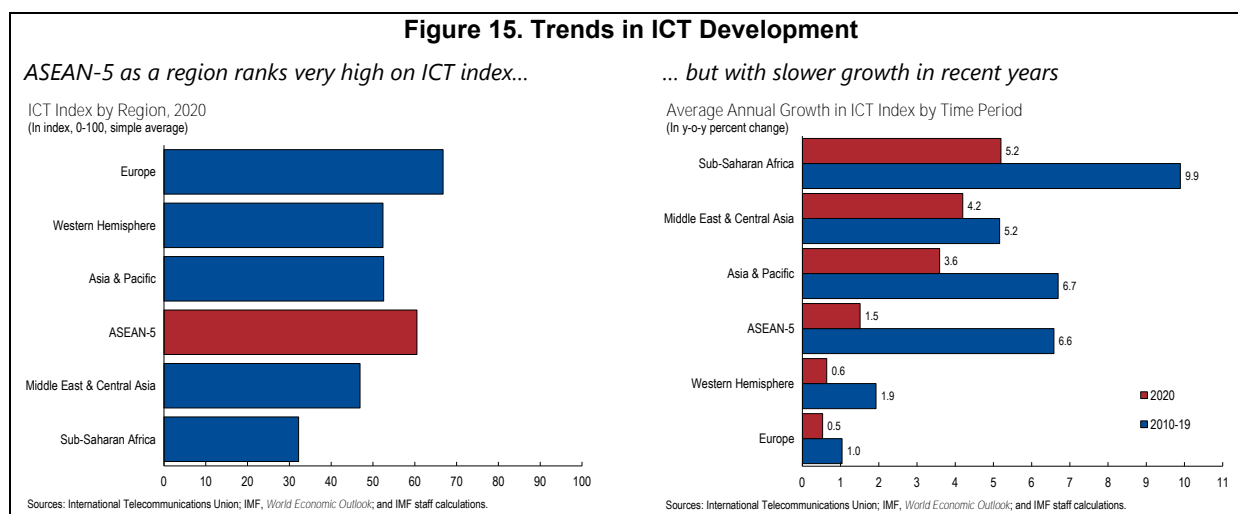


Sources: Thomson WorldScope Database, Financial Development Index Database, IMF Staff Calculations.

Leveraging Digitalization for Greater Integration and Value Creation in ASEAN-5

A. The Digital Economy Landscape in ASEAN-5

ASEAN-5 has made considerable strides in digitalization. The digital user's index, which captures various aspects of mobile and internet usage, highlights that Asia & Pacific as a region ranks relatively high, though still lagging Europe.²⁹ However, the growth of ICT index in Asia has been significantly higher in the past decade, second only to Sub-Saharan Africa. The ICT index for ASEAN-5 is higher than the Asia & Pacific mean, reflecting high level of ICT development in the region. There is, however, significant heterogeneity within ASEAN-5 – Singapore leads the pack with an index higher than the average for advanced economies; Malaysia and Thailand's index is significantly higher than the average for emerging and developing economies (EMDEs), while Indonesia and the Philippines are just around the EMDE average (Figure 15).

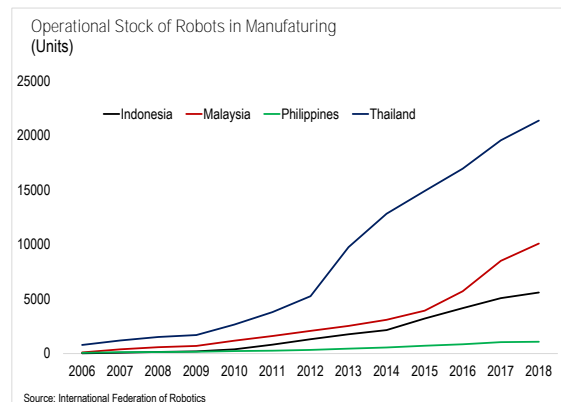


Singapore leads in the digitalization of production through industrial robots, which is also growing rapidly in some other ASEAN-5 countries. Industrial robots are higher-end digitalization products predominantly used for automation in the manufacturing sector (Figure 16). Singapore had the highest robot density in the manufacturing industry in 2019 (also reflecting Singapore's small labor force), while the robot density in other ASEAN-5 countries was significantly lower than the world average of 113 per 10 thousand employees. However, the operational stock of industrial robots in the manufacturing sector has grown markedly in the past decade, particularly in Thailand.

²⁹ The Digital User's Index is a composite index created by IMF staff that consists of the average of four indicators: mobile phone subscriptions in terms of subscriptions per 100 population; percentage of individuals using the Internet; fixed broadband Internet access in terms of subscriptions per 100 population; and fixed telephone subscriptions in terms of subscriptions per 100 population.

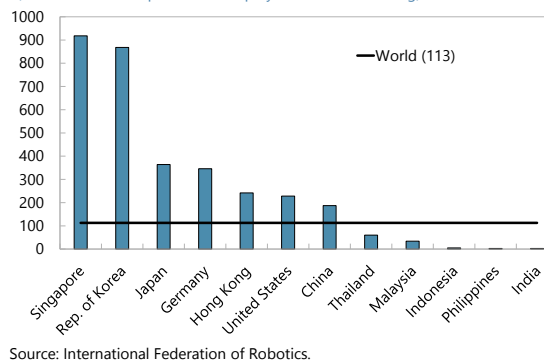
Figure 16. Digitalization of Production: Robotics

Industrial robots have grown significantly in Asia in the past decade



With Singapore having the highest robot density in the world

Robot Density in the Manufacturing Industry 2019
(In robots installed per 10,000 employees in manufacturing)

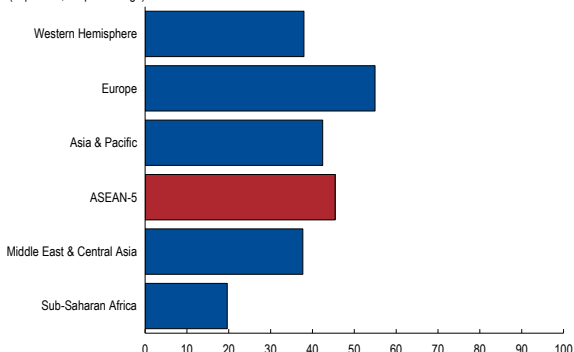


E-commerce has grown manifold in ASEAN-5 in recent years, including in response to the pandemic (Figure 17). Asia, led by China, is playing a leading role in digitalization of consumption via e-commerce. ASEAN-5 as a region has also developed a robust and dynamic e-commerce sector that has grown rapidly in recent years. The acceleration in e-commerce growth further picked up after the pandemic with e-commerce revenue growing by over 60 percent in the region in 2020. As of 2020, average e-commerce sales in the region were about 3 percent of GDP and 47 percent of the regions' population was using e-commerce. ASEAN is on the path to become a US\$1 trillion internet economy by 2030, propelled by a fast-growing base of digital consumers and merchants, acceleration in e-commerce, and food delivery. In December 2021, the ASEAN E-Commerce Agreement, which was signed in January 2019, also came into effect that establishes common principles and rules to promote the growth of e-commerce in the region and to strengthen capacity to implement them.

Figure 17. Digitalization of Consumption and Finance: E-commerce and Payments

Average e-commerce usage in ASEAN-5 is close to 50 percent

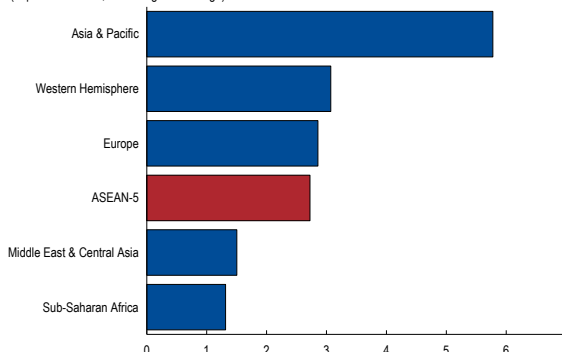
E-Commerce User Share by Region, 2020
(In percent, simple average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

With an average revenue of around 3 percent of GDP

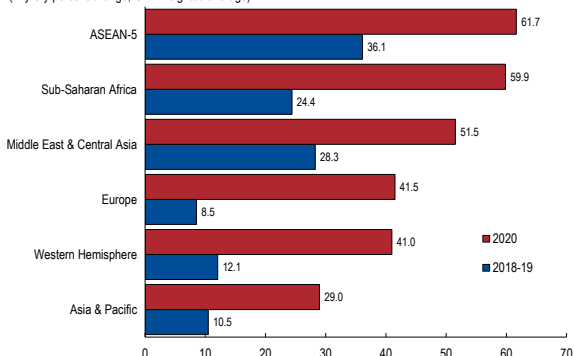
E-Commerce Revenue as a Share of GDP by Region, 2020
(In percent of GDP, GDP weighted average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

The pandemic turbocharged the growth of e-commerce in ASEAN-5.

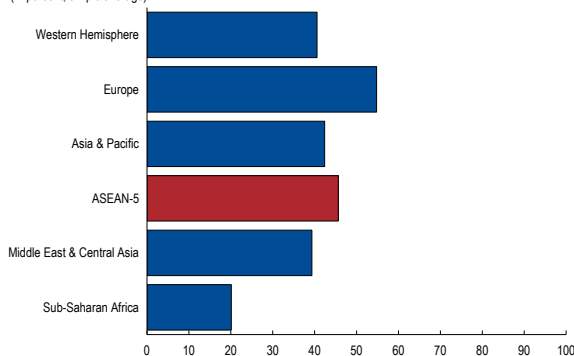
Average Annual Growth in E-Commerce Revenue as a Share of GDP
(In y-o-y percent change, GDP weighted average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

Average digital payment usage is also high at around 50 percent

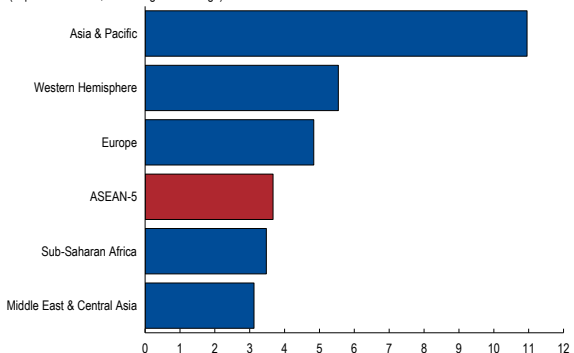
Digital Payments User Share by Region, 2020
(In percent, simple average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

However, there is scope for increases in transaction volumes

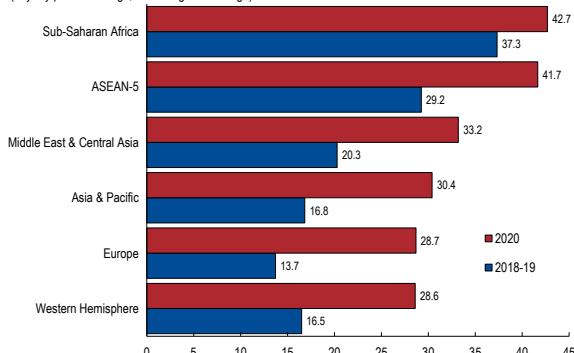
Digital Payments Transaction Value as a Share of GDP by Region, 2020
(In percent of GDP, GDP weighted average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

Digital payments also grew significantly during the pandemic

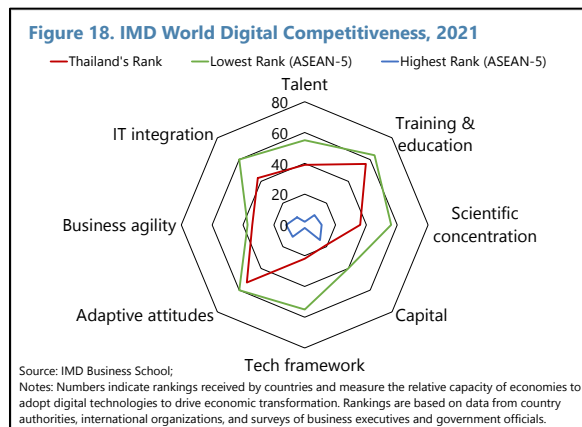
Average Annual Growth in Digital Payments Transaction Value as a Share of GDP
(In y-o-y percent change, GDP weighted average)



Sources: Statista; IMF, World Economic Outlook; and IMF staff calculations.

Relatedly, financial services—particularly payments—have also boomed in recent years (Figure 17). Financial services have been significantly transformed over the years, underpinned by rapid changes in technology. Asia-Pacific remains the most developed real-time payments market globally, with Thailand leading the way in

terms of volume and growth. Digital payments have been thriving in recent years, supported by real-time payment systems, a trend that has been reinforced during the pandemic.³⁰ According to research from ACI Worldwide and YouGov, real-time payments are now as popular as cash as a payment method for consumers in Southeast Asia. Three out of five consumers (61 percent) in Indonesia, Malaysia, Thailand and Singapore prefer real-time payments as a favored way to pay in 2021, level with cash (61 percent) and higher than other payment categories, including digital wallets requiring cash or card top-ups (56 percent) and credit cards (30 percent). Going forward, central banks of ASEAN-5 countries are also planning to develop an interoperable cross-border payments system that will enable residents of each country to use their mobile banking app to make QR code-based payments for goods and services when visiting any of the other territories. At this point, Malaysia, Indonesia and Thailand are connected, while Singapore is linked to Thailand and is seeking to add more countries.



While Singapore ranks very high on digital competitiveness, other ASEAN-5 countries have room to improve on various aspects (Figure 18). Malaysia would benefit from greater technology investment and improved regulatory framework, Thailand needs to invest on training and education and increase its share of scientific and technical employment. Indonesia and Philippines on the other hand, have room to improve on various dimensions including IT integration, training and education, talent, and regulatory framework.

B. Digitalization and Trade integration: Evidence from Firm Level Data in ASEAN-5

This section uses firm level data for ASEAN-5 economies to assess the role of digitalization and innovation in boosting trade integration. World Bank Enterprise Surveys (WBES), which are standardized and conducted across large and representative samples of firms over 2015-2016 are only available for Indonesia, Malaysia, Philippines, and Thailand. As such our evidence in this section will focus on these countries. Digitalization is proxied by (i) whether firms own a website, and (ii) whether they communicate with their clients/vendors by email. Firms' integration with international markets is captured by their exports as a percent of total sales, whether the main market for the firm is international, as well as participation in global value chains (GVC), which is proxied by the sum of exports as a percent of sales and imports as share of total inputs.

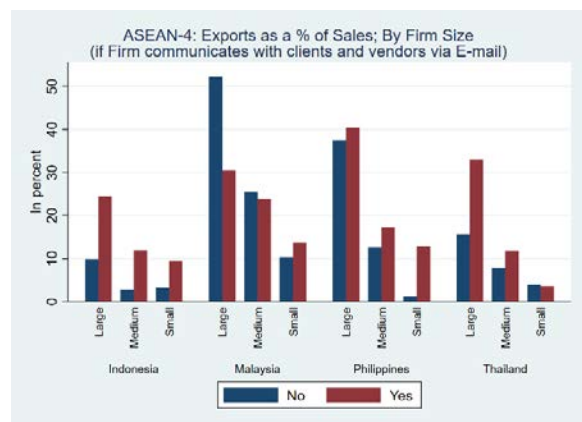
³⁰ PromptPay is a real-time electronic fund transfer system, which was part of a national strategy aimed at the development of an integrated digital payment infrastructure. It enables consumers, businesses and government agencies to make real-time payments in Thai baht.

	Communicates with clients/vendors by E-mail		Owns Website		Product Innovation		Process Innovation	
	No	Yes	No	Yes	No	Yes	No	Yes
Performance								
Annual Sales per Employee (in Thousands US\$)	62.2	206.3	86.3	250.2	133.6	279.6	106.5	263.9
Exports (% of Sales)	7.4	22.2	11.2	25.3	15.6	25.9	14.3	24.6
Main Market for the Firm is International	2.6	20.6	7.7	23.8	12.3	23.5	11.7	20.6
Imports (% of Production Inputs)	5.4	21.1	11.5	22.0	13.2	30.0	11.9	25.5
Innovation								
Internationally recognized quality certification	7.8	37.9	11.3	49.6	25.5	38.1	21.3	42.2
Use of technology licensed from a foreign company	7.2	25.4	10.6	31.0	16.6	33.0	14.4	31.3
Firm spent on R&D last FY	3.1	18.9	6.5	23.1	8.3	37.4	3.6	35.8
Firm purchased Fixed Assets last FY	12.4	26.4	16.1	29.2	15.9	46.3	12.8	40.5
Human Capital								
Employees with high school education	70.0	80.8	76.3	79.0	77.6	77.5	77.9	76.5
Formal Training Programs for Employees	11.8	44.5	21.1	50.2	30.3	50.6	25.8	51.5
Business Environment								
Telecommunications an obstacle	25.8	38.0	29.9	39.3	32.1	39.6	28.7	43.3
Business Licenses an obstacle	23.3	25.8	25.2	24.7	24.5	28.9	22.0	32.5

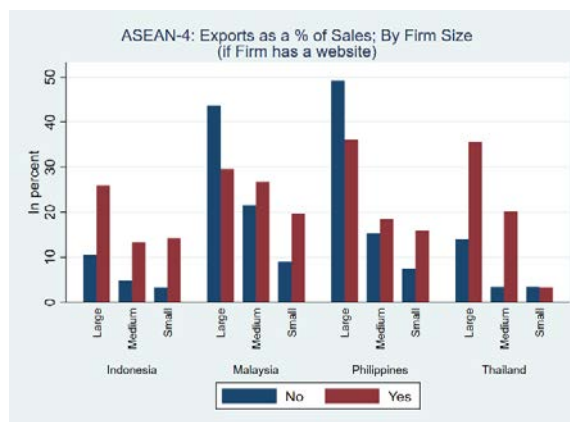
Digitalized firms in ASEAN-4 appear to be more innovative, invest more in human capital, and are more integrated with international markets. Firms that are more digital (website, email), on average, are more integrated in the value chains with significantly higher share of imports in production inputs and exports (Table 3). Further, a larger proportion of such firms also cater to international markets and tend to be more productive (Kinda, 2019). Firms that have innovated (introduced new products, improved processes) in the past three years also appear to have better performance. In the next section we also show that product innovation and sophistication is closely linked with digitalization.

Figure 19. ASEAN-4: Digitalization and Trade Integration

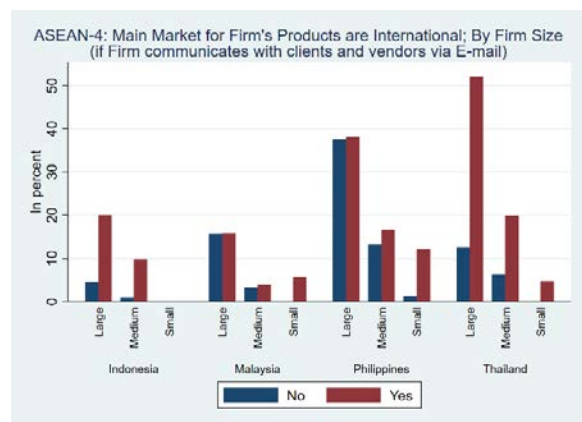
Email usage is correlated with higher exports



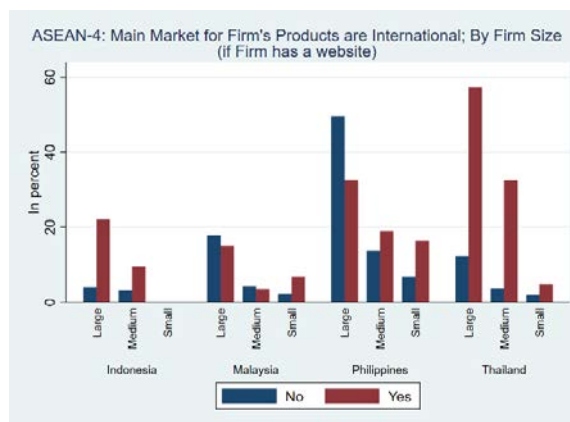
Firms with websites also generally have higher exports



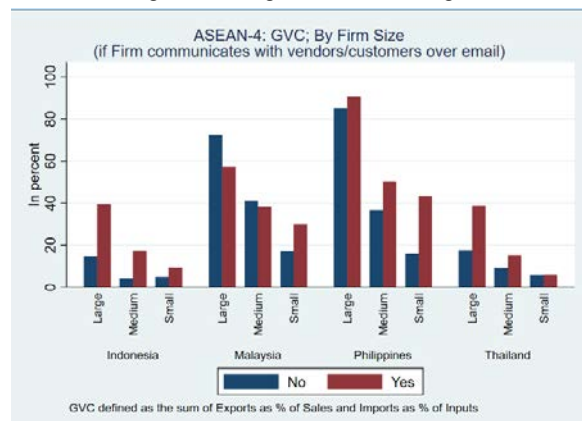
Firms with international markets also generally use email



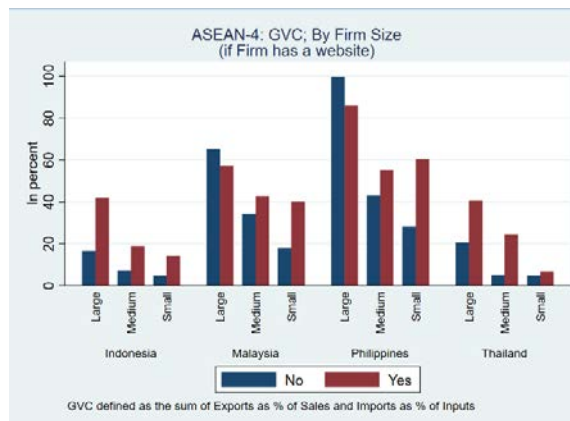
And have a website



GVC integration is higher for firms using email...



...as well as for those with websites



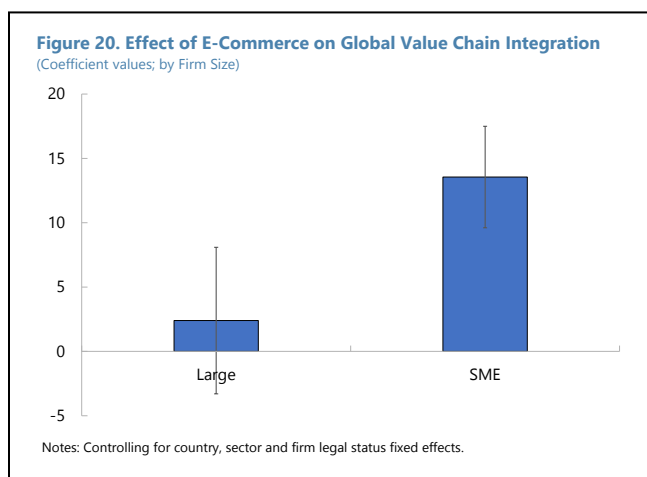
Digitalization in the small and medium enterprises (SMEs) may help them better integrate in the GVCs. Figure 19 shows that SMEs, on average, have significantly lower export orientation and are less well integrated in the GVCs. However, among SMEs, digitalized firms play a more active role in GVCs. Recent research (WTO, 2016; Cusolito and others, 2016; Lanz and others, 2018) has shown that digital economy can help SMEs integrate into GVCs. This could happen through reduced barriers to entry and exporting costs, increased

access to international markets, for example, through online sales and e-commerce as well as via creating new business models that affect the structure of supply chains, for example, SMEs achieving scale without mass sometimes referred to as micro-multinationals (Cusolito and others, 2016).

Digitalization is found to benefit SMEs more than the large firms. To empirically assess the role of digitalization in boosting integration in GVC, we estimate the following regression:

$$GVC_{ijk} = \alpha_0 + \alpha_1 website_{ijk} + \alpha_2 SME_{ijk} + \alpha_3 SME * website_{ijk} + BX_{ijk} + \gamma C_j + \mu S_k + \varepsilon_{ijk}$$

where GVC_{ijk} the sum of exports as a percent of sales and imports as share of total inputs of each firm i , in country j , in sector k ; $website_{ijk}$ is a dummy variable equal to one if firm i uses email to communicate with clients/vendors; SME_{ijk} is a dummy variable equal to one if the firm is a SME; and X_{ijk} is firm level controls accounting for firm performance, human capital, and innovation. C_j and S_k are country and sector fixed effects. As expected, we find that SMEs are, on average, less integrated with the GVC. However, digitalization (having a website) can facilitate SMEs participation in GVCs. Further, we find that having a website benefits SMEs more than the large firms in our sample (Table 4, Figure 20).³¹ The results are robust to controlling for firm specific factors. We also find that innovation (internationally recognized quality certification, use of technology licensed from foreign companies) at the firm level also enhances integration with international markets. Further, more productive firms and those investing in worker training are more likely to be better integrated in GVCs. Product and process innovation also enhances GVC participation though the impact is bigger for large firms.



³¹ These results should be interpreted as association rather than causality as the coefficients could be biased due to endogeneity.

Table 4. Digitalization and Integration in GVC

	(1)	(2)	(3)	(4)	(5)
	gvc	gvc	gvc	gvc	gvc
website	2.397 (2.904)	-0.993 (3.015)	-.357 (3.052)	-1.348 (3.099)	-1.429 (3.109)
sme	-31.395*** (2.819)	-24.123*** (2.896)	-21.996*** (2.962)	-22.763*** (3.028)	-23.093*** (3.041)
websitexsme	11.154*** (3.504)	11.46*** (3.587)	11.052*** (3.63)	12.335*** (3.711)	12.857*** (3.726)
quality_certif~n		15.334*** (2.043)	13.348*** (2.105)	12.566*** (2.172)	12.834*** (2.176)
foreign_tech		8.172*** (2.049)	7.406*** (2.08)	6.814*** (2.143)	6.767*** (2.146)
spent_RD		3.906 (2.426)	3.352 (2.455)	3.692 (2.506)	3.878 (2.508)
employee_finish~l			-.016 (.024)	-.004 (.025)	-.005 (.025)
training_for_em~s			8.674*** (1.936)	9.112*** (1.993)	8.919*** (1.997)
prop_production			.1** (.05)	.102** (.051)	.098* (.051)
log_sales_emplo~e				1.424*** (.452)	1.348*** (.455)
informal_compet~s				-5.81*** (1.739)	-5.616*** (1.743)
telecom_obstacle					-2.583 (1.699)
_cons	53.408*** (5.318)	39.599*** (5.815)	31.299*** (7.327)	21.62** (8.591)	23.51*** (8.661)
Observations	3280	2977	2898	2703	2694
R-squared	.294	.325	.334	.352	.353

Standard errors are in parentheses

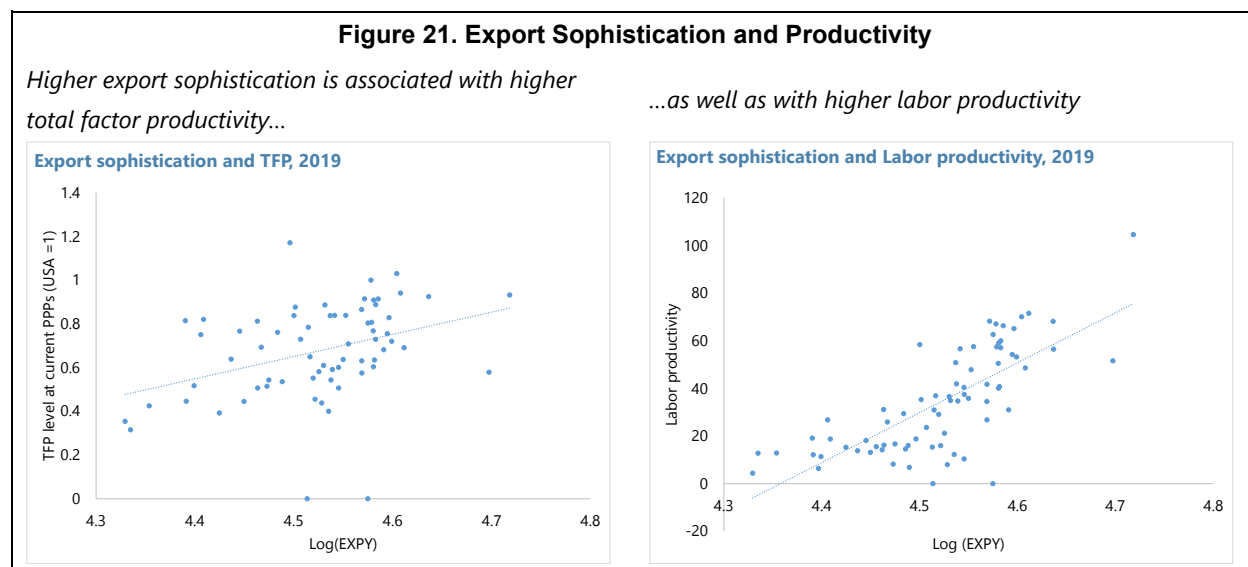
**** $p < .01$, ** $p < .05$, * $p < .1$*

C. Digitalization and Export Sophistication

In addition to GVCs integration, digitalization can also help countries rise the value chain. As shown in the previous section, digitalization can facilitate integration of firms in the GVCs, particularly for SMEs that face significantly larger obstacles. This section further explores the role of digitalization, focusing on moving up the value chain—by enhancing sophistication of exports.

The literature highlights a positive correlation between export sophistication and productivity growth. Export sophistication captures various factors associated with the productivity of country's exports. Among other, it includes the technology embedded in the exports, the levels of specialized skills required to produce it, R&D investments etc. The literature finds a positive relationship between export sophistication and economic growth. For example, Felipe, Kumar and Abdon (2010) find that countries unable to upgrade and diversify their exports may be caught in a middle-income trap. Jarreau and Poncet (2012) similarly find that regions specializing in more sophisticated goods in China grew more subsequently. We create a measure of export sophistication

based on Rodrik (2006) and Hausmann et. al. (2007)³², which is found to be positively correlated with both labor productivity and total factor productivity (Figure 21).



Singapore is the Asian leader in terms of goods export sophistication while the other ASEAN-5 countries have differing room to catch up (Figure 22). Before the pandemic hit, the goods export sophistication index grew consistently over the past decade in ASEAN-5 countries except Indonesia. In Indonesia, sophistication of goods export has been largely stagnant for the past 20 years. The pace of growth of product sophistication in Singapore, Malaysia, Thailand, and the Philippines has been broadly similar, which has resulted in limited catch of Malaysia, Thailand, and the Philippines to the Asian frontier (Singapore). When compared to the global frontier of product sophistication, Asia has fallen back in recent period. The distance to the global frontier for Singapore, the Asian leader in terms of export sophistication, has increased from 10 percent in 2013 to around 30 percent in 2020. For the other ASEAN-5 economies, the distance to global frontier ranges from 45 percent for Malaysia to over 90 percent for Indonesia in 2020. This implies that some ASEAN-5 economies have significant room to move towards exports of more sophisticated products.

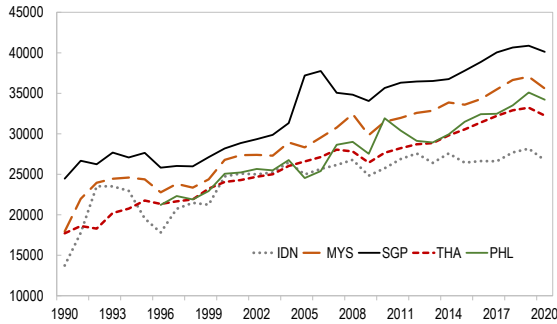
Services export sophistication has also risen in ASEAN-5 in the past decade, however there is still room to catch up to the Asian and global frontier. The room to grow to reach the Asian frontier (Japan) ranged from 2.5 percent in Singapore to 25 percent in Thailand in 2018 (Figure 22). When compared to the global frontier in services export (Switzerland), Singapore's sophistication has been broadly stable, while the sophistication of other 4 economies has fallen in relative terms in recent years.

³² The authors defined PRODY and EXPY indexes to compute sophistication levels for individual goods and a country's overall export basket, respectively. The formula of the PRODY index is $PRODY_k = \sum_j \frac{x_{jk}/x_j}{\sum_j x_{jk}/x_j} Y_j$, where the PRODY of product k is the ratio of the export share of k in country j (x_{jk}) to the sum of the export shares of k in all countries weighted by their per capita incomes (Y_j). PRODY is calculated using Product (at the four-digit level comprising of 1260 products) export data collected from UNCOMTRADE. Accordingly, a higher PRODY score indicates a higher sophistication level. Based on the PRODY index, the sophistication level of a country's overall export basket (EXPY) could be calculated as the weighted average of the sophistication index of all export products in this country and is given by $EXPY_i = \sum_l (\frac{x_{il}}{x_i}) PRODY_l$.

Figure 22: ASEAN 5 - Goods and Services Export Sophistication

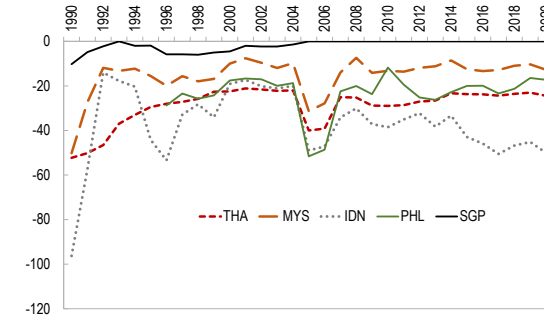
Export sophistication has risen in ASEAN-5 in the past 3 decades, however, at varying pace

ASEAN 5 - Goods Export sophistication Index



Despite an increase in sophistication, the distance from Asian frontier has not reduced

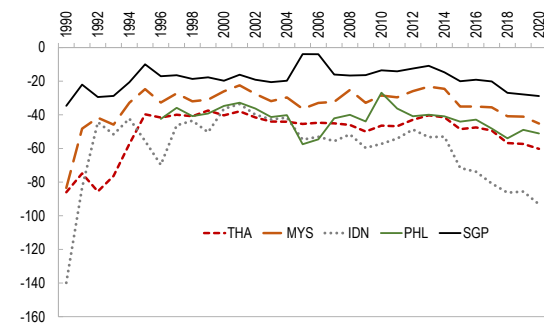
Shortfall of Goods Sophistication Index from the Asian Frontier (In percent)



Sources: United Nations (UNCOMTRADE) and IMF staff calculations.

And distance from the global frontier has increased

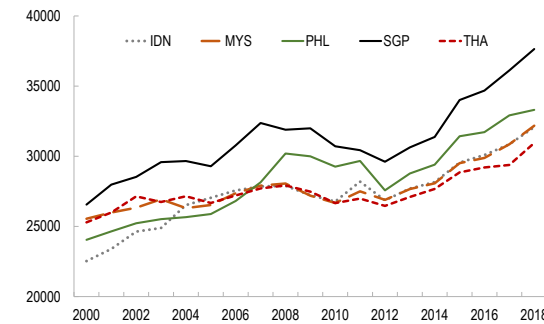
Shortfall of Goods Sophistication Index from the Global Frontier (In percent)



Sources: United Nations (UNCOMTRADE) and IMF staff calculations.

Services export sophistication has also improved, however, less markedly than goods

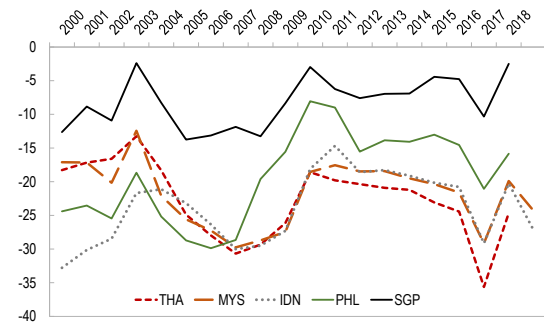
ASEAN-5: Services Export Sophistication Index



Sources: United Nations (UNCOMTRADE) and IMF staff calculations.

The distance from increased from both Asian...

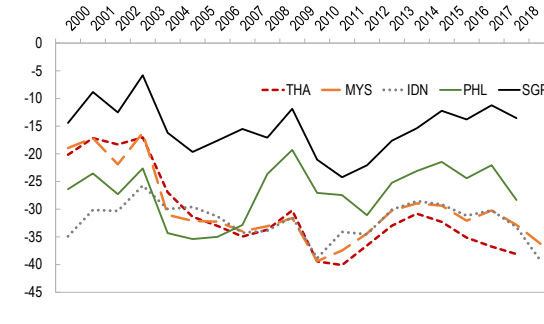
Shortfall of Services Sophistication Index from the Asian Frontier (In percent)



Sources: United Nations (UNCOMTRADE) and IMF staff calculations

...and global services export sophistication

Shortfall of Services Sophistication Index from the Global Frontier (In percent)



Sources: United Nations (UNCOMTRADE) and IMF staff calculations

This section investigates the role of digitalization in promoting export sophistication. The empirical literature on export sophistication has highlighted the important role of physical capital, human capital, FDI and research and development expenditures (R&D) in boosting export sophistication. Here, we assess whether digitalization also plays a role in moving countries up the value chain. The determinants of export sophistication are

analyzed using data for 76 advanced and emerging market economies over the period 1990-2020. In particular, we estimate the following regression using system GMM:

$$LEXPY_{it} = \alpha_0 + \alpha_1 D_{it} + \beta X_{it} + \delta_i + u_{it} \quad (3)$$

Where $LEXPY_{it}$ is the log of export sophistication index, D_{it} is a measure of digitalization, X_{it} is a vector of control variables including FDI inflow, and tertiary education enrolment (human capital). Country and time fixed effects are included to control for unobserved country characteristics and global factors. Further, since there may be a two-way relationship between FDI and export sophistication, it is treated as an endogenous variable, while remaining regressors are treated as exogenous in the GMM specification.

The results indicate that various measures of digitalization (ICT, patents, robots) are positively related with export sophistication. An increase in both ICT infrastructure and its usage is associated with an increase in export sophistication. Similarly, countries with higher patent applications are likely to have higher export sophistication. Finally, installations of industrial robots also increase export sophistication.

	Dependent Variable: Log (Export sophistication) - Goods					
<i>L.export sophistication</i>	0.804*** (0.0967)	0.782*** (0.0981)	0.753*** (0.130)	0.810*** (0.0840)	0.551*** (0.158)	0.932*** (0.0331)
<i>FDI inflow</i>	0.0274*** (0.00983)	0.0218* (0.0121)	0.0256** (0.0123)	0.0253* (0.0137)	0.0196** (0.00973)	0.0736*** (0.0181)
<i>Tertiary enrollment ratio</i>	0.0373 (0.0301)	0.0187 (0.0236)	0.0191 (0.0227)	0.0361* (0.0194)	0.0878** (0.0380)	0.00659 (0.00900)
<i>Internet users (% of population)</i>	0.000771** (0.000385)					
<i>Digital user index</i>		0.00158** (0.000699)				
<i>ICT</i>			0.00492* (0.00251)			
<i>Log (Patent applications)</i>				0.00716* (0.00387)		
<i>Log (Tech Patent Publications)</i>					0.0125** (0.00498)	
<i>Log (Robot installations)</i>						0.00199** (0.000942)
Constant	1.975** (0.962)	2.173** (0.968)	2.485* (1.293)	1.912** (0.834)	4.564*** (1.597)	0.643* (0.333)
Observations	1,553	1,185	1,125	1,459	1,402	712
Number of country_code	75	75	74	74	74	56
AR(2)	0.584	0.202	0.265	0.524	0.275	0.591
Hansen	0.605	0.617	0.800	0.671	0.420	0.483
Standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

FDI and Human capital, proxied by tertiary enrollment, is also an important determinant of export sophistication. Our results indicate that higher FDI also leads to greater sophistication of exports. This implies positive

knowledge spillovers from foreign firms to domestic firms. In this respect, liberalizing regulations on FDI inflow, easing to do business, promoting rule of law, and securing property rights would help attract FDI. However, technology and knowledge diffusion require that local firms can absorb new information. To ease absorption, investment in physical and digital infrastructure should be complemented with investments in education to make the work force better prepared for a transition to digital economy (Dabla-Norris and others, 2023).

Table 6. Digitalization and Services Export Sophistication

	Dependent Variable: Log (Export sophistication) - Services					
<i>L.export sophistication</i>	0.532*** (0.123)	0.649*** (0.139)	0.538*** (0.127)	0.566*** (0.141)	0.713*** (0.123)	0.859*** (0.112)
<i>FDI inflow</i>	0.0522*** (0.0165)	0.0473*** (0.0145)	0.0514*** (0.0151)	0.0503*** (0.0162)	0.0498*** (0.0146)	-0.0155 (0.0481)
<i>Tertiary enrollment ratio</i>	0.0291** (0.0129)	0.00874 (0.00822)	0.00717 (0.0117)	0.0503** (0.0209)	0.0268* (0.0143)	0.0247 (0.0187)
<i>Internet users (% of population)</i>	0.000948*** (0.000317)					
<i>Digital user index</i>		0.00106** (0.000424)				
<i>ICT</i>			0.00451*** (0.00147)			
<i>Log (Patent applications)</i>				0.00651*** (0.00246)		
<i>Log (Tech Patent Publications)</i>					0.00332** (0.00152)	
<i>Log (Robot installations)</i>						0.000990 (0.000824)
Constant	4.796*** (1.253)	3.610** (1.417)	4.743*** (1.296)	4.442*** (1.437)	2.986** (1.266)	1.446 (1.150)
Observations	1,039	1,053	1,053	977	955	649
Number of country_code	73	73	73	71	72	55
AR(2)	0.427	0.480	0.429	0.314	0.912	0.814
Hansen	0.409	0.329	0.220	0.403	0.138	0.357

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Institutional variables appear to be more important for boosting sophistication in services exports than goods exports. We augment regression 3 with additional control variables reflecting the institutional capacity of the country. These include – voice and accountability, government effectiveness, regulatory quality, rule of law, control of corruption, and access to finance. The results (Annex Table 1 and 2) indicate that (i) our earlier results on the importance of digitalization in boosting export sophistication are robust to adding these additional controls; and (ii) higher institutional quality results in higher services export sophistication.

Conclusion

This paper took stock of recent developments in trade and financial integration in the ASEAN-5 region. In the context of rising geoeconomic fragmentation, which could reverse gains from globalization of the past decades, the paper explores how further trade and financial integration within ASEAN-5 could help enhance the region's resilience to rising geopolitical tensions and their potential implications.

Despite notable progress, regional trade integration can be further strengthened. The recent ratification of the Regional Comprehensive Economic Partnership (RCEP) will open the way for further trade integration but there is scope for more policy initiatives. Non-tariff barriers should be reduced in line with the Non-Tariff Measures (NTM) Guidelines, including through improved notification and stronger discipline in simplifying and harmonizing rules and regulations impacting trade. Regional trade integration could be enhanced by i) facilitating free trade agreements in line with the initiative for ASEAN Integration Work Plan (2021-2025) ii) eliminating non-tariff barriers iii) strengthening GVC in the region, and iv) further advancing progress on the digital economy, including to facilitate cross-border e-commerce and financial flows.

The paper highlighted that digitalization could support regional integration by helping firms better integrate with the global value chains (GVCs), with the benefits being stronger for small and medium sized enterprises. Further, digitalization can also help countries rise the value chain by the production of more sophisticated products. While ASEAN-5 economies have made considerable strides in various aspects of digitalization, there is significant heterogeneity with sizeable room to further advance digitalization in many countries in the region. In addition, digitalization also needs to be complemented with other policies including investment in physical and human capital, reducing regulatory barriers, and increasing FDI liberalization.

Financial integration lags trade integration in ASEAN-5 and most ASEAN-5 economies have significant room to advance regional financial integration, which could be a pillar for financial development. Despite several regional initiatives toward more regional financial integration, many challenges remain. Using firm level data, the paper shows that financial integration could generate sizeable growth gains for the ASEAN-5 region. In addition, the magnitude of the gains varies across countries and sectors depending on the degree of financial development and financial constraints. Our findings also show that trade liberalization through regional trade integration, improving regulatory and institutional quality, and reducing restrictions on capital flows would further strengthen gains from financial integration.

The role of appropriate financial infrastructures such as payments and settlement systems in financial integration is recognized under the ASEAN Economic Community (AEC) Blueprint 2025. Cross-border payment initiatives could contribute to financial integration in the region through an enhanced financial flow across borders and improved regional interconnectivity. Indeed, macroeconomic objectives pursued by the ASEAN countries include the reduction of cross-border payment frictions such as remittances, faster, more inclusive payment systems, to facilitate cross-border trade and e-commerce, and thus enhance regional economic integration. Most of these initiatives are undertaken at the bilateral level by linking domestic instant payment systems. Further, two tripartite cross-border payment agreements have been under discussion for an upcoming implementation including i) between Philippines, Malaysia, and Singapore through BancNet, a Philippines-based interbank network connecting the ATM networks of local and offshore banks and, ii) between Indonesia,

Malaysia, and Thailand. The development of an ASEAN interoperable Quick Response (QR) Code Framework is also ongoing, which once implemented will ultimately simplify retail payment across the region.

As financial integration may also present some risks and challenges, ASEAN economies should carefully proceed to contain risks to financial stability. Efforts toward more financial openness should be preceded by strong macroeconomic fundamentals and efforts to increase the resilience of domestic financial systems, including through enhanced information sharing, surveillance and crisis management, and a regional safety net. A gradual approach toward promoting more regional financial integration is therefore appropriate to harness gains while minimizing risks. Pursuing greater integration with the ASEAN-5 region could help build a layer of resilience for countries in the region, which would prove useful in a shock-prone global economy that is in the midst of policy-induced reversal of globalization reflected by heightened geoeconomic fragmentation risks.

Appendix

Appendix Table 1: Digitalization and Goods Export Sophistication								
Dependent Variable: Log (Export sophistication) - Goods								
<i>L.export sophistication</i>	0.782*** (0.0981)	0.787*** (0.103)	0.766*** (0.115)	0.779*** (0.107)	0.772*** (0.109)	0.785*** (0.108)	0.589*** (0.0993)	0.534*** (0.118)
<i>Digital user index</i>	0.00158** (0.000699)	0.00164** (0.000780)	0.00115** (0.000550)	0.00134** (0.000615)	0.00133** (0.000592)	0.00139** (0.000649)	0.00211*** (0.000649)	0.00239*** (0.000818)
<i>FDI inflow</i>	0.0218* (0.0121)	0.0236** (0.00947)	0.0194* (0.0101)	0.0221** (0.0105)	0.0216** (0.0101)	0.0214** (0.0106)	0.0195** (0.00831)	0.0182 (0.0114)
<i>Tertiary enrollment ratio</i>	0.0187 (0.0236)	0.0105 (0.0205)	0.0139 (0.0215)	0.0121 (0.0220)	0.0125 (0.0220)	0.0100 (0.0208)	0.0127 (0.0220)	0.0405 (0.0346)
<i>Voice&Accountability</i>		-0.000200 (0.00440)						
<i>Government Effectiveness</i>			0.0170 (0.0114)					
<i>Regulatory Quality</i>				0.00999 (0.00872)				
<i>Rule of Law</i>					0.0105 (0.00843)			
<i>Control of Corruption</i>						0.00668 (0.00670)		
<i>L.R_n_D</i>							0.109*** (0.0354)	
<i>L.Access_to_finance</i>								0.0762* (0.0392)
Constant	2.173** (0.968)	2.122** (1.019)	2.360** (1.149)	2.222** (1.064)	2.293** (1.089)	2.161** (1.078)	4.064*** (0.980)	4.634*** (1.173)
Observations	1,185	1,131	1,131	1,131	1,131	1,131	738	738
Number of country_code	75	75	75	75	75	75	75	75
AR(2)	0.202	0.228	0.243	0.239	0.237	0.237	0.135	0.149
Hansen	0.617	0.473	0.513	0.491	0.524	0.480	0.534	0.614

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 2: Digitalization and Services Export Sophistication

	Dependent Variable: Log (Export sophistication) - Services							
<i>L.export sophistication</i>	0.493*** (0.131)	0.548*** (0.149)	0.578*** (0.155)	0.586*** (0.149)	0.587*** (0.152)	0.584*** (0.148)	0.570*** (0.0958)	0.576*** (0.0986)
<i>Digital user index</i>	0.00155*** (0.000494)	0.00115** (0.000460)	0.000858** (0.000425)	0.000924** (0.000447)	0.000839* (0.000431)	0.000903** (0.000440)	0.000660** (0.000262)	0.000774*** (0.000286)
<i>FDI inflow</i>	0.0507*** (0.0176)	0.0514*** (0.0160)	0.0503*** (0.0154)	0.0516*** (0.0160)	0.0497*** (0.0161)	0.0495*** (0.0158)	0.0501*** (0.0132)	0.0474*** (0.0132)
<i>Tertiary enrollment ratio</i>	0.0158 (0.0151)	-0.00486 (0.0150)	0.00847 (0.0158)	0.00615 (0.0157)	0.00543 (0.0153)	0.00677 (0.0152)	0.0130 (0.0154)	0.0211 (0.0179)
<i>Voice&Accountability</i>		0.0123** (0.00467)						
<i>Government Effectiveness</i>			0.0129* (0.00748)					
<i>Regulatory Quality</i>				0.0115* (0.00616)				
<i>Rule of Law</i>					0.0122* (0.00655)			
<i>Control of Corruption</i>						0.0100* (0.00534)		
<i>L.R&D</i>							0.0601*** (0.0171)	
<i>L.Access to finance</i>								0.0316 (0.0232)
Constant	5.196*** (1.331)	4.614*** (1.502)	4.283*** (1.571)	4.198*** (1.505)	4.193*** (1.540)	4.226*** (1.496)	4.354*** (0.965)	4.282*** (0.990)
Observations	1,053	1,002	1,002	1,002	1,002	1,002	616	616
Number of country_code	73	73	73	73	73	73	73	73
AR(2)	0.591	0.469	0.420	0.434	0.425	0.424	0.674	0.645
Hansen	0.323	0.131	0.0993	0.0946	0.0838	0.0971	0.453	0.430

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3. Firm Growth, External Finance Dependence and Financial Development Using Net Sales

Net Sales Growth, External Finance Dependence and Financial Development						
	(1)	(2)	(3)	(4)	(5)	(6)
Sales Growth (t-1)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.013)	0.057*** (0.013)
EFD x FD	0.133*** (0.037)	0.119*** (0.037)				
EFD x FD x SME		0.098** (0.048)				
SME		-0.044** (0.022)		-0.055*** (0.020)		-0.023 (0.023)
EFD x FI			0.016 (0.032)	0.001 (0.032)		
EFD x FI x SME				0.122*** (0.043)		
EFD x FM					0.197*** (0.040)	0.189*** (0.040)
EFD x FM x SME						0.051 (0.053)
Observations	26170	26170	26170	26170	26170	26170
Companies	1916	1916	1916	1916	1916	1916

Notes: The dependent variable is the growth of net sales at the firm level. The sample includes Indonesia, Malaysia, Philippines and Thailand. Clustered standard errors at the firm level in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Appendix Table 4. Firm Level Results Including Singapore in the Sample

Table : Firm Growth, External Finance Dependence and Financial Development

	(1)	(2)	(3)	(4)	(5)	(6)
Sales Growth (t-1)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)
EFD x FD	0.109*** (0.029)	0.089*** (0.030)				
EFD x FD x SME		0.069* (0.039)				
SME		-0.044** (0.019)		-0.048** (0.019)		-0.036** (0.018)
EFD x FI			0.027 (0.028)	0.007 (0.029)		
EFD x FI x SME				0.077** (0.039)		
EFD x FM					0.154*** (0.030)	0.138*** (0.030)
EFD x FM x SME						0.054 (0.039)
Observations	30837	30837	30837	30837	30837	30837
Companies	2242	2242	2242	2242	2242	2242

Notes: The dependent variable is the growth of gross sales at the firm level. The sample includes Indonesia, Malaysia, Philippines, Singapore and Thailand. Clustered standard errors at the firm level in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Appendix Table 5. Firm Level Results – Other Measures of Financial Development

Table : Firm Growth, External Finance Dependence and Financial Development

	(1)	(2)	(3)	(4)
Sales Growth (t-1)	0.039*** (0.013)	0.039*** (0.013)	0.035** (0.014)	0.035** (0.014)
EFD x Stock Market Capitalization	0.001*** (0.0002)	0.0004** (0.0002)		
EFD x Stock Market Capitalization x SME		0.001*** (0.0002)		
SME		-0.054*** (0.018)		-0.029* (0.016)
EFD x Domestic Credit to Private Sector			0.0002 (0.0002)	0.0002 (0.0002)
EFD x Domestic Credit to Private Sector x SME				0.0003* (0.0002)
Observations	25027	25027	22406	22406
Companies	1875	1875	1875	1875

Notes: The dependent variable is the growth of gross sales at the firm level.

Financial development is measured as the stock market capitalization and the domestic credit to private sector as share of GDP. The sample includes Indonesia, Malaysia, Philippines and Thailand. Clustered standard errors at the firm level in parentheses.

* p<0.10, ** p<0.05, *** p<0.01

Table : Firm Growth, External Finance Dependence and Financial Development

	Financial Institutions - FI			Financial Markets- FM		
	(1)	(2)	(3)	(4)	(5)	(6)
Sales Growth (t-1)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)	0.034*** (0.012)
EFD x FID	0.023 (0.027)					
EFD x FIA		-0.001 (0.028)				
EFD x FIE			0.052** (0.025)			
EFD x FMD				0.097*** (0.027)		
EFD x FMA					-0.044 (0.031)	
EFD x FME						0.174*** (0.023)
Observations	30837	30837	30837	30837	30837	30837
Companies	2242	2242	2242	2242	2242	2242

Notes: The dependent variable is the growth of gross sales at the firm level. Financial development sub-indices capture Depth (D), Access (A) and Efficiency (E).

The sample includes Indonesia, Malaysia, Philippines, Singapore and Thailand.

Clustered standard errors at the firm level in parentheses. * p<0.10, ** p<0.05, *** p<0.01

Appendix Table 6. Determinants of Financial Development – Including USA and Singapore in the Sample

	(1)	(2)	(3)	(4)	(5)
Log Real GDP per capita (t-1)	0.133*** (0.011)	0.132*** (0.011)	0.133*** (0.011)	0.131*** (0.011)	0.130*** (0.011)
Change in Corporate Income Tax rate (t-1)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002* (0.001)	-0.002** (0.001)
Capital Account Openness (t-1)	0.070*** (0.013)	0.074*** (0.013)	0.070*** (0.013)	0.071*** (0.013)	0.068*** (0.013)
Government Stability (t-1)	0.010*** (0.001)	0.010*** (0.001)	0.010*** (0.001)	0.011*** (0.002)	0.010*** (0.001)
Log Population (t-1)	0.177*** (0.030)	0.175*** (0.029)	0.176*** (0.030)	0.174*** (0.029)	0.174*** (0.029)
Log Trade Openness (t-1)	0.069*** (0.014)	0.069*** (0.014)	0.069*** (0.014)	0.073*** (0.014)	0.094*** (0.017)
Capital Account Openness (t-1) x ASEAN5 Dummy		0.096* (0.051)			
Change in Corporate Income Tax rate (t-1) x ASEAN5 Dummy			0.000 (0.003)		
Government Stability (t-1) x ASEAN5 Dummy				-0.006* (0.003)	
Log Trade Openness (t-1) x ASEAN5 Dummy					-0.113*** (0.028)
Observations	880	880	880	880	880
R-Squared	0.451	0.453	0.451	0.453	0.462

Source: IMF Staff Calculations.

Robust standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Appendix Table 7. Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Firm Level Data					
Sales Growth (Log change)	25,027	0.070	0.319	-0.877	1.125
Net Sales Growth (Log change)	26,170	0.068	0.338	-0.962	1.226
Industry median EFD	26,170	0.800	0.107	0.1215	1
Cross - Country sample					
Financial Development Index	824	0.529422	0.193421	0.093427	0.90073
Real GDP per capita (Log)	824	9.579233	0.98738	6.592414	11.22675
Change in Corporate income Tax	824	-0.39922	2.038749	-20	10
Capital Account Openness Index	824	0.72919	0.324404	0	1
Government Stability Index	824	7.902306	1.693884	3	12
Population (Log)	824	16.87894	1.78708	12.8148	21.06525
Trade openness (Log)	824	4.353093	0.614158	2.689953	5.77665

Sample of countries in the analysis of the determinants of financial development: Argentina, Austria, Belgium, Brazil, Canada, Chile, China, Cyprus, Estonia, Finland, France, Germany, Greece, Indonesia, Ireland, Italy, Japan, Korea, Rep., Latvia, Lithuania, Malaysia, Malta, Mexico, Myanmar, Netherlands, Philippines, Portugal, Slovak Republic, Slovenia, Spain, Thailand, Vietnam.

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