Chapter 4

Trade and E-Commerce in Asia: Policy Considerations

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4.1. Introduction

The continued rapid expansion of e-commerce globally presents growth opportunities for Asia and the Pacific economies.[2] To benefit, they have to navigate policy areas with a clear mindset and a forward-looking perspective. E-commerce transforms trade by making the flow of information more efficient throughout the transaction process, making the flow of funds faster and less costly through the ancillary e-payment services, and increasing the traffic of retail parcels across borders.

This chapter first seeks to establish empirically the extent to which e-commerce market development is influencing the bilateral flow of consumer goods trade in Asia and the Pacific. The proposition is that e-commerce activity of trading economies has a significant positive effect on the magnitude of their bilateral consumer goods trade. E-commerce development feeds into trade directly and indirectly. The direct channel pertains to transactions made online and the producer is based offshore. The indirect channel pertains to purchases that pass through traditional linkages but are distributed via the domestic e-commerce ecosystem.

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[2] This chapter was prepared as a background paper for ADB (2021).

The second objective of the chapter is to lay out the policy issues relevant to the linkage between e-commerce and trade. These issues include the competitiveness of local entrepreneurs in the digital space, the underlying support infrastructure, trade facilitation, and compliance to customs regulations.

In the subsequent discussion, Section 2 reviews the literature on the relationship between e-commerce and cross-border trade. Section 3 describes the framework of analysis, the characteristics of internet retailing and platform revenue data used in the analysis, and the details of the methodology. Section 4 lays out the results of the empirical exercise. Section 5 fleshes out the policy considerations given the empirical results. And Section 6 sums up key messages of the research.

4.2. Background

As it expands globally, e-commerce causes various industries to modify business models and amplifies "servicification." Enterprise participation in digital platforms is arguably underpinned by network effects (Kinda 2019). Global e-commerce sales are estimated to have exceeded $25 trillion in 2018, or about 30% of gross domestic product (GDP) of economies included in the assessment (UNCTAD 2020). The report indicates that the business-to-business segment accounts for about 83% of sales and the rest by business-to-consumer (B2C).[3]

The deepening penetration of e-commerce is particularly important in Asia and the Pacific. United Nations Conference on Trade and Development (UNCTAD 2020) data put the People's Republic of China (PRC), Japan, and the Republic of Korea in the top five economies for total e-commerce sales, led by the United States. A separate report shows that Asia and the Pacific accounted for an estimated 44% of global B2C e-commerce turnover in 2019 (Ecommerce Foundation 2019).

The growing clout of digital platforms in e-commerce cannot be overlooked. E-commerce transforms trade in at least three ways. First, internet-based marketplaces make the flow of information more cost-efficient. This includes finding markets or suppliers in another country, getting information about the products, and facilitating and monitoring orders.

[3] UNCTAD (2020) makes no mention of the business-to-government segment.

Second, the accompanying e-payment systems make the flow of funds faster and less costly, with built-in validation mechanisms. Finally, e-commerce increases the traffic of *parcelized* cross-border shipments.

Empirical literature examining the relationship between e-commerce development and trade has gained traction in recent years. The lack of official and publicly available comprehensive cross-border e-commerce transactions datasets, however, remains a considerable limitation. As a result, existing analyses use privately collected data that only provide glimpses of the dynamics, as ADB and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) (2018) point out. Nevertheless, consensus appears to be growing on the significant impact of e-commerce on trade. The empirical results of this chapter not only lend support to this view, but also provide information on the magnitude of association between e-commerce development and bilateral trade.

Lendle et al. (2016) look into e-commerce platform data and links the trends with international trade. Specifically, it examines the changes in the distance parameter between transactions done via eBay and offline traditional trade. Notably, in the mid-2000s, eBay was one of the largest global online marketplaces. The Lendle et al. (2016) dataset comprises 61 developing and developed economies from 2004 to 2007. The eBay product categories are matched with product descriptions from the six-digit level HS classification to make the basket of goods comparable. Using ordinary least squares (OLS) and poisson pseudo maximum likelihood (PPML) to estimate a gravity model, they find that the effect of distance is reduced by an average of 65% (across commodities) on eBay that is attributed to lower search cost. They argue that the reduction in distance effect rises when information frictions are higher (e.g., different languages between trading economies or when corruption is high).

Gomez-Herrera, Martens, and Turlea (2014), who analyze a cross-sectional dataset that compares the online and offline trade, also confirm the reduction in distance-induced trade costs in online trade compared to offline trade. The analysis draws from a commissioned survey that contained information on online domestic and cross-border B2C trade in goods between the European Union member states. OLS, PPML, and Heckman techniques were employed to estimate the specified gravity model.

Meanwhile, Kim, Dekker, and Heij (2017) postulate that distance remains a key dampener of cross-border trade. However, ancillary services, such as express delivery, reduce the distance effect for cross-border demand.

The study uses the data of the central distribution center in the Netherlands on cross-border e-commerce services to 721 regions in five European Union economies: Germany, Italy, Spain, Sweden, and the United Kingdom (then a member). The gravity model is estimated using OLS.

Incidentally, while the studies linking e-commerce and international trade are emerging, extensive literature has examined the relationship between information and communication technology (ICT) and trade. Xing (2017), who analyzes the role of ICT and e-commerce indices in the trading patterns of 51 developed and developing economies, concludes that access to advanced ICT and e-commerce applications stimulates bilateral trade flows. The study uses a cross-section dataset and estimates a gravity model by OLS. Freund and Weinhold (2002, 2004), Tang (2006), Clarke and Wallsten (2006), Vemuri and Siddiqi (2009), Choi (2010), Liu and Nath (2014), and Yushkova (2014) also provide empirical evidence of the significant positive contribution of ICT in facilitating cross-border flow of goods and services.

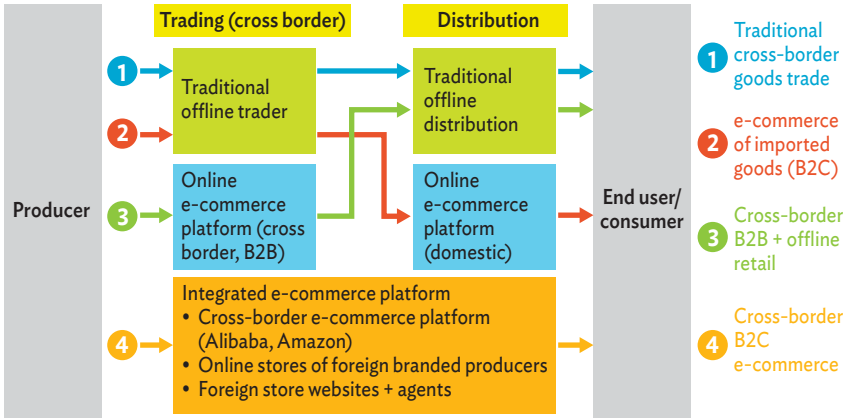
4.3. Research Objectives

The existing literature largely provides evidence of the relative ease of online goods transactions. An ample number of studies examine the value of ICT infrastructure in fostering e-commerce development as well. To add another dimension to the analysis, this study seeks to establish empirically the extent to which e-commerce market development is influencing the bilateral consumer goods trade in Asia and the Pacific.

The study posits that the level of joint e-commerce activity of trading economies has a significant positive effect on the magnitude of bilateral trade. Following the framework in Figure 4.1, e-commerce development feeds into trade directly and indirectly. The direct channel pertains to transactions done online wherein the producer is based offshore. The e-commerce integrated platforms are part of this process. The indirect channel pertains to purchases that pass through traditional linkages but are distributed via the domestic e-commerce ecosystem.

Moreover, this chapter lays out policy issues relevant to the linkage between e-commerce development and trade. Notwithstanding efforts to generate e-commerce official statistics, issues related to consumer and data protection, data localization, and digital infrastructure have been highlighted.

Figure 4.1: E-Commerce and Cross-Border Trade Linkages



B2B = business-to-business, B2C = business-to-consumer.
Source: Ali Research and Accenture (2016).

Beyond these, concern exists about the ability of domestic firms to compete in e-commerce and for economies to maximize the value added of the local participation in e-commerce. Taxation, in particular the *de minimis* rule that can have domestic market competition implications, is another important issue. Finally, the evolving trade dynamics call into question the responsiveness of the trade agreements and free trade zone strategies to strengthen production bases and address related customs challenges.

4.4. Internet Retailing and Platform Revenues Data

The assessment takes advantage of e-commerce internet retailing data compiled by Euromonitor International at the country level and spanning 2006 to 2018, and platform revenues data in 2017 and 2018 from Statista. In this exercise, the internet retailing data serve as a proxy for the e-commerce market activity or e-commerce market development in each country. The e-commerce platform revenues data, on the other hand, proxy for e-commerce platform penetration.

Technically, internet e-commerce retailing is a subset of B2C e-commerce that excludes auctions or travel bookings (Francis and White 2004). However, it is arguably the biggest component of the B2C market. The internet retailing

data of Euromonitor International is likewise one of the most comprehensive datasets available at present that is collected consistently over a considerable length of time.

Succinctly, the Euromonitor International internet retailing data refer to sales of consumer goods to the general public on the internet, including sales through mobile phones and tablets. The dataset is composed of sales from pure e-commerce websites and sites operated by traditional retail stores. The location of sales in the dataset refers to the consumer's country and the sources of information include public and private institutions. The dataset at hand covers 19 economies in Asia and the Pacific.[4] These economies each have data since 2006, except Azerbaijan (missing data in 2006), Pakistan (missing data in 2006 and 2007), and Viet Nam (missing data from 2006 to 2009).

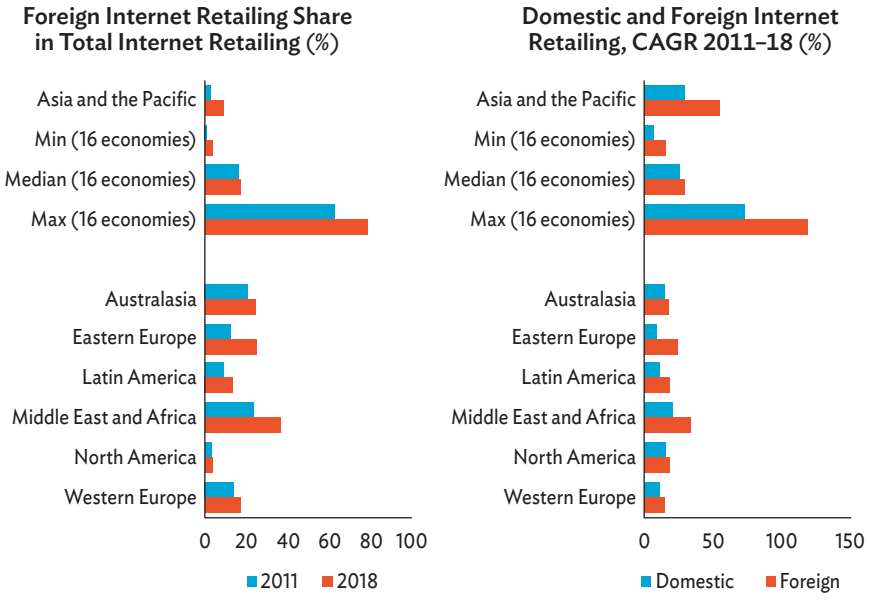
Meanwhile, the platform revenues data are from Statista, compiled using primary survey, country-specific sources, industry associations, and third-party studies. E-commerce platform revenue comprises sales of physical goods via a digital channel to a private end user. In the dataset at hand, actual data are available for 2017–2018 covering 150 economies, of which 34 are from Asia and the Pacific.

4.5. General Trends and Preliminary Inspection

High-level inspection of the data show that the rate of expansion of internet retailing has been encouraging across Asian economies. Growth has gained some traction in recent years in Azerbaijan, Cambodia, the Lao People's Democratic Republic, Malaysia, Pakistan, the Republic of Korea, Singapore, Sri Lanka, Uzbekistan, and Viet Nam. Disaggregated data further reveal that the share of foreign retail sales grew faster across geographic clusters between 2011 and 2018 (Figure 4.2). This observation holds in 11 of 16 Asia and the Pacific economies, where disaggregation is available in our dataset. As a proportion of the countries' GDP, the range of ratios in 2018 is rather wide, i.e., between less than 0.02% and about 20%.

[4] The sample includes economies from Central Asia, East Asia, South Asia, and Southeast Asia.

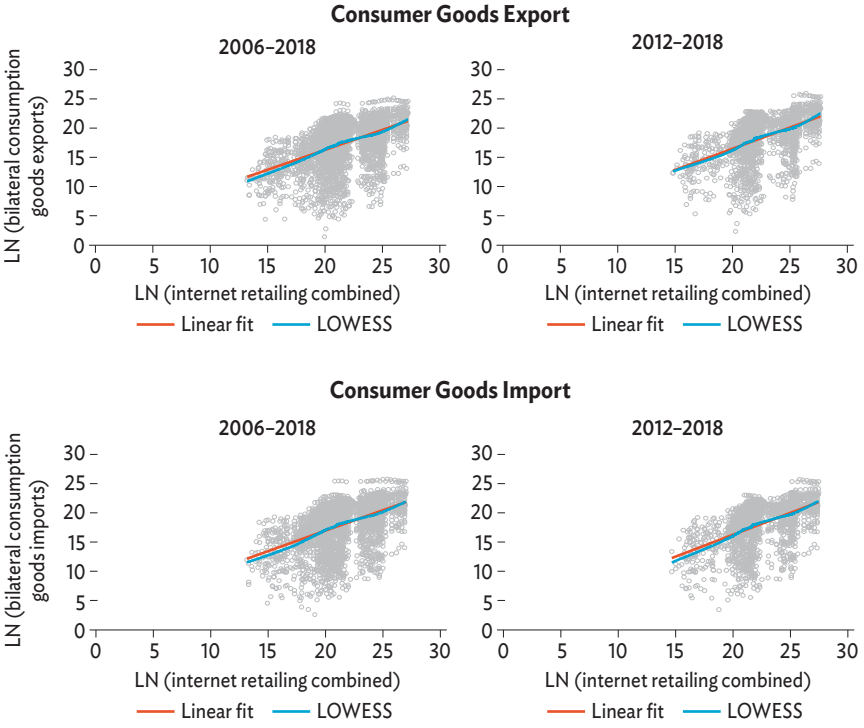
Figure 4.2: Shares and Growth in Internet Retailing Sales by Segment



CAGR = compounded annual growth rate.
Note: Country groupings are based on the definitions of Euromonitor. Azerbaijan data start in 2007, Pakistan in 2008, and Viet Nam in 2010.
Source: Author, based on Euromonitor International Retailing industry edition 2019.

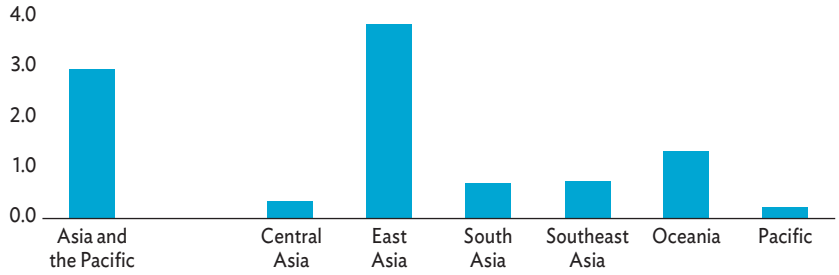
In cross-border transactions, the pair-wise, combined e-commerce internet retailing of the trading economies exhibits positive association with their bilateral trade (Figure 4.3), as expected. The association holds for both the full sample (2006–2018) and sub-sample (2012–2018). Similarly, digital e-commerce platforms are vital channels of digital retailing. Total e-commerce platform revenue in Asia and the Pacific 2017 and 2018 is about 3% of GDP in those 2 years (Figure 4.4). Among the subregions, East Asia has the highest ratio at almost 4%, then Oceania. Ratios are highly dispersed at the country level, i.e., between 5% and less than 0.04%. Overall, the combined e-commerce platform revenues of reporter and partner economies exhibit positive association with their bilateral consumer goods trade (Figure 4.5). The same can be observed if the sample is constrained to Asia and the Pacific reporting economies (Figure 4.6).

Figure 4.3: Combined Internet Retailing Sales and Bilateral Consumption Goods Trade, 2006–2018 and 2012–2018



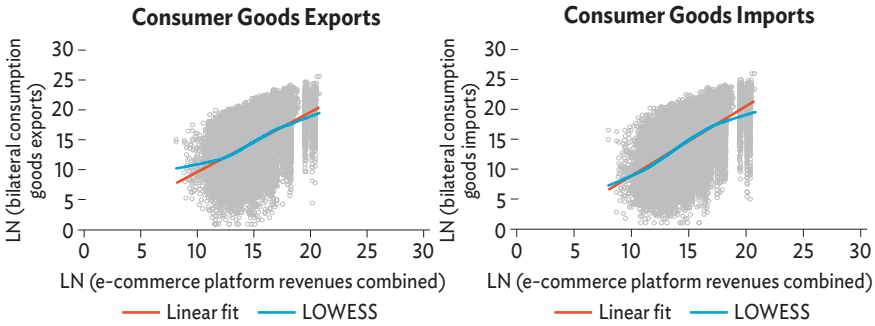
Note: LOWESS is a plot based on a locally weighted regression of the dependent and independent variables.
Sources: Author, based on Euromonitor International Retailing industry edition 2019 and UN Comtrade (accessed April 2020).

Figure 4.4: E-Commerce Platform Revenues, 2017–2018
(% of GDP)



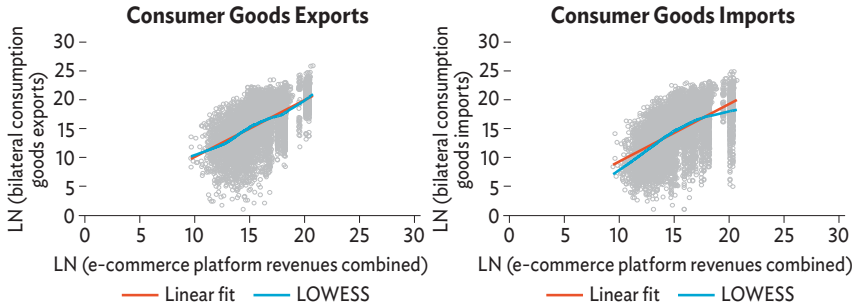
GDP = gross domestic product.
Source: ADB (2021).

Figure 4.5: Combined Platform Revenues and Bilateral Consumption Goods Trade, All Reporting Economies, 2017–2018



Note: LOWESS is a plot based on a locally weighted regression of the dependent and independent variables.
Sources: Author, based on Statista (2020a, 2020b) (accessed 15 July 2020) and UN Comtrade (accessed 15 April 2020).

Figure 4.6: Combined Platform Revenues and Bilateral Consumption Goods Trade, Reporting Asia and the Pacific Economies, 2017–2018



Note: LOWESS is a plot based on a locally weighted regression of the dependent and independent variables.
Sources: Author, based on Statista (2020a, 2020b) (accessed 15 July 2020) and UN Comtrade (accessed 15 April 2020).

4.6. The Gravity Model

To examine the relationship more rigorously, gravity model-based specifications are estimated. The analysis focuses on the sensitivity of consumer goods trade to the combined internet retailing activity and the penetration of e-commerce digital platforms in trading partner economies. The specification for the empirical exercise follows the theory-based gravity model of Anderson and van Wincoop (2003).[5] In this analysis, the baseline regression equation is given by equation 4.1, which is essentially split into fixed effects and trade cost variables and the combined e-commerce activity of the country pair. The extensive array of fixed effects control for the multilateral resistance.[6] These fixed effects also absorb the size variables and other observable and unobservable time-invariant characteristics of the economies (Yotov et al. 2016).

Eq. 4.1. $$ln\, X_{ij,t} = c + \delta_{i,t} + \delta_{j,t} + \beta_1\, ln\, D_{ij} + \beta_2 Comcol_{ij} + \beta_3 Comlang_{ij} + \beta_4 Contig_{ij} + \beta_5 ln\, Eco_{ij,t} + \varepsilon_{ij,t}$$

D is the geographic distance. *Comcol, Comlang, Contig* are dummy variables indicating whether the partner economies have the same colonizer, a common official language, and common border, respectively. *Eco* is the combined internet e-commerce retailing sales (first set of estimates) and the e-commerce platform revenues in the two economies (second set of estimates). For this exercise, bilateral exports of consumption goods are used as the dependent variable. The betas are the parameters to be estimated and ε is the error term. Table 4.1 summarizes the data sources.

5 Gomez-Herrera, Martens, and Turlea (2014) provide a detailed backstory of the use of the gravity model in analyzing trade flows. Lendle et al. (2016), Shepherd (2016), and Yotov et al. (2016) provide additional information on the derivation of the base equation.

6 Following Anderson and van Wincoop (2003), the multilateral resistance captures the bilateral trade resistance between region i and region j with respect to region's i's resistance to trade with all regions, and region j's resistance to trade with all regions. The resulting panel is unbalanced. Fisher-type unit-root test was done to inspect the stationarity of the nominal variables.

Table 4.1: Primary Data and Data Sources

Data	Data Sources
Bilateral goods trade data	UN Comtrade database
Internet retailing e-commerce sales	Euromonitor International Retailing industry edition 2019
Platform revenues	Statista (2020a, 2020b)
Distance	CEPII
Contiguity	CEPII
Language	CEPII
Colonial history	CEPII
ICT indicators	World Bank, World Development Indicators

CEPII = Centre d'Etudes Prospectives et d'Informations Internationales, ICT = information and communication technology, UN = United Nations.
Note: All data in levels are in nominal terms.

Poisson pseudo maximum likelihood (PPML) is the primary estimation procedure employed, which, as proposed by Santos Silva and Tenreyro (2006), is advantageous in dealing with zero trade flows. The estimator is assessed to be well-behaved even if there are substantial numbers of zeros in the dataset (Santos Silva and Tenreyro 2011). More importantly, the PPML estimator is robust to heteroscedasticity. The PPML is also the suggested gravity model estimation technique in the manuals released by UNCTAD, World Trade Organization, and UNESCAP (Yotov et al. 2016; Shepherd 2016).

In estimating the PPML parameters, the codes put together by Correia, Guimarães, and Zylkin (2019) for *Stata* are utilized. This code set substantially increases the time efficiency in estimating the parameter values in the presence of multiple high-dimensional fixed effects. To ensure the existence of maximum likelihood estimates, the code identifies and does away with separated or problematic observations in the sample without losing relevant information.

For internet retailing sales, the panel dataset has an interval of 2 years, following Yotov et al. (2016). The rationale is that trade flows do not typically adjust within 1 year of changes in structural or policy variables. While it is desirable to have longer intervals akin to Trefler (2004) and Anderson and Yotov (2016), it will substantially reduce the observations. The Ramsey regression equation specification error test is used to assess the functional form of the PPML regression specifications. The baseline model is re-estimated using the gamma pseudo maximum likelihood (GPML), Heckman 2-stage sample selection, and OLS to check the robustness of the results.

To obtain information on parameter changes over time and across exported commodity types, variations of the baseline model have been estimated. Capital goods exports, intermediate goods exports, and total goods exports were also used as dependent variables. The idea is to examine potential spillovers into trade in other types of goods. The commodity compositions of consumer, intermediate, and capital goods follow the UN Comtrade Broad Economic Categories commodity classification and definitions. Technology access indicators such as internet and mobile phone usage have also been used in lieu of internet retailing e-commerce sales to extract information on their relative importance to consumer goods trade.

For the e-commerce platform revenues dataset, estimations are carried out in two ways due to the shortness of the time period, i.e., only 2 years. The dataset is first treated as a 2-year panel and then as a cross section (i.e., platform revenues and trade flows over the 2-year period are summed up) to verify if results hold or change. Estimations are also done across different regions, Asia and the Pacific, Europe, Africa, and the Americas, to draw information on variations in cross-regional dynamics. Consumer goods exports from UN Comtrade following the Broad Economic Categories classification are used as the dependent variable and PPML was the estimation technique employed in all platform-related estimations.

4.7. Results and Findings

The results of the estimations indicate that internet retailing e-commerce sales are seemingly positively driving the consumer goods trade. The corresponding parameter value using PPML estimation conveys a positive association between combined e-commerce sales of trading economies and their bilateral trade (Table 4.2, column 1). The positive association is supported by the results using the other three estimation techniques and is statistically significant in two, i.e., the OLS and Heckman (Table 4.2, columns 2–4). Separately, commonality in language and border are also associated with higher trade, while distance is a significant barrier to trade flows.[7]

[7] The beta parameters of the dummy variables give information on the semi-elasticities that can be calculated as $(\mathbf{e}^{(beta)} - 1)*100$.

Table 4.2: E-Commerce and Consumption Goods Trade, 2006–2018

	Dependent Variable: Bilateral Consumption Goods Exports			
	PPML	OLS	GPML	Heckman[1]
Distance	−0.659***	−1.501***	−1.709***	−1.478***
	(0.1046)	(0.2166)	(0.2630)	(0.0764)
Common colony	−0.042	1.623***	1.749***	1.594***
	(0.1879)	(0.3885)	(0.2254)	(0.1211)
Common language	0.604***	−0.211	0.223	−0.194
	(0.1492)	(0.3185)	(0.2308)	(0.1505)
Contiguity	0.508***	0.433	0.655**	0.440***
	(0.1420)	(0.3200)	(0.2728)	(0.1352)
E-commerce	0.148**	0.156*	0.119	0.150***
	(0.0575)	(0.0940)	(0.1001)	(0.0402)
Constant	23.737***	16.548***	22.914***	16.824***
	(1.0406)	(2.8695)	(2.6022)	(1.0347)
Fixed effects:				
Exporter-year	Yes	Yes	Yes	Yes
Importer-year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	No
Total observations	1,977	1,935	1,977	2,229
Uncensored observations				1,935

CEPII = Centre d'Etudes Prospectives et d'Informations Internationales, GPML = gamma pseudo maximum likelihood, OLS = ordinary least squares, PPML = poisson pseudo maximum likelihood.
Notes: 1-FTA dummy variable sourced from the Asian Development Bank, Asia Regional Integration Center database was used as the auxiliary regression in the selection equation. The numbers in parentheses are the standard errors: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The pseudo R-squared of the PPML is 0.9612. The Ramsey RESET Test was used to check the functional form.
Sources: Author, based on Euromonitor International Retailing industry edition 2019, UN Comtrade (accessed April 2020), and CEPII (accessed April 2020).

Interestingly, subsample inspection (2012–2018) supports the earlier finding on the relationship between internet retailing e-commerce sales and consumer goods cross-border trade and the parameter value has even risen using data in recent years (Table 4.3, column 1). The PPML internet retailing parameter, which indicates the elasticity of consumer goods exports to the combined internet retailing e-commerce activity (following Yotov et al. 2016), is positive, significant, and marginally higher than the full sample (i.e., from 0.148 to 0.165). The estimates using the other three methods indicate a similar story (Table 4.3, columns 2–4).

Table 4.3: E-Commerce and Consumption Goods Trade, 2012–2018

	Dependent Variable: Bilateral Consumption Goods Exports			
	PPML	OLS	GPML	Heckman[1]
Distance	-0.632***	-1.548***	-1.816***	-1.529***
	(0.1169)	(0.2317)	(0.2700)	(0.0995)
Common colony	-0.011	1.639***	1.635***	1.614***
	(0.1935)	(0.3962)	(0.2244)	(0.1554)
Common language	0.594***	-0.274	0.22	-0.251
	(0.1541)	(0.3377)	(0.2255)	(0.1995)
Contiguity	0.466***	0.367***	0.53***	0.374**
	(0.1545)	(0.3385)	(0.2821)	(0.1754)
E-commerce	0.165**	0.216**	0.178*	0.203***
	(0.0644)	(0.1003)	(0.1030)	(0.0536)
Constant	23.072***	16.552***	24.210***	16.643***
	(1.1354)	(3.0635)	(2.7920)	(1.2678)
Fixed effects:				
Exporter-year	Yes	Yes	Yes	Yes
Importer-year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	No
Total observations	1,239	1,219	1,239	1,352
Uncensored observations				1,219

GPML = gamma pseudo maximum likelihood, OLS = ordinary least squares, PPML = poisson pseudo maximum likelihood.
Notes: 1-FTA dummy variable sourced from the Asian Development Bank, Asia Regional Integration Center database was used as the auxiliary regression in the selection equation. The numbers in parentheses are the standard errors: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. The pseudo R-squared of the PPML is 0.9612. The Ramsey RESET Test was used to check the functional form.
Sources: Author, based on Euromonitor International Retailing industry edition 2019, UN Comtrade (accessed April 2020), and CEPII (accessed April 2020).

The parameter of distance in the PPML estimation, though still negative and significant, suggests that the variable is marginally less of an obstacle in the subsample.[8] In the same way, commonality in official language, albeit still significant in PPML, has a lower parameter value in the subsample and insignificant in other specifications. This could be explained by the greater availability of translation facilities, which bridges communication gaps across economies.

[8] In this setup, disentangling the determinants of the distance parameter is not straightforward. As Gomez-Herrera, Martens, and Turlea (2014) point out, it could include transport costs, import tariffs, costs due to regulatory differences between economies, financial transaction costs, and information costs to bring the trading partners together in a transaction, etc.

Estimations were also done across commodity types and the results indicate that the influence of internet retailing in commodities other than consumption goods is comparatively limited and statistically insignificant. Subsample estimations yield roughly similar results.

Moving to the platform penetration, PPML estimates using regional subsets purport that trade of Asia and the Pacific economies with regional partners is more sensitive to e-commerce platform development than trade with partners outside the region (Tables 4.4 and 4.5). This indicates the relative maturity of intra-regional e-commerce ties in Asia and the Pacific. It is seemingly the case in Europe (albeit statistically insignificant) but not in Africa and the Americas. Separate estimations treating the platform revenue dataset as a 2-year cross section (i.e., summing activities over a 2-year period) yield a picture consistent with these results.

Table 4.4: Platform Revenues and Consumption Goods Trade by Region with All Partners, 2017–2018

Reporters' Region	Asia and the Pacific	Europe	Africa	Americas
Partner: All reporting economies				
Dependent variable: Bilateral consumer goods exports				
Distance	-0.7373***	-0.5319***	-1.2789***	-0.4081***
	(0.1084)	(0.0833)	(0.1133)	(0.1138)
Common colonial ties	0.5431***	1.6975***	0.2464	0.4344
	(0.1806)	(0.3666)	(0.3471)	(0.6311)
Common language	-0.0732	0.2856*	0.8567***	0.3736***
	(0.1353)	(0.1602)	(0.1593)	(0.1161)
Contiguity	0.1615	0.6232***	1.0971***	1.5514***
	(0.1492)	(0.1135)	(0.2322)	(0.2183)
E-commerce platform	0.1467***	0.0177	0.3286***	0.0176
	(0.0513)	(0.0662)	(0.0983)	(0.0663)
Constant	24.9720***	24.8841***	21.0082***	24.3188***
	(1.2768)	(1.5809)	(2.4903)	(1.8346)
Fixed effects				
Exporter-year	Yes	Yes	Yes	Yes
Importer-year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	Yes
Number of observations	6,453	10,274	5,658	4,532
Pseudo R-squared	0.9540	0.9303	0.8382	0.9552

PPML = poisson pseudo maximum likelihood.
Note: PPML method is used. The numbers in parentheses are the standard errors: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
Sources: Author, based on Statista (2020a, 2020b) and UN Comtrade (accessed April 2020).

Table 4.5: Platform Revenues and Consumption Goods Trade by Region with Regional Partners, 2017–2018

Reporters' Region	Asia and the Pacific	Europe	Africa	Americas
Partner: All reporting economies in the same region				
Dependent variable: Bilateral consumer goods exports				
Distance	-0.6392***	-0.5798***	-1.6511***	-1.0571***
	(0.0849)	(0.0814)	(0.1123)	(0.0866)
Common colonial ties	0.3689**	1.5295***	-0.4239*	3.7908***
	(0.1786)	(0.4247)	(0.2333)	(0.4022)
Common language	0.1941	0.3647**	0.8673***	-0.461***
	(0.1568)	(0.1826)	(0.2281)	(0.1128)
Contiguity	0.381***	0.6263***	0.7895***	0.7225***
	(0.1395)	(0.0996)	(0.1994)	(0.1303)
E-commerce platform	0.2245***	0.0776	0.0508	-0.1074
	(0.0669)	(0.0755)	(0.1217)	(0.0668)
Constant	21.3234***	23.6575***	28.5839***	33.4504***
	(1.5092)	(1.6761)	(2.7275)	(1.9547)
Fixed effects				
Exporter-year	Yes	Yes	Yes	Yes
Importer-year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	Yes
Number of observations	1,515	2,659	1,682	921
Pseudo R-squared	0.9477	0.9314	0.8784	0.9852

PPML = poisson pseudo maximum likelihood.
Note: PPML method is used. The numbers in parentheses are the standard errors: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
Source: Author, based on Statista (2020a, 2020b) and UN Comtrade (accessed April 2020).

Finally, the number of internet and mobile phone users of trading economies are found to be positively associated with consumer goods exports, with the former seemingly having broader impact than the latter (Table 4.6). Both metrics are significant components in e-commerce development. Despite the data limitations in capturing the quality dimension, the increase in parameter values between the full sample and subsubsample lends empirical support to the thesis that ICT tools help facilitate trade.

It cannot be ruled out that the elasticities could be higher if there were available data that adjusted the simple usage metrics for quality—a potential area of future research. Quality could be in terms of the improvement in speed and functionalities of the internet (e.g., cloud hosting) that are vital in e-commerce development. The same can be said of the capabilities of

Table 4.6: ICT Indicators and Consumption Goods Trade, 2006–2018 and 2012–2018

	Dependent Variable: Bilateral Consumption Goods Exports			
	PPML1 2006–18	PPML2 2006–18	PPML1 2012–18	PPML2 2012–18
Distance	-0.780***	-0.798***	-0.761***	-0.768***
	(0.0843)	(0.0849)	(0.0897)	(0.0891)
Common colony	0.246	0.276	0.288	0.328*
	(0.1921)	(0.1840)	(0.1974)	(0.1870)
Common language	0.143	0.133	0.125	0.121
	(0.1084)	(0.1096)	(0.1146)	(0.1155)
Contiguity	0.469***	0.46***	0.401***	0.391***
	(0.1221)	(0.1227)	(0.1294)	(0.1293)
Internet		0.175***		0.19***
		(0.0628)		(0.0706)
Mobile telephone	0.145*		0.151*	
	(0.0754)		(0.0814)	
Constant	26.114***	25.736***	25.884***	25.225***
	(1.5513)	(1.1643)	(1.7287)	(1.3615)
Fixed effects:				
Exporter-year	Yes	Yes	Yes	Yes
Importer-year	Yes	Yes	Yes	Yes
Cluster exporter-importer	Yes	Yes	Yes	Yes
Total observations	27,675	24,943	16,000	13,379
Pseudo R-squared	0.9604	0.9604	0.9599	0.9598

CEPII = Centre d'Etudes Prospectives et d'Informations Internationales, ICT = information and communication technology, PPML = poisson pseudo maximum likelihood.
Notes: PPML method is used. The numbers in parentheses are the standard errors: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.
Sources: Author, based on UN Comtrade; World Bank, World Development Indicators Database; and CEPII (accessed April 2020).

the current generation of mobile phones in the applications that they can accommodate—a digital tool, together with websites, that is exploited heavily by e-commerce enterprises and platforms to expand their reach.

For instance, Abeliansky and Hilbert (2016) suggest that data speed quality matters most for developing economies' exports, whereas the subscription quantity is more relevant for developed economies. The reason for this is that data speed in developing economies is deemed generally far from the "frontier," thus, incremental improvement can be material in facilitating trade, while the increase in high-speed subscriptions in developed economies are argued to result in the opening of new markets.

4.8. National Policy and Regional Cooperation Implications

The growing role of e-commerce in trade facilitation could lead to significant adjustments in the supply and value chain in coming years. Digital platforms, therefore, with their ancillary tucked-in services will arguably play an even more pronounced role moving forward. As Fine (1998) and Weil (2013) aptly posit, integrated value chains are "unbundled, attacked, and commoditized" in the short run, before a new wave of innovations will drive the re-bundling and de-commoditization.

The prevailing circumstances are both an opportune time to further the development of the inclusiveness agenda and to review trade and related policies. ADB and UNESCAP (2018) highlight a number of crucial policy issues to help economies foster e-commerce. These are largely issues that pertain to digitalization as a whole, including e-commerce induced trade. For governments, the report underlined the importance of official statistics for monitoring and analysis. It stressed the need to work on harmonizing applicable laws and regulations, including taxation, and improve the access to and quality of ICT infrastructure such as e-payments systems. It also underscored the need to attract foreign players to reap potential gains from technology transfer, facilitate development of the ICT skills of the locals, and enact the requisite regulations on intellectual property, cybersecurity, consumer protection, and data protection, among other things.

Beyond the cross cutting digitalization policy concerns, there are three important policy areas that are specifically relevant to cross-border e-commerce transactions (ADB 2021). These are:

- competition, customs administration, and trade taxation;
- the role of multilateral initiatives and trade agreements in resolving policy disconnects; and
- the responsiveness of free trade zone or economic processing zone strategies in light of the increasing role of platforms and other digital media in trade.

Taxation, Competition, and Customs Administration Issues

Trade taxation is one contentious topic, as ADB and UNESCAP (2018) note. Parcelization of transactions has allowed overseas e-commerce players to benefit from a certain degree of customs duties exemptions subject to the countries' *de minimis* rules. The principle behind this practice is to avert spending more on tax administration than the amount that can be collected.

De minimis regimes that apply to e-commerce tend to vary across economies. In a meeting of the Asia-Pacific Economic Cooperation in 2011, a *de minimis* threshold of $100 was endorsed (APEC 2011). However, this direction of policy cooperation has not gained much traction since. In comparison, the customs duties on digital trade, which are also under intense scrutiny of late, are subject to a long-standing World Trade Organization (WTO) agreement.[9] After the WTO formally adopted its Work Programme on Electronic Commerce in 1998 (WTO 1998a, 1998b), the moratorium on imposing customs duties on electronic transmissions has been extended a number of times and remains in place as of this writing. The discussions on these extensions are not straightforward as some WTO members have raised concerns on the implications for government revenue.

Terzi (2011) notes that digital innovations such as the internet have opened markets that were previously relatively difficult to penetrate, which makes it akin to trade liberalization. Against this characterization, keeping, if not raising, the *de minimis* thresholds enables trade flows and is deemed to generate substantial net economic benefits (Holloway and Rae 2012; International Chamber of Commerce 2015).

[9] In digital trade, a multilateral agreement on customs duties exists on electronic transmissions, which can be traced back to 1998 under WTO auspices (International Chamber of Commerce 2019). The moratorium is reviewed every 2 years and the governments agree on its extension at the biennial WTO Ministerial Conference. The moratorium remains in place as of this writing. In their decision in December 2019, the WTO members agreed to maintain the practice of not imposing customs duties on electronic transmissions until the 12th Ministerial Conference (WTO 2019), which scheduled in late 2021. Nevertheless, the loss in potential revenue as transactions volume has increased several fold is becoming an issue in many economies, notwithstanding efficiency gains from free-flowing data. For instance, Bangga (2019) estimates that because of the moratorium, the WTO developing member economies, as a group, incur tariff revenue loss of about $10 billion annually, using average bound duties, and $5.1 billion, using average most favored nation (MFN) applied rate.

On the other hand, the thresholds have become somewhat a regulatory gateway for the relatively cheaper products from offshore producers to access the domestic markets and compete with domestic firms. In this sense, e-commerce does tend to magnify comparative advantages of some economies in international trade of certain goods.

Enabling local entrepreneurs and enterprises to participate in e-commerce is one thing; making them more competitive in the e-commerce environment is another matter. In the absence of appropriate policies, economies unable to produce goods that can compete well in the e-commerce space may confine local platform participants largely to the distribution aspect of the cross-border supply chain. Thus, the interventions ought to go beyond training local players with the digital aspects of e-commerce and providing infrastructure support. Economies need to have a clear idea about the business activities that can be feasibly pursued in the e-commerce space and how these will be supported.

As also noted by ADB (2021), the World Customs Organization sorts cross-border e-commerce customs administration into three clusters: (i) trade facilitation and security, (ii) fairness and efficiency in tax collection, and (iii) protection against criminal exploitation of e-commerce (Table 4.7). The first cluster deals with policy adjustments to the emerging trade environment to ensure efficiency, timely transmission of information, and credibility of data. The second cluster is about recognizing mechanisms that misapply the systems' rules on parcelized goods and ensuring compliance with other rules (e.g., rules of origin classification and valuation rules). The third cluster concerns possible ways to prevent, detect, and pursue customs-related legal offenses in the digital space.

Multilateral Initiatives and Trade Agreements

Multilateral initiatives and trade agreements are a crucial tool in facilitating regulatory catch-up, especially in less developed economies. Apart from taxation, these initiatives and agreements can address the ease of information exchange between all the parties in e-commerce transactions. This mainly involves linkages between customs offices, which is judged to be not yet well-developed (WCO 2017).

Table 4.7: Customs Administration Challenges Related to Cross-Border E-Commerce

Trade Facilitation and Security	Fair and Efficient Collection of Duties and Taxes	Protection of Society—Criminal Exploitation of E-Commerce
Ensuring speed and efficiency in the clearance process for an increasing volume of transactions	Identifying abuse or misuse of *de minimis* for illicit trade purposes (splitting of consignments/ undervaluation)	Setting up a specialized unit to trawl the internet for information which might be of use in preventing, detecting, investigating, and prosecuting a customs-related offense (drug trafficking/counterfeited and pirated goods/illicit financial flows/ money laundering)
Managing change from a few large/bulk shipments into a large number of low-value and small shipments	Ensuring compliance with classification and origin rules	Enhancing international cooperation and ensuring that agreements on mutual legal assistance are in place to allow for investigations or prosecutions when websites are hosted outside a national territory
Managing risks posed by limited knowledge on importers and the e-commerce supply chain (new class of sellers and buyers/occasional shippers and buyers)	Integration of e-commerce versus traditional trade	Making the most of existing technologies, especially those related to data analysis
Ensuring data quality (accuracy and adequacy of the data received)		
Defining the role and responsibility (liability) of e-commerce operators to assist governments (e-vendors/intermediaries)		

Note: The entries in the table were directly lifted from the source.
Sources: ADB (2021) and World Customs Organization, http://www.wcoomd.org/en/topics/facilitation/activities-and-programmes/ecommerce.aspx?p=1 (accessed August 2020).

At the global level, the WTO leads the policy dialogues and the framing of multilateral accords to coordinate and harmonize the policy actions of different countries and forge plurilateral agreements based on existing WTO agreements and frameworks. The WTO Work Programme on Electronic Commerce sets to "*to examine all trade-related issues relating to global electronic commerce*" (WTO 1998a). In line with this, a number of WTO members endorsed the Joint Statement Initiative on e-commerce in 2017 and negotiated trade-related aspects of e-commerce thereafter (Ismael 2020).[10]

[10] Ismael (2020) lays out a succinct timeline of key actions regarding the work program.

The World Customs Organization (WCO) created the Working Group on E-Commerce to lay out the framework of standards on cross-border e-commerce and their implementation based on an in-depth look at issues and multi-stakeholder collaboration and as a follow-up to the WCO Luxor Resolution on Cross-Border E-Commerce in 2017 (WCO 2018a). The framework aims to create a robust and transparently governed e-commerce global supply chain. It specifically targets the harmonization of risk assessment procedures, revenue collection, and border cooperation.

The WCO has also released a set of guidelines in 2018 pertaining to customs and trade rules on the clearance of low-value and small e-commerce shipments and parcels (WCO 2018b). What these frameworks need are implementing rules and regulations in every jurisdiction to strengthen cross-border governance. The broadening automation in customs procedures through national single windows and the progress in creating integrated national single windows (e.g., the Association of Southeast Asian Nations single window) can be leveraged to pursue the objectives in these frameworks.

Lopez-Gonzalez and Ferencz (2018) likewise highlight the increasing importance and usage of regional trade agreements (RTAs), considering the complexity of trade rules and the rapidly evolving business models and landscape (including digital platforms).

E-commerce-related RTA provisions typically cover promotion of e-commerce activity; cross-border cooperation; and moratoriums on customs duties and domestic legal frameworks including electronic authentication, consumer protection, personal information protection, and paperless trading. Monteiro and Teh (2017) cite examples of agreements that contain e-commerce development provisions and involve Asia and the Pacific. These include RTAs between the PRC and the Republic of Korea; Hong Kong, China and New Zealand; the Republic of Korea and Singapore; Japan and Australia; Thailand and New Zealand; and Japan and Mongolia, among others.

One key challenge is to ensure that overlapping RTAs do not exacerbate the "spaghetti" or "noodle bowl effect" resulting in unintended friction—such as conflicting rules of origin—that affect the cost of trading. As Monteiro and Teh (2017) note: "even in RTAs negotiated by the same country, e-commerce provisions vary significantly."

Free Trade Zone Strategies

Free trade zone or economic processing zone strategies are also crucial in promoting e-commerce. They help facilitate compliance with trade rules and assist customs authorities in their work. In many economies in Asia and the Pacific, these strategies need to reviewed and revised. The PRC has taken the lead in this area by establishing cross-border e-commerce comprehensive pilot zones. A total of 105 zones are spread over four regions in the country (Zhang 2020).

The objectives stipulated by the Government of the PRC State Council (2020) include building brands, developing cross-border e-commerce, stabilizing foreign capital flows related to trade, raising the quality of trade, and addressing pertinent transaction security concerns. Preferential tax treatment, such as value-added tax exemptions, consumption tax on retail exports exemptions, and corporate income tax reductions, are offered in the pilot zones.

Malaysia is another early mover in the region and it could serve as a good benchmark for the other economies once performance indicators are released. The Government of Malaysia launched a digital free trade zone in 2017 in order to strengthen the participation of local enterprises in cross-border, e-commerce activities (METDC n.d.).

The Alibaba Group-led electronic World Trade Platform (eWTP) is a notable recent initiative of the digital free trade zone (Yean 2018). The hub in Malaysia is incidentally the first eWTP pilot project outside of the PRC (eWTP n.d.[a]). eWTP is deemed a step toward establishing the digital version of the Silk Road, designed to complement the Belt and Road Initiative.[11] The initiative was likewise part of the core policy recommendations of the *Business 20* (the private sector caucus within the G20) and cited in the G20 communiqué in 2016 (International Trade Centre and Ali Research 2018).

[11] As of this writing, the eWTP has at least six partner economies on at least three continents (eWTP, n.d.[b]).

4.9. Conclusion

E-commerce influences trade flows directly through online purchases from an offshore producer and indirectly through traditional channels but distributed via domestic e-commerce facilities. Taking advantage of the internet retailing sales data and the e-commerce platform revenues data that are available for many economies, the study analyzed the extent to which the joint e-commerce market development in trading economies is affecting the magnitude of bilateral trade of consumer goods.

Utilizing the PPML estimation technique, the results show that bilateral consumer goods trade flow is positively associated with the combined e-commerce development of the trading economies. The linkage is statistically robust and appears to be gaining traction in recent years. Estimations using platform revenues data further reveal that platform development or penetration helps significantly bolster consumer goods trade in Asia and the Pacific economies. It is also shown that intra-regional consumer goods trade in the region is relatively more sensitive to e-commerce platform penetration than trade with economies outside the region. Separately, internet and mobile phone usage, which is an enabler of e-commerce, are found to be positive drivers of trade of consumer goods as well. Distance is still a significant barrier, although it is seemingly becoming less of a constraint over time. Difference in languages is also becoming less important.

As e-commerce deepens its trade penetration, a number of policy issues stand out that are important to maximizing welfare gains. The value of rolling out of official statistics on e-commerce trade flows cannot be overstated. At the operations level, the underpinning digital infrastructure needs to be strengthened. Meanwhile, enacting the requisite regulations on intellectual property, consumer protection, data protection, and cybersecurity will establish a trustworthy e-commerce market.

Beyond the general enabling policies, a clear approach to bolster the competitiveness of domestic enterprises in the digital space is also necessary. This includes taxation issues that are tied with cross-border transactions, such as the *de minimis* rule, that ought to have consensus, at least at the regional level.

Another area pertains to trade agreements. Multilateral agreements and initiatives play an important role in harmonizing the policy approaches. Since multi-country negotiations can be quite tedious, regional trade agreements can be valuable in this regard. One key challenge concerning RTAs is to contain the noodle bowl effect resulting from overlapping agreements.

Finally, it is an opportune time for many economies in the region to review and revise decades-long free trade zone or economic processing zone strategies to make them more responsive to developments in digitally driven cross-border trade. More than supporting e-commerce development, these strategies are valuable in facilitating compliance to the trade rules and in helping customs authorities address the challenges they face related to e-commerce trade flows.

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