ADBI Working Paper Series

From Global Factory to Global Mall: East Asia's Changing Trade Composition

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No. 496
August 2014

Asian Development Bank Institute

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Suggested citation:

Helble, M., and B.-L. Ngiang. From Global Factory to Global Mall: East Asia's Changing Trade Composition. ADBI Working Paper 496. Tokyo: Asian Development Bank Institute. Available: http://www.adbi.org/working-paper/2014/08/18/6376.global.factory.global.mall/

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Abstract

This paper studies how East Asia's trade composition and orientation have changed over the past decade and analyzes the implications for the region and beyond. Over the last 2 decades we have witnessed the emergence of regional and global supply chains, in which production is divided into production stages or tasks across the most competitive locations. East Asia has been the most successful region in the world in building up or joining regional and global supply chains and has been described as "Factory Asia" (Baldwin 2008). Introducing a new and simple analytical tool, we show that over the past decade East Asia has successfully consolidated its role as the "Global Factory." Furthermore, studying East Asia's recent trade patterns in primary, intermediate, capital, and consumption goods, our results indicate that East Asia is on track to becoming one of the biggest "malls" in the world. Whereas in 1999–2000 around half of all consumption goods exported by East Asia went to the United States and the European Union-27, in 2011–2012 half stayed in the region or were traded with the rest of the world.

JEL Classification: F14, F15, N15

Contents

1. INTRODUCTION

The composition of international trade is in constant flux. In the struggle for competitiveness, firms permanently need to optimize their production and organization structure. Over the last 3 decades production has become increasingly fragmented across locations in various countries. Based on the pioneering work of Jones and Kierzkowki (1990), who introduced the concept of production networks, various theoretical models and sound empirical evidence are now available that show that many production processes can be best described as global value chains or global supply chains.

International division of labor in terms of tasks has been facilitated by the spread of information and communication technology (ICT), which has drastically reduced coordination costs (Baldwin 2008). Countries in East Asia have been particularly successful in building or joining regional and global supply chains. Their share of world trade in intermediate goods increased dramatically from 14% in 2000 to 50% in 2012. The growing share of intermediate goods also reflects that East Asian economies are increasingly responsible for the production of manufactured goods worldwide. Baldwin and Kawai (2013) labeled the resulting trade pattern as "triangle trade." Advanced countries in East Asia export sophisticated parts and components to developing and emerging countries in the region where they are assembled into final goods and then shipped to high-income countries, particularly the United States (US), the European Union (EU), and Japan. East Asia was subsequently described as "Factory Asia" (Baldwin 2008) or the "Global Factory," since the majority of final consumption goods originated from this region. However, in recent years, we observe that East Asia itself has become an important destination for exports of final consumption goods, not only for goods produced within the region, but also those produced in the EU and the US. Thus, is East Asia evolving into the "Global Mall" and absorbing a large share of final goods produced worldwide?

The objective of this paper is to retrace and analyze the evolution of East Asia's trade patterns over the past 15 years. We are particularly interested in the question how East Asia's trade has changed in its composition and geographical outreach. In order to answer the first question of changing composition we divide goods trade into four commodity groups: primary goods, intermediate goods, capital goods, and consumption goods. Applying this typology we observe that East Asia has indeed become a major provider of intermediate and final goods over the past decade.

In order to better understand how the geographical patterns of East Asia's trade have changed we develop of simple tool that measures how far East Asia's trade has traveled. In addition, we apply a standard gravity equation approach to gauge the geographical bias in East Asia's trade. We find that trade in intermediate goods within the region has been facilitated over the past decade. More interestingly, over the past 5 years, an increasing share of trade in consumption goods has become reoriented. More and more final goods are now being exported to countries within the region. It seems that East Asia's strong economic growth has now been translated into a stronger demand for consumption goods. Assuming that East Asia will continue on its current growth trajectory, the region is on its way to becoming the largest market for final goods. East Asia, the Global Factory, will also become the Global Mall.

This transformation of East Asia's trade pattern holds two important implications for the region. First, East Asia will be able to capture an increasing share of global production of high value-added downstream value chain activities such as distribution, marketing, and customer services, which have been traditionally undertaken in major final

markets, such as the EU and the North American Free Trade Agreement (NAFTA). Second, the average lead times for East Asia's exports to reach end-consumers will fall. Increased exports to nearer destinations translate into lower transportation and inventory costs and eventually higher margins for companies or lower prices for consumers. These two consequences could be expected to further enhance economic growth of East Asia and further accelerate the region's transformation into the Global Mall.

The paper is structured as follows. After a brief literature review, Section 3 introduces the goods typology and describes how East Asia's trade with the rest of the world has developed from 2000 to 2012. Section 4 introduces a simple tool to measure the distance traveled by goods, and applies a trade data set of East Asia. In Section 5 we specify a standard gravity model and run several regressions that show how East Asia's trade patterns have changed.

2. LITERATURE REVIEW

Existing literature on East Asia's trade patterns adopts two distinct approaches to measure trade occurring within production networks. They are namely the "gross" and "value-added" approaches. The gross approach involves distilling parts and components, and final goods trade using the Standard International Trade Classification (SITC) codes of trade figures reported to the UN Comtrade Database (Yeats 2001; Ng and Yeats 2003; Athukorala 2011; Wignaraja et al. 2013). In contrast, the value-added approach entails tracing the value attributed at various stages of production across countries using an inter-country input–output table. (WTO-IDE JETRO 2011; Mattoo et al. 2013).

Both approaches to measuring production network trade have strengths and weaknesses. Broadly, the gross trade approach is a convenient proxy, while the value-added approach is more precise, but suffers from incomplete coverage. Specifically, the advantages of the gross approach include: consistent availability of data points over several decades; wide coverage of commodities up to 6-digit SITC; and encompassing of a large number of countries (Athukorala 2010). The disadvantages consist of relying on arbitrary classifications of goods into intermediates and finals (Hummels et al. 2001) and not being able to capture the source of value added or quantify the contribution of each country to total product value created in the production network (Wang et al. 2009). Diametrically, the value-added approach provides the most ideal level of accuracy. However, its drawbacks comprise low frequency over time (complicating time series analysis), high industrial aggregation (hindering detailed product analysis) and insufficient availability of countries to enable a comprehensive analysis of global trade patterns (Athukorala 2010).[1]

Despite the differences between the two approaches, proponents of both methods have reached largely similar conclusions regarding the prevailing patterns of trade in East Asia. Studies that adopt either approach have also focused mainly on the time periods before the 2008 global financial crisis. There are surprisingly few empirical works that examine in detail the impact of the global financial crisis on East Asia's trade patterns.

[1] Although the OECD–WTO's Trade in Value Added (TiVa) indicators released in 2013 are a substantial improvement over other sources of value-added trade data, they still suffers from the same drawbacks, albeit to a lesser extent.

2.1 Gross Trade Approach

Using the gross approach to measure biannual averaged production network trade between 1992 and 2008, Athukorala (2014) observed that the rapid expansion of production networks in East Asia had also led to the rapid growth of cross-border trade in parts and components in the region. The component share in intraregional trade in developing East Asia was substantially higher than that of NAFTA and the EU-15, and was the key driver behind the significant rise in the region's share of non-oil intraregional trade in total world trade.[2] Turning to final products, Athukorala (2014) found no indication that East Asia's intraregional trade in final goods had intensified at the same rate as that of parts and components. Instead, it was seen that developing East Asia's vertical specialization-based growth depended vitally on extra-regional trade in final goods, and over time, the dependence had deepened. Switching to quarterly data between 2008 and 2009, Athukorala (2014) found no evidence that the global financial crisis had altered the general pattern of trade in East Asia. Trade for both commodity groups contracted, while East Asian economies like the PRC and Japan were not observed to have provided a cushion against the fall in final demand from NAFTA and the EU-15.

Extending Athukorala (2014)'s analysis using a panel vector autoregression model to examine the relationship of output shocks among East Asia, the US, and the EU-27 between 2000 and 2007, Kim et al. (2010) found that the positive effects of the US and EU-27's output shocks on East Asian economies were consistent with the trade pattern of East Asia as observed by Athukorala (2014).[3] However, Kim et al. (2010) also found the reverse effect to be prominent: East Asia's aggregate shocks had a positive impact on both those of the US and EU-27. The authors postulate that an increasingly globalized production network between East Asia and the US and EU-27 may have contributed to the positive influence of East Asian economies on the US and EU-27. The region may also be progressively playing an important role as a supplier of intermediate goods for the advanced economies, while importing more final goods from those economies.

2.2 Value-Added Trade Approach

Using the Asian International Input–Output (AIO) Table compiled by IDE-JETRO, Mori and Sasaki (2007) found that the interdependencies between 10 Asia-Pacific economies[4] in terms of global production networks, through increases in trade in intermediate goods, had further deepened between 2000 and 2005. Particularly, the PRC had become the Asia-Pacific's main production center. The authors also found that the East Asian economies, rather becoming more autonomous, had become more exposed to economic developments outside the region due to its dependence on extra-

[2] Athukorala (2014) defines developing East Asia as the Newly Industrialized Economies (NIEs) of North Asia (the Republic of Korea; Taipei,China; and Hong Kong, China), the PRC, and ASEAN. Among the ASEAN economies, Myanmar is not covered due to the lack of data. Brunei Darussalam, Cambodia, and the Lao PDR are treated as a residual group due to data gaps.

[3] Kim et al. (2010) define East Asia as the nine emerging economies in East and Southeast Asia. They include the PRC; Hong Kong, China; Indonesia; the Republic of Korea; Malaysia; the Philippines; Singapore; Taipei,China; and Thailand.

[4] The 10 Asia–Pacific economies as referred to by Mori and Sasaki (2007) are: the PRC; the Republic of Korea; Taipei,China; Singapore; Thailand; Indonesia; Malaysia; the Philippines; Japan; and the US.

regional final demand.[5] The degrees of income dependence of the East Asian economies on out-of-region demand had remained fairly stable or increased slightly since the 1990s.

Expanding on Mori and Sasaki's (2007) approach, Pula and Peltonen (2009) found that developing East Asia's dependence on extra-regional final demand may be substantially overstated. Only about one-third of the value added of developing East Asian economies was determined by external demand, significantly lower than the 50% exposure as measured by gross trade data. Nevertheless, Pula and Peltonen (2009) concurred with Mori and Sasaki (2007) that developing East Asia's dependence on extra-regional export markets, in terms of value added, had steadily increased between 1995 and 2006. Developing East Asia saw rising dependence on the EU-15 and falling importance of the US and Japanese markets. Final demand from the rest of the world had also expanded substantially, accounting for 14% of total final demand in 2006.

3. EVOLUTION OF EAST ASIA'S TRADE PATTERNS: WHEN THE SUPPORTING ACTOR BECOMES THE CHIEF PERFORMER

3.1 East Asia's Trade Share in World Trade

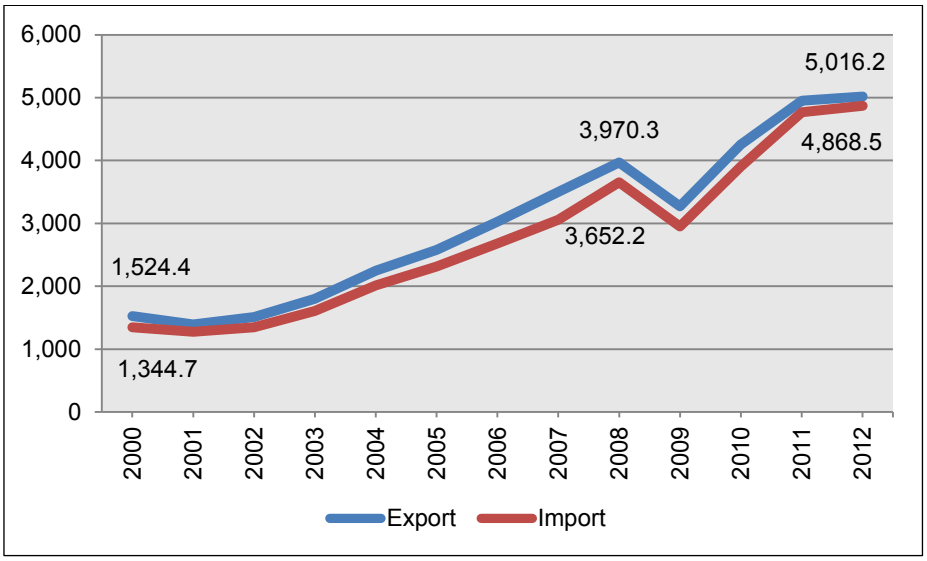
Over the last decade, East Asia has experienced a fast growth in its exports and quickly gained a large share of world trade. East Asia was able to expand trade with the region and the rest of the world by more than fourfold, from $2.5 trillion in 2002 to $9.9 trillion in 2012. As a corollary, East Asia's share in world trade has grown from 23% in 2000 to 31% in 2012. This expansion of trade constitutes one of the fastest transformations in recent history.

However, the expansion of East Asia's trade volume has not been smooth (see Figure 1). The crash of the dot-com bubble in 2000–2001 led to first contractions of both imports and exports of East Asian economies. Yearly trade growth accelerated again in 2002 and growth rates remained above 15% for the period 2003–2008. East Asia consistently recorded a trade surplus, which widened until 2007 when exports exceeded imports by 14.5%. The global financial crisis brought this upward trend to a sudden stop. Both imports and exports of East Asia dropped by more than 17% from 2008 to 2009, taking both flows back to lower levels than in 2007. The global financial crisis also reduced the trade deficit from $443.6 billion to $319.3 billion. However, already in 2010 the region's trade rebounded strongly (by 30%) and outweighed the losses incurred during the previous year. In 2011, East Asia's trade further expanded by almost 20%. For the year 2012, trade growth significantly slowed down. The slowdown might have been due to macroeconomic uncertainties and the recession in several European countries. During the years 2009–2012, East Asia's trade surplus remained rather small.

[5] Mori and Sasaki (2007) and Pula and Peltonen (2009) define East Asia as the PRC; Rep. of Korea; Taipei,China; Singapore; Thailand; Indonesia; Malaysia; and the Philippines.

Figure 1: East Asia's Exports to the World, 2000–2012

($ billion)



Source: Authors' calculations using UN Comtrade database.

3.2 East Asia's Trade by Commodity Group

The tremendous growth of East Asia's trade share in global trade was not caused by an expansion of trade in all commodity groups. In order to better understand how trade in certain commodity groups has evolved, we divide all exports into four broad commodity groups, namely:

i. Primary goods, including food and beverage, fuel, lubricants, and primary industrial supplies for industry;

ii. Intermediate goods, including processed goods mainly for industry and parts, components for capital goods and transport equipment.

iii. Capital goods, including machinery and equipment used by producers as inputs for production.

iv. Consumption goods, including household goods and government final product purchases.

These commodity groups are based on the United Nations (UN) Broad Economic Categories (BEC) classification (developed by the UN) which classifies traded goods by stages of production.[6] Primary goods include food and beverages, fuel, lubricants,

[6] As the focus of this study is on where intermediate and final goods are produced, and where they are going over time, rather than the contribution of economies to total product value created in production networks, the gross approach to measuring production network trade is adopted. This is because the data coverage in terms of both time series and economies are more complete for gross trade data. Particularly for discerning the impact of the global financial crisis, complete time series data for the periods after 2008 are vital. Improving upon the existing gross approach as pioneered by Athukorala (2011), which allows for only two commodity groups, the UN Broad Economic Categories (BEC) classification is used. The BEC classification enables trade data compiled on SITC to be approximated to the basic classes of goods in the System of National Accounts (UN 2002). They are namely: consumption, capital, intermediate, and primary goods. As there are four commodity groups, a finer grain analysis on the trade patterns and compositions in East Asia could be conducted. The trade data

and primary industrial supplies for industry. Intermediate goods include processed goods mainly for industry and parts, components for capital goods, and transport equipment. Capital goods include machinery and equipment used by producers as inputs for production. Consumption goods are household goods and government final product purchases.

We consider this typology particularly pertinent in our research context. As explained in the introduction, trade in East Asia has been driven by the regional production networks. The production of many manufactured goods is divided up among East Asian countries according to their comparative advantage in performing certain processes or tasks. As a result, intermediate goods become intensively traded within East Asia. Apart from intermediate goods, the production of goods requires two major inputs: primary goods, such as industrial supplies, as well as capital goods, such as machinery. We have therefore singled them out as additional product groups. The last product group consists of consumption goods, which are the main output of the production process. In addition to dividing all exports into four commodity groups, we have further facilitated the analysis by creating four geographical groups: East Asia (ASEAN members, the PRC, Japan, and the Republic of Korea), the European Union (27 members as of 2012), the US, and rest of the world (ROW).

Using corresponding trade data from the UN Comtrade database, Table 1 lists East Asia's export volumes within the region, toward the EU-27, the US, and the rest of the world by commodity group for the years 1999–2012. In order to increase the reliability and readability we have constructed 2-year averages. The first striking observation is that intermediate goods account for the lion's share of the regions exports. In 2011–2012 intermediate goods represented almost 48% of all exports, whereas primary goods represented around 11%, capital goods 22%, and consumption goods 19%. The share of intermediate goods in exports was even higher for intraregional trade. In 1999–2000 it stood at 58% and in 2011–2012 it was still almost 54%. The high level on intermediate export goods clearly shows that the region has established itself as "Factory Asia," with value chains that are well integrated across countries in the region (Baldwin 2008).

for the four commodity groups are computed via rearranging BEC codes at the 3-digit level (see Appendix, Table A.2), referencing the methodologies recommended by the UN (2002) and ADB (2012).

Table 1: Destination of East Asia's Exports by Stage of Production, 1999–2012
($ billion)

Stage of Production	Destination	1999/00	2001/02	2003/04	2005/06	2007/08	2009/10	2011/12
Primary goods	East Asia	72.6	79.9	106.9	157.3	226.2	233.4	356.0
	EU-27	8.8	9.1	12.5	18.8	30.8	28.9	36.3
	US	9.4	9.6	12.6	19.6	25.3	23.6	29.0
	ROW	22.4	24.8	36.2	55.0	90.4	93.5	134.7
Intermediate goods	East Asia	333.8	363.3	547.7	745.3	947.4	973.4	1,285.5
	EU-27	89.0	82.5	115.4	161.7	224.2	207.8	251.6
	US	123.4	107.7	126.9	168.6	190.4	170.3	229.7
	ROW	113.4	112.2	158.0	240.2	361.4	386.7	535.9
Capital goods	East Asia	87.0	102.2	161.6	226.8	300.8	335.7	474.8
	EU-27	58.4	58.9	83.1	121.0	167.2	154.3	176.5
	US	75.1	71.8	94.5	128.4	148.5	144.0	182.8
	ROW	60.5	55.8	83.2	126.3	204.2	225.2	294.1
Consumption goods	East Asia	82.8	91.6	122.4	147.6	193.4	203.2	271.4
	EU-27	73.1	71.5	104.3	139.4	173.9	162.0	185.6
	US	128.7	139.2	159.5	198.7	218.9	197.4	230.5
	ROW	62.8	66.5	98.5	146.9	232.5	224.1	310.2
All goods	East Asia	576.2	637.0	938.6	1,277.1	1,667.8	1,745.6	2,387.6
	EU-27	229.4	221.9	315.3	440.8	596.1	553.0	650.0
	US	336.6	328.4	393.5	515.3	583.2	535.4	672.1
	ROW	259.1	259.3	375.9	568.3	888.5	929.6	1274.8

EU = European Union, ROW = rest of the world, US = United States.

Source: Authors' calculations using UN Comtrade data.

One of the unique features of East Asian trade is the so-called "triangle trade" (Baldwin and Kawai 2009). This is where advanced economies in the region export sophisticated parts and components to developing economies in the region where these are assembled into final goods and shipped to developed economies, especially the US, the EU, and Japan. Although this started as a simple triangle, e.g., going from Japan to ASEAN—and more recently to the PRC as well—and then exported to the US, Europe and Japan, it has become a far richer pattern. While the most sophisticated components still come from the advanced economies in the region, many parts and components are produced by the emerging market economies and sold to each other.

The triangular trade pattern has been created initially by FDI activities of global multinational corporations—Japanese, European, and American—and more recently by firms from within emerging East Asia. In this context it is interesting to observe that the share of capital goods traded within East Asia has increased from 15% in 1999–2000 to almost 20% in 2011–2012. "Factory Asia" seems to source its machinery increasingly from the region.

The table holds another interesting insight. When comparing the evolution of East Asia's exports in the four product groups during the last three periods, one observes that all intra-regional export flows continuously increased, despite the global financial crisis. The global financial crisis merely slowed down intra-regional biannual trade growth to a one-digit level compared to solid two-digit level prior to the crisis. In

contrast, export flows to the EU-27 and the US in all four commodity groups declined in 2009–2010 compared to 2007–2008. The contraction was more severe for exports toward the US (except for capital goods) compared to the EU-27. However, the rebound of exports in 2011–2012 was more marked for the US than for the EU-27 (except for primary goods). The overall trade effect of the global financial crisis (GFC) was thus that East Asia continued its economic integration in terms of increasing intraregional trade, whereas the EU-27 and US lost part of their importance as export destinations.

In order to establish a clearer picture on how the geographical export orientation of East Asia has changed since 2000, Table 2 shows the regional shares for each commodity group and the total. For primary goods, the main export destination is and remained East Asia with around 64 %. Between 1999–2000 and 2011–2012, the EU-27 and the US lost 4.4% to the rest of the world. In the case of intermediate goods, the picture becomes starker. Over the sample period, East Asia reduced its exports of intermediate goods to the EU-27 and the US by over 11% and increased its exports within the region and toward the rest of the world by over 5%. The strongest reorientation can be observed for capital goods. East Asia increased its export share of intra-regional trade in capital goods by 11.1% and toward the rest of the world by 4.6%. Today, the EU-27 and the US hold a share of 31.8% compared to 47.5% in 1999–2000.

Table 2: Destination of East Asia's Exports by Stage of Production, 1999–2012
(% of total, biannual averages)

Stage of Production	Destination	1999/00	2001/02	2003/04	2005/06	2007/08	2009/10	2011/12
Primary goods	East Asia	64.1%	64.7%	63.5%	62.8%	60.7%	61.5%	64.0%
	EU-27	7.8%	7.3%	7.4%	7.5%	8.3%	7.6%	6.5%
	US	8.3%	7.8%	7.5%	7.8%	6.8%	6.2%	5.2%
	ROW	19.8%	20.1%	21.5%	21.9%	24.3%	24.6%	24.2%
Intermediate goods	East Asia	50.6%	54.6%	57.8%	56.6%	55.0%	56.0%	55.8%
	EU-27	13.5%	12.4%	12.2%	12.3%	13.0%	12.0%	10.9%
	US	18.7%	16.2%	13.4%	12.8%	11.1%	9.8%	10.0%
	ROW	17.2%	16.9%	16.7%	18.3%	21.0%	22.2%	23.3%
Capital goods	East Asia	31.0%	35.4%	38.3%	37.6%	36.6%	39.1%	42.1%
	EU-27	20.8%	20.4%	19.7%	20.1%	20.4%	18.0%	15.6%
	US	26.7%	24.9%	22.4%	21.3%	18.1%	16.8%	16.2%
	ROW	21.5%	19.3%	19.7%	21.0%	24.9%	26.2%	26.1%
Consumption goods	East Asia	23.8%	24.8%	25.2%	23.3%	23.6%	25.8%	27.2%
	EU-27	21.0%	19.4%	21.5%	22.0%	21.2%	20.6%	18.6%
	US	37.0%	37.8%	32.9%	31.4%	26.7%	25.1%	23.1%
	ROW	18.1%	18.0%	20.3%	23.2%	28.4%	28.5%	31.1%
All goods	East Asia	41.1%	44.0%	46.4%	45.6%	44.6%	46.4%	47.9%
	EU-27	16.4%	15.3%	15.6%	15.7%	16.0%	14.7%	13.0%
	US	24.0%	22.7%	19.4%	18.4%	15.6%	14.2%	13.5%
	ROW	18.5%	17.9%	18.6%	20.3%	23.8%	24.7%	25.6%

EU = European Union, ROW = rest of the world, US = United States.

Source: Authors' calculations using UN Comtrade data.

Finally, for consumption goods the two regions decreased from 58.0% to 41.7% over the same time period. In this commodity group, East Asia was able to increase exports to the rest of the world by 13% in the past 12 years. It appears that the financial crisis and subsequent economic crisis in southern Europe has led to a decline in EU-27 shares of East Asia's exports, which have been reoriented toward countries within the region. In contrast, the US was substantially losing its importance as an export destination for East Asia well before the crisis. Overall, the last decade has made "triangle trade" less relevant and substantially diversified East Asia's trade.

Looking at the changing trade volumes (Table 1) and shares (Table 2) allows us to obtain a first broad idea of the evolution of East Asia's trade patterns. In the following two sections we apply two different, but related empirical tools to have a more robust and more comprehensive understanding of the change as well as the underlying determinants.

4. MEASURING TRADE DISTANCE

The main focus of this paper is to study how East Asia's trade patterns have changed along two dimensions. First, we would like to know how the content of trade has evolved since the turn of the millennium. And second, we are interested in the question how the geography of trade has changed. In the previous section, we have provided some evidence on both questions by dividing all East Asia's exports into four product categories and studying how trade to different destinations has changed. In this and the next section, we will present more sophisticated analytical tools to complement and corroborate the findings of Section 2.

We focus on the question of how the geography of the trade flows of the four commodity groups has changed over time. As Tables 1 and 2 show, East Asian trade has been shifting away from the traditional destinations, especially for consumption goods, toward new markets. We know from the trade literature that distance plays a pivotal role in shaping international commodity flows as it is a particularly suitable proxy for capturing trade costs. A first question that a trade economist might therefore ask is whether we can observe changes in the distance traveled by East Asia's exports.

We argue that the distance traveled by trade in goods is revealing for two reasons: First, a falling distance would imply that trade costs are equally falling (Hummels 2007), holding other possible trade costs constant. Second, for East Asia the traditionally important export markets, namely the US and the EU, are relatively distant. Falling distance would therefore imply that both destinations lose importance to the benefit of markets closer to East Asia and in East Asia itself.

Developing a simple tool of average distance traveled by goods therefore has the merit of revealing information that simply looking at trade volumes and destinations cannot tell us. The caveat is, however, that it is purely a trade-distance measurement without including any supply or demand components and without the backing of a theoretical model.

4.1 Data

All trade flow data used for our research was downloaded from the UN Comtrade database. As is commonly done in the trade literature in order to increase the reliability of trade data, we downloaded the bilateral trade data in terms of imports for the four commodity groups listed above using the UN Broad Economic Categories classification. The exact definition of the four commodity groups can be found in the

Appendix. Our main sample therefore consists of the bilateral trade flows between 13 East Asian economies (ASEAN+3)[7] and 190 economies (including ASEAN+3). The time period covered is 1999–2012. In total, our sample holds 58,585 positive trade flows.

The objective of this section is to measure the distance of trade. The data on the distance between economies come from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). CEPII offers different distance measurements. One is the geographical distance between the two capital cities of the bilateral pair. However, the capital city of a country might not always coincide with being the economic center of a country. Another distance measure offered by CEPII is the geographical distance between the most important cities/agglomeration (in terms of population) of the bilateral pair. We decided to use this distance measure as it reflects more accurately the distance between major economic hubs in each economy.[8]

4.2 Measuring Trade Distance

In order to gauge the geographical reorientation of East Asia's exports, we introduce a simple and new quantitative tool. The objective is to measure how far the exports of East Asia "travel" every year. In order to do so, we build a measurement of the average distance traveled of export flows by aggregating the product of the distance between the economic centers and export share of bilateral trade flows.

The basic equation for this measurement is the following:

$$D_i = \frac{\sum_{j=n}^{n}(d_{ij} \times x_{ij})}{X_i}$$

d_{ij} captures economy *i*'s geographical distance from the trade partner *j*. x_{ij} stands for economy *i*'s exports in terms of value (measured in current US dollars) to destination economy *j*. X_i is the sum of economy *i*'s total export flows. D_i thus measures economy *i*'s average distance traveled per US dollar exported.

Modifying the above equation and applying is to the context of East Asia, we get:

$$D_i = \frac{\sum_{row=n}^{n}(d_{irow} \times x_{irow}) \; + \; \sum_{asia=n}^{n}(d_{iasia} \times x_{iasia})}{X_i}$$

Where x_{irow} stands for Asian economy *i*'s exports to an economy outside Asia (rest of the world), x_{iasia} is Asian economy *i*'s exports to an economy within Asia, d_{irow} measures Asian economy *i*'s distance to an economy outside Asia (rest of the world), and d_{iasia} is Asian economy *i*'s distance to an economy within Asia. Given d_{irow} and d_{iasia} are constant and d_{irow} larger than d_{iasia}, we know that when x_{irow} increases, then D_i will increase. When x_{iasia} increases, then D_i will fall.

Applying this formula to all 14 economies in the region, we obtain 14 coefficients for each year. We construct one single average distance for East Asia by weighing the

[7] The ASEAN members are Brunei Darussalam, Myanmar, Cambodia, Indonesia, the Lao PDR, Malaysia, the Philippines, Singapore, Thailand, and Viet Nam. Our sample further includes Japan, the Republic of Korea, the PRC, and Hong Kong, China.

[8] For more information on CEPII methods to calculate the weighted distance between economies, please refer to: http://www.cepii.fr/distance/noticedist_en.pdf

economy coefficients by the respective economic weight. Algebraically, it can be written as follows:

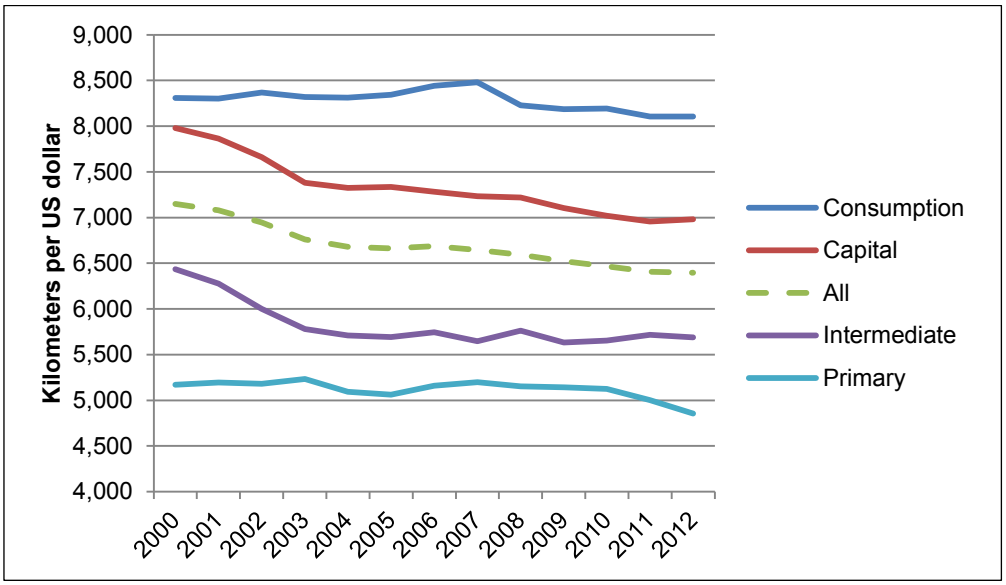
$$D_{asia} = \frac{\sum_{i=n}^{n}(D_i \times Y_i)}{Y_{asia}}$$

Where D_{asia} is East Asia's average distance traveled per US dollar export, Y_i is Asian economy i's GDP, and Y_{asia} is Asia's GDP. To observe changing trade patterns over time, the average distance traveled per US dollar export is calculated for all four commodity types (primary goods, intermediate goods, capital goods, and consumption goods) for all 13 time periods.

4.3 Results of Trade Distance

Applying this formula to the four commodity groups introduced above allows us to calculate the average distance of East Asia's exports for the years 2000–2012 (Figure 1). Looking at Figure 2, the first obvious observation is that the average distance traveled by the goods of the four commodity groups is rather different. Whereas primary (5,100 km) and intermediate (5,800 km) goods are shipped over the shortest distances, capital (7,300 km) and consumption (8,300 km) goods travel furthest. The average distance traveled by each commodity type thus increases with the stage in the production chain. Primary and intermediate goods are exported to nearer destinations as production inputs, while capital and consumption goods are dispatched to further final markets.

Figure 2: Average Distance Traveled by East Asia's Exports, 2000–2012



Source: Authors' calculations.

Studying the evolution over time, we notice that the average distances of the four groups have all declined, but at a different speed and point in time. The average distance for primary goods was relatively stable (around 5,200 km) for most of the time period and only fell below 5,000 km in the last 2 years of the sample period. More interestingly, East Asia's trade in intermediate goods fell sharply from almost 6,500 km in 2000 to 5,700 km in 2004 and has been relatively stable since then. It thus seems that in the early 2000s the main trade links for primary and intermediate goods trade

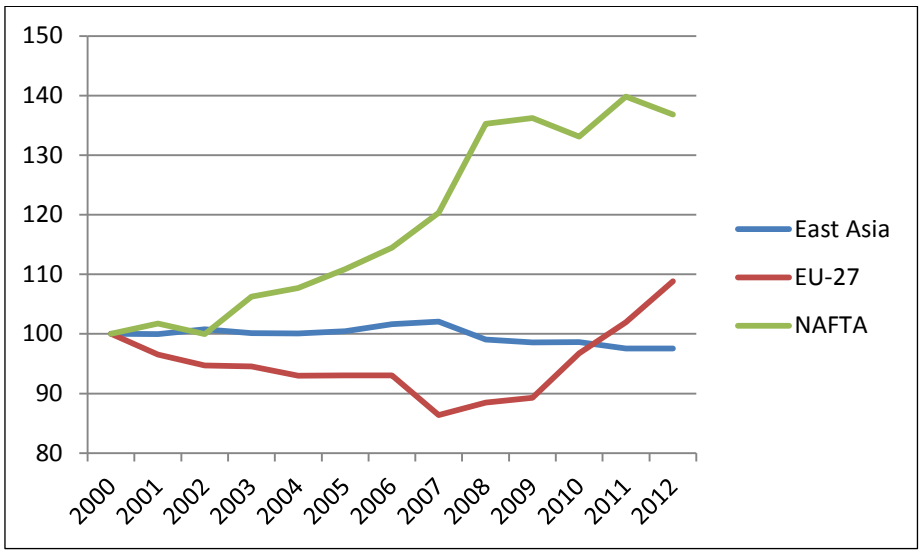
that went into Factory Asia were established, and the famous East Asia production network was put in place. Interestingly, the average distance traveled of the region's intermediate good exports is comparable to that of the span between Tokyo and Jakarta (5,800 km)—the two most populous metropolitan areas in Northeast and Southeast Asia, respectively.

Another interesting observation is that the average distance of capital goods has declined drastically from over 8,000 km in 2000 to less than 7,000 km in 2012. More and more capital goods therefore stay in the region and supply Factory Asia with the necessary equipment. Factory Asia also as the "Global Factory" is even more evident by contrasting the distance traveled by consumption good exports. Over the last decade, East Asia's consumption good exports traveled on average over 8,000 km before reaching their final markets.

However, there are signs that East Asia as the Global Factory may be an evolving reality. In the aftermath of the 2008–2009 GFC, the distance traveled by East Asia's consumption good exports has declined by 4.5%. In contrast, the same measure for the EU and NAFTA has risen by 25.9% and 13.7%, respectively (Figure 3). These changes are due to East Asia's increasing share as a destination market for the world's consumption good exports. While East Asia still accounts for the smallest proportion of the EU and NAFTA's consumption good exports, the remarkable double digit percentages leap in the commodity type's export distances for the EU and NAFTA are due to the doubling or more of East Asia's share of the EU and NAFTA's consumption good exports. If the trend continues for the next decade, it is not inconceivable that East Asia could evolve into the "Global Mall."

Figure 3: Average Distance Traveled of Consumption Goods

(exports by region, base=2000)



EU = European Union, NAFTA = North American Free Trade Agreement.

Source: Authors' calculations.

5. THE GRAVITY MODEL APPROACH

Developed over 40 years ago by the late Nobel Laureate Jan Tinbergen (1962), the gravity model has become the workhorse for trade economists. It basically stipulates that international trade flows follow the law of gravity—the closer and the bigger two

masses are, the larger is their mutual attraction. Translated into the context of international trade it means that the closer and bigger two economies are, the more trade is observed between the two. The model was at first developed without the backing of an economic model at the beginning of the 1960s. Anderson (1979) provided one of the first theoretical foundations. Over time, the theoretical underpinning was further developed. The seminal work of Eaton and Kortum (2002) as well as Anderson and van Wincoop (2003) show that neither the assumption of increasing return nor imperfect competition was needed to formulate a micro-founded gravity equation. More recently, it was found that the gravity approach is also compatible with the heterogeneous firm literature, for example Chaney (2008). Due to this strong theoretical backing the gravity model has maintained its high popularity among trade economists.

In our context, the gravity equation approach is particularly helpful because it allows estimation of the bias in East Asia's exports. As we have seen in the previous section, different commodity groups are exported over different distances. This already points to a bias in East Asia's trade pattern. However, without a model we are unable to measure the magnitude of the bias. Similar to the inspiring paper by McCallum (1995), we can assess in which commodity groups East Asia is trading "too much" or "too little" with itself. The gravity equation gives us the benchmark to gauge this bias.

5.1 Additional Data

Estimating a gravity equation requires additional data. As explained above, the gravitational forces are determined by the "mass" of the economies as well as their distance for each other. A good approximation of the "mass" of the economy is the gross domestic product (GDP). The population size might be another determinant. We downloaded this data from the World Development Indicators (World Bank) for the years 1999–2012. The distance between two economies is basically a proxy for the trade costs between the two. In addition to the geographical distance used in Section 3, we try to include all other factors that increase or decrease trade costs between two economies. For example, sharing a common language or being part of the same regional trade agreement might facilitate trade. The data for bilateral trade costs determinants is taken from two sources. First, the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) provides data on several bilateral coefficients (see Appendix, Table A.1). The data on membership of regional trade agreements (RTAs) are from de Sousa (2012). Finally, we construct a number of dummy variables to single out certain trade flows. First, a dummy variable (*EA*) for trade flows within the region of East Asia (unity for every trade flow between one of the 14 ASEAN+3 economies). Second, a dummy variable *(EA-EU)* for trade flows between East Asia and the EU (unity for every flow between one of the ASEAN+3 economies and a European Union economy). Finally, a dummy variable (EA-NAFTA) for all trade flows between East Asia and NAFTA (unity of every flow between one of the ASEAN+3 economies and Canada, Mexico, and the US).

5.2 Methodology

The modeling of the gravity equation used in this paper closely follows the presentation of Head and Mayer (2014). The general gravity model can be formulated as follows:

$$X_{ni} = GS_i M_n \phi_{ni} \quad (1)$$

X_{ni} stands for the trade flows to the destination market *n* from *i*. S_i measures the ability of economy *i* to export to all destinations. M_n captures all characteristics of the destination market *n*. Bilateral trade costs and their impact on trade flows between *n* and *i* are captured by ϕ_{ni}, where $0 \leq \phi_{ni} \leq 1$. *G* is the constant.

Taking logs of equation (1), we obtain the following equation:

$$\ln X_{ni} = \ln G + \ln S_i + \ln M_n + \ln \phi_{ni} \qquad (2)$$

The log of GDP of the exporting and importing economies were traditionally used as proxies for S_i and M_n. In order to observe the impact of capital and labor endowments on trade flows, the logs of GDP per capita and population have also been used in place of GDP. However, since the influential contribution by Anderson and van Wincoop (2003), it has become common practice to use fixed effects for importers and exporters instead. Another solution proposed in the literature is the so-called ratio-type estimations. The basic idea is to normalize bilateral flows by trade with itself (Head and Mayer 2000) or with a reference trading partner for a given year (Head et al. 2010).

Nonetheless, considering that the impact of factor endowments for both importers and exporters as key drivers of trade, as well as the bias of trade flows toward certain regions are essential to the study, both methods are unsatisfactory. Particularly, the ratios of ratios procedure, also named the Tetrads method by Head et al. (2010), does not allow for the inclusion of monadic variables like GDP per capita and population as well as time-fixed dyadic variables as regressors. Whereas for the importer and exporter fixed effects method, the regional trade flow dummies are collinear with importer fixed effects. As a compromise, where standards of collinearity for the variables of interest are not contravened (e.g. variance inflation factor of above 3.0), importer, exporter, and time fixed effects are included in a variety of specifications to control for multilateral resistance. As the sample period is relatively short, time varying importer and exporter fixed effects are not incorporated.

In order to elucidate the drivers of trade flows over the entire sample period, we first estimate the gravity model using a dynamic ordinary least squares (DOLS) regression as proposed by Stock and Watson (1993) on pooled panel data of all years stretching from 1999 to 2012. Separate cross-sectional regressions on biannual averaged data are then performed using seemingly unrelated regression (SUR), so as to discern the changing relationship between time invariant explanatory variables (e.g., East Asia to East Asia trade flow dummies) and trade patterns over time.

The DOLS estimator is chosen for computing the panel gravity model as it corrects for the possible non-stationarity and co-integration of dependent and explanatory variables. It also allows for the inclusion of time-invariant regressors, which the fixed effects estimator as commonly specified for gravity models does not. Fidrmuc (2009) found that in estimating co-integrated gravity models, although the results derived using DOLS and fixed effects estimators are close, the fixed effects estimator exhibits a small bias arising from neglecting the non-stationarity of involved variables. For the purpose of this study, the DOLS estimator with one lead and one lag on first-differenced explanatory variables are used. The standard errors are computed using the Bartlett kernel with automatic bandwidth selection according to Newey and West (1994), and are robust to heteroskedasticity and autocorrelation.

To test for the non-stationarity and co-integration of dependent and explanatory variables, the Phillips–Perron and the Fisher–Phillips–Perron tests are respectively employed using the specifications provided by Zwinkels and Beugelsdijk (2010), who proposed procedures to improve the robustness of co-integrated panel gravity model

estimations. Where necessary, the Hadri LM stationarity test is used to confirm the non-stationarity of variables. The optimal lag length is chosen by using the modified information criterion as proposed by Ng and Perron (2001). The tests assume that all economies have a unique trend.

For the biannual averaged cross-sectional regressions, the SUR estimator is used as it accounts for the existence of contemporaneous correlation amongst the cross-section equations. It also allows for the imposition of constraints on parameters across the different equations. For instance, to better isolate the impact of time invariant explanatory variables on changing trade flows, the coefficients of time varying explanatory variables are held constant across all equations, while that of time invariant regressors are allowed to fluctuate. The observations for the equations are unbalanced so as to make maximum use of all available data. White cross-section standard errors and covariance are computed, and the Breusch–Pagan test of independence is used to confirm the contemporaneous correlation of the cross-section equations.

5.3 Results of the Gravity Model Approach

5.3.1 Baseline Pooled Regression

The estimation results of the baseline regression are listed in Table 3. As our data stretches from 1999 to 2012, we pool all years in a first step.[9] In order to facilitate the readability we have only listed the variables of interests. The first interesting observation is that the distance coefficient is different for all four commodity groups. As suggested by our previous results on distance measures of trade (Section 3), primary goods face the highest trade costs. Doubling the distance between trading partners reduces trade of primary goods by more than half. Intermediate goods have a lower resistance to trade (-0.90), but are still significantly higher than capital goods (-0.62). Consumption goods suffer least from trade costs and thus travel furthest. Their trade cost elasticity is half that of primary goods. One reason for the high trade costs of primary goods is that they include perishable agricultural goods. In comparison, finished goods are typically easier to transport.

In our baseline regression we also include a dummy variable for all trade flows within East Asia (labeled “East Asia”) for bilateral trade flows between East Asian economies and EU economies (labeled “EU”), and for bilateral trade flows between East Asian economies and Canada, Mexico, and the US (labeled “NAFTA). For primary goods, East Asia has a positive and statistically highly significant bias to trade more within the region compared to the predictions of the gravity equation. For intermediate goods this bias is even more important. As our estimation is in log form, a coefficient of 1.16 means that East Asia is trading three times (exp[1.16] = 3.19) more intermediate goods within the region compared to the predictions of the gravity equation. Consumption goods are also sourced above average within the region. However, its coefficient is not significant. This indicates that the rise in consumption goods trade within East Asia is due to other factors, namely rising GDP per capita and to a lesser extent, growing population.

[9] The results of the non-stationarity tests indicate that all time-varying variables are non-stationary at the 95% confidence level. The only exception is population. In theory, population trends are not random and should be highly dependent on past population stocks, meaning that it ought to follow a stochastic trend. Repeating the non-stationarity test for population at first difference indicates that non-stationarity cannot be rejected for the variable. The Hadri LM stationarity test confirms that it cannot be rejected that population is non-stationary at all confidence levels. Thus, all variables including population are taken to be non-stationary. The co-integration tests indicate that the equations in the gravity model are highly co-integrated.

Table 3: Gravity Model Results (Dynamic OLS), East Asia's Exports, 1999–2012

Variable	Primary	Intermediate	Capital	Consumption
Log (distance)	-1.18***	-0.90***	-0.62***	-0.56***
	(0.10)	(0.08)	(0.08)	(0.07)
EA dummy	0.87***	1.16***	0.67***	0.24
	(0.26)	(0.20)	(0.19)	(0.18)
EU dummy	-0.33***	0.44***	0.10	0.33***
	(0.13)	(0.10)	(0.10)	(0.09)
NAFTA dummy	0.19	0.47*	-0.01	1.13***
	(0.30)	(0.25)	(0.32)	(0.18)
RTA dummy	0.76***	0.51***	0.35**	0.55***
	(0.24)	(0.18)	(0.17)	(0.18)
Contiguity	-0.15	0.14	0.39	0.23
	(0.25)	(0.30)	(0.29)	(0.28)
Common language	0.29	0.70***	0.44***	0.34**
	(0.19)	(0.13)	(0.12)	(0.14)
Common colonizer	1.34***	1.06***	0.66***	1.01***
	(0.18)	(0.14)	(0.13)	(0.13)
Time dummies	Yes	Yes	Yes	Yes
Centered R^2	0.56	0.77	0.73	0.76
Number of obs.	13,754	15,082	13,952	15,797

EA = East Asia, EU = European Union, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

The coefficients of the EU and NAFTA dummies tell another interesting story. For primary goods, the EU is less important compared to the predictions of the gravity equation. However, the EU is important as a destination of intermediate goods originating from East Asia. No particular bias was found for capital goods exports, neither toward the EU nor to NAFTA countries. However, our regressions reveal that the exports of consumption goods are heavily biased toward the EU and to an even larger extent toward NAFTA countries. Previously, we observed that trade in intermediate goods within East Asia is about three times as high as predicted by the gravity model. For consumption goods, the bias is approximately of the same magnitude for the trade with NAFTA countries—three times (exp[1.13] = 3.10) more consumption goods are shipped to NAFTA countries than expected. The regional dummies included in our estimations thus nicely reflect the economic structure described as "Factory Asia" (Baldwin 2008): primary, intermediate, and capital goods flow intensively across borders in East Asia. The final goods are then predominantly shipped to EU countries as well as North America.

The other dummy variables included in the regression yield more compelling insights. Being part of bilateral or regional trade agreements boosts East Asia's exports in all commodity groups. The RTA coefficient is highest for primary goods (0.76) and lowest for capital goods (0.35). The high coefficient might be explained by the fact that at the multilateral level the market access commitments for agricultural products are still rather limited. Therefore, becoming a member of an RTA typically provides a substantial advantage in market access. For intermediate and capital goods the multilaterally agreed tariffs are already low and thus RTA membership can only provide limited additional market access. The relatively high coefficient for consumption goods (0.55) might indicate that tariff escalation in WTO commitments is still a challenge.

Surprisingly the dummy variable for contiguity is not significant. In other words, economies that share a land border in East Asia do not trade more with each other. In

other regions, this dummy variable is typically positive and significant, such as in case of the EU (Fidrmuc and Fidrmuc 2014). The reason is that neighboring economies often benefit from better infrastructure connectivity. The non-significant result might be interpreted as evidence that cross-border infrastructure is still lagging behind in East Asia.[10]

The fact that two trading partners are sharing a common official language is captured by the dummy variable "common language." Speaking the same language is apparently not important in primary goods trade in Asia. Two explanations might be in order. First, primary goods are typically considered as relatively homogenous and often traded at commodity markets (Rauch 1999). Buying and selling these goods does not require lengthy explanations or descriptions. Second, trade in primary goods is often explained by differences in natural endowments or climate conditions. Choosing a trading partner might thus be rather determined by the availability of the product and not so much by whether one shares a common language.

The case of intermediate goods is the stark opposite. Intermediate goods are typically very heterogeneous and not traded at organized markets (Rauch 1999). As a consequence, it is key for trading partners to communicate intensively to find a match and also when the trading relation is established. As a result, sharing a common language is crucial for intermediate goods trade as reflected in the high coefficient for intermediate goods. For capital goods the language coefficient is highly statistically significant, but of lower magnitude (0.44) compared to intermediate goods. For consumption goods the coefficient for sharing a common official language is even lower. This might be a hint that consumption goods require less explanation compared to capital or intermediate goods.

Having shared a common colonizer, such as having been part of the British Empire, is measured by the dummy variable "common colonizer." Former colonial links seem to be an important determinant for trade in East Asia in all four commodity groups still today. The coefficient is most important for primary goods (1.34) and smallest for capital goods (0.66). One possible explanation for the high coefficient for primary goods is that the colonizers originally used colonies to source primary goods, mostly natural resources, not available at home. Some of these types of linkages might still come into play today.

5.3.2 Time Trends

As we have seen above (Table 1), the volume, composition, and geographical composition of East Asia's trade is constantly evolving. In order to know how trade patterns change over time, we therefore run separate biannual regressions. As our main commodity groups of interest are intermediate goods and consumption goods, we show the estimations for the two groups only (Table 4 and Table 5). To increase readability we have only listed the coefficients of interests. The full table of regressions results can be found in the Appendix.

In Table 4 we present the results of an SUR regression for intermediate goods on a biannual basis from 1999 to 2012. The first observation is that the distance coefficient displays a tendency to decrease. Trade costs for intermediate goods thus seem to fall. The bias to export intermediate goods to East Asia, captured by the EA dummy, seems to have fallen from 1999/2000 to 2007/2008, however, it increased again in the last 4

[10] A recent ADBI study highlighted that infrastructure quality is particularly lagging among Cambodia, Lao PDR, Myanmar, and Viet Nam (CLMV countries) (ADBI 2014). It is noteworthy that these countries are situated centrally between North and Southeast Asia. They share significant land borders among themselves as well as with a number of major East Asia economies.

years of our sample. One might speculate that due to the GFC the demand for intermediate goods from the EU and NAFTA fell after 2007/2008, while the demand for those products remained stable in East Asia. The dummy to measure bias of intermediate goods trade with the EU was significant for the years 2001/2002 to 2007/2008, but lost its significance after the GFC. The bias toward NAFTA existed throughout the period.

Table 4: Gravity Model Results (SUR), East Asia's Intermediate Goods Exports

Variables	1999/00	2001/02	2003/04	2005/06	2007/08	2009/10	2011/12
Log (distance)	**-1.03*** **	**-1.13*** **	**-1.14*** **	**-1.06*** **	**-0.96*** **	**-0.96*** **	**-0.83*** **
	(0.10)	(0.10)	(0.09)	(0.10)	(0.11)	(0.10)	(0.11)
EA	**1.37*** **	**1.21*** **	**1.22*** **	**1.09*** **	**1.09*** **	**1.25*** **	**1.44*** **
	(0.22)	(0.23)	(0.22)	(0.24)	(0.24)	(0.22)	(0.22)
EU	**0.21**	**0.28***	**0.48*** **	**0.27** **	**0.35** **	**0.19**	**0.06**
	(0.13)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.13)
NAFTA	**0.64** **	**0.85*** **	**0.80*** **	**0.76** **	**0.59** **	**0.68** **	**0.78*** **
	(0.33)	(0.32)	(0.31)	(0.32)	(0.30)	(0.29)	(0.27)
Contiguity	**0.03**	**0.07**	**0.13**	**0.33**	**0.54**	**0.47**	**0.64***
	(0.36)	(0.35)	(0.32)	(0.34)	(0.36)	(0.33)	(0.36)
Common language	**1.20*** **	**0.86*** **	**1.02*** **	**0.99*** **	**0.93*** **	**0.66*** **	**0.69*** **
	(0.19)	(0.20)	(0.18)	(0.19)	(0.17)	(0.19)	(0.19)
Common colonizer	**1.17*** **	**1.30*** **	**1.28*** **	**1.16*** **	**1.02*** **	**1.01*** **	**0.84*** **
	(0.18)	(0.18)	(0.17)	(0.18)	(0.18)	(0.19)	(0.20)
N	1,636	1,664	1,718	1,779	1,789	1,739	1,699

EA = East Asia, EU = European Union, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using seemingly unrelated regression with coefficients held constant across time periods for lnrgdpcap, population, and rta. White cross-section standard errors are in parentheses; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

The other control variables also display interesting changes over time. Contiguity played no role in increasing trade at the beginning of the period, but has become statistically significant by the end of the period. This might be a sign that cross-border infrastructure in East Asia has improved and starts to show an effect on international trade. Furthermore, sharing a common language and sharing a common colonizer remain important determinants of bilateral trade flows. However, their influence seems to wane. Both coefficients show a falling tendency.

In Table 5 we present the result of the SUR model for consumption goods for the time period 1999–2012. In contrast to intermediate goods, the weight of distance in exports stays at similar levels except for 2003/2004 when it peaked. The dummy to measure the bias of trade in consumption goods for East Asia fell from 1999/2000 to 2009/2010 and became insignificant in 2005/2006, 2007/2008, and 2009/2010. It increased in the last period and became significant again. In the run up to the GFC, the world economy experienced solid and broad-based growth (UN 2007). The relatively robust rise in income among extra-regional economies may have fueled an import bias of East Asia's consumption goods, which was reversed after the GFC. The dummy for the EU exhibited a falling tendency and was close to zero as well as being statistically significant from 2009/2010 onward. The economic crisis in Europe in the aftermath of the GFC seems to have lowered East Asia's exports of consumption goods to levels

predicted by the gravity equation. The NAFTA dummy shows also a clear falling trend, which apparently accelerated with the GFC. In 2011/2012 exports of consumption goods to NAFTA had only half the bias compared to the beginning of the period (exp[1.77] = 5.87 compared to exp[0.94] = 2.56).

Table 5: Gravity Model Results (SUR), East Asia's Consumption Goods Exports

Variables	1999/00	2001/02	2003/04	2005/06	2007/08	2009/10	2011/12
Log (distance)	-0.64***	-0.67***	-0.82***	-0.73***	-0.67***	-0.63***	-0.64***
	(0.10)	(0.10)	(0.09)	(0.08)	(0.09)	(0.10)	(0.11)
EA	**0.70*** **	**0.68*** **	**0.48** **	**0.33**	**0.18**	**0.23**	**0.50** **
	(0.24)	(0.23)	(0.20)	(0.21)	(0.22)	(0.22)	(0.22)
EU	**0.66*** **	**0.70*** **	**0.77*** **	**0.53*** **	**0.22** *	**-0.03**	**-0.07**
	(0.13)	(0.12)	(0.12)	(0.12)	(0.13)	(0.13)	(0.14)
NAFTA	**1.77*** **	**1.84*** **	**1.77*** **	**1.49*** **	**1.39*** **	**1.08*** **	**0.94*** **
	(0.24)	(0.23)	(0.24)	(0.25)	(0.25)	(0.26)	(0.31)
Contiguity	**0.05**	**0.39**	**0.18**	**0.41**	**0.66** **	**0.63** *	**0.70** **
	(0.45)	(0.33)	(0.31)	(0.32)	(0.33)	(0.34)	(0.33)
Common language	**0.62*** **	**0.60*** **	**0.50*** **	**0.54** **	**0.46** **	**0.39** **	**0.28**
	(0.21)	(0.20)	(0.19)	(0.21)	(0.20)	(0.19)	(0.19)
Common colonizer	**1.16*** **	**1.27*** **	**1.21*** **	**1.01*** **	**0.86*** **	**0.80*** **	**0.80*** **
	(0.18)	(0.17)	(0.16)	(0.17)	(0.17)	(0.17)	(0.17)
N	1,697	1,710	1,745	1,835	1,837	1,799	1,736

EA = East Asia, EU = European Union, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using seemingly unrelated regression with coefficients held constant across time periods for lnrgdpcap, population, and rta. White cross-section standard errors are in parentheses; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively

Source: Authors' calculations.

Sharing a common land border has become increasingly important for consumption goods exports according to our regression results. While the coefficient for contiguity was low and statistically insignificant, it rose and became significant from 2007/2008 onward, which might be interpreted as evidence that the cross-border infrastructure in East Asia has been constantly improving. Finally, the dummy variables for sharing a common language and a common colonizer show the same trend as for intermediate goods. In a globalizing world, the importance of colonial links and of speaking the same language seems less relevant in explaining today's trade patterns. Head et al. (2010) corroborate that trade with former colonizers and other countries in the same colonial empire gradually deteriorates over time.

The results above are corroborated by several robustness checks which can be found in the Appendix. As a first test of robustness, we rerun the regressions on the four commodity groups excluding Japan from the East Asia sample (Appendix, Tables A.7–A.10). In a second test, we dropped BEC code 7, which captures governmental final product purchases, for the regression on consumption goods (Appendix, Tables A.11 and A.12). The robustness checks confirm the results presented above.

6. SUMMARY AND DISCUSSION

6.1 Summary

The objective of this paper was to analyze how the trade patterns of East Asia have evolved in the past years. We have applied different tools to study how trade composition in terms of goods and trading partners has changed over time. Dividing all trade into four commodity groups and studying the evolution from 1999 to 2012, we discovered that the share of intermediate goods in East Asia's export basket remains predominant. However, we have also noticed that consumption goods are being exported less to traditional markets in Europe and the US, while more of East Asia's exports of consumption goods are staying within the region or are being exported to the rest of the world.

We then developed a simple tool to measure the distance that trade in the four commodity groups travels. Applying the tool for the entire time period, we observed that trade distance has been shrinking for all groups, however, at different times and speeds. While the decline for intermediate goods was most apparent in the first half of the 2000s, the fall in the trade distance of consumption goods has been more recent. Finally, we used a gravity equation to test our hypotheses. The regression results corroborate the earlier findings—East Asia's exports in intermediate goods are heavily biased within the region, whereas exports in consumption goods are excessively exported to the EU and NAFTA. When running the regressions on biannual data the results become more nuanced. The bias of trading too many intermediate goods within the region remained over the entire time period. However, less and less consumption goods find their way to the EU and NAFTA compared to other markets. The triangular trade pattern is waning and a fresh thinking is needed. We predict that assuming further sustained growth in East Asia, East Asia will still be producing the lion's share of the world's manufactured goods. However, it is on the way to becoming the Global Mall as well.

6.2 East Asia as the Global Mall: Possible Drivers and Implications

The rebalancing of global consumption good exports toward East Asia as a final market is likely to be driven by factors internal to the region as well as external in the global economic environment. Internally, decades of rapid economic growth in East Asia and Asian regionalism have led to rising income levels, expanding markets, and falling trade costs. Barring the outbreak of armed conflict over territorial disputes or sustained economic shocks, it is expected that these trends would persist in the foreseeable future.

Externally, the GFC appears to be have dramatically accelerated the rebalancing of the world economy toward East Asia. Depending on whether the EU and NAFTA economies can extricate themselves from stagnation and resume sustained growth, the pace of the rebalancing toward East Asia may intensify or dampen. However, the overall trend seems clear: East Asia has become the Global Factory and due to its economic size and dynamic economic development is on its way to becoming the Global Mall as well.

As East Asia evolves toward becoming the Global Mall, at least two major implications for the region's economies could be postulated.

First, East Asia may host an increasing proportion of higher value-added downstream value chain activities such as distribution, marketing, and customer services.[11] Since these activities have to be located in proximity to end consumers, many of them are traditionally performed in major final markets like the EU and NAFTA. The iPhone value chain aptly illustrates this pattern. Although the iPhone is predominantly manufactured in East Asia and exported to final markets all over the world, Factory Asia captures only a relatively small fraction of the value added (about 18%) derived from iPhone sales (Xing and Detert 2010; Inomata 2013). This could be partly attributed to higher value activities being primarily conducted in the US, which is also the largest final market for iPhones. As East Asia matures as an end consumer market, higher value-added downstream value chain activities will reorient toward the region. It is also most likely that the region will capture an increasing share of global production value added.

Second, average lead times for East Asia's exports to reach end consumers are likely to shorten. Presently, it takes about a month for newly assembled automobiles to be shipped from Japan to the US, the world's second-largest final market for automobiles (*New York Times* 2012). For automakers, this means substantial transportation and inventory costs. It is partly due to these costs that Japanese automakers have found it financially worthwhile to locate a significant number of plants in the US (*Financial Times* 2014). As East Asia grows in importance as a final market and intraregional trade further expands, increased exports to closer destinations mean that the region's export lead times are likely to fall. This will translate into lower transportation and inventory costs and eventually higher margins for producers or lower prices for consumers. For industries like the automobile industry, which produces goods that are logistically challenging to export, it would also mean that more final assembly facilities are likely to be established in the region. These implications are expected to feed positively back into the drivers for East Asia's evolution toward the Global Mall and further accelerate the region's transformation.

[11] For a discussion on the distribution of value added across value chain activities, refer to Inomata (2013).

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APPENDIX

Table A.1: Description of Variables

Variable	Unit	Description
Imports	Current US dollars	Imports of economy i to economy j in year t
Exports	Current US dollars	Exports of economy i to economy j in year t
Real GDP per capita	Constant 2005 US dollars	Real GDP per capita in year t
Population	Total	Population in year t
RTA	0;1	Unity if two economies are members of a bilateral or regional trade agreement, zero otherwise.
EA dummy	0;1	Brunei Darussalam, Myanmar, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam, Japan, Rep. of Korea, PRC, and Hong Kong, China; zero otherwise.
EU dummy	0;1	Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom; zero otherwise.
NAFTA dummy	0;1	Canada, United States, and Mexico; zero otherwise.
Distance	Kilometers	Geographical distance between the two economies' most populated cities
Contiguity	0;1	Unity if two economies share a land border, zero otherwise.
Common official language	0;1	Unity if two economies share an official or primary language, zero otherwise.
Common ethnic language	0;1	Unity if a common language is spoken by at least 9% of the population in both economies, zero otherwise.
Colony	0;1	Unity if the economy pair has ever been in a colonial relationship, zero otherwise.
Common colonizer	0;1	Unity if the two economies share a common colonizer, zero otherwise.
Current colonial relation	0;1	Unity if the two economies are currently in a colonial relationship, zero otherwise.
Colony post-1945	0;1	Unity if two economies had a common colonizer post 1945, zero otherwise.
Same economy	0;1	Unity if two economies were or are the same economy, zero otherwise.

EA = East Asia, EU = European Union, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, NAFTA = North American Free Trade Agreement, PRC = People's Republic of China.

Source: Authors' compilation.

Table A.2: Broad Economic Category Classification

Commodity	BEC Code
Primary	111 – Primary food and beverages, mainly for industry 112 – Primary food and beverages, mainly for household consumption 121 – Processed food and beverages, mainly for industry 122 – Processed food and beverages, mainly for household consumption 21 – Primary industrial supplies not elsewhere specified 31 – Primary fuels and lubricants 321 – Processed fuel and lubricants, motor spirit 322 – Processed fuel and lubricants, others
Intermediate	22 – Processed industrial supplies not elsewhere specified 42 – Parts and accessories of capital goods (except transport equipment) 53 – Parts and accessories of transport equipment
Capital	41 – Capital goods (except transport equipment) 521 – Industrial transport equipment
Consumption	51 – Passenger motor cars 522 – Non-industrial transport equipment 61 – Durable consumer goods 62 – Semi-durable consumer goods 63 – Non-durable consumer goods 7 – Others (e.g., government final product purchases)

BEC = broad economic category.

Source: Authors' compilation.

Table A.3: Gravity Model Results (DOLS), East Asia's Consumption Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.05***	1.05***		1.07***
	(0.03)	(0.03)		(0.02)
log (population origin)	1.19***	1.19***		1.21***
	(0.03)	(0.03)		(0.02)
log (real GDP per cap destination)	1.13***	1.07***	1.10***	
	(0.02)	(0.02)	(0.02)	
log (population destination)	0.90***	0.86***	0.87***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-0.56***	-0.56***	-0.47***	-1.07***
	(0.06)	(0.07)	(0.06)	(0.11)
RTA dummy	0.59***	0.55***	0.54***	0.25*
	(0.17)	(0.18)	(0.15)	(0.15)
EA dummy		0.24	0.51***	
		(0.18)	(0.14)	
EU dummy		0.33***	0.39***	
		(0.09)	(0.07)	
NAFTA dummy		1.13***	1.15***	
		(0.18)	(0.16)	
Contiguity	0.23	0.23	0.47*	0.17
	(0.29)	(0.28)	(0.26)	(0.24)
Common official language	0.37***	0.34**	0.55***	0.35***
	(0.14)	(0.14)	(0.13)	(0.13)
Common colonizer post-1945	099***	1.01***	0.50***	1.07***
	(0.14)	(0.13)	(0.12)	(0.12)
Colonial links post-1945	1.04***	1.02***	1.16***	0.49
	(0.35)	(0.34)	(0.42)	(0.40)
Same economy	0.21	0.15	-0.44	-0.25
	(0.40)	(0.39)	(0.46)	(0.44)
Constant	-33.18***	-32.22***	-3.60***	-8.26***
	(0.95)	(0.98)	(0.71)	(1.20)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.76	0.76	0.81	0.81
Number of observations	15,797	15,797	16,533	16,553

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.4: Gravity Model Results (DOLS), East Asia's Capital Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.62***	1.62***		1.64***
	(0.04)	(0.04)		(0.03)
log (population origin)	1.40***	1.39***		1.40***
	(0.04)	(0.04)		(0.03)
log (real GDP per cap destination)	1.04***	1.03***	1.08***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	1.03***	1.03***	1.05***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-0.78***	-0.62***	-0.60***	-0.88***
	(0.07)	(0.08)	(0.07)	(0.12)
RTA dummy	0.62***	0.35**	0.53***	0.17
	(0.16)	(0.17)	(0.13)	(0.15)
EA dummy		0.67***	1.04***	
		(0.19)	(0.14)	
EU dummy		0.10	0.11	
		(0.10)	(0.08)	
NAFTA dummy		-0.01	0.25	
		(0.32)	(0.16)	
Contiguity	0.31	0.39	0.43	0.30
	(0.28)	(0.29)	(0.29)	(0.27)
Common official language	0.45***	0.44***	0.27**	0.57***
	(0.12)	(0.12)	(0.12)	(0.13)
Common colonizer post-1945	0.65***	0.66***	0.56***	0.64***
	(0.13)	(0.13)	(0.12)	(0.13)
Colonial links post-1945	-0.25	-0.29	0.29	0.04
	(0.38)	(0.39)	(0.31)	(0.41)
Same economy	-0.10	-0.15	0.18	-0.36
	(0.40)	(0.40)	(0.51)	(0.41)
Constant	-42.16***	-43.34***	-7.01***	-18.26***
	(1.11)	(1.16)	(0.75)	(1.55)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.73	0.73	0.81	0.78
Number of observations	13,952	13,952	14,153	14,574

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.5: Gravity Model Results (DOLS), East Asia's Intermediate Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.57***	1.57***		1.59***
	(0.03)	(0.03)		(0.03)
log (population origin)	1.52***	1.52***		1.51***
	(0.03)	(0.03)		(0.03)
log (real GDP per cap destination)	0.97***	0.91***	0.98***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	1.08***	1.04***	1.07***	
	(0.08)	(0.02)	(0.01)	
log (distance)	-1.15***	-0.90***	-0.93***	-1.09***
	(0.07)	(0.08)	(0.07)	(0.12)
RTA dummy	0.93***	0.51***	0.57***	0.30**
	(0.15)	(0.18)	(0.13)	(0.15)
EA dummy		1.16***	1.42***	
		(0.20)	(0.15)	
EU dummy		0.44***	0.41***	
		(0.10)	(0.08)	
NAFTA dummy		0.47*	0.52*	
		(0.25)	(0.16)	
Contiguity	-0.03	0.14	0.41	0.27
	(0.31)	(0.30)	(0.25)	(0.30)
Common official language	0.70***	0.70***	0.37***	0.67***
	(0.13)	(0.13)	(0.13)	(0.12)
Common colonizer post-1945	1.03***	1.06***	0.88***	0.87***
	(0.14)	(0.14)	(0.13)	(0.12)
Colonial links post-1945	0.13	0.04	0.34	0.28
	(0.36)	(0.36)	(0.36)	(0.36)
Same economy	0.13	0.03	0.19	-0.23
	(0.49)	(0.48)	(0.47)	(0.44)
Constant	-40.11***	-41.51***	-2.87***	-17.67***
	(1.05)	(1.09)	(0.72)	(1.30)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.77	0.77	0.84	0.82
Number of observations	15,082	15,082	15,623	15,761

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.6: Gravity Model Results (DOLS), East Asia's Primary Goods Exports (1999-2012)

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	0.32***	0.32***		0.35***
	(0.04)	(0.04)		(0.04)
log (population origin)	0.86***	0.86***		0.85***
	(0.04)	(0.04)		(0.04)
log (real GDP per cap destination)	0.80***	0.83***	0.89***	
	(0.03)	(0.04)	(0.03)	
log (population destination)	0.94***	0.92***	0.98***	
	(0.02)	(0.03)	(0.02)	
log (distance)	-1.38***	-1.18***	-1.19***	-0.86***
	(0.08)	(0.10)	(0.09)	(0.17)
RTA dummy	1.23***	0.76***	0.48***	0.58***
	(0.20)	(0.24)	(0.20)	(0.18)
EA dummy		0.87***	1.23***	
		(0.26)	(0.20)	
EU dummy		-0.33***	-0.30***	
		(0.13)	(0.10)	
NAFTA dummy		0.19	0.14	
		(0.30)	(0.19)	
Contiguity	-0.24	-0.15	0.10	0.38
	(0.26)	(0.25)	(0.27)	(0.28)
Common official language	0.35*	0.29	0.90***	0.04
	(0.19)	(0.19)	(0.17)	(0.18)
Common colonizer post-1945	1.33***	1.34***	0.91***	1.40***
	(0.18)	(0.18)	(0.16)	(0.17)
Colonial links post-1945	0.06	0.10	0.39	-0.04
	(0.53)	(0.52)	(0.44)	(0.50)
Same economy	0.12	0.06	0.89*	-0.20
	(0.36)	(0.37)	(0.43)	(0.41)
Constant	-12.84***	-14.50***	3.35***	0.15
	(1.38)	(1.44)	(0.93)	(1.82)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.55	0.56	0.69	0.62
Number of observations	13,754	13,754	14,236	14,367

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.7: Gravity Model Results (DOLS), East Asia (excluding Japan) Consumption Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.09***	1.09***		1.11***
	(0.03)	(0.03)		(0.02)
log (population origin)	1.23***	1.23***		1.26***
	(0.03)	(0.03)		(0.03)
log (real GDP per cap destination)	1.15***	1.09***	1.12***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	0.90***	0.86***	0.88***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-0.58***	-0.59***	-0.51***	-1.21***
	(0.07)	(0.07)	(0.07)	(0.13)
RTA dummy	0.58***	0.58***	0.55***	0.28*
	(0.17)	(0.19)	(0.15)	(0.16)
EA dummy		0.19	0.48***	
		(0.20)	(0.15)	
EU dummy		0.36***	0.42***	
		(0.09)	(0.07)	
NAFTA dummy		1.18***	1.20***	
		(0.19)	(0.17)	
Contiguity	0.22	0.21	0.45*	0.17
	(0.29)	(0.28)	(0.26)	(0.24)
Common official language	0.33**	0.30**	0.54***	0.36***
	(0.14)	(0.14)	(0.13)	(0.13)
Common colonizer post-1945	1.03***	1.05***	0.55***	1.15***
	(0.14)	(0.13)	(0.12)	(0.12)
Colonial links post-1945	1.24***	1.20***	1.32***	0.58
	(0.33)	(0.33)	(0.42)	(0.44)
Same economy	0.22	0.17	-0.46	-0.36
	(0.40)	(0.39)	(0.46)	(0.45)
Constant	-34.04***	-32.90***	-3.49***	-8.04***
	(1.00)	(1.03)	(0.73)	(1.34)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.75	0.75	0.80	0.80
Number of observations	14,328	14,328	15,064	15,008

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.8: Gravity Model Results (DOLS), East Asia (excluding Japan) Capital Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.90***	1.90***		1.92***
	(0.04)	(0.04)		(0.04)
log (population origin)	1.69***	1.69***		1.70***
	(0.04)	(0.04)		(0.04)
log (real GDP per cap destination)	1.08***	1.06***	1.10***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	1.06***	1.04***	1.06***	
	(0.02)	(0.02)	(0.07)	
log (distance)	-0.79***	-0.66***	-0.64***	-0.91***
	(0.07)	(0.08)	(0.07)	(0.14)
RTA dummy	0.72***	0.49***	0.55***	0.32**
	(0.16)	(0.18)	(0.14)	(0.14)
EA dummy		0.58***	0.98***	
		(0.20)	(0.15)	
EU dummy		0.13	0.14	
		(0.11)	(0.09)	
NAFTA dummy		0.08	0.26	
		(0.31)	(0.17)	
Contiguity	0.41	0.47*	0.41	0.39
	(0.28)	(0.28)	(0.29)	(0.26)
Common official language	0.35***	0.35***	0.27**	0.51***
	(0.12)	(0.12)	(0.12)	(0.13)
Common colonizer post-1945	0.74***	0.75***	0.60***	0.80***
	(0.13)	(0.13)	(0.12)	(0.13)
Colonial links post-1945	-0.13	-0.15	0.33	0.20
	(0.40)	(0.41)	(0.33)	(0.43)
Same economy	0.08	0.03	0.15	-0.27
	(0.44)	(0.44)	(0.51)	(0.37)
Constant	-49.20***	-50.07***	-6.96***	-25.10***
	(1.11)	(1.28)	(0.80)	(1.74)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.73	0.73	0.80	0.78
Number of observations	12,492	12,492	12,693	13,038

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.9: Gravity Model Results (DOLS), East Asia (excluding Japan) Intermediate Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.82***	1.82***		1.85***
	(0.03)	(0.03)		(0.03)
log (population origin)	1.79***	1.79***		1.79***
	(0.03)	(0.03)		(0.03)
log (real GDP per cap destination)	0.98***	0.91***	0.97***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	1.08***	1.04***	1.07***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-1.16***	-0.92***	-0.95***	-1.01***
	(0.07)	(0.08)	(0.07)	(0.14)
RTA dummy	1.02***	0.62***	0.58***	0.44***
	(0.16)	(0.19)	(0.14)	(0.15)
EA dummy		1.13***	1.36***	
		(0.21)	(0.15)	
EU dummy		0.49***	0.44***	
		(0.10)	(0.09)	
NAFTA dummy		0.57*	0.55***	
		(0.24)	(0.17)	
Contiguity	0.12	0.21	0.40	0.41
	(0.33)	(0.32)	(0.25)	(0.33)
Common official language	0.53***	0.53***	0.37***	0.48***
	(0.13)	(0.13)	(0.13)	(0.12)
Common colonizer post-1945	1.02***	1.04***	0.87***	0.87***
	(0.14)	(0.14)	(0.13)	(0.12)
Colonial links post-1945	0.32	0.25	0.44	0.52
	(0.34)	(0.35)	(0.39)	(0.35)
Same economy	0.42	0.32	0.19	0.01
	(0.59)	(0.57)	(0.46)	(0.51)
Constant	-45.68***	-46.84***	-2.35***	-23.89***
	(1.08)	(1.10)	(0.76)	(1.30)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.78	0.79	0.83	0.84
Number of observations	13,613	13,613	14,154	14,216

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.10: Gravity Model Results (DOLS), East Asia (excluding Japan) Primary Goods Exports, 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	0.55***	0.55***		0.60***
	(0.05)	(0.05)		(0.05)
log (population origin)	1.10***	1.10***		1.11***
	(0.05)	(0.05)		(0.05)
log (real GDP per cap destination)	0.79***	0.82***	0.87***	
	(0.03)	(0.04)	(0.03)	
log (population destination)	0.93***	0.91***	0.97***	
	(0.03)	(0.03)	(0.02)	
log (distance)	-1.34***	-1.19***	-1.20***	-0.96***
	(0.08)	(0.10)	(0.09)	(0.19)
RTA dummy	1.30***	0.90***	0.49**	0.77***
	(0.20)	(0.24)	(0.21)	(0.19)
EA dummy		0.75***	1.09***	
		(0.27)	(0.22)	
EU dummy		-0.30**	-0.27***	
		(0.14)	(0.11)	
NAFTA dummy		0.23	0.10	
		(0.29)	(0.21)	
Contiguity	-0.08	-0.01	0.15	0.51**
	(0.23)	(0.23)	(0.26)	(0.26)
Common official language	0.22	0.16	0.91***	-0.13
	(0.19)	(0.19)	(0.17)	(0.18)
Common colonizer post-1945	1.32***	1.33***	0.90***	1.41***
	(0.18)	(0.18)	(0.16)	(0.17)
Colonial links post-1945	0.13	0.23	0.38	0.06
	(0.54)	(0.54)	(0.48)	(0.50)
Same economy	0.32	0.27	0.90*	-0.03
	(0.27)	(0.29)	(0.42)	(0.34)
Constant	-17.95***	-19.24***	3.86***	-4.14**
	(1.43)	(1.50)	(0.96)	(1.95)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.56	0.56	0.68	0.63
Number of observations	12,367	12,367	12,849	12,912

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.11: Gravity Model Results (DOLS), East Asia's Consumption Goods Exports (excluding BEC code 7), 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.03***	1.03***		1.05***
	(0.03)	(0.03)		(0.02)
log (population origin)	1.17***	1.18***		1.20***
	(0.03)	(0.03)		(0.02)
log (real GDP per cap destination)	1.13***	1.06***	1.10***	
	(0.02)	(0.02)	(0.88)	
log (population destination)	0.91***	0.87***	0.88***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-0.52***	-0.53***	-0.44***	-1.03***
	(0.07)	(0.07)	(0.07)	(0.12)
RTA dummy	0.56***	0.56***	0.54***	0.22
	(0.17)	(0.18)	(0.15)	(0.15)
EA dummy		0.19	0.49***	
		(0.19)	(0.15)	
EU dummy		0.37***	0.43***	
		(0.09)	(0.07)	
NAFTA dummy		1.06***	1.10***	
		(0.18)	(0.16)	
Contiguity	0.11	0.10	0.36	0.10
	(0.31)	(0.30)	(0.26)	(0.26)
Common official language	0.27***	0.25**	0.49***	0.29**
	(0.14)	(0.14)	(0.13)	(0.14)
Common colonizer post-1945	1.05***	1.07***	0.54***	1.11***
	(0.14)	(0.13)	(0.12)	(0.12)
Colonial links post-1945	1.02***	1.00***	1.13***	0.50
	(0.35)	(0.34)	(0.43)	(0.39)
Same economy	0.36	0.33	-0.50	-0.13
	(0.42)	(0.41)	(0.53)	(0.44)
Constant	-33.35***	-32.34***	-4.11***	-8.18***
	(0.98)	(1.00)	(0.72)	(1.23)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.76	0.76	0.81	0.80
Number of observations	15,713	15,713	16,431	16,457

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.

Table A.12 Gravity Model Results (DOLS), East Asia (excluding Japan) Consumption Goods Exports (excluding BEC code 7), 1999–2012

Variable	(1)	(2)	(3)	(4)
log (real GDP per cap origin)	1.07***	1.07***		1.09***
	(0.03)	(0.03)		(0.02)
log (population origin)	1.21***	1.21***		1.25***
	(0.03)	(0.03)		(0.03)
log (real GDP per cap destination)	1.16***	1.09***	1.12***	
	(0.02)	(0.03)	(0.02)	
log (population destination)	0.91***	0.88***	0.89***	
	(0.02)	(0.02)	(0.02)	
log (distance)	-0.55***	-0.57***	-0.48***	-1.15***
	(0.07)	(0.08)	(0.07)	(0.14)
RTA dummy	0.56***	0.60***	0.57***	0.26*
	(0.18)	(0.19)	(0.16)	(0.15)
EA dummy		0.12	0.44***	
		(0.20)	(0.16)	
EU dummy		0.40***	0.46***	
		(0.09)	(0.08)	
NAFTA dummy		1.11***	1.15***	
		(0.19)	(0.17)	
Contiguity	0.09	0.07	0.33	0.09
	(0.30)	(0.29)	(0.26)	(0.26)
Common official language	0.23	0.21	0.48***	0.30**
	(0.14)	(0.14)	(0.13)	(0.14)
Common colonizer post-1945	1.09***	1.11***	0.58***	1.20***
	(0.14)	(0.13)	(0.12)	(0.12)
Colonial links post-1945	1.21***	1.16***	1.28***	0.58
	(0.34)	(0.33)	(0.44)	(0.43)
Same economy	0.36	0.33	-0.53	-0.23
	(0.42)	(0.41)	(0.52)	(0.46)
Constant	-34.16***	-32.96***	-4.00***	-8.03***
	(1.03)	(1.05)	(0.75)	(1.37)
Time dummy	Yes	Yes	Yes	Yes
Exporter dummy	No	No	Yes	No
Importer dummy	No	No	No	Yes
Centered R^2	0.74	0.75	0.80	0.80
Number of observations	14,244	14,244	14,962	14,912

EA = East Asia, EU = European Union, GDP = gross domestic product, NAFTA = North American Free Trade Agreement, RTA = regional trade agreement.

Notes: Estimated using dynamic OLS with one lead and one lag on first-differenced explanatory variables; standard errors are in parentheses and are robust to heteroskedasticity and autocorrelation; ***, **, and * indicate significance levels of 1%, 5%, and 10%, respectively.

Source: Authors' calculations.