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# Differential impacts of trade facilitation on homogeneous and differentiated products in East Asia

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## Contents

Executive summary	1
Introduction	2
1. Trade facilitation: Definition, measurement and potentially different impacts on different products	4
A. Definition of trade facilitation and product classification	4
<ul><li>B. Specific measures of trade facilitation factors</li><li>C. Potential variation in impacts of trade facilitation on different product groups</li></ul>	5 6
<ol> <li>Export and trade facilitation performances of East Asian economies</li> <li>A. Relative performance of export of the differentiated versus</li> </ol>	8 8
homogeneous products B. Trade facilitation of selected economies	8 10
<ul> <li>3. Evaluation of impacts of trade facilitation on product groups</li> <li>A. Estimation model and description of variables</li> <li>B. Estimation results</li> <li>C. Simulation results</li> </ul>	13 13 15 22
4. Conclusion	25
Reference	26
Annexes	28

## List of figures

Figure 1. Share of homogeneous products in world imports	9
Figure 2. Price indexes of manufactured versus	9
Figure 3. Share of homogeneous products in total exports by East Asian economies	10
Figure 4. Average scores of seaport efficiency	11
Figure 5. Average number of Internet users per 100 head of population	12
Figure 6. Average number of documents required for starting a business	12

### List of tables

Table 1. Correlation between overall ranking and selected indicators in	5
Table 2. Estimation results	17
Table 3. Results of Wald tests on differences in estimated coefficients for the two	
product groups	20
Table 4. Simulation results when trade facilitation factors are improved by quantiti	ies24

### **Executive summary**

East Asia is an interesting group of countries to study the impacts of trade facilitation. The majority of the economies in the region have shared similarities in terms of the apparent pursuit of export-lead growth policies. These similarities would partially reduce the impacts of unobservable factors such as economy specific policies, endowments and result in a more precise picture of trade facilitation effects on trade.

A number of papers have explored the effects of various trade facilitation factors, both at-the-border and behind-the-border, on trade flows among East Asian economies. Those studies have found that factors such as transport costs, infrastructure and some elements of domestic regulation have had significant impacts on the intra-regional trade of the East Asian economies.

This paper also studies impacts of trade facilitation dimensions including crossborder transport infrastructure, communication infrastructure and domestic regulation on exports of East Asian economies. However, this paper is different from other studies in the region, in three aspects. Firstly, it covers exports to all economies in the World instead of looking at only intra-regional trade as other analyses have done. Secondly, homogenous products and differentiated products are investigated separately. Thirdly, time-importer fixed effects and time-variant approximation as proposed in Baier and Bergstrand (2009) are employed to control for "multilateral resistances" of importers and exporters, respectively.

Some efforts are made to find fairly well representative measures of the three above-mention dimensions of trade facilitation to include in empirical models. Estimation results show that all factors under study have significant impacts on both product groups. Cross-border transport infrastructure has larger impacts on differentiated products. Meanwhile, communication infrastructure is found surprisingly to have larger impacts on homogenous products. Impacts of domestic regulation are insignificantly different for the two product groups. This paper puts forward three distinguishable features of East Asian economies that could attribute partially to this "abnormal" result of communication infrastructure as well as other counter-intuitive results: (a) the popularity of industrial policy among the economies (in contrast to perceived adoption of export-led i.e. outwardoriented strategies); (b) the critical role of multinational corporations in manufactured exports of some economies in the region; and (c) the relatively high proportion of parts and components in exports of the region.

The counterfactual analysis illustrates that export gains would be remarkable if the trade facilitation factors are improved. However, these results should only be regarded as indicative, other factors such as costs of implementation and possible changes in export behavior due to policy changes, must also be taken into account when any initiatives are considered in practice. Taking into account general export evolution of the economies, cross-border infrastructure should be given priority as it would not only result in the highest export gains but also improvement in export structure. However, attention to improved communication infrastructure for homogenous products should also be considered, at least in the short run.

### Introduction

Along with tariff reduction under the growing number of bilateral and multilateral trade agreements, trade facilitation has been increasingly documented as an important factor affecting national trade performance, especially in the case of developing countries<sup>1</sup> where firms still face significant obstacles to participating in international trade activities. Empirically, studies have shown that improvements in some elements of trade facilitation, both at-the-border and behind-the-border, have had positive impacts on trade activities. For example, Wilson and others (2002) reported that improvements of trade facilitation could increase trade between Asia-Pacific Economic Cooperation countries (APEC) by around 10 per cent.

East Asian countries/territories<sup>2</sup> (hereafter referred to as economies) are an interesting group with regard to studying the impacts of trade facilitation. The majority of these economies have been pursuing, to varying degrees, export-led economic growth policies. In fact, some have been frequently cited as successors of this policy, such as the Republic of Korea and the Taiwan Province of China. Exports by the region increased more than 13-fold from 1980 to 2007; in other words, the share of these economies in the total merchandise exports of the world increased from 13.8 per cent to 27.2 per cent during that period.<sup>3</sup> According to the United Nations Conference on Trade and Development (UNCTAD) (2008), the region has 8 out of 12 of the world's major exporters of manufactured goods. Furthermore, 8 of these economies are regarded as newly industrialized economies (NICs); all are in the East Asian region (UNCTAD, 2008). These similarities of economies provide a good platform for evaluating the effects of improved trade facilitation. The study of factors linked to trade facilitation would improve our understanding of the impacts on trade, since the role of unobservable economic trade specifics on policies, endowments, etc., would be (at least partially) reduced.

A number of papers have explored the effects of various trade facilitation factors on trade flows among East Asian economies. De (2007) analyzed the impacts of infrastructure facilities, cross-country transport costs and tariffs on trade among nine East Asian economies and India. He found that all three components of trade costs had significant impacts on trade flows. If cross-country transport costs were reduced by 10 per cent, trade among the economies would increase by 6 per cent, which was the largest impact among the three components. However, the estimation at the 4-digit HS level appeared to smooth the impacts as well as economy-fixed effects, and the remoteness was not sufficient for controlling "multilateral resistance" as it needs control at the corresponding level of study (e.g., if the study is at the 4-digit HS level, control of "multilateral resistance" at 4-digit HS is also needed). Shepherd and Wilson (2009) reported that at-the-border infrastructure and communication technology had significant impacts on trade flows among selected East Asian economies during 2000-2005. Employing the same approach, Hernandez and Taningco (2010) also estimated the effects of various factors on intra-trade flows in the region during 2006-2008. Port infrastructure and communication services were again found to be significantly affecting intraregional

<sup>&</sup>lt;sup>1</sup> A Google scholar search on 26 November 2009, revealed more than 10,000 results for "trade facilitation" and about 6,000 results for "trade facilitation" and "developing countries".

<sup>&</sup>lt;sup>2</sup> The East Asian region includes East Asian and South-East Asian countries. A list of the economies in each region is provided in Annex I.

<sup>&</sup>lt;sup>3</sup> The authors' calculation based on UNCTAD, 2008.

trade. In addition, their results showed that the depth of credit information available also had significant effects. However, these studies only looked at intra-trade between the economies being reviewed. Two later studies, by Shepherd and Wilson, and Hernandez and Taningco, looked at aggregate bilateral exports and the BEC 1-digit level of product classification. Studying at the BEC 1-digit level made it possible to account for heterogeneity among product groups but the underlying characteristics of the product groups were unclear. This makes it difficult to draw distinctive conclusions from the various results among the product groups. In addition, the two studies had to compromise on the separate impacts of trade facilitation on exporters and importers in order to take into account "multilateral resistance".

For the current study, an alternative product classification was employed with clearer distinguishing characteristics and evaluation of exports by East Asian economies to all destinations in order to establish a more complete picture of export gains from trade facilitation as well as differences in the impacts of trade facilitation factors on various products. By employing the product classification method of Rauch (1999) the authors attempted first to assess the effects of selected trade facilitation factors, both at-theborder and behind-the-border on the exports of two East Asian economy's product groups; these groups were identified as homogenous and differentiated products. These trade facilitation factors included cross-border transport infrastructure, communications infrastructure and domestic regulation of exports. They then estimated export gains for the product groups under the individual improvement of these trade facilitation elements. To control for effects of "multilateral resistances", time-importer fixed effects and timevariant-approximation proposed in Baier and Bergstrand (2009) were used for importers and exporters, respectively. Fixed effect is one of the best estimators of "multilateral resistances", while the time-variant-approximation of Baier and Bergstrand was carefully and reliably derived.

The econometric results show that trade facilitation has significant impacts on trade in the two product groups. Transport infrastructure has significantly higher impact on exports of differentiated products. Although domestic regulation also has a higher impact on the differentiated group, it is not significant. The positive impact of communications infrastructure is significantly higher on exports of homogenous products. Although this runs counter to existing theories as well as the results of other empirical studies, it could be partially attributed to some distinguishable features of the economies in the East Asian region. Simulation results imply that economies in the region would gain significantly in terms of export increases if the trade facilitation factors are improved; however, the gain varies among factors as well as economies.

This paper is organized as follows. Specific theoretical issues of trade facilitation and its impacts on different products are presented in section 1, while section 2 discusses the performances of exports of the two product groups as well as trade facilitation of selected economies in the region. Section 3 is devoted to econometric models, and estimation and simulation results. Section 4 provides the conclusion.

# **1. Trade facilitation: Definition, measurement and potentially different impacts on different products**

### A. Definition of trade facilitation and product classification

Although research on trade facilitation has been rapidly growing, there is still no generally accepted definition(s) of trade facilitation. As Anderson and van Wincoop (2004) argued, "both domestic and international trade costs are included because it is arbitrary to stop counting trade costs once goods cross a border". Thus, in a broad sense, trade facilitation could refer to measures or factors contributing to the reduction of the costs of moving goods when crossing borders. However, experts often define specific domains in the routine of goods movements from a producer in one country to consumers in another country. Some may only concern procedures required for the cross-border movement of goods. For example, Persson's (2008) definition "might be summarized as measures to decrease the transaction costs arising from 'moving [of] goods through ports or customs' (as cited in Roy and Bagai, 2005)". Meanwhile, definitions in a number of papers cover more factors in broader domains, both at-the-border (such as customs valuation and port efficiency) and behind-the-border (such as service efficiency), and business regulation. (For example, Wilson, Catherine and Otsuki, [2005] noted that "the definition has been broadened to include the environment in which trade transactions take place with the focus of trade facilitation efforts 'inside-the-border' on domestic policies and institutional and governance structures").

This paper considers trade facilitation from the broad perspective, which includes both border and behind-the-border measures. Domestic business regulation, communications infrastructure and cross-border transport infrastructure are investigated. Although trade facilitation studies frequently include another indicator called "custom environment" or "cross-border regulation", this indicator has been excluded by the authors as it is more relevant to imports than exports (Wilson, Catherine and Otsuki, 2005). This exclusion is even more practical for the East Asian economies as the majority of which have more or less been pursuing export-led economic growth policies and it is believed that those economies have made great efforts to improve the regulatory environment for exports.

With regard to product classification, the approach by Rauch (1999) is followed in this paper. Under this approach, 4-digit products are classified as homogeneous and differentiated. Homogeneous products are further divided into commodities traded in organized markets such as crude oil, basic metals and coffee. Price referenced products for which prices are available but for which there are no organized markets, could include raw silk, cotton for the textile industry or several types of acids for the chemical industry. The remainder comprises differentiated products (almost all products of the electric industry belong to this group). In this paper, the first level of classification – i.e., product groups that are homogeneous and differentiated – is used. There are two versions of this classification, "conservative" and "liberal". The former minimizes the number of products overlapping between trade in organized markets and referenced prices, while the latter version maximizes it. Since the first level of classification is used here, either version would produce the same results.

### **B.** Specific measures of trade facilitation factors

The World Bank's "Doing Business" surveys cover 10 aspects of the business environment, in which the overall country ranking is a good indicator of the quality of the business environment in general. This can be used as a measure for the domestic regulation element of the study discussed in this paper. However, a more informative and absolute measure is required for policy discussion, but this indicator is needed to represent the overall ranking as closely as possible. Thus, the focus is on the number of documents required to complete a deal in some economic activities. Specifically, documents for starting a business, registering a property and enforcing contracts are regarded as appropriate examples. The criterion for selecting these categories of documents is the correlation between them and the overall ranking; the higher the correlations of the document numbers and the ranking of East Asian economies studied during 2005-2009<sup>4</sup> and 2006-2007. It is clear that the number of documents needed for starting a business outperforms the other indicators. Thus, this number was used as the measure for the domestic regulation dimension in the analysis.

Table 1. Correlation between	overall	ranking ar	nd selected	indicators in
East	Asian e	conomies		

	2005-2009	2006-2007 <sup>a</sup>
Documents for starting a business	0.829	0.885
Documents of registering property	0.389	0.389
Documents for enforcing a contract	0.548	0.557

Source: Authors' calculation based on the World Bank's "Doing Business" database.

<sup>a</sup> This study and further justification is discussed later in this paper.

Two indicators – airport and seaport efficiency – are considered as the measure of cross-border transport infrastructure. Airport efficiency was captured by responses by interviewees to the question of "Passenger air transport in your country is…", with the answer being given on a scale of 1 (underdeveloped) to 7 (extensive and efficient by international standards). Seaport efficiency was captured by responses to the question of "Port facilities and inland waterways in your country are:" on a similar scale to that for airport infrastructure. These questions are used in the annual surveys of the World Economic Forum and the aggregated data at national level are sourced from the *Travel and Tourism Competitiveness Reports* prepared by the World Economic Forum. A very high correlation between the two indicators<sup>5</sup> allows the selection of seaport efficiency as the measure for cross-border transport infrastructure.

Wilson, Catherine and Otsuki (2005) put together an index from the two indicators of "speed and cost of Internet access" and "the effect of the Internet on business". Shepherd and Wilson (2009) used the "ISP sector competition index" for the service sector infrastructure. However, the former information is not available in recent *Global Competitiveness Reports* while the latter is only available as raw data which the

<sup>&</sup>lt;sup>4</sup> During this period, some new economies were included in the "Doing Business" surveys, which meant that ranking for this period was not fully comparable. Thus, the economies that were covered for every year in this period were re-ranked before estimating the correlations. The number of economies for which data were available for the complete period was 175.

<sup>&</sup>lt;sup>5</sup> The correlation between these indicators is about 96 per cent for the studied East Asian economies in 2006-2007.

authors were unable to access. Furthermore, the authors focused more on communications infrastructure. Thus, the "number of Internet users per 100 population" was used, as given in the *Global Competitiveness Reports* and the *Travel and Tourism Competitiveness Reports*.

The number of mobile phones or fixed landline telephones per 100 head of a population can be used to measure the development of the communications infrastructure; however, the authors argue that these indicators may be misleading in terms of the true situation. For mobile phone subscribers, the number per 100 persons may not reflect the actual ratio of population using this service as it depends on service providers who often provide pre-paid sim-cards included in promotions as a marketing policy; some people just use a new sim-card for a short time in order to utilize the promotion, yet a significant amount of these sim-card numbers are still counted when calculating the number of mobile phone subscribers. It is clear that this marketing policy varies between economies and this indicator may thus fail to reflect the actual development of the communications infrastructure of individual economies.

Fixed landline telephones are a different story since they have been competing with, or have even been replaced by, mobile phones in recent years. Economies that developed their communications infrastructure before the mobile phone 'era' often have an abnormally high number of this type of phone compared with more recently developed economies because people in the former economies often use mobile phones as a replacement for fixed landline telephones. Thus, this data may also fail to reflect the relative extension of the communications infrastructure among economies. Meanwhile, as the Internet has only been developed in the past two decades and because it is no direct replacement, the number of internet users is less affected by the above issue of telephone user numbers and can therefore more correctly reflect development of the communications infrastructure.

### C. Potential variation in impacts of trade facilitation on different product groups

This subsection briefly summarizes the potential differences in the impacts of trade facilitation factors on the product groups as well as empirical evidence. Rather than present a full survey, this paper just notes some of the differences as justification for product classification.

Communication infrastructure directly relates to search cost. Unlike homogeneous

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