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Economic Modelling

journal homepage: <https://www.journals.elsevier.com/economic-modelling>Tariff evasion in machinery production networks: Evidence from East Asia[☆]

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ARTICLE INFO

JEL codes:

F12
F14
F15

Keywords:

International production networks
Machinery industry
Tariff evasion
Asian fragmentation
Parts and components

ABSTRACT

We estimate the effects of tariff rates on bilateral tariff evasion in international production networks, namely parts and components and final products, focusing on intra-regional trade in East Asia during 1996–2011. Our results reveal that tariff evasion is prevalent in 7 of the 12 East Asian countries studied, particularly in non-high-income importers. Specifically, the tariff evasion of parts and components increases by 1.10%–1.55% compared with that of final products (0.55%–0.96%), with a one-percentage-point increase in the tariff rate. Moreover, the responsiveness of the unit price gap to the tariff level is greater for parts and components than for final products. Finally, we investigate the nonlinear issue and tariff evasion of the misclassification of imported products and obtain robust results. Our findings provide relevant economic implications for policy makers regarding the severity of tariff evasion because machinery production networks are crucial factors driving intra-regional trade in East Asia.

1. Introduction

Many international trade researchers have emphasized the severe consequences of illicit trade, including violence, competition distortion, and tariff revenue loss. Corruption, which is an indicator of institutional quality, has been proven to severely undermine economic exchanges in bilateral trade flow. Corruption is particularly widespread among customs officials, which has caused enormous losses in revenue and has increased incidences of smuggling and resulted in the illicit flow of goods through bribery, extortion, and evasion. In particular, import tariffs are considered a key source of revenue for many developing and transition countries, so policy makers have scrutinized the evasion behavior of customs officials.

Although the precise quantification of tariff evasion is difficult, recent studies have used discrepancies in official trade statistics to identify correlations with tariff or tax rates. [Fisman and Wei \(2004\)](#) propose that missing import typically occurs in customs during international trade and is known as the evasion gap.¹ The evasion gap, which is defined by the

log difference between the trade value of exports recorded by the exporting country authority and the trade value of imports recorded by the importing country authority. They investigate the association between tax schedules and the evasion gap and report that missing import is positively correlated with the tax rate. [Fisman and Wei \(2004\)](#) develop a methodology that has been extensively used in many studies² to investigate tax (tariff) evasion. These studies report that the evasion gap is positively correlated with tax and tariff rates.

In this paper, we estimate the relationship between the tariff rate and evasion gap by applying the methodology outlined by [Fisman and Wei \(2004\)](#) to East Asian international production and distribution networks, namely machinery parts and components and final goods.³ Regarding the literature on evasion and corruption, most studies focus on non-East Asian countries. Although some studies focus on East Asia, they investigate neither the robustness of Asian fragmentation nor intra-regional trade in East Asia. Furthermore, although a series of empirical studies report the relevance of Asian fragmentation, the literature on production networks in East Asia does not investigate the robustness of production

[☆] The author deeply appreciates the valuable comments from Professor Sushanta Mallick and an anonymous referee. The author also thanks Professor Fukunari Kimura, Kozo Kiyota, Toshihiro Okubo, and Mateus Silva Chang from Keio University, and seminar participants of the 15th International Convention of the East Asian Economic Association (EAEA) held in Bandung, Indonesia in November 2016 for their helpful comments.

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¹ [Gorodnichenko et al. \(2009\)](#) use household data from 1998 to 2004 for investigating income tax reform on consumption, income, and tax evasion. The consumption-income gap is defined as a log difference between consumption and income.

² The issues of tax and tariff evasion are studied in many cases, such as Germany and 10 Eastern European countries ([Javorcik and Narciso, 2008](#)), India ([Mishra et al., 2008](#)), Mozambique ([Dunem and Arndt, 2009](#)), Kenya and Tanzania ([Levin and Widell, 2014](#)), Austria ([Berger et al., 2016](#)), China and Hong Kong ([Fisman et al., 2008](#)), China ([Rotunno and Vezina, 2012](#)), America and China ([Ferrantino et al., 2012](#)), South Africa ([Sequeira, 2016](#)), and 15 countries which joined the WTO ([Javorcik and Narciso, 2017](#)).

³ East Asian countries in this paper are defined as Japan, China, Korea, Singapore, Malaysia, Thailand, Brunei, Lao PDR, Cambodia, Vietnam, Myanmar, Indonesia, and the Philippines (i.e., the ASEAN + 3). However, the Lao PDR sample is excluded because of data limitation.

<https://doi.org/10.1016/j.econmod.2017.10.017>

Received 27 July 2017; Received in revised form 27 October 2017; Accepted 27 October 2017

Available online xxx

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networks against tariff evasion or corruption.⁴ Therefore, according to our review of the relevant literature, this is the first paper to link two strands of the trade literature by investigating the impact of tariff evasion on international production and distribution networks.

East Asia is a reasonable case for researching tariff evasion on production networks for three reasons. First, intra-regional production networks in East Asia involve numerous countries, but with different income levels.⁵ The distinct performance of tariff evasion stratified by the income level in East Asia is worth investigating. Second, machinery production networks are a multinational activity⁶ in East Asia. A larger proportion of missing trade in imports might cause a marked decrease in the networking of production chains, resulting trade activities might be hampered because production networks in East Asia are a multinational, intra-regional activity, and an input–output relationship exists for parts and components and final products. Third, the tariff evasion performance of parts and components and final products may vary. In recent decades, intra-regional trade in East Asia has been driven by the machinery industry.⁷ The problem of parts and components versus final products is a growing concern in international production network research. Moreover, unlike a restricted sample in previous studies, we extend our investigation to regional groups, examining trade relationships between multiple countries, namely the bilateral evasion gap in East Asia.

Machinery production networks in East Asia have rapidly developed in recent years, reflected in the marked growth in the export and import of parts and components and final products. Because machinery production is the most important industry in East Asian manufacturing,⁸ great losses in tariff revenue can be expected while tariff evasion is prevalent, particularly for less economically developed countries that depend on import tariffs as a major source of revenue. In addition to tariff revenue loss, widespread tariff evasion can damage a country's image so that becoming an attractive location for foreign direct investment (i.e., outsourcing and offshoring) is difficult. *Anderson and Marcouiller (2002)* note that corruption markedly reduces international trade and identify high taxes and corruption as the first and second largest obstacles in conducting business, as reported by the World Bank in 1996. Moreover, the prevalence of corruption from customs may harm international trade and lead to smaller trade flows in import (*Theede and Gustafson, 2012*).

The formation of vertical production chains and international production and distribution networks is attributed to fragmentation theory, which suggests splitting a previously integrated production process into two or more production process steps so that the components or fragments are undertaken in different locations but result in the same final product. Therefore, we consider that the tariff evasion that emerges from production networks causes a misrepresentation of import prices, and the quantity of imported products are subsequently undercounted. This makes assessing the accurate price and producing sufficient parts and

components and final products difficult for meeting the demand necessary for the products that are correctly imported. This phenomenon can cause a production chain to collapse.

To quantify the effect of tariff rates on the evasion gap in international production networks, we will focus on four issues. Firstly, we develop a model in accordance with the model of *Fisman and Wei (2004)* and examine whether the tariff rate is positively correlated with the evasion gap. Secondly, we introduce the interaction term between the dummy of parts and components and tariff rates, in which the product is classified as a product of parts and components, following *Kimura and Obashi's (2010)* definition.⁹ This methodology identifies the type of products, which are subject to greater evasion for parts and components and final products. Trade authorities may encounter difficulties when judging whether the prices of parts and components are correctly reported compared with the final goods. Furthermore, parts and components are often traded within a multinational. Therefore, we expect that trading parts and components is more likely to occur for tariff evasion. Thirdly, we analyze other methods of tariff evasion, namely undercounting the quantity of imported products and misrepresenting the price of imported products. Finally, we provide other potential specifications that clarify whether differences exist in the magnitude of the coefficient on the tariff rate, which would imply that tariff evasion is more severe in that specification.

The paper is organized as follows: Section 2 provides how and why tariff evasion happens. Section 3 reports the two crucial data sources required to majorly construct our sample. Section 4 briefly shows the distribution of tariff rates and bilateral evasion gap in production networks. Section 5 explains the model specification and application of this estimation in different methods of tariff evasion as well as in different types of products. Section 6 and 7 present the estimated results and policy implication, respectively. Section 8 is the study conclusion.

2. Tariff evasion — how and why it happens

Bhagwati (1964) conducts seminal work on tariff evasion and indicate that the reported discrepancies¹⁰ could be explained by tariff evasion and other possible reasons, implying that missing imports reported in a country might have been smuggled, misreported, and underinvoiced. Moreover, *Bhagwati (1964)* notes that understating import values and underinvoicing can be profitable if the tariff rate or premium on the imported commodity exceeds the premium to be paid for exchanging transactions in the black market. Various avenues facilitate tax and tariff evasion. Fake invoices and double invoicing might reduce the value of imported commodities. *Mwinyimvua (1996)* indicates that underinvoicing, smuggling, tax exemptions, complicated tax schedules, excessive documentation, and corruption are major avenues for tax and tariff evasion. However, the presence of understatement is determined by risk controls, it is reasonable to honestly import under existing import regulations once high risk attached. *Allingham and Sandmo (1972)* consider the risk factors for tax-payers and argue that low tax evasion is correlated with high rates of detection and prosecution.

In addition to the aforementioned methods, the product type may affect attempts at tax and tariff evasion. *Javorcik and Narciso (2008)* suggest that differentiated products result in more attempts at tariff evasion than homogeneous goods. This is because falsified prices of differentiated products are difficult for competent customs officials to

⁴ *Jones et al. (2005)*, *Athukorala and Yamashita (2006)* *Ando and Kimura (2013)*, and *Obashi and Kimura (2017)* mainly emphasize that parts and components are crucial factors in the formation of production networks. *Hayakawa (2014)*, *Florensa et al. (2015)*, and *Lin (2015)* have investigated the effect of tariff rates on production networks and have indicated that the reduction of tariffs would not only increase trade flow but also strengthen the trade relationship closely.

⁵ *Athukorala (2011)* indicate that East Asia is the most striking example of international production and distribution networks because of more extensive and wider trade and a magnitude of production unmatched elsewhere in the world.

⁶ For example, an intermediate good may be traded from one country to another and subsequently traded to a third country or more. By contrast, an intermediate good may be traded to another country and assembled with other intermediate goods into finished goods and then transacted.

⁷ *Kimura and Obashi (2010)* identify parts and components and final products in the most disaggregated Harmonized System (HS) product classification system in the machinery industry (HS84-HS92), comprising general machinery (HS 84), electric machinery (HS 85), transport equipment (HS 86-89), and precision machinery (HS 90-92).

⁸ *Kimura and Obashi (2010)* investigate the importance of the machinery industry in East Asia and determine that the proportion of machinery in the total trade of manufactured goods in terms of exports and imports, which can be regarded as the extent of participation in international production networks, increases over time.

⁹ To quantify the extent of the international fragmentation of production, several data sources of trade statistics are commonly used in the literature, such as the Standard International Trade Classification, Broad Economic Categories, Main Industrial Grouping, HS product classification, and Input–Output tables. We use the definition of *Kimura and Obashi (2010)* at the HS six-digit product level because of the available detailed product classification and long analysis period, as well as because it enables comparisons between different types of products and across multiple countries.

¹⁰ *Feenstra and Hanson (2000)* indicate that these discrepancies could be seen as measurement errors.

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