

Correlation between misinvoicing and non-tariff measures for Turkey's exports to the EU

AYŞEGÜL KARATAŞ , HALİL ŞİMDİ*  and BÜŞRA GARİP 

International Trade and Finance Department, Sakarya Business School, Sakarya University, 54050 Serdivan, Sakarya, Turkey

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ABSTRACT

Many researchers have analysed the factors that cause discrepancies in the mirror trade statistics. However, the conflicting findings of the relatively limited number of studies on the relation between non-tariff measures and misinvoicing make further research in this area necessary. Therefore, our paper aimed to analyse the impact of non-tariff measures on misinvoicing in the context of Turkey's exports to the European Union (EU) between 2008 and 2015. This study tested the possible relationship between them using other measurable variables related to Turkey's exports to the EU of the products to which the non-tariff measures were applied. This has been done by employing the dynamic generalized method of moments (GMM) as well as the quantile regression (QR) models. It was observed that tariffs, along with non-tariff measures, have negative relationship with the misinvoiced amount. Additionally, it is also observed that the transfer price manipulation appears to be a means of corporate tax evasion. This finding aligns with the decrease in reported imports and the decrease in the perceived levels of corruption.

KEYWORDS

non-tariff measures, misinvoicing, generalized method of moments (GMM), quantile regression (QR), corruption, transfer pricing

JEL CLASSIFICATION INDICES

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* Corresponding author. E-mail: hsimdi@sakarya.edu.tr

1. INTRODUCTION

International trade statistics collected by national and international organizations are used for various purposes by professionals, politicians, marketers, etc. However, the accuracy of official international trade data is questionable, owing to the discrepancies between the reports of bilateral trade partners. The basic question that arises from the previous studies can be stated as why is the aggregate export of country A to country B not equal to the aggregate import of country B from country A for the same product in the same period? Although a multitude of factors are responsible for causing this discrepancy, the researchers have reached a consensus that some of these factors are structural, including time-lags, the differences in exchange rates and the classification of goods, etc. Conversely, in order to derive illegitimate benefits, trading partners may deliberately declare incorrect invoices to customs. Moreover, either or both of the trading partners may manipulate the commodity type (HS code), value, weight, or a combination of these aspects in the invoice. As a result, the transaction may be recorded under different codes or with different invoice values by the customs offices of different countries. Ultimately, the official record of each HS code may be seen to be above or below the actual amount. These malpractices are called “misinvoicing.” Misinvoicing requires more attention than the structural factors because the companies that engage in this behaviour inhibit tax collection, cause illegal flow of money from one country to another, and misuse export incentive programs. Therefore, misinvoicing constitutes a crime against public trust. According to the [Global Financial Institute's \(2019\)](#) estimations, in 2015, the illicit financial flows resulting from trade misinvoicing for all the developing economies amounted to approximately \$1,690 billion.

There are two ways of preventing this. Previous studies have revealed that high corruption levels and low respect for the rule of law increase the instances of misinvoicing in trade ([Lee – Rishi 2006](#); [Buehn – Farzanegan 2012](#); [Kellenberg – Levinson 2019](#)). Therefore, increasing the extent of customs control may supposed to be one of the possible solutions for preventing misinvoicing. However, previous researches have also indicated that increasing the extent of customs control has had little or questionable impact on curbing misinvoicing ([Tikhomirov 1997](#); [Anson et al. 2006](#); [Aktaş et al. 2014](#); [Chalendard et al. 2016](#)). The second solution to the problem of misinvoicing is eradicating the dubious motives of the trading companies. Although misinvoicing is carried out due to many different motivations, the evasion of import and export restrictions, customs duties, domestic taxes, capital controls, extra export incentives, and money laundering are the most common ones. Most of these motivations have been accepted as the main reasons of misinvoicing by many previous researchers. Although some of them have been tested empirically by employing different research methods in the context of different periods and countries; non-tariff measures, as a determinant of misinvoicing, has been tested empirically only by [Sheikh \(1974\)](#) and [Mahmood \(1997\)](#), in the context of Pakistan. However, these two studies reveal contradictory findings regarding the impact of import quotas on misinvoicing.

Therefore, our study has addressed the assumed relationship between non-tariff barriers and misinvoicing, alongside other, already discovered antecedents, in the context of Turkey's exports to the EU between 2008 and 2015. Testing the possible relationship between non-tariff barriers and misinvoicing in a different context is this study's first contribution to the existing literature on the subject. This is an important issue because both the Global Trade Alert (GTA) and the Organization for Economic Co-operation and Development ([OECD 2001](#)) have emphasized



that the rapid increase in the use of non-tariff measures is raising concerns regarding their being used for the purposes of trade protection.

The earlier studies that examined Turkey's exports to the EU generally concluded that the Turkish companies are involved in the *overinvoicing* of exports (Celasun – Rodrik 1989; Duman et al. 2005; Yalta – Demir 2010). One exception is the study of Tokdemir – Günlük-Senesen's (1997) in which Turkey's exports to the UK and France are found to be *underinvoiced* between 1970 and 1991. In fact, when there is a discrepancy in different countries' records, it is very difficult to assign the blame to one of the parties. Indeed, from the observation of the reported figures (i.e., the mirror trade statistics), it can only be claimed that there is an overinvoicing of exports or an underinvoicing of imports, or vice versa, as the mirror trade statistics do not reveal any information regarding which one of them is actually true. Therefore, the domestic factors of the countries that affect misinvoicing must be evaluated before making any assumptions. In the present case, the EU countries – due to their lower corruption levels generally, higher auditing standards, and more open economies compared to Turkey – have been assumed to be the party having correct records. However, in a country such as Turkey, where the floating exchange regime has been implemented and the capital account is open, the only motivation for a company to overinvoice exports is to gain extra export incentives (Table 1). Nevertheless, Turkey abrogated almost all the direct incentives in 1994. Conversely, the evasion from tariff or non-tariff measures and high corporate taxes constitute possible motivations for a company that underinvoices the imports. Moreover, the presence of tariff evasion behaviour even among the developed countries (Stoyanov 2012) necessitates caution in concluding that the misinvoicing behaviour is caused by the overinvoicing of exports and not the underinvoicing of imports. In this study, the factors related to the possible misinvoicing of the EU companies are tested in order to determine whether they play a role in this illicit behaviour. This study contributes to the existing literature by providing an alternative perspective through applying dynamic generalized method of moments (GMM) estimations to detect the determinants of misinvoicing and by conducting the conditional nonlinear quantile regression (QR) model analyses whether the determinants alter according to the different misinvoicing ratios.

Table 1. Summary of misinvoicing motivations in international trade

	Under invoicing exports	Over invoicing exports	Under invoicing imports	Over invoicing imports
Evasion of tariff and non-tariff measures			X	
Evasion of high corporate tax	X			X
Evasion of VAT			X	
Evasion of capital controls	X			X
Gaining extra export incentives		X		
Evasion of export restrictions	X			
Money laundering	X			X



The rest of the article is organized in five parts, the structure of which is as follows: the theoretical background for the reasons of misinvoicing and discrepancies in international trade are presented in Sections 2 and 3, while the applied model and methodology are described in Section 4. Next, the econometric results based on the system generalized method of moments (System GMM) and QR are presented in Section 5. At last, the outcomes of the research are provided in Section 6.

2. THE REASONS OF MISINVOICING

2.1. Import restrictions

2.1.1. Tariff. Tariff is paid for import products on the basis of the invoice value declared by the importer at the time of arrival. Therefore, underinvoicing the import value will directly contribute to the reduction of the tariff to be paid. Due to its immediate benefit, underinvoicing of imports is probably the most prominent and widely used practice under trade misinvoicing (Yang 2008; Nitsch 2016; Global Financial Integrity Report – GFI 2017). As the imposed tariff rate increases, so does the tax evasion behaviour, which causes further underinvoicing by the importers (Drenski et al. 2019). Furthermore, a 1% increase in the average tariff rates leads to up to 3% increase in the relative underreporting by the importers (Epaphra 2015; Kellenberg – Levinson 2019). Besides, another way of evading customs duties is through the misclassification of imports of the higher-taxed categories as lower-taxed ones (Fisman – Wei 2004).

In the case of the EU's imports from Turkey – owing to the implementation of the Customs Union Agreement of 1996 – the free circulation of industrial and processed agricultural products were guaranteed, while the import tariffs were still being applied on agricultural products and services. Moreover, Kellenberg – Levinson (2019) discovered that when trading partners are the members of the same regional trade agreement, the tariff effect disappears for the lower-income importers. However, for higher-income importers, it remains significant. As for Turkey, the expectation of a decrease in misinvoicing through the abolishment of most of the tariffs implemented before has not been realized yet (Yalta – Demir 2010).

2.1.2. Non-tariff measures. The International Trade Center (ITC) defines non-tariff measures as policy measures other than the ordinary custom tariffs that can potentially affect the international trade of goods. Import quotas and licensing systems, sanitary regulations, and anti-dumping taxes are all examples of the non-tariff measures. Owing to the regional trade agreements and the efforts of multinational initiations that promote international trade – particularly the World Trade Organization (WTO) – the customs tariffs in the developed countries have decreased considerably. Conversely, the non-tariff barriers have become a frequently used means of controlling the imports (Deardorff – Stern 1997). In their study, Patnaik et al. (2012) suggest that evasion of quantitative restrictions such as import quotas can be a motivation for importers to underinvoice imports. However, this suggestion was not empirically tested. They also suggest that the use of the quantitative restrictions is expected to decline for most of the WTO members, which may be true for quotas. However, restrictions may have increased in other versions of non-tariff barriers, such as non-standard technical and



quality requirements, anti-dumping taxes, and licensing requirements. In fact, after the global financial crisis in 2008, GTA was launched in order to build a database of non-tariff measures because of the claims that the crisis would lead governments to adopt the widespread 1930-style beggar-thy-neighbour policies. Aside from these discussions, the empirical findings were not been consistent regarding the impact of the non-tariff barriers on misinvoicing. While [Sheikh \(1974\)](#) discovered that the import quotas had led to misinvoicing, [Mahmood \(1997\)](#) – in his study on Pakistan – did not find any such impact.

In the present situation, it is evident that most non-tariff barriers are applied by the EU on imports from Turkey. For instance, the multilateral transit permit is governed by a quota system. According to the [Economic Development Foundation's \(2017\)](#) calculations, if full liberalization is achieved in the logistics, Turkey's exports to the EU will increase by 1.9 billion euros or Y per cent. Many Turkish agricultural products are also subjected to import quotas.

2.2. Export incentives

Overinvoicing of exports allows exporters to benefit from the extra export incentives ([Tandon – Roa 2017](#)). Moreover, the direct export incentives based on export performance may cause fictitious exports. The exploitation of the export incentive system in the context of Turkey was discussed by [Celasun – Rodrik \(1989\)](#), who concluded that the share of fictitious exports constituted between 9.2 and 17.5% of the total exports from 1980 to 1985. According to their estimation, the ratio of export overinvoicing was positive during the 5-year period, reached 28% in 1984, and declined to 8% in 1985, with the reduction in the export subsidies. Turkey completely abrogated the direct export incentives except from certain agricultural goods only in 1994.¹ At present, the subsidized export credits and marketing support – such as marketing research and financing projects which aim to increase the international competitiveness of companies – dominate the export incentive program of the Turkish government. [Yalta and Demir \(2010\)](#) examined the Turkish exports between 1970 and 2005, and they claimed that Turkey has consistently experienced export overinvoicing in that period due to high subsidies and export promotion. Moreover, even after 1990, the pattern of overinvoicing exports remained unaltered despite the change in the export incentive program. However, the empirical testing of all the assumptions is not feasible due to the difficulties in the operationalization of the export incentives.

2.3. Evasion of domestic taxes

In the context of international trade, corporate tax and value-added tax (VAT) are the most widely known domestic taxes that companies like to evade. Unlike in the case of customs duties, both the trading partners in international trade may be motivated to evade the domestic taxes of their own countries.

First, in the case of corporate taxes, both the trading partners pay corporate tax, which is calculated on the basis of the reported profits; therefore, the amount of reported profits and corporate tax to be paid are correlated. Overinvoicing imports or underinvoicing exports

¹Directly promoted agricultural products are defined by Turkish Money-Credit and Coordination Council and changes from year to year.



decreases the partners' profits on paper (Nitsch 2012). If the partners are interrelated – i.e., if there is an intrafirm trade – the multinational company may shift the profit to the country in which the tax rate is lower through manipulating *transfer pricing*. Supporting this assumption, most studies have discovered evidence that transfer pricing manipulation occurs in response to the changing corporate tax rate differentials (Eden 2012). Tandon – Roa (2017) also revealed a statistically significant negative relationship between corporate tax rate and overinvoicing imports. If the corporate tax ratios applied by the countries through the years vary a lot, the impact of corporate tax evasion on misinvoicing can be seen. According to the data from the World Bank, in the case of Turkey and the EU, the corporate tax ratios applied during 2008–2015 varied not only between the countries but also for the same country through the years (e.g., in Bulgaria, the corporate tax ratio was 33.9% in 2008 and 27% in 2015; similarly, in Denmark, it was 29.2% in 2008 and 24.5% in 2015). Moreover, the corporate tax applied by these countries ranged from 20% (in the case of Croatia in 2015) to 72.5% (in the case of Italy in 2008).

While the evasion of VAT and customs duties serves as a motivation for the underinvoicing of imports (Farhad et al. 2018), the evasion of corporate tax requires the overinvoicing of imports (Kar – Freitas 2013). This is due to the fact that overinvoicing imports decreases the corporate tax but increases the tariff and VAT to be paid. Kant (1995) supports this by suggesting that tariff causes a decrease in the transfer price manipulation between interrelated companies.

It appears that the exporters are also involved in illicit behaviours although VAT is based on the destination principle. To make it clear, the exporters pay VAT for the inputs used in manufacturing exported goods and then claim the VAT refund. Obtaining illicit VAT refunds usually motivates exporters to overinvoice the exports. Afterwards, the so-called exported goods are sold in the domestic market at high profits. Contrary to this idea, Ferrantino et al. (2012) discovered strong statistical evidence of the underinvoicing of exports at the Chinese border in order to avoid paying VAT. These findings are related to the unusual VAT collection method of China, i.e., hiding the exports to decrease VAT refund and export incentives.

In conclusion, the motivation to evade domestic taxes should be evaluated in the context of the tariff rate of the importing country, export incentives of the exporting country, and the VAT rates of both the countries. In the present case, the EU importers may have been motivated to underinvoice their imports due to VAT and tariff (if the product is subject to tariff). However, they would also be motivated to overinvoice imports in order to decrease their profits on paper and, in turn, evade corporate tax. Conversely, the Turkish exporters may have been motivated to overinvoice exports in order to obtain the undeserved VAT refunds and take undue advantage of other export incentives. However, neither Turkey nor the EU has HS code-based VAT rate statistics which makes the empirical testing impractical.

2.4. Money laundering

The Financial Action Task Force (FATF) (2012) defines money laundering as “the process of disguising the proceeds of crime and moving value through the use of trade transactions in an attempt to legitimize their illicit origin.” Although companies engage in illicit behaviour to a greater or lesser extent in the case of all misinvoicing activities, the money transferred in these activities is legitimately earned. However, in the case of money laundering, the underinvoicing of



exports or overinvoicing of imports allows companies to legitimize illicit money. Similarly, invoicing the same goods or service more than once as well as accepting multiple payments for the same shipment of goods or delivery of services also allows money laundering. FATF's (2012) Trade-Based Monetary Laundering (TBML) report includes multiple cases of abuse of the international trade system in order to launder money. The illegal traders, then, use the black market for foreign exchange in order to launder money earned from misinvoicing the value of traded goods (Buehn – Eichler 2011).

2.5. Export restrictions

Governments have the power to control, restrict, or totally forbid the export of certain goods due to concerns related to security, culture or strategy. Exporters who want to bypass the export bans prefer to misdeclare the commodity code in the source country or hide the export totally, which is a practice known as *smuggling*. In contrast, if there are no restrictions in the importing country, an invoice with the correct commodity code can be declared in the destination country. Berger – Nitsch (2008) have suggested that at least a part of the discrepancy in the international trade figures is caused by smuggling. Conversely, if there are export restrictions instead of bans, the underinvoicing of exports allows fraudulent traders to evade the restrictions (Nitsch 2016). Moreover, if there are export taxes, higher export taxes lead to higher underreporting of exports (Kellenberg – Levinson 2019). In Turkey, only two types of commodities are subject to export taxes, namely hazelnut and animal pelts. Additionally, while some products, such as antiques and specific locally grown flower seeds and tree saplings are forbidden, other products, such as ammunition, fertilizers and sugar are subject to prior authorization. Therefore, the scope of the restrictions is evidently narrow.

2.6. Capital controls

Capital controls are capital flow measures (including taxes and regulations) which affect the cross-border financial activities that discriminate on the basis of residency (IMF 2011). In other words, capital controls are policies designed to reduce or redirect transactions into the capital account of a given nation (Alfaro et al. 2014). The less the capital is controlled, the less the export underinvoicing is sustained in the country (Patnaik et al. 2009). This is owing to the fact that with an open capital account, capital can move freely. Therefore, companies do not have to resort to illegal ways such as trade misinvoicing (Patnaik et al. 2012). However, in the countries that are characterized by capital account restrictions, underinvoicing exports or overinvoicing imports continue to serve as options for companies to transfer money (Wood – Moll 1994). Östensson (2018) notes that illicit flows may be related to the avoidance of strict capital controls. In their study, Patnaik et al. (2009) discovered that the countries that had undertaken significant liberalization of the capital account survived a decrease in the capital flight through export misinvoicing; however, they could not draw the same conclusion in the case of import overinvoicing. The reason for this may be the conflict of desire to evade the tariff and the capital restrictions. Yalta – Demir (2010) – who examined the Turkish international trade with major partners between 1990 and 2007 – reached the same conclusion: the liberalization of the capital account in 1989 did not help mitigate export overinvoicing.



Lastly, in 2008, the Turkish government abolished not only the obligation to convert the export values to Turkish Lira but also the obligation to bring the export value to Turkey (These obligations came into force in 2018 again). Since then, in the Chinn-Ito Index² – which grades countries according to their financial openness – Turkey has consistently obtained the same score (–0.018), whereas it was –1.19 previously.

3. STRUCTURAL REASONS OF DISCREPANCY IN THE INTERNATIONAL TRADE STATISTICS

3.1. Transportation and insurance costs

In general, exports are recorded in terms of the free on board (FOB) value and imports are recorded on the cost, insurance and freight (CIF) value, which includes the transportation and insurance costs. The CIF/FOB margins – which reflect the proportion of insurance and transportation value to the goods value – vary based on the distance between the trading partners, transportation mode and kind of goods (GFI 2017; Nitsch 2016)³. However, the researchers who try to find out other causes of the discrepancy in the mirror trade statistics accept a standard ratio to eliminate this factor. While 1.1 is a widely used ratio (Yalta – Demir 2010; Kar – Freitas 2012; Hong – Pak 2017), 1.3 (Chalendar et al. 2016) and 1.08 (Celasun – Rodrik 1989) are also accepted. Nevertheless, the use of a standard ratio to normalize the data has been criticized (Makhoul – Otterstrom 1998; Yalta – Demir 2010; Kar – Freitas 2012; GFI 2017).

If we consider Turkey's exports to the EU at the aggregate level, the CIF/FOB ratios are reasonable in the mirror trade statistics (ranging from 1.08 to 1.16 in the last 17 years), giving the impression that there is no trace of misinvoicing. However, there is a possibility that the discrepancies at the overall level would be smaller than those observable at the disaggregated level (Hamanaka 2012; Hong – Pak 2017). In particular, if some products are taxable and others are not, and if there are product-based non-tariff barriers, an aggregate on the basis of the country may give rise to falsified conclusions.

3.2. Time-lag

The trade transaction may be recorded in different calendar years by the trading countries because of long-distance sea cargo, delay in customs declaration, and temporary storage in warehouses (Berger – Nitsch 2008; Hamanaka 2012). For example, a cargo shipped from China reaches the Turkish borders in approximately 25–30 days. This implies that the goods exported by a Chinese firm in December will probably be recorded by Turkish customs in January. However, being geographically close, the discrepancy resulting from the time-lag in

²The Chinn-Ito index measures a country's capital account openness. The score of the “most financially open” countries is 2.37, whereas it is –1.90 for the “least financially open” countries. More information regarding the index is available at http://web.pdx.edu/~ito/Chinn-Ito_website.htm.

³The CIF-FOB margins that change according to the country pairs and commodity type can be seen in the OECD-STAT database on a yearly basis.



the case of Turkish exports to the EU is supposed to be low. This is owing to a number of reasons. First, the carrying time by road from Turkey to the farthest member country of the EU does not require more than two-and-a-half days. Second, the imports of the current year, which have not been recorded yet, will be recorded in the following year's statistical data in the next year. Therefore, this recording will more or less offset the imports that have been made but not yet recorded (Celasun – Rodrik 1989). However, if the monthly data are going to be used or the transactions between the countries that are very far away are studied, these assumptions will not be valid.

3.3. Unknown origin or final destination

This type of discrepancy is observed when the final destination of the exported goods is not known at the time of the export. In such a case, the country of the last shipment is recorded as the importing country, although it is not (Ferrantino – Wang 2008; GFI 2017). Moreover, when the goods are re-exported to the real importing country, this country records the country of origin as the exporting country, not the re-exporting country. For example, while Cambodia declares large amounts of exportation to Hong Kong, Hong Kong does not declare such imports. Conversely, while countries such as the US, Japan and China declare that they import goods from Cambodia, the Cambodian trade statistical data do not have any such records (Hamanaka 2012). This kind of discrepancy can also be observed in the trade between Australia and the EU (Nitsch 2012) as well as China-Hong Kong and the US (Ferrantino – Wang 2008). Although Rotterdam is one of the well-known transaction hubs of the EU (Herrigan et al. 2005), the geographical proximity between Turkey and the EU countries is supposed to reduce the effect of Rotterdam on the international trade figures. This assumption is based on the examples presented by the literature. Contrary to our case, such transaction hubs have become more of an issue in the overseas markets.

3.4. Differences in exchange rate

If different exchange rates are used to record the trade in the customs of the trading countries, or if there is a possible change in the exchange rate between the beginning and ending time of a transaction, a gap will arise in the official statistical data of the same trade transaction (Carrère – Grigoriou 2015; Makhoul – Otterstrom 1998). This kind of difference is assumed to not be significant for this study, as the floating exchange rate regime has been applied by Turkey since 2001 and by the EU countries for years. Additionally, owing to the geographical proximity between Turkey and the EU, the transaction period is supposed to be short.

3.5. Differences in the classification of goods

Governments may want to black out some transactions due to reasons of confidentiality. For instance, according to the import statistics released by the Turkish Statistical Institute, 3.4% of all imports in 2016 are from “classified country.” While some countries such as Turkey and the US hide these types of transactions under chapter 99 – which covers “*items not elsewhere classified*” – other countries such as China and Hong Kong do not use chapter 99 at all (Ferrantino – Wang 2008; Nitsch 2012; Carrère – Grigoriou 2015). The second reason of



discrepancy due to the differences in classification is the ambiguous classification of goods, which in particular is a result of the emerging technologies. In such a case, trading partners may attribute different codes, even when they try to assign the correct code (Ferrantino – Wang 2008). In chapter 99, the ratio of commodities exported from Turkey to the EU, along with the total exports to the EU, has not been more than 0.3% for about two decades, according to the reports of both. Therefore, the influence of this variable is assumed to be limited in the gap between the official statistical data of the EU and Turkey.

4. MODEL AND METHODOLOGY

In this section, we have described our model and the estimation method that we have employed in a panel setting. We specify our panel regression model in the following manner:

$$\text{Misinv}_{it} = \beta_0 + \beta_1 \text{NTariff}_{it} + \beta_2 \text{Tariff}_{it} + \beta_3 \Delta \text{CopTax}_{it} + \beta_4 \text{ICRG}_{it} + \varepsilon_{it} \quad (1)$$

where the subscripts i and t show the importing EU country and the time period, respectively. Our study has covered the EU27 countries for the period between 2008 and 2015. All the variables of regression are identified in Table 2.

The ordinary least squares (OLS) model assumes $\varepsilon_i \sim \text{iid}(0, \varepsilon_u^2)$, $E[\varepsilon_{it}] = 0$, and $\text{Var}(\varepsilon_{it}) = \sigma_\varepsilon^2 = \text{constant}$. However, we have adopted a dynamic model using the System GMM to measure the impact of the determinants on misinvoicing. Most macroeconomic cases are dynamic and have long-term effects in the future; therefore, the results presented by the panel OLS models are biased and inconsistent for the dynamic panel data. The core equation specification takes the following form:

Table 2. Definitions and sources of variables

Variable	Definition	Source
Misinv	Ratio between export of Turkey and import of the EU country (converted version of CIF to FOB) from Turkey	International Trade Center, Trade Map
NTariff	Dummy variable for anti-dumping, import licensing requirement, import quota, import tariff quota, import-related non-tariff measure imposed by the EU on Turkish exports	Global Trade Alert
Tariff	Tariff rate of the EU countries against Turkish products	UNCTAD TRAINS
ΔCopTax	Corporate Tax difference between the EU countries and Turkey	World Bank
ICRG	Corruption Disindicator of International Country Risk Guide	PRS Group

Note: ICRG monthly analyses 140 countries in terms of country risks and ratings by using 22 indicators scores. The most corrupted country gets 1 and lowest one gets 6.



$$\text{Misinv}_{it} = \alpha + \beta_i \text{Misinv}_{i,t-1} + \gamma_i X_{it} + \delta_i + \eta_t + \varepsilon_{it} \quad (2)$$

Besides the initial equation, lagged misinvoicing ($\text{Misinv}_{i,t-1}$) has been added to the model as a predetermined variable to the current period. Additionally, δ_i and η_t denote country-specific effects and time-specific effects, respectively. As previously mentioned, estimating (1) presents a dynamic panel bias due to the lagged dependent variable, which is still correlated with the error term (Nickell 1981). Arellano – Bond (1991) developed a GMM estimator, and they suggested using the first differences of the variables to eliminate the problem of bias and country-specific effects. This difference GMM model can be expressed as follows:

$$\begin{aligned} \text{Misinv}_{it} - \text{Misinv}_{i,t-1} = & \beta (\text{Misinv}_{i,t-1} - \text{Misinv}_{i,t-2}) + \gamma (X_{i,t} - X_{i,t-1}) + (\eta_t - \eta_{t-1}) + (\varepsilon_{i,t} \\ & - \varepsilon_{i,t-1}) \end{aligned} \quad (3)$$

By taking the first differences, the information related to the long-run relationship between the explanatory variables and the dependent variable is lost. In essence, the performance of the difference GMM estimator is poor and leads to biases in the case of large sample sizes if the series are persistent over time (Blundell – Bond 1998). Additionally, appropriate lags of dependent and independent variables signify weak instruments if persistency is held. In order to solve these problems, Arellano – Bover (1995) and Blundell – Bond (1998) developed the System GMM, which combines regressions in the first differences and levels. This estimator provides efficient and consistent estimation in the regression, although the regressors are correlated with the past and current values of the error term or heteroscedasticity and autocorrelation problems exist (Roodman 2009a). The consistency of the System GMM estimator depends on two vital conditions: first, there should be no serial correlation in the error term; second, the instruments should not be correlated with the error term. Therefore, we have used specification tests, namely Arellano – Bond's (1991) AR tests for serial correlation and Hansen's (1982) J-test for over-identifying restrictions. Another reason for using the GMM model over the OLS model is dealing with the case of endogeneity, which may result in wrong sign coefficients and inconsistent estimates. To illustrate, Ullah et al. (2018) implemented the GMM model to control dynamic endogeneity by adding instruments that are lagged values of the dependent variables. Despite the limitations, lagged values – defined as “internal instruments” – are seen as a response to the case of endogeneity (Roodman 2009b).

Additionally, we estimate simultaneous conditional nonlinear quantile regressions that demonstrate the effect of different quantiles in order to test the robustness of the relationship between the dependent and independent variables. Moreover, the probability distribution of the dependent variable is entirely estimated by the conditional nonlinear QR technique. Such an analysis for the misinvoicing between Turkey and the EU countries has not been used before. The QR model was first introduced by Koenker – Bassett (1978) for the collection of models for different quantile functions.

The coefficients of the QR model are interpreted in a manner similar to that of the OLS regression, except in predicting the mean of the dependent variable. The QR presents better results than the OLS, fixed and random effect models when there are outliers. Our sample has consisted of the EU countries with different misinvoicing ratios. Consequently, the panel regression models that assume normal distribution of errors do not hold for our dataset because the distribution of the misinvoicing ratio variable is skewed. Thus, we have analysed



QR for misinvoicing, where τ is 0.05, 0.1, 0.25, 0.5, 0.75, 0.9 and 0.95, by using the panel data. Initially, QR is able to explain the entire conditional distribution of the dependent variable (Coad – Rao 2006). Then, it has analysed the high or low misinvoicing ratio determinants that are not removed from the analysis. Lastly, QR avoids tough assumptions regarding the error terms and investigates whether the different misinvoicing levels are affected by our focused variables.

5. DATA AND EMPIRICAL RESULTS

In our review of the previous studies concerning the determinants of misinvoicing, no empirical study on the panel regression of the export figures of Turkey is found. Moreover, other studies that examined the non-tariff barriers provided conflicting results. Therefore, our study empirically has examined the impact of the non-tariff barriers on the misinvoicing between Turkey and the EU. Our panel is used to investigate whether there was an impact of non-tariff barriers on the misinvoicing figures of Turkey's exports to the EU. The dependent variable is the misinvoicing ratio, which implies the ratio of the declared amount of exports from Turkey to the EU countries to the declared amount of imports of the EU countries from Turkey. The independent variables are the non-tariff (dummy) barriers and tariff rates applied by the EU to Turkey, the corporate tax difference (EU – Turkey), and the corruption indicator of the International Country Risk Guide (ICRG) score of the EU countries.

The dependent variable has been computed according to the Trade Map International Trade Statistics, which are based on the UN Comtrade Statistics Department. Instead of employing a standard ratio that was common in the literature, we have purified the CIF figure of the EU countries to FOB through the use of product-based CIF-FOB margins reported by the OECD. The analysis has consisted of the misinvoicing ratio of 16 products that are mostly exposed to the non-tariff barriers between 2008 and 2015.⁴ Hence, measuring the misinvoicing ratio of these products using real-like CIF-FOB margins is another contribution that our study makes to the literature. As opposed to the EU countries, Turkey has reported free-zone figures. In order to lessen the possible distorting impact of the free-zone trade on the analysis, we have excluded the products whose exports to free-zones are more than 5% of the total amount. Finally, some of them are excluded due to the incomplete trade data in the Trade Map Database. The final dataset has covered 25% (mostly due to incomplete trade data) of the non-tariff barrier implementations between 2008 and 2015. These implementations have focused on the two major categories of goods: iron/steel and vegetables/fruits. Despite most of the trade between Turkey and the EU being under the scope of the Customs Union, the agricultural products are excluded from the Customs Union. Moreover, the Preferential Agreement on Agriculture governs the conditions between Turkey and the EU. These products are seemingly not only

⁴In 2015, the monetary amount of the Turkish exports to free zones was 2.9 billion USD. In the same year, the total amount of the Turkish exports to the EU is 63.8 billion USD. Even if all the exports to free zones were shipped to the EU, the free-zone trade over the total EU exports would not have exceeded 5%. Therefore, the products for which this ratio exceeded 5% were excluded, in addition to the products whose trade volume was lower than \$2 million. The HS codes of the analysed products are 070960, 071080, 071190, 071290, 080550, 200819, 721391, 721499, 721650, 721720, 721933, 722830, 730630, 730661, 731815, 731816.



exposed to the tariff but also the non-tariff measures. On the other hand, the Customs Union including iron/steel products and the non-tariff barriers is the only way for the government to intervene in the free trade. The descriptive statistics of our analysis of the variables are summarised in Table 3.

According to Table 3, the mean of Misinv ratio is 1.357, whereas the median is 1.008, which is as expected. Moreover, the Pearson correlation matrix is presented in Table 4, which shows that no significant correlation or possible multicollinearity phenomenon existed between the explanatory variables. The strongest cross-correlation between the pairs is 0.16. Therefore, there should be no certain linear correlation for the regressions.

The System GMM is more efficient than the classical models in providing robust errors for the system of GMM tests (Rahman et al. 2015). We have estimated the dynamic model for the misinvoicing ratio of the Turkey – EU trade by employing the System GMM and the QR model for the balanced panel over the 2008–2015 period. The empirical findings of the System GMM estimation regarding the misinvoicing are presented in Table 5.

The diagnostic tests on the dynamic System GMM demonstrate that the lagged value of the misinvoicing ratio, corporate tax difference and ICRG are statistically significant in the estimated model. The model meets the serial correlation condition as indicated by the probability value (0.897) of the AR (2) test, i.e., the serial correlation in the error term is not held at the second order. Furthermore, the second key condition for the System GMM is the validity of instruments. According to the Hansen test score, validity of the instruments is confirmed at below 5% significance level.

We have noted that the corporate tax difference between the EU countries and Turkey have a negative impact on the misinvoicing ratio at a significance level of 5%, suggesting that one more point of corporate tax difference causes the misinvoicing ratio to decrease by 0.01. Conversely, ICRG is positively and significantly related to the misinvoicing ratio. It is suggested that one

Table 3. Descriptive statistics of variables

Variable	Mean	Std. Dev.	Min.	Max.
Misinv	1.357	1.444	0.008	17.149
Tariff	0.714	1.942	0	7.593
Δ CopTax	4.211	12.026	-23.7	28.5
ICRG	3.553	1.203	2	6

Table 4. Correlation coefficient matrix of variables

Explanatory variables	Misinv	Tariff	Δ CopTax	ICRG
Misinv	1			
Tariff	-0.08	1		
Δ CopTax	-0.12	-0.09	1	
ICRG	0.12	-0.16	0.13	1



Table 5. Determinants of misinvoicing ratio between Turkey and the EU

	Coefficient	z-score	Prob.
Misinv (-1)	0.36 [0.166, 0.553]	3.64	0.000***
NTariff	-0.056 [-0.157, 0.043]	-1.11	0.268
Tariff	-0.008 [-0.033, 0.016]	-0.66	0.512
Δ CopTax	-0.01 [-0.018, -0.002]	-2.43	0.015**
ICRG	0.239 [0.163, 0.314]	6.2	0.000***
Observations	1,022		
Instruments	26		
Number of Groups	146		
AR(1)		-2.86	0.004
AR(2)		0.13	0.897
Hansen Test			0.078

Notes: ** and *** indicate the significance levels at 5% and 1%, respectively. Upper and lower bounds are given in the parenthesis with 95% confidence interval.

more point of ICRG increases the misinvoicing ratio by 0.239, which means that trade between the less corrupted countries and Turkey raises the ratio.

As previously discussed, QR provides better results by accounting for outliers. We have tested whether the coefficients change when misinvoicing ratio is high or low. Therefore, QR is a robust estimation for outliers and tailed distributions, whereas OLS is not. Moreover, we have estimated simultaneous QR to discover the effect of the explanatory variables at different quantiles. Table 6 presents the results of the simultaneous QR estimation.

Table 6. Coefficient of explanatory variables in different quantiles

Variable	Q5(0.32)	Q10(0.58)	Q25(0.84)	Q50(1.008)	Q75(1.33)	Q90(2.31)	Q95(3.23)
NTariff	-0.019	0.027	-0.013	-0.059	-0.191	-0.267	-0.617
Tariff	0.041**	0.012	-0.006	-0.009**	-0.02	-0.071**	-0.107
Δ CopTax	-0.001	-0.006***	-0.003***	-0.001	-0.007***	-0.036***	-0.052*
ICRG	-0.044	-0.015	-0.005	0.038***	0.15	0.38***	0.583**
Constant	0.454***	0.666***	0.882***	0.907***	0.894	1.18***	1.458
Pseudo R ²	0.018	0.016	0.004	0.01	0.029	0.073	0.106
# of obs.	57	61	180	282	302	177	109

Notes: Misinvoicing ratios are noted in parentheses according to quantiles. *, ** and *** indicate the significance levels at 10%; 5% and 1%, respectively.



To begin with, in 887 out of the 1,168 observations, the reported Turkish exports are higher than the reported imports of the EU. This signifies that 76% of the observations imply over-invoicing of exports by Turkey and/or underinvoicing of imports by the EU countries. This statement overlaps with the existing literature on misinvoicing in Turkey. Moreover, as evident from Table 6, the non-tariff dummy variable has no effect on misinvoicing for all the quantiles. Nevertheless, the results of the QR estimation contribute to the strength of the System GMM model after Q90 and Q95. Additionally, Q50 refers to the 1.008 misinvoicing ratio that provides an opportunity to make interpretations for the over -1 and under -1 conditions. For Q5 (i.e., the misinvoicing ratio of 0.32), a 1-point increase in the tariff rate raises the misinvoicing ratio by 0.041. However, this positive effect of tariff becomes negative when the misinvoicing rate is greater than 1. This is an expected outcome because the tariff rate has imposed by the EU on the Turkish export converges the misinvoicing ratio to 1 for ratios both below and above 1. Therefore, the sign of significant tariff coefficients becomes negative after Q50. These results of the QR model are aligned with the estimation of the System GMM model. In contrast to the previous literature, in our study, an increase in tariff led to a decrease in the misinvoicing amount. One possible way to explain this contradiction is to attribute it to the increased strictness of customs auditing when the products are exposed to higher tariff.

The next result of the analysis has revealed that there is a statistically significant negative relationship between the corporate tax difference and the misinvoicing ratio. This signifies that the interrelated companies manipulate the invoice prices to shift the profit to Turkey with the motive of evading high corporate taxes. Thus, the overinvoicing of imports decreases the misinvoicing ratio, which explains the sign of the relationship.

We found statistically positive relationship between ICRG and misinvoicing ratios at Q50, Q90 and Q95. According to Table 6, the ICRG score of the EU countries have a positive relationship with the misinvoicing ratio. The previous literature states that corruption will decrease transparency and correct invoicing. In our case, more transparent conditions made the EU companies report lower import amounts, which indicates that they had overinvoiced imports before. This finding is consistent with the impact of the corporate tax difference on misinvoicing. To summarise, the explanation of this finding may refer to the import over-invoicing of the EU companies. However, there is no direct evidence to prove it.

In the second part of the QR analysis, the sample is divided according to the industries. Mostly, iron/steel and fruit/vegetable sectors are subjected to the non-tariff measures of the EU against the exports of Turkey. The sectoral results can be observed in Tables 7a and 7b.

Table 7a. Coefficients of iron-steel industry in different quantiles

Variable	Q5(0.31)	Q10(0.58)	Q25(0.87)	Q50(1.04)	Q75(1.48)	Q90(2.51)	Q95(3.83)
NTariff	0.363**	0.212	0.003	-0.042	-0.321	-1.51***	-2.35*
Δ CopTax	0.003	0.002	-0.001	-0.001	-0.01***	-0.04***	-0.051
ICRG	-0.166***	-0.121***	-0.011	0.072***	0.267***	0.476***	0.585
Constant	0.946***	0.998***	0.917***	0.839***	0.636***	1.017**	1.5
Pseudo R ²	0.05	0.031	0.002	0.015	0.047	0.066	0.069
# of obs.	32	33	100	165	173	100	69



Table 7b. Coefficients of vegetable-fruit industry in different quantiles

Variable	Q5(0.31)	Q10(0.58)	Q25(0.87)	Q50(1.04)	Q75(1.48)	Q90(2.51)	Q95(3.83)
NTariff	0.03	0.036	0.019	-0.034	-0.042	-0.204	-0.497
Tariff	0.057***	0.016*	0.003	-0.003	-0.014	-0.052	-0.09
Δ CopTax	-0.002	-0.01***	-0.004***	-0.0004	-0.005**	-0.025***	-0.048
ICRG	0.107***	0.064***	0.026*	0.018*	0.07**	0.23**	0.479
Constant	-0.063	0.36***	0.718***	0.911***	1.03***	1.32***	1.524
Pseudo R ²	0.083	0.005	0.01	0.004	0.013	0.045	0.11
# of obs.	23	25	76	125	121	76	50

Notes: The Hansen test score validity of instruments is not confirmed at 5% significance level for vegetable-fruit sector. *, ** and *** indicate the significance levels at 10%, 5% and 1%, respectively.

The System GMM results pertaining to the iron/steel industry meet the validity condition of the Hansen test score, while the results of the fruit/vegetable industry do not. Therefore, the QR coefficients of the iron/steel industry is interpreted, except from Q5 and Q10, due to the limited availability of the number of observations. Apart from the results related to the non-tariff measures, all the results are consistent with the whole sample's results. While the non-tariff measures have no statistically significant effect on the results of the whole sample, it is apparent that there was a negative statistically significant relationship between the non-tariff measures and the misinvoicing ratio of the iron/steel industry at Q90 and Q95. As mentioned before, industrial goods are not exposed to tariff in the trade between the EU and Turkey due to the Customs Union Agreement. As a result, the non-tariff measures are the only means of import restriction in the case of industrial goods. Moreover, in the absence of an alternative import restriction tool, the non-tariff measures act as tariffs in the case of misinvoicing. In other words, according to the results, a negative relationship exists between the tariff rate and the misinvoicing ratio. Similarly, non-tariff measures also have a significant negative relationship in the case of the steel/iron industry.

6. CONCLUSION

This study firstly aimed to find out whether a relationship exists between the non-tariff measures and the instances of misinvoicing – along with other measurable factors – in the context of Turkey's iron/steel and vegetable/fruit exports to the EU. Our findings suggest that the presence of non-tariff measures have a correctional effect on misinvoicing in the iron/steel industry. Moreover, tariffs also have the same effect on the vegetable/fruit industry. Based on the rule of thumb, these import restrictions are expected to have the opposite effect. Although there may be other explanations for this contradiction, the increase in government controls through the increase in the restrictions is supposed to be the one of them. Another explanation in the case of tariffs can be the trade-off between the evasion of high corporate taxes and the evasion of tariff. Despite this, it is apparent that the factors underlying misinvoicing may not lead to the same result in every setting.



More industry-based research related to the relationship between import restrictions and misinvoicing is required to highlight the pattern of the relationship and the reasons behind it.

Secondly, the study also aimed to examine the situation from the perspective of variables related to the more developed country without making any assumptions and assigning the responsibility of the misinvoicing behaviour to only one party of the trade (in most cases the less developed country), as is common in the existing literature. Furthermore, in the analysis, the multinational companies' evasion of high corporate taxes seems to be a factor related to misinvoicing among the traders, which refers to the transfer price manipulation. However, it is difficult to assert that the subsidiaries in the developed country are responsible for the malpractice. Either the companies in Turkey underinvoice exports or the companies in the developed country overinvoice the imports or, as is possible, both do so. Implementing more stringent controls focused on the invoice prices of intrafirm trade may decrease the misinvoicing amount. Additionally, when transparency increases, the EU companies tend to report lower imports from Turkey, indicating an ongoing practice of import overinvoicing.

Our study, consistent with the literature, implies that Turkey is overinvoicing its exports. When compared with the EU, the Turkish customs are known to be less controlled by the government. Therefore, the exploitation of export incentives can be reduced by the government controls designed for the companies which use export incentives. However, overinvoicing exports may be the government's choice for the sake of high export statistics or as a way of implying higher export incentives without being noticed. If the EU is overinvoicing the imports along with Turkey overinvoicing the exports, the actual trade between the countries must be lower than the reported amounts on both the sides. Unfortunately, unless the researchers observe all the traded goods at the time of delivery, arriving at a precise conclusion is impossible. However, the choice of many governments all over the world is decreasing and simplifying customs procedures, which makes this suggestion impractical.

Furthermore, it would be better to remind that although the CIF/FOB margins reported by the OECD are used to purify the international trade data in this research, these margins may not be accurate. However, they are the closest ratios to accuracy. Hence, the results are valid depending on the accuracy of these margins and the reliability of the other secondary data used. Future studies should explore the non-tariff measures and misinvoicing relationship with other trade partners of Turkey. Essentially, longer time periods will also be meaningful when examining the determinants of misinvoicing.

REFERENCES

- Aktaş, Z. – Aldan, A. – Özmen, M. U. (2014): Import Surveillance and Over-Invoicing Imports: The Case of Turkey. *Journal of Economic Policy Reform*, 17(4): 360–373.
- Alfaro, L. – Chari, A. – Kanczuk, F. (2014): The Real Effects of Capital Controls: Financial Constraints, Exporters, and Firm Investment. *Harvard Business School Working Paper*, No. 15–16.
- Anson, J. – Cadot, O. – Olarreaga, M. (2006): Tariff Evasion and Customs Corruption: Does Pre-Shipment Inspection Help? *The BE Journal of Economic Analysis & Policy*, 5(1): 1–26.
- Arellano, M. – Bond, S. (1991): Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2): 277–297.



- Arellano, M. – Bover, O. (1995): Another Look at the Instrumental Variable Estimation of Error-Components Models. *Journal of Econometrics*, 68(1): 29–51.
- Berger, H. – Nitsch, V. (2008): Gotcha! A Profile of Smuggling in International Trade. *Cesifo Working Paper Series*, No. 2475.
- Blundell, R. – Bond, S. (1998): Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. *Journal of Econometrics*, 87(1): 115–143.
- Buehn, A. – Eichler, S. (2011): Trade Misinvoicing: The Dark Side of World Trade. *The World Economy*, 34(8): 1263–1287.
- Buehn, A. – Farzanegan, M. R. (2012): Smuggling around the World: Evidence from a Structural Equation Model. *Applied Economics*, 44(23): 3047–3064.
- Carrère, C. – Grigoriou, C. (2015): Can Mirror Data Help to Capture Informal International Trade? *Policy Issues in International Trade and Commodities Research Study Series*, No 65.
- Celasun, M. – Rodrik, D. (1989): Debt, Adjustment, and Growth: Turkey. In: Sachs, J. D. – Collins, S. M. (eds): *Developing Country Debt and Economic Performance, Volume 3: Country Studies – Indonesia, Korea, Philippines, Turkey*. Chicago: University of Chicago Press, pp. 615–616.
- Chalendar, C. R. – Raballand, G. – Rakotoarisoa, A. (2016): The Use of Detailed Statistical Data in Customs Reform: The Case of Madagascar. *Policy Research Working Paper*, No. 7625.
- Coad, A. – Rao, R. (2006): Innovation and Market Value: A Quantile Regression Analysis. *Economics Bulletin*, 15(13): 1–10.
- Deardorff, A. V. – Stern, R. M. (1997): Measurement of Non-Tariff Barriers. *OECD Economics Department Working Papers*, No. 179.
- Drenski, A. – Hallren, R. – Lee, J. N. (2019): Tariff Evasion in Global Trade Data. *The Journal of International Trade & Economic Development*, 28(7): 829–842.
- Duman, A. – Erkin, H. C. – Gul, F. (2005): Capital Flight and Capital Controls in Developing Countries. In: Epstein, G. A. (ed.): *The Determinants of Capital Flight in Turkey: 1971–2000*. Cheltenham: Edward Elgar, pp. 116–142.
- Economic Development Foundation (2017): The Quota Issue of the Turkish Road Transport Sector in the EU. [http://www.ikv.org.tr/images/files/brief\(1\).pdf](http://www.ikv.org.tr/images/files/brief(1).pdf). (Accessed November 15, 2017).
- Eden, L. (2012): Draining Development? Controlling Flows of Illicit Funds from Developing Countries. In: Reuter, P. (ed.): *Transfer Price Manipulation*. The World Bank, pp. 205–233.
- Epaphra, M. (2015): Tax Rates and Tax Evasion: Evidence from Missing Imports in Tanzania. *International Journal of Economics and Finance*, 7(2): 122–137.
- Farhad, M. – Jetter, M. – Siddique, A. – Williams, A. (2018): Misreported Trade. *CESIFO Working Paper Series*, No. 7150.
- Ferrantino, M. J. – Liu, X. – Wang, Z. (2012): Evasion Behaviors of Exporters and Importers: Evidence from the US – China Trade Data Discrepancy. *Journal of International Economics*, 86(1): 141–157.
- Ferrantino, M. J. – Wang, Z. (2008): Accounting for Discrepancies in Bilateral Trade: The Case of China, Hong Kong, and the United States. *China Economic Review*, 19(3): 502–520.
- Fisman, R. – Wei, S. J. (2004): Tax Rates and Tax Evasion: Evidence from “Missing Imports” in China. *Journal of Political Economy*, 112(2): 471–496.
- Global Financial Integrity Report (2017): Illicit Financial Flows from Developing Countries: 2005–2014.
- Global Financial Integrity Report (2019): Illicit Financial Flows from 148 Developing Countries: 2006–2015.
- Hamanaka, S. (2012): Whose Trade Statistics Are Correct? Multiple Mirror Comparison Techniques: A Test Case of Cambodia. *Journal of Economic Policy Reform*, 15(1): 33–56.



- Hansen, L. P. (1982): Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica*, 50(4): 1029–1054.
- Herrigan, M. – Kochen, A. – Williams, T. (2005): Analysis of Asymmetries in Intra-Community Trade Statistics with Particular Regard to the Impact of the Rotterdam and Antwerp Effects. *Edicom Report*, 200453202017.
- Hong, K. P. – Pak, S. J. (2017): Estimating Trade Misinvoicing from Bilateral Trade Statistics: The Devil is in the Details. *The International Trade Journal*, 31(1): 3–28.
- IMF (2011): The Multilateral Aspects of Policies Affecting Capital Flows. <http://www.imf.org/external/npp/eng/2011/102111.pdf>.
- Kant, C. (1995): Minority Ownership, Deferral, Perverse Intrafirm Trade and Tariffs. *International Economic Journal*, 9(1): 19–37.
- Kar, D. – Freitas, S. (2012): Illicit Financial Flows from Developing Countries: 2001–2010. *Global Financial Integrity Report*.
- Kar, D. – Freitas, S. (2013): Russia: Illicit Financial Flows and the Role of the Underground Economy. *Global Financial Integrity Report*.
- Kellenberg, D. – Levinson, A. (2019): Misreporting Trade: Tariff Evasion, Corruption, and Auditing Standards. *Review of International Economics*, 27(1): 106–129.
- Koenker, R. – Bassett, G. (1978): Regression Quantiles. *Econometrica*, 46(1): 33–50.
- Lee, Q. V. – Rishi, M. (2006): Corruption and Capital Flight: An Empirical Assessment. *International Economic Journal*, 20(4): 523–540.
- Mahmood, Z. (1997): Determinants of Under-Invoicing of Imports in Pakistan. *Journal of International Development*, 9(1): 85–96.
- Makhoul, B. – Otterstrom, S. M. (1998): Exploring the Accuracy of International Trade Statistics. *Applied Economics*, 30(12): 1603–1616.
- Nickell, S. (1981): Biases in Dynamic Models with Fixed Effects. *Econometrica*, 49(6): 1417–1426.
- Nitsch, V. (2012): Draining Development? Controlling Flows of Illicit Funds from Developing Countries. In: Reuter, P. (ed.): *Trade Mispricing and Illicit Flows*. The World Bank, pp. 309–333.
- Nitsch, V. (2016): Trade Misinvoicing in Developing Countries. *CGD Policy Paper*, No. 103.
- OECD (2001): Non-Tariff Barriers Threaten Exports from Emerging and Transition Economies. <http://www.oecd.org/tad/agricultural-policies/non-tariffbarriersthreatenexportsfromemergingandtransitioneconomies.htm> (Accessed December 24, 2017).
- Östensson, O. (2018): Misinvoicing in Mineral Trade: What Do We Really Know? *Mineral Economics*, 31(1–2): 77–86.
- Patnaik, I. – Gupta, A. S. – Shah, A. (2009): Trade Misinvoicing: A Channel for de facto Capital Account Openness. *NIPFP–DEA Program on Capital Flows*.
- Patnaik, I. – Gupta, A. S. – Shah, A. (2012): Determinants of Trade Misinvoicing. *Open Economies Review*, 23(5): 891–910.
- Rahman, S. – Aslam, M. – Lau, W.-Y. – Shahari, F. (2015): Does Financial Cooperation Agreement Influence the Real Economy? A GMM Panel Data Approach on ASEAN+3 Countries. *DLSU Business & Economics Review*, 24(2): 65–76.
- Roodman, D. (2009a): How to Do Xtabond2: An Introduction to Difference and System GMM in Stata. *The Stata Journal*, 9(1): 86–136.
- Roodman, D. (2009b): A Note on the Theme of too Many Instruments. *Oxford Bulletin of Economics and Statistics*, 71(1): 135–158.



- Sheikh, M. A. (1974): Underinvoicing of Imports in Pakistan. *Oxford Bulletin of Economics and Statistics*, 36(4): 287-296.
- Stoyanov, A. (2012): Tariff Evasion and Rules of Origin Violations under the Canada – US Free Trade Agreement. *Canadian Journal of Economics*, 45(3): 879-902.
- Tandon, S. – Rao, R. K. (2017): Trade Misinvoicing: What Can We Measure? *NIPFP Working Paper Series*, No. 200.
- The Financial Action Task Force (FATF) (2012): Trade-Based Money Laundering Typologies. <http://www.fatf-gafi.org/publications/methodsandtrends/documents/trade-basedmoneylaundryingtypologies.html>. (Accessed November 7, 2017).
- Tikhomirov, V. (1997): Capital Flight from Post-Soviet Russia. *Europe-Asia Studies*, 49(4): 591-615.
- Tokdemir, E. – Günlük-Senesen, G. (1997): Does Liberalization Reduce Foreign Trade Data Discrepancies? Counterevidence from Turkey, 1970-91. *International Review of Applied Economics*, 11(2): 287-302.
- Ullah, S. – Akhtar, P. – Zaefarian, G. (2018): Dealing with Endogeneity Bias: The Generalized Method of Moments (GMM) for Panel Data. *Industrial Marketing Management*, 71: 69-78.
- Wood, E. – Moll, T. (1994): Capital Flight from South Africa: Is Underinvoicing Exaggerated? *South African Journal of Economics*, 62(1): 17-28.
- Yalta, A. Y. – Demir, I. (2010): The Extent of Trade Mis-Invoicing in Turkey: Did Post-1990 Policies Matter? *Journal of Economic Cooperation and Development*, 31(3): 41-66.
- Yang, D. (2008): Can Enforcement Backfire? Crime Displacement in the Context of Customs Reform in the Philippines. *The Review of Economics and Statistics*, 90(1): 1-14.

