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THE SHORT- AND LONG-TERM EFFECTS OF TRADE TAXES ON VERTICAL SPECIALIZATION

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ABSTRACT

The aim of this study is to evaluate the effects of taxes on international trade in the short- and long-term on vertical specialization in the case of Turkey, which signed the GATT agreement and entered into the customs union in the process of its accession to the EU. Balassa's measure of relative exports-imports has been used in the study as the measure of vertical specialization. The relationship between the measure of vertical specialization and customs and import duties has been tested with the ARDL approach for the period 1989-2012. This analysis has shown that there is not a statistically significant relationship between the variables in the short term but that there is a positive and significant relationship between them in the long term. In this sense, it may be stated that taxes on international trade have in Turkey a limited but positive effect on vertical specialization in the long term, even if not in the short term.

Keywords: International trade, Vertical specialization, Trade tax, Optimal taxation, Relative advantage, ARDL.

JEL Codes: F10, F14, H21.

1. INTRODUCTION

Trade in goods and services across international borders and regions is one of the key elements that play a role in the economic development of a country. Underlying globalization, which has a direct effect on economic development, and the increasing foreign trade deficit is the liberalization of world trade. The causes of this increase observed in world trade can be brought together under four headings:

- Trade barriers decreasing steadily after the Second World War;
- Developments in the transport sector arising from technological developments;
- Decreasing production costs and increasing intra-industry trade; and
- Increasing trade in intermediate goods and the internationalization of production.

The increase in foreign trade across the world is attributed generally to these four causes enumerated above. However, the increase in international production does not always lead to an increase in international trade. This is because goods produced in foreign countries are offered on the domestic market alone and are not exported. International production and international trade increase at the same time only if there are vertical connections between countries. In other words, where different countries are specialized in the different stages of international production, an increase in international production can lead to a parallel increase in international trade. In such a trade, one can talk of the existence of a production chain. That is to say, a country uses goods it imports from another country as an input and exports the goods produced as a result to a third country or to the country from which it imports the goods used by it as an input. This production chain continues until the final product reaches the last point. This fact is described by Hummels *et al.* (2001) as "vertical specialization", which means that the different production stages of a product are carried out in different countries.

Better results have been obtained in the explanation of the increase in world trade in recent years by adding the fact of vertical specialization to the analysis involving the decrease in trade barriers and the developments in the transport sector. According to Yi (2003), "decreases in trade barriers and developing technologies encourage countries to divide their manufacturing processes and specialize in certain stages". Products manufactured in vertically specialized countries pass through international borders more than once during the manufacturing process but, as a result of tariff reductions, their production costs are lower than those of products which do not involve vertical specialization and which are thus manufactured in a single country. This leads to vertically specialized countries obtaining greater benefits from trade.

Many countries in the world adopt vertical specialization in order to use economies of scale or comparative advantages to increase their competitiveness (Yi, 2003). What should be considered at this point is the elements that have a direct effect on the competitiveness of countries and therefore on vertical specialization. First and foremost among those elements are taxes and duties on international trade. According to Balassa, the dimensions of taxes, tariffs and other restrictive measures on imports differ from country to country, and such differences directly affect the measure of export-import rates. Local regulations created according to the requirements of national markets often disrupt global trade, and national rules hinder globalization. The most obvious examples are regulations that restrict international borrowing and lending, or customs tariffs imposed by the government. Regardless of the local purpose they serve, such restrictions establish definite transaction costs applicable to international exchanges (Rodrik, 2011) and affect international trade. To minimize these costs and effects, customs policies between countries are sought to be relaxed and harmonized with each other on a national, regional and international basis. The most important step in this regard was taken with the signing of the GATT in 1946. Although burdens on international trade have gradually decreased through regional and international integrations in the following period, national differences and practices continue to exist. The aim of this study is to identify the short and long-term effects on vertical specialization of the customs and

import duties applied in Turkey, which signed the GATT and which joined the customs union in the process of accession to the European Union. For this purpose, first, Turkey's customs duties practice is discussed and then, information is given on the measure of vertical specialization to be used in our study. In the last part, the relationship between the measure of vertical specialization used and customs duties is tested with the ARDL approach for the period1989-2012.

2. BASIC CHANGE IN TURKEY'S CUSTOMS AND IMPORT DUTIES PRACTICE

The globalized world urges countries to reduce fiscal obligations on international trade to enhance competitiveness. Fiscal obligations on international trade may be described basically as import tariffs and export taxes. Import tariffs directly affect producer and consumer prices. When tariffs fall, both producer and consumer prices move downward. Underlying this fall is the Diamond- Mirrless production efficiency lemma, according to which producer prices and world prices are required not to differentiate in order to achieve efficiency in production under certain economic conditions. This ultimately means eliminating trade taxes (Emran and Stiglitz, 2007). In the historical process, developing countries in particular have in this context lowered taxes and tariffs on trade in the scope of efficiency in production, on the one hand, and embarked on a search for optimal trade taxes on the basis of the theory of comparative advantages, on the other.

The optimum taxation (tariff) is the rate that maximizes the net welfare increases resulting from the improvement in the terms of trade against the negative effects of the shrinkage in the volume of trade. Under the Ricardian model of comparative advantages, the optimal trade taxes must be at uniform rates in the case of imported goods and monotonous in the case of exported goods in view of comparative advantages. The optimal tariffs covering uniform and monotonous trade taxes have been developed and expanded in Costinot *et al.* (2013). In this respect, the conclusion in Costinot *et al.* (2013) has been arrived at 'Optimal trade taxes include (i) a zero import tariff accompanied by export taxes that are weakly increasing with comparative advantage or (ii) a uniform, positive import tariff accompanied by export subsidies that are weakly decreasing with comparative advantage. While the latter pattern accords well with the observation that countries tend to protect their least competitive sectors in practice, larger subsidies do not stem from a greater desire to expand production in less competitive sectors.'

When the historical process is examined, it may be concluded that there has been a relative decrease in Turkey's customs duties and tariffs by reason of international competition, in parallel to the explanations above. Turkey, which took its first step in this context by acceding to the GATT in 1953, experienced the basic change regarding customs duties and obligations on international trade by joining the Customs Union (CU) in 1996. The decision for Turkey to join the CU with the member countries of the European Union (EU) and for its industrial and processed agricultural products to go into free movement with the products of those countries was signed and ratified on March 6, 1995 and the CU practice started with the EU countries in 1996. With this practice, it was intended that the customs duties applied by Turkey to industrial products from the European Union

at 50 to 60 % should be gradually reduced to zero. In this framework, the Common Customs Tariff was adopted, and the commercial agreements signed by the EU and the preferential trade regimes of the Community were assumed (Bilici, 2012). After the Community unilaterally reduced to zero its customs duties on all industrial products imported from Turkey and abolished the quotas in 1971 with the exception of certain petroleum and textile products, Turkey signed the CU text and fulfilled its commitment under the Ankara Agreement (Soğuk, 2002). With the transition to the CU, the possible short- and long-term positive and negative effects of the union began to be debated. The main points of criticism from the point of Turkey with regard to the Customs Union in its current structure are the loss of $ 350 billion in customs duties, the amount of Euro 316 billion forfeited as a result of joining the union, and the annual loss of $ 10 billion due to the exclusion of the agricultural sector from the union (Altundal, 2008). Although the gradual reduction of obligations on international trade has caused important costs to Turkey, which joined the union mainly with the objective of increasing its competitiveness and its share in foreign trade, the results of implementation in terms of competitiveness and vertical specialization are important with regard to compensating for those costs.

3. COMPETITIVENESS AND VERTICAL SPECIALIZATION

As already stated, fiscal obligations on international trade have a direct effect on international trade and a country's competitiveness (Balassa, 1963; Rodrik, 2011).

The concept of competitiveness is used to measure the extent to which a branch of industry in a country can compete with the branches of industry in other countries (Frohlich, 1992). The concept of competitiveness is considered in two categories as price competitiveness and non-price competitiveness. Price competitiveness is determined by the variations in monetary wages (including taxes), efficiency and the exchange rate, while non-price competitiveness can be achieved through product specifications, quality, marketing and after-sales services (Francis, 1992).

In international trade, most countries use comparative advantages to enhance their competitiveness. The fundamental study in the theory of comparative advantages belongs to David Ricardo. The price and non-price variables that determine Ricardian comparative advantages are rather difficult to measure for many countries and many products (Balance, 1988). For this reason, comparative advantages are calculated on the basis of post-trade rather than pre-trade data. In this way, based on product flows resulting from international trade, comparative advantages can be calculated indirectly.

In 1965, Balassa developed the approach of revealed comparative advantages to make it easier to calculate comparative advantages in a multi-country and multi-product world (Balassa, 1965). This approach suggests that the product mix of international trade reflects non-price factors (quality, service etc.) as well as relative cost differences between countries. Balassa's approach is intended to explain comparative advantages between trading countries. While comparative advantages are an important means for countries to enhance their competitiveness, they form the basis of international trade today. For this reason, many countries in the world opt for vertical

specialization in order to use comparative advantages. A country going into vertical specialization becomes specialized in one or several stages of the manufacturing of a product. However, such specialization does not take place in all of the stages of the manufacturing process, and at least one part of the product crosses international borders more than once. Vertical specialization occurs where products manufactured in a country with the use of imported intermediate goods are exported. Thus, countries become successively tied to each other to manufacture a final product (Balassa, 1977; Hummels *et al.*, 2001).

Two methods of measuring vertical specialization have been developed to measure trade originating from vertical specialization and these methods of measurement have been used in a large number of studies (Hummels *et al.*, 2001). The first among these methods is Balassa's measure of comparative advantages. Balassa proposes two measures to calculate comparative advantages (Balassa, 1977):

1- Measure of Relative Exports-Imports Rates

2- Measure of Relative Exports Performance

Balassa takes the measure of relative exports performance as a basis in the calculation of comparative advantages. There are limitations regarding the number of products and countries in the calculation of comparative advantages through Balassa's approach (Hillman, 1980). However, the scope of Balassa's approach can be expanded by lifting the limitations regarding products and countries while calculating comparative advantages. In this way, the measure relating to revealed comparative advantages can be restated as follows (Vollranth, 1991):

1- Measure of Relative Exports-Import:

$$RCA_{ij} = \left(X_{ij}/X_{it}\right)\left(M_{ij}/M_{it}\right) \quad (1)$$

Where:

RCA_{ij} = level of revealed comparatives advantages of country i in product j

X_{ij} = exports of commodity j by country i

X_{it} = total exports by country i

M_{ij} = imports of commodity j by country i

M_{it} = total imports by country i

While calculating comparative advantages by this approach, the exports in a certain industry are prorated to their share of total exports. With this approach, it is possible to calculate the comparative advantages and disadvantages of a country according both to various groups of countries and to countries in the world as a whole. If RCA_{ij}> 1, country i has a relative advantage in the manufacturing of product j. As the index grows, the relative advantage becomes stronger. IfRCA_{ij}< 1, country i has a relative disadvantage in the manufacturing of product j. As the index diminishes, the disadvantage increases further.

The second measure relating to the calculation of revealed comparative advantages is stated as follows:

2-Relative Exports Performance

$$RCA = \left(X_{ij}/X_{it}\right)\left(X_{wj}/X_{wt}\right) \quad (2)$$

Where:

X_{ij} = exports of commodity j by country i

X_{it} = total exports by country i

X_{wj} = exports of commodity j by world countries

X_{wt} = total exports by world countries

While calculating comparative advantages by this approach, the share of the exports in a certain industry in the total exports by the country is calculated and this is prorated to the share of the world exports in the same industry in the total world exports. If $RCA > 1$, country i has a relative advantage in the manufacturing of product j. As the index grows, the relative advantage becomes stronger. If $RCA < 1$, country i has a relative disadvantage in the manufacturing of product j. As the index diminishes, the disadvantage increases further. It may thus be said that a value of revealed comparative advantage greater than 1 calculated under measures (1) and (2) indicates a revealed comparative advantage in that branch of industry while a value smaller than 1 indicates a comparative disadvantage (Yeats, 1985). Due to the existence of the above-mentioned difficulties in the estimation of the Ricardian model, the measure of relative exports-imports used by Balassa to express revealed comparative advantages has been used in our study to measure vertical specialization.

4. RELEVANT LITERATURE

The aim of this study is to examine the short- and long-term effects on vertical specialization of the international obligations, particularly customs and import duties, applied in Turkey in parallel to the changing conditions. In this respect, the literature concerning the effects on foreign trade and competition of the obligations on international trade generally starts from the theory of optimal taxation and comparative advantages. As is known, a country's customs tariff (duty) practice creates two conflicting situations from the point of that country's welfare: an improvement in the terms of trade and a reduction in the volume of trade. The optimum taxation (tariff) is the rate that maximizes the net welfare increases resulting from the improvement in the terms of trade against the negative effects of the reduction in the volume of trade. In this respect, some of the studies in the literature concentrate on the effects of optimal tariffs in international trade (Dixit, 1985; Bagwell and Staiger, 1990; Bond, 1990; Broda *et al.*, 2008). Since optimal taxation is the rate that maximizes the net welfare increases resulting from the improvement in the terms of trade and since, in this context, comparative advantages are closely related with the analysis of the effects of countries' trade polices on welfare and income distribution (Hartigan, 1981), certain fundamental studies concentrate on the relationship between optimal trade taxes and comparative advantages (Itoh and Kiyono, 1987; Costinot *et al.*, 2013). These studies investigate the relationship between variables under the Ricardian model of comparative advantages and the Constant Elasticity of Substitution (CES) utility. Unlike the studies in question, our study examines the effects on competitiveness of the international trade obligations including customs and import

duties applied in Turkey during the period 1989-2012, rather than dwelling on an optimal trade tax. In this respect, unlike the other studies in the literature on competitiveness, Balassa's measure of relative exports-imports performance has been used instead of the Ricardian method of comparative advantages.

5. DATA AND METHODOLOGY

In this study, the short- and long-term relationship between the fiscal obligations on international trade or, in other words, customs and import duties in the Turkish economy during the period 1989-2012 and the measure of relative exports-imports will be analysed through the ARDL (Autoregressive Distributed Lag) Bounds test approach. The measure of relative exports-imports, the first of the variables to be used in the analysis, was calculated by us through Balassa's method using the data of the Turkish Central Bank for capital intermediate goods, which have an important share in Turkey's foreign trade, according to equation 1. Customs and import duties, the other variable, includes the customs duties, the customs duties on petroleum, the production tax on imports, the production tax on petroleum imports, the stamp duty on imports, and the wharf duty. The variable in question was obtained from the OECD Statistics, the current series in million T.L. was disinflated and realized by us, and algorithms were taken of both series.

Following the calculation of the series, their unit roots were tested through the ADF and PP methods, and the existence of cointegration between the series in the long and short run was analyzed through the ARDL test approach.

This method, developed by Pesaran, Shin and Smith through their study in 2001, has important advantages over the other methods of cointegration. The first of these advantages is that cointegration between series can be tested even where the series have different degrees of stability. In addition, as (Narayan and Narayan, 2004) study, this method can integrate short-term dynamics and long-term equilibrium without losing knowledge of the long term thanks to its error correction term.

After the model is briefly explained, the unit root tests of the series to be used in the analysis will be performed as the initial stage. Many macroeconomic time series include unit roots. Series that include unit roots lose their stationarity, and non-stationary series may have a negative effect on results. In this context, whether series include unit roots can be tested by different methods. In our study, the unit root tests have been performed with the help of the Augmented Dickey Fuller and Phillips-Perron tests, and the results in Table 1 have been reached.

Table- 1.Unit Root Tests

Değişkenler	ADF istatistiği	MacKinnon 5% kritik değer	PP istatistiği	MacKinnon5% kritik değer
lnct	-1.299993	-2.998064	-1.299993	-2.998064
Lnrca	-2.468114	-2.998064	-2.601570	-2.99864
Δlnct	-4.955771*	-3.004861	-4.955771*	3.004861
Δlnrca	-6.202736*	-3.004861	-6.202736*	-3.004861

Lnct represents custom duty and lnrca the measure of relative exports-imports. The Critical Values have been taken from MacKinnon (1996).* 1% indicates the level of significance.

As can be seen in Table 1, although neither of the series lnct and lnrca is stationary at this level of significance, the first-order difference of both series is stationary I(1) at the 1 % level of significance. After this stage, the Unrestricted Error Correction Model will be created in the analysis. In parallel to the variables we use in our study, the model has been determined as:

$$\Delta lnrca_t = \alpha_0 + \sum_{i=1}^{m} \propto_{1i} \Delta lnrca_{t-i} + \sum_{i=0}^{m} \propto_{2i} \Delta ct_{t-i} + \alpha_3 \, lnrca_{t-1} + \alpha_4 \, lnct_{t-1} + u_t \, (3)$$

After the model is established, another stage important for the application of the bounds test is the determination of the appropriate lag length. In the model the lag length m has been determined as 3 due to the limit of the sample size used in the estimation. After this point, it will be possible to identify cointegration between the variables by applying the F test to the first lags of the dependent and independent variables.

Table- 2. The Results of Bounds Test For Cointegration

k	F	I(0)	I(1)
1	11.73341	4.934	5.764

Since the F statistic calculated by Wald test in Table 2 is above the critical Pesaran *et al.* (2001) lower and upper values, the null hypothesis $H_o=\alpha_3=\alpha_4=0$ is rejected and it is concluded that there is cointegration between the series. In line with this conclusion, the ARDL model will be established in order to determine the long- and short-term relationships between the series. The ARDL model has been established as follows to examine the long-term relationship between the variables:

$$lnrca_t = \alpha_0 + \sum_{i=1}^{m} \propto_{1i} lnrca_{t-i} + \sum_{i=0}^{n} \propto_{2i} ct_{t-i} + u_t \, (4)$$

Table-3. Estimation Results of the ARDL (1,0) Model

Depended Variable:lnrca		
Reggressors	ARDL(1,0)	
	Coefficient	t statistics
Constant	0.745131	5.515141*
lnrca(-1)	0.620277	6.677378*
lnct	0.019067	4.534109*
R-squared	0.79	
Adjusted R-squared	0.77	
DW stat	2.046345	
Diagnostic Tests		
X^2BPG	2.195804	
$X^2BGSC\ LM$	0.137943	
X^2JBNl	1.046563	
X^2RR	0.120858	

1. * is statistically significant at 1%, **.* is statistically significant at 5%.* is statistically significant at 10%,

2 .DW stat is Durbin Watson Statistics

3.X^2 *BGSC-LM*is the Breusch–Godfrey LM test for autocorrelation

4.X^2*JBNl* is the Jarque–Bera normality test.

5.X^2*BPG* is the test f Breusch–Pagan-Godfrey heteroscedasticity

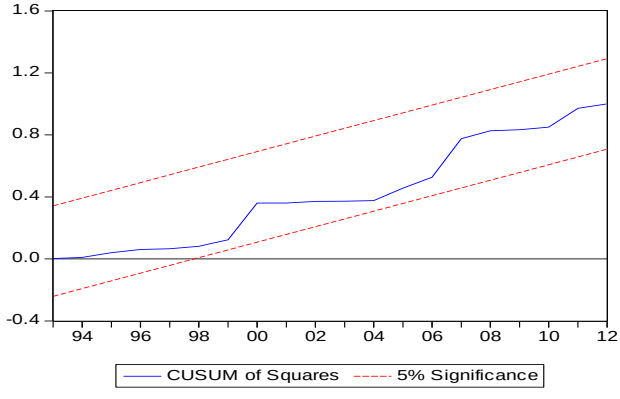
6.X^2*RR* is the Ramsey test for omitted variables/functional

Equation 5 shows the long-term coefficients calculated in line with Estimation Results of the ARDL (1,0) Model.

$$\text{lnrca}_t = 1.962+0.05021\text{lnct} \qquad (5)$$

The results indicate that customs and import duties have a positive and significant effect on vertical specialization in the long term. The diagnostic test results prove that the model has no diagnostic problems. When Figure 1 is examined, it is noted that the graph of the model in line with CUSUM Q statistics is within the critical bounds or, in other words, that the coefficients in the model are stable. This indicates that the regression coefficients are stable.

Figure-1. Cumulative Sum of Recursive Residuals



At the next stage, the short-term relationship between the variables was investigated through the ARDL error correction model. The version of the model adapted to the study is as follows: The error correction model based on the ARDL approach to investigate the short-term relationship was established in the following way.

The relationship between the variables in the short term was tested with the help of the following equations:

$$\Delta\text{lnrca}_t = \alpha_0 + \alpha_1\ \text{ECT}_{t-1} + \sum_{i=1}^{m} \propto_{2i} \Delta\text{lnrca}_{t-i} + \sum_{i=0}^{n} \propto_{3i} \Delta\text{lnct}_{t-i} + \varepsilon_t \quad (6)$$

The ECTt-1 variable in the model is the one-period lagged value of the error terms series obtained from the long-term relationship. A negative and significant coefficient of ECt-1 will be an indication of cointegration. The estimation results obtained in equation 6 are seen in Table 4.

Table- 4. Error Correction Representations of ARDL Model

Depended Variable:lnrca		
Reggressors	ARDL(1,0)	
	Coefficient	t statistics
Constant	0.016518	0.663963
Δlnrca(-1)	0.048644	0.313959
Δlnct	-0.031010	-0.607900
ECT(-1)	-0.2048644	0.313959
R-squared	0.87	
Adjusted R-squared	0.64	
DW stat	1.893517	
Diagnostic Tests		
X^2BPG	2.427442	
$X^2BGSC\ LM$	0.116708	
X^2JBNl	0.903042	
X^2RR	0.501739	

1.* is statistically significant at 1%, **.* is statistically significant at 5%.* is statistically significant at 10%,

2..DW stat is Durbin Watson Statistics

3.X^2 *BGSC-LM*is the Breusch–Godfrey LM test for autocorrelation

4.X^2JBNl is the Jarque–Bera normality test.

5.X^2BPG is the test f Breusch–Pagan-Godfrey heteroscedasticity

6.X^2RR is the Ramsey test for omitted variables/functional

According to the results obtained in parallel to equation 6, the model does not include diagnostics problems and the error correction term (ect) is negative. Despite these results, it was not possible to reach a statistically significant conclusion between the variables in the short term.

6. CONCLUSION

In this study, the effect on competition of the taxes on international trade in Turkey has been examined in the framework of data covering the years 1989 to 2012. First, it was concluded that both series are stationary at the first difference. Then, the relationship between vertical specialization in capital goods and customs duties was analyzed through the ARDL test approach. Following this analysis, it was concluded that there is no statistically significant relationship between the variables in the short term but that there is a positive and significant relationship between the variables in the long term. In this respect, the taxes on international trade in Turkey have a positive, albeit low, effect on vertical specialization in the long term, even if not in the short term.

Vertical specialization is defined as a situation where a country uses goods imported by it from another country as an input and exports the goods produced by it as a result to a third country or to

the country from which it imports the goods used by it as an input. Based on this definition, it may be concluded that Turkey's customs duties and tariffs, reduced to zero in 1996 under the CU with the member countries of the EU, with which Turkey carried out 50 % of its foreign trade in 2010, despite the loss of tax revenue caused by such reduction in the long term, have the effect of increasing vertical specialization especially with regard to capital goods or, to use a more general expression, Turkey's competitiveness.

In addition to the existence of a positive relationship between taxes on international trade and vertical specialization in Turkey in the long term, the differentiation of trade taxes between goods according to comparative advantages unlike the Ricardian optimal taxes can provide greater increases in welfare and therefore in competitive advantage than optimal uniform trade taxes can, as stated in Costinot et. al 2013. In this respect, a higher rate of taxation can be applied in those export goods which have a strong comparative advantage than in those which have a weak comparative advantage. However, the fact that it is not possible for Turkey to apply such taxation unilaterally under the CU may be interpreted as another cost imposed by the union on our country.

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