THE EFFECTS OF PHTHALATE RESTRICTIONS ON TURKEY'S FOOTWEAR IMPORTS

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ABSTRACT
This study analyzes the effects of a technical barrier to trade containing phthalate restrictions on Turkey's imported footwear. To this end, a log-linear trend model is estimated to identify the value and quantity impacts on trade flows from the European Union (EU) and non-EU countries by using monthly data over the last decade. The results suggest that the policy measure has a promoting effect on the footwear import value of non-EU countries, while it does not matter for the import from EU countries. On the other hand, the impact of the measure on the import quantity cannot be observed from the regression results for EU and non-EU countries or both.

1. INTRODUCTION

Phthalates are used widely in various consumer goods such as footwear and accessories which are made of soft plastic. However, an ongoing debate is whether exposure to phthalates may have adverse health effects, especially in children. Over the past years, some phthalates have been prohibited by various countries, while some others have not been regulated in all products yet.

Turkey has started to implement phthalate restrictions on imported footwear products since October 2012 in order to protect human health. The measure seems to be compatible with the commitments arising from the WTO and Customs Union agreements. However, compliance with the rules on phthalates might be difficult or costly for importers. Therefore, the implementation could cause additional costs for producers from exporting countries and have the potential to act as an impediment to footwear trade.

Accordingly, the objective of this paper is to identify the impacts of those restrictions on imports from both the European Union and third countries. For this purpose, the first section sheds some light on the footwear sector in Turkey *vis-à-vis* the world. The second part of the study explains the scope and procedures required for Turkey's phthalate restrictions on imported footwear. The next section reviews the existing literature on impacts of non-tariff measures. The subsequent two sections are dedicated to explaining the methodology to estimate the effects of policy measures on phthalates and evaluating the empirical results. The last section provides conclusions and suggested further research.

2. THE FOOTWEAR SECTOR IN TURKEY *VIS-À-VIS* THE WORLD

Footwear manufacturing is among the most traditional and globalized industries. However, almost 87 percent of total world footwear production is now concentrated in Asia. China alone is responsible for around 2/3 of world production (22 billion pairs), which is 14.2 billion pairs in 2013 (APICCAPS, 2014). Turkey ranks first in the EU and seventh in the world in footwear manufacturing, although it only accounts for 1.36 percent (300 million pair) of world production. The domestic sector is dominated by small and medium sized enterprises (SMEs) consisting of 4,928 companies and there is an estimated of 42,348 people employed in the sector in 2012 (TSI, 2015).

The world footwear trade set new record levels in 2013, reaching 14.4 billion pairs and 119 billion US dollars of world exports, up 7 percent and 12 percent from the previous year respectively (APICCAPS, 2014). According to the same statistics, Asia accounted for 86 percent (12.400 million pairs) of total quantity trade and 61 percent (72.6 billion USD) of total value trade. On the other hand, Europe has lowered its quantity share to 11 percent (1,590 million pairs) and its value share from 44 percent to 35 percent (41.6 billion USD).

Although Turkey has faced a trade deficit in footwear over the last decade, its value of exports has increased more rapidly than the value of imports. Between 2009 and 2014, exports grew sharply by 148.5 per cent while imports increased by only 76.8 percent. As a result, the export-import ratio rose from 53.7 percent to 75.4 percent in the same period (Figure 1).

Russia, Iraq, Germany and Saudi Arabia still are the main export markets, Russian and Iraqi markets accounted for almost one third of total Turkish footwear exports in 2014. On the contrary, the share of total footwear of mostly EU countries (in particular Germany, France, Bulgaria, Romania, Greece and the Netherlands) dropped in 2014 compared to 2005. In 2014, the main importers of footwear to the Turkish market were China (50.9 percent), Vietnam (16.4 percent) and Italy (11.7 percent).

Figure 1. Turkey's Footwear Trade
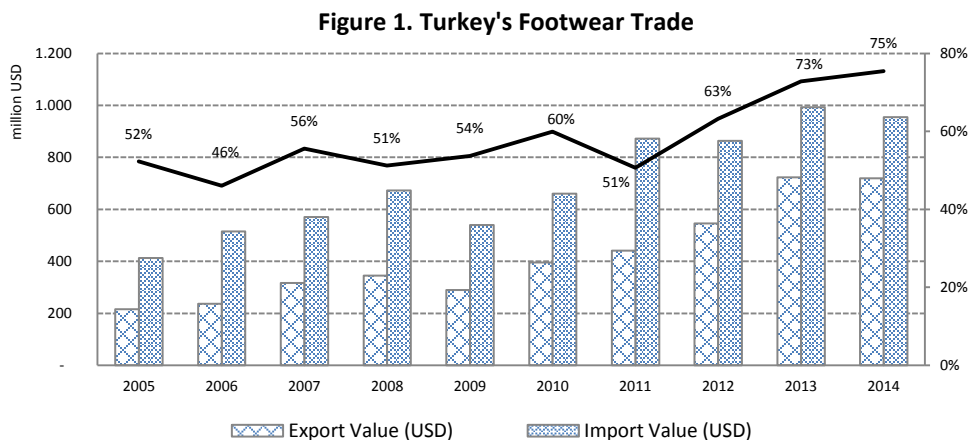
Source: Computed by the author from TSI Database.

Export pricing of footwear is one of the most important factors for market access and competition. As compared to all other regions the Asian footwear industry has always sold on the average at lower prices, which are still below 6 USD per pair (APICCAPS, 2014). Meanwhile, the Europe has concentrated on the higher end of the scale and its export prices (26 USD per pair) were more than four times those of the Asian market in 2013. That's why many European manufacturers have moved to high-quality and high-added value segments such as high-end footwear, children's shoes and footwear for specific applications (protective equipment and sportive activities such as golf, skiing boots) (European Commission, 2015).

Imported footwear has a strong competitive position and is generally associated with low labor cost advantage, which allows consumers in target markets to purchase products at reasonable prices. On the other hand, product branding and a high level of quality are also very important factors in order to compete globally in the footwear industry. These factors through marketing activities might create a loyal consumer base by changing consumer behavior and recognition (IBISWorld, 2010, pp. 14-15).

Turkey's footwear trade structure may be best explained by consumer preferences and demand elasticity. By comparing export price with import price, trade figures reveal that Turkey exports at an average price of 4-6 USD per pair, while importing at an average price of 14-17 USD per pair (TSI, 2015). Accordingly, we can conclude that Turkey might have a lower price advantage over other suppliers, but domestic consumers demand higher quality and recognizable brands.

3. TURKEY'S PHTHALATE RESTRICTIONS ON IMPORTED FOOTWEAR

Hauser *et al*. (2006, p. 682) define phthalates as *"… a class of multifunctional chemicals used in a variety of consumer and personal care products. High molecular-weight phthalates … are primarily used as plasticizers in the manufacture of flexible vinyl, which is used in consumer products, flooring and wall coverings, food contact applications, and medical devices. Manufacturers use low-molecular-weight phthalates … in personal care products (e.g. perfumes, lotions, cosmetics), …"*.

Their extensive use has been the subject of legislative and scientific debate since the early 1980's. Main concerns have been expressed related to carcinogenicity, endocrine modulation and alleged disruption of certain phthalates. Many studies such as Mendes (2002), Heudorf *et al*. (2007) and López-Carrillo *et al.* (2009) elaborate more closely on the potential adverse effects. Because of those concerns, The European Union, United States, China, Canada, Argentina, Brazil and Japan have set limits on some phthalates in toys and certain child care articles.

Turkey's Ministry of Economy also published a piece of legislation on 4 October 2012 regulating the content of all imported footwear (T.C. Resmi Gazete, 2012). This regulation (the Communiqué on Import Controls for Certain Consumer Products-Product Safety and Inspection: 2012/30), consisting of 40 products on the basis of HS-12 classification, set limits for 6 different phthalates (DBP, BBP, DINP, DIDP, DnOP and DEHP) as 0.1% of the total by weight. According to the initial version of the regulation, third party testing and certification was required for footwear articles in order to demonstrate compliance to the rules of limits on phthalates in footwear articles. Subsequently, the regulation was

amended twice in 2013 and 2014 by the regulatory authority so that imported footwear products have also been randomly subject to physical checking for phthalate content.

Turkey would apply those restrictions on phthalates, which could be classified as a non-tariff measure, in a WTO-consistent manner in footwear trade. The WTO Agreement on Technical Barriers to Trade (TBT) recognizes its members have the right to establish protection for human, animal or plant life or health or the environment (WTO, 2005). The TBT Agreement accordingly contains rules that help ensure that standards-related measures serve legitimate objectives, are transparent, and do not create unnecessary obstacles to trade.

One important aspect of the regulation is that it was drafted taking into consideration Turkey's commitments arising from the Customs Union agreement with the EU. Turkey and the EU established a Customs Union in 1995, which covers mainly trade in industrial products. The Customs Union Agreement requires alignment by Turkey with all EU product legislation and elimination of import controls at the borders in order to ensure the free movement of products between parties. As a result, "*in the sectors for which Turkey has aligned its legislation with that of the EU, a product lawfully manufactured and/or marketed in Turkey should be treated equal to the EU originating products and should not be subject to import controls. The same reasoning would apply in the non-harmonised sectors where Turkey has aligned its legislation …*" (European Commission, 2015, p. 71).

To this end, Turkish regulation on phthalates contains a specific exception to the import controls for footwear articles coming from the EU area. In other words, footwear imports are treated differently depending on whether the goods come from the EU countries or from third countries and in the case of the EU goods can be imported without import controls.

4. EXISTING LITERATURE ON ESTIMATING IMPACTS OF NON-TARIFF MEASURES ON TRADE

Non-tariff measures such as product standards, technical regulations and conformity assessment procedures have become widely used in international trade for the purposes of legitimate policy objectives such as the protection of human health or safety as well as the protection of the environment. Even though they are sometimes considered to be protection instruments or impediments to trade, their impacts on trade flows remain really an open issue.

Deardorff and Stern (1997, pp. 8-9) view *inter alia* the reduction in quantity imports and the increase in price of imports as important characteristics of non-tariff barriers in order to understand fully their effects. Likewise, Stephenson (1997) points out the danger of their acting as barriers to trade as they have the capacity to restrain trade growth and an effect on economic efficiency. Bognar (2011, p. 186) suggests that "once regulations for higher standards of production are introduced, producers from exporting countries may be subject to additional costs in order to meet the standards specified in the regulations".

In a very recent study, for example, Markus *et al.* (2013) have estimated the effects of such regulations by importing countries on production costs of firms in developing countries. They found that those regulations raise production costs by requiring additional

labor and capital, which may affect the export success for firms in developing countries. The World Trade Report (WTO, 2012, p. 136), which also refers to the previous studies, not only reveals that non-tariff measures are almost twice as trade restrictive as tariffs, but also shows that they contribute much more than tariffs to the overall level of trade restrictiveness. Indeed, some recent studies using different estimating models have supported these arguments. Czubala *et al.* (2007), Dean *et al.* (2009), Liu and Yue (2009), Kareem (2013), and Jiang (2013) found that technical barriers to trade such as standards, sanitary and phytosanitary measures are still highly restrictive in many countries and for many traded goods.

Existing literature also suggests that non-tariff measures have no negative impact on or even facilitate trade. For example, conformity assessment procedures could facilitate trade by increasing consumer confidence if done without excessive time and cost (Cadot, Malouche and Sáez, 2012, p. 30). The European Standardization Organization (CENCENELEC, 2015) suggests that "standards facilitate international trade by ensuring compatibility and interoperability of components, products and services. They bring benefits to businesses and consumers in terms of reducing costs, enhancing performance and improving safety". Fontagné, Mimouni and Pasteels (2005), Anders and Caswell (2009), Gibson (2007), Beghin *et al.* (2011) and Sithamaparam and Devadason (2011) showed empirical findings which could indicate the presence of no impact or even facilitating effect of those non-tariff measures on trade.

Another problem with non-tariff measures is the difficulty of their estimation. Unlike tariffs, they are often regulatory in nature and not in an economically significant form. That's why the techniques used to analyze them range from descriptive to the highly analytical. These techniques may be as follows: data sources, frequency counts or coverage ratios, price gap measures, quantity measures, partial equilibrium modelling and computable general equilibrium (CGE) modelling (Dee and Ferrantino, 2005). Having analyzed various methods of estimating non-tariff trade measures, Baldwin (1989) concluded that tariff and subsidy equivalents, preferably determined by directly comparing distorted and non-distorted prices, are the most useful forms of measurement. However, he also believed that the other types of measure can be valuable in supplementing the information obtained from tariff and subsidy equivalents.

Over the years, many studies by using aforementioned methods have attempted to identify either their direct effects on price or quantity effects on trade flow of non-tariff measures for particular industries and economies. The method of quantity effects has been widely preferred because of trade data availability, while the gravity model has been used in studies estimating quantity effects (Ferrantino, 2006, p. 10). The gravity model is also among the quantitative methods that are widely applied in the literature to measure the impacts of food safety regulations (Ragona and Mazzocchi, 2008).

5. MODEL SPECIFICATION

This section of the paper investigates the impact of phthalate restrictions on EU and non-EU exports to the domestic market over the last decade. Therefore, for footwear products the study will analyze the impact of the measure on exports from the EU, non-EU and all countries. In addition, the study will take these impacts of the quantity and the value of imports into account separately.

The measure has been applied since November 2012 and its product coverage was described in the annex to the regulation on the basis of HS12 classification. As a non-tariff barrier, its effect on trade flows is not predictable according to the results of existing empirical studies. The study is based on monthly time series data over a period from 2005 to 2014, which are received from Turkish Statistical Institute (TSI). The data series measured in current USD for the value of imports and in pairs for the quantity of imports.

Using a similar methodology applied by Thuresson and Andersson (2008), the following log-linear trend equation may be proposed in order to estimate the trade flow effects of the phthalate restriction on footwear imports:

$$\ln IMP_t = \propto_0 + \propto_1 t + u_t \quad (1)$$

where In*IMP is* Turkish footwear imports (in USD or pairs) from EU, non-EU or both, *t* is the trend variable for the whole period, $\propto$'s are constants and *u* is the error term. This methodology uses time series econometrics to assess the impact of the national regulation on phthalates, when historical observations are available before and after the implementation of the policy measure. For example, this application evaluates financial markets response to new regulations or to recalls due to food safety incidents (Ragona and Mazzocchi, 2008, p. 5).

On the other hand, two more explanatory variables should be added to Equation I. The first one is a dummy variable to understand whether the phthalate restriction has an impact on imports. Therefore, the dummy variable *D* is added to the model, which takes the value of "1" over the period of implementation (from November 2012 to December 2014) and "0" before that period (from January 2005 to October 2012). The second explanatory variable needed an interaction term, which would expand our understanding of the relationships among the variables in the model. We employ this variable in order to investigate the change of the trend after the policy measure in line with Brambor, Clark and Golder (2006). Then, the model can be re-written as;

$$\ln IMP_t = \propto_0 + \propto_1 D_t + \propto_2 t + \propto_3 Dt_t + u_t \qquad (2)$$

This semi-log model suggests that the slope coefficients measure the relative change in dependent variables for a given absolute change in the value of the explanatory variables. If the relative change in dependent variable *IMP* is multiplied by 100, the percentage change or the growth rate for an absolute change in *IMP* is estimated in *t*. The model contains also trend variable *t* which shows whether IMP grows over time at a rate of the slope coefficient and depending on its sign.

Before reporting the regression results, we present descriptive statistics in Table 1 for the dependent variables defined in the model. Since the study will analyze the impact of phthalate restriction on footwear imports from the EU, non-EU and all countries by taking into consideration the quantity and the value of trade separately, Table 1 summarizes descriptive statistics for six different dependent variables in log form. On the other hand, they are not provided for explanatory variables because the model includes only a trend variable, a dummy variable and an interaction term.

Table 1: Descriptive Statistics of the Variables

Explained Variables	Mean	Median	Maximum	Minimum	Standard Deviation
Value of Imports					
ln *EU*	14.66178	14.99116	16.28164	12.55691	1.038057
ln *Non-EU*	17.21207	17.42944	18.39114	14.70993	0.793619
ln *Total*	17.29951	17.52794	18.50562	14.95370	0.796130
Quantity of Imports					
ln *EU*	11.17293	11.24238	12.82408	9.913198	0.653955
ln *Non-EU*	14.64003	14.80245	15.74221	12.12880	0.767421
ln *Total*	14.67532	14.83513	15.77393	12.32142	0.754230

6. RESULTS

Since the monthly data series show an upward linear trend, they should be seasonally adjusted before estimating the model by employing tramo-seats methodology. The results are presented in Table 2. The initial model estimation by OLS also indicates the existence of heteroscedasticity and autocorrelation. After solving these problems, the regressions are re-run and their final estimation results are reported in Table 2.

Table 2: Regression Results

Estimates	Coefficients of Explanatory Variables						Sample
Value of Imports	Constant	Trend	Dummy	Interaction	AR(1)	AR(2)	No. of Obs.
EU (Model 1)	13.01408 (Pr. 0.0000)	0.029261 (Pr. 0.0000)	2.212907 (Pr. 0.1855)	-0.023510 (Pr. 0.1525)	0.435471 (Pr. 0.0000)	0.268572 (Pr. 0.0038)	118
Non-EU (Model 2)	16.36452 (Pr. 0.0000)	0.017243 (Pr. 0.0000)	1.228683 (Pr. 0.0257)	-0.014362 (Pr. 0.0062)	0.454722 (Pr. 0.0000)		119
Total (Model 3)	16.39895 (Pr. 0.0000)	0.017924 (Pr. 0.0000)	1.242837 (Pr. 0.0272)	-0.014375 (Pr. 0.0074)	0.478309 (Pr. 0.0000)		119
Quantity of Imports	Constant	Trend	Dummy	Interaction	AR(1)	AR(2)	No. of Obs.
EU *(Model 4)*	10.27807 (Pr. 0.0000)	0.014222 (Pr. 0.0000)	1.580656 (Pr. 0.2838)	-0.013489 (Pr. 0.3366)		0.424938 (Pr. 0.0000)	118
Non-EU *(Model 5)*	14.15268 (Pr. 0.0000)	0.011743 (Pr. 0.0000)	0.517181 (Pr. 0.3421)	-0.006950 (Pr. 0.1769)	0.401706 (Pr. 0.0000)		119
Total *(Model 6)*	14.17917 (Pr. 0.0000)	0.011723 (Pr. 0.0000)	0.531990 (Pr. 0.3336)	-0.006951 (Pr. 0.1816)	0.408543 (Pr. 0.0000)		119

Table 3: Diagnostic Checks

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
X^2_{BG} **(a)**	0.223 [0.799]	0.353 [0.702]	0.683 [0.507]	2.198 [0.141]	0.258 [0.772]	0.197 [0.821]
$X^2_{ARCH\ LM}$ **(b)**	2.024 [0.114]	0.042 [0.836]	0.083 [0.772]	0.014 [0.903]	1.371 [0.244]	1.275 [0.261]
X^2_{RAMSEY} **(c)**	1.084 [0.299]	1.118 [0.292]	1.758 [0.187]	1.946 [0.148]	1.274 [0.261]	1.164 [0.283]

Note: (a) Lagrange multiplier test of residual serial correlation, (b) Based on the regression of squared residuals on squared fitted values, (c) Ramsey's RESET test using the square of the fitted values.

According to diagnostic checks, error terms in the model do not include serial correlation, heteroscedasticity and misspecification problems (Table 3).

Let's begin the specific analysis of the regression results with the effects on the value of footwear imports. In Model 1, the estimated coefficients of explanatory variables for the policy measure on phthalates and interaction term are not significant with high p-values of 0.1855 and 0.1525 respectively. According to these results, the phthalate restrictions have no effect on footwear imports from EU countries. The policy measure has no relationship with the growth rate of import value, either. On the other hand, the growth of import value can only be explained by the trend variable since its estimated coefficient (0.029261) is positive and statistically significant. This refers to a 2.92 percent monthly growth rate of Turkey's import value from the EU.

According to the estimates of Model 2, on the contrary, the policy measure on phthalates has a clear promoting effect on the value of imported footwear from non-EU countries. The regression coefficient of the dummy variable is 1.228683 with a p-value of 2.57 percent, which means that the restriction on phthalates has increased tremendously (by 122.86 percent) the value of footwear imports from non-EU countries. The estimated coefficient for the trend variable is 0.017243 and statistically significant. From this result, we can conclude that the value of imports has grown at a rate of 1.72 percent monthly over the last decade. However, the estimated coefficient of the interaction term is negative (-0.014362), but also statistically significant at a low p-value of 0.0062. In other words, the policy measure on footwear has reduced the growth rate of import value by 1.44 percent.

The regression of Model 3 produces the estimated coefficients of the variables in the case of footwear imports of the EU and non-EU together. In fact, its results are very similar to those of Model 2. Briefly, the policy measure on phthalates has a promoting effect on the total footwear export to the Turkish market in terms of current USD.

Now let us turn to the effects of policy measure on the quantity of footwear imports. The policy's effects on the import quantity cannot be observed from the regression results of Model 4, Model 5 and Model 6 presented in Table 1 for EU and non-EU countries or both. The estimated parameters for the dummy variable are not significant even at almost 30 percent. The estimated coefficients of interaction terms aren't significant either, which means that it does not indicate any presence of interaction between dummy and trend variables. Shortly, the log-linear model implies the constant growth of quantity of footwear imports, approximately 1 percent monthly.

7. CONCLUSION

The multilateral trading system allows governments to adopt technical regulations and standards to fulfill a legitimate objective such as national security, protection of human, animal or plant life or health, or the environment. In adopting measures to achieve such goals, however, governments should ensure that they do not create unnecessary obstacles to trade.

One good example of this ruling is imposing restrictions on the use of phthalates in consumer goods. There has been an ongoing debate whether exposure to phthalates may have adverse health effects, especially in children. Therefore, many countries have taken actions against phthalates which are used extensively in the production of various consumer goods such as footwear and accessories made of soft plastic.

Likewise, Turkey started to implement phthalate restrictions on imported footwear articles at the end of 2012 in order to protect domestic consumers' health. The regulation consists of some 40 types of footwear products and set certain limits for 6 different phthalates. According to the regulation, third party testing and certification as well as physical checking are required for footwear articles in order to demonstrate compliance to the rules of limits on phthalates. The regulation contains a specific exception to the import controls for footwear articles coming from EU countries in line with the Customs Union Agreement.

For Turkey, footwear manufacturing is one of the most important sectors, which is dominated by SMEs consisting of almost 7000 producers and employing more than 65.000 people. Turkey ranks first in the EU and seventh in the world, although it only accounts for a small part of global production. Although Turkey's value of exports has increased more rapidly than the value of imports over the last decade, Turkey has still experienced a substantial trade deficit. Lastly, Turkey's footwear imports prices are more than 3 times greater than import prices on the average, which would mean that domestic consumers prefer higher quality and recognizable brands.

That's why it is worth investigating the effects of phthalate restrictions on footwear imports into Turkey from the EU and third countries. Indeed, previous studies imply that the effects of such technical measures on trade have not been cleared yet: they can facilitate trade by increasing consumer confidence or hamper export supply through compliance or additional production costs.

In this study, a log-linear trend equation is used to estimate the trade flow effects of the phthalate restriction on footwear imports from the EU, non-EU or both. The model also measures the impacts of the quantity (pairs) and the value (USD) of imports separately. Regression results show that the policy measure on phthalates has no effect on the value of imports from EU countries, while increasing the value of imports from non-EU countries' or total footwear export to the Turkish market. The results also show that the policy's effects on the import quantity of EU and non-EU countries or both cannot be observed.

In summary, the policy overall has resulted only in the increasing cost of footwear goods imported into Turkey. However, we cannot infer from this estimation whether the policy implementation has increased the level of compliance and adherence to the limits on phthalate content of footwear. A detailed analysis of this issue may be valuable in supplementing a more comprehensive evaluation of the policy implications.

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