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A STATISTICAL ANALYSIS OF INTERNATIONAL TRADE COSTS FOR THE OECD COUNTRIES

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ABSTRACT

International trade is a very important issue for global economic growth and welfare of the global society There are many factors affecting international trade volume among the countries. In this study, it is analyzed international trade cost for OECD countries with the US for the year 2014. Statistical test results show that there is a significant difference in international trade cost at the sectoral level. It is concluded that international mean cost of agriculture is higher than manufacturing and total trading. On the other hand, international mean cost of total trading and manufacturing is very close to each other.

Keywords: International trade, Cost, OECD countries

Jel Kod: A10, B17, C40

OECD ÜLKELERİ İÇİN ULUSLARARASI TİCARETİN MALİYETİ ÜZERİNE İSTATİSTİKSEL BİR ANALİZ

ÖZET

Uluslararası ticaret küresel ekonomik büyüme ve küresel toplumun refahı için çok önemli bir konudur.Ülkeler arasında uluslararası ticaret hacmini etkileyen birçok faktör bulunmaktadır. Bu çalışmada, 2014 yılında ABD ile OECD ülkeleri için uluslararası ticaret maliyeti analiz edilmiştir.İstatistiksel test sonuçları, sektörel düzeyde uluslararası ticaret maliyetlerinde önemli bir fark olduğunu göstermektedir. Tarımın uluslararası ortalama maliyetinin imalattan ve toplam ticaretden daha yüksek olduğu sonucuna varılmıştır. Öte yandan, toplam ticaret ve imalatın uluslararası ortalama maliyeti birbirine çok yakındır.

Anahtar Kelimeler: Uluslararası Ticaret, Maliyet, OECD Ülkeleri

1. INTRODUCTION

International trade is very important issue for global economic growth and welfare of the global society. On the other hand, there are many factors affecting international trade volume among the countries. In this study, it is analyzed international trade cost of industries for OECD countries with the US for the year 2014.

There is a huge literature on measuring and effects of international costs across the world.

Hummels (2007) stated that there is remarkably little systematic evidence documenting in declining of transport costs in international trade. Hummels (2007) claimed that *"the ad-valorem impact of ocean shipping costs is not much lower today than in the 1950s, with technological advances largely trumped by adverse cost shocks. In contrast, air shipping costs have dropped an order of magnitude, and airborne trade has grown rapidly as a result"*.

Arkolakis (2010) developed "*a novel theory of marketing costs within a trade model with product differentiation and heterogeneity in firm productivities"*. Arkolakis (2010) stated that *"a firm enters a market if it is profitable to incur the marginal cost to reach a single consumer. It then faces an increasing marginal penetration cost to access additional consumers"*. Arkolakis (2010) claimed that "*the model, therefore, can reconcile the observed positive relationship between entry and market size with the existence of many small exporters in each exporting market. Comparative statics of trade liberalization predict a large increase in trade for goods with positive but low volumes of previous trade"*.

Novy (2013) derived a micro-founded measure of bilateral trade costs that indirectly infers trade frictions . Novy (2013) found that *"U.S. trade costs with major trading partners declined on average by about 40 between 1970 and 2000, with Mexico and Canada"*.

Anderson and Van Wincoop (2004) analysed the measurement of trade costs. Anderson and Van Wincoop (2004) claimed that *"partial and incomplete data on direct measures of costs go with inference on implicit costs from trade flows and prices. Total trade costs in rich countries are large. Poor countries face even higher trade costs. There is a lot of variation across countries and across goods within countries, much of which makes economic sense"*.

In the literature, it is found many factors affecting international trade costs resulted from production costs of the good and services, international trade policies, pricing strategy of the firms, heterogeneity of production, transportation costs, returns to scale, competition level in the market, consumer preferences etc. (see Bernard et al, 2006; Blum et al, 2018; Hornok and Koren, 2015 ; Arvis et al ,2016; Edmond et al, 2015; Yeaple, 2005; Rose and Van Wincoop, 2001; Krugman, 1979; Atkeson and Burstein, 2008; Brander and Krugman, 1983; Jackson, 1984; Bernard et al, 2003; Fink, 2005; Novy, 2006; Norman and Venables,1995; Mundell, 1957).

2. DATA AND METHOD

The Data used in the study is from database of ESCAP World Bank, International Trade Costs for the year 2014. The method is independent samples *t*-test, parametric test assumtions are hold. The hpothesis of the study is as follows:

Ho: There is not significant difference among international trade cost of industries for OECD countries with the US

H1 : There is significant difference among international trade cost of industries for OECD countries with the US

3. EMPIRICAL RESULTS

Table 1 shows descriptive statistics for international trade cost of industries for OECD countries with the US for the year 2014. International trade mean cost of agriculture is 164.75. International trade mean cost of manufacturing is 97.04 International trade mean cost of total trade is 99.03[1].

Table 1. Descriptive Statistics for International Trade Cost Of Industries for OECD Countries with The US for the year 2014

	Sector			Statistic	Std. Error
Trade Cost	**Agriculture**	**Mean**		**164.7553**	16.72176
		95% Confidence Interval for Mean	Lower Bound	130.3162	
			Upper Bound	199.1944	
		5% Trimmed Mean		154.6441	
		Median		149.2513	
		Variance		7270.050	
		Std. Deviation		85.26459	
		Minimum		49.41	
		Maximum		503.84	
		Range		454.43	
		Interquartile Range		77.80	
		Skewness		2.679	.456
		Kurtosis		9.800	.887
	Manufacturing	**Mean**		**97.0396**	5.85418
			Lower Bound	84.9827	

[1] *"The Trade Costs Dataset provides estimates of bilateral trade costs in agriculture and manufactured goods. It is built on trade and production data collected in over 200 countries. Symmetric bilateral trade costs are computed using the Inverse Gravity Framework (Novy 2009), which estimates trade costs for each country pair using bilateral trade and gross national output"* (Worldbank, 2017)

Table 1. Descriptive Statistics for International Trade Cost Of Industries for OECD Countries with The US for the year 2014

	Sector			Statistic	Std. Error
		95% Confidence Interval for Mean	Upper Bound	109.0965	
		5% Trimmed Mean		97.4447	
		Median		96.2919	
		Variance		891.058	
		Std. Deviation		29.85059	
		Minimum		32.46	
		Maximum		152.35	
		Range		119.89	
		Interquartile Range		45.73	
		Skewness		-.028	.456
		Kurtosis		-.494	.887
	Total Trade	**Mean**		**99.0298**	6.01331
		95% Confidence Interval for Mean	Lower Bound	86.6452	
			Upper Bound	111.4145	
		5% Trimmed Mean		99.4373	
		Median		99.0727	
		Variance		940.158	
		Std. Deviation		30.66200	
		Minimum		33.61	
		Maximum		154.78	
		Range		121.17	
		Interquartile Range		47.90	
		Skewness		.008	.456
		Kurtosis		-.476	.887

Table 2 shows the results for tests of normality. The results for the sectors shows that the null hypotheses, data follow a normal distribution, fail to reject at the significance level of 0.01 except the agriculture sector.

Table 2. Test Results of Normality for International Trade Cost Of Industries for OECD Countries with The US for the year 2014

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Sector	Statistic	df	Sig.	Statistic	df	Sig.
Trade Cost	Agriculture	.211	26	**.004**	.747	26	**.000**
	Manufacturing	.102	26	.200*	.973	26	.705
	Total Trade	.104	26	.200*	.972	26	.675

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 3 shows mean ranks for international trade cost of industries for OECD countries with the US for the year 2014. Mean rank of the agriculture is higher than manufacturing and total trade.

Table 3. Mean Ranks for International Trade Cost Of Industries for OECD Countries with The US for the year 2014

	Sector	N	Mean Rank
Trade Cost	Agriculture	26	56.85
	Manufacturing	26	29.92
	Total Trade	26	31.73
	Total	78	

Table 4 shows Kruskal-Wallis test statistics results, as P<0.05, null hypothesis is rejected, meaning that there is significant difference among international trade cost of industries for OECD countries with the US for the year 2014.

Table 4. Kruskal-Wallis Test Statistics Results[a,b]

	Trade Cost
Chi-Square	22.935
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: Sector

As P<0.05, null hypothesis is rejected by Kruskal-Wallis test. It is analysed sub-group tests whether there is a significant difference among international trade cost between agriculture and manufacturing sectors. Table 5 shows mean ranks for sectors of agriculture and manufacturing. Mean rank of the agriculture is higher than manufacturing.

Table 5. Mean Ranks For Sectors Of Agriculture And Manufacturing				
	Sector	N	Mean Rank	Sum of Ranks
Trade Cost	Agriculture	26	35.35	919.00
	Manufacturing	26	17.65	459.00
	Total	52		

Table 6 shows Mann-Whitney U test statistics results for agriculture and manufacturing. As P<0.05, null hypothesis is rejected by Mann-Whitney U test, meaning that there is significant difference for international trade cost of agriculture and manufacturing.

Table 6. Mann-Whitney U Test Statistics Results for Agriculture and Manufacturing	
	Trade Cost
Mann-Whitney U	108.000
Wilcoxon W	459.000
Z	-4.209
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Sector	

Table 7 shows mean ranks for agriculture and total trading. Mean rank of the agriculture is higher than total trading. Table 8 shows Mann-Whitney U test statistics results for agriculture and total trading. As P<0.05, null hypothesis is rejected by Mann-Whitney U test, meaning that there is significant difference for international trade cost of agriculture and total trading.

Table 7. Mean Ranks For Sector Of Agriculture And Total Trade				
	Sector	N	Mean Rank	Sum of Ranks
Trade Cost	Agriculture	26	35.00	910.00
	Total Trade	26	18.00	468.00
	Total	52		

Table 8. Mann-Whitney U Test Statistics Results for Agriculture and Total Trade	
	Trade Cost
Mann-Whitney U	117.000
Wilcoxon W	468.000
Z	-4.045
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Sector	

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Table 9 shows mean ranks for manufacturing and total trading. Mean rank of the total trading is higher than manufacturing. Table 10 shows Mann-Whitney U test statistics results for manufacturing and total trading. As P>0.05, null hypothesis fails to be rejected by Mann-Whitney U test, meaning that there is not significant difference for international trade cost of manufacturing and total trading.

Table 9. Mean Ranks For Sector Of Manufacturing and Total Trade

	Sector	N	Mean Rank	Sum of Ranks
Trade Cost	Manufacturing	26	25.77	670.00
	Total Trade	26	27.23	708.00
	Total	52		

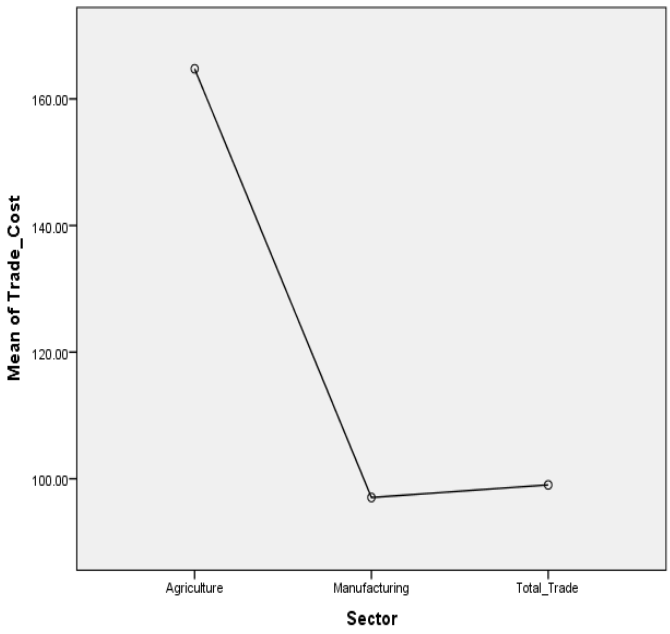
Table 10. Mann-Whitney U Test Statistics Results for Manufacturing and Total Trade

	Trade Cost
Mann-Whitney U	319.000
Wilcoxon W	670.000
Z	-.348
Asymp. Sig. (2-tailed)	.728

a. Grouping Variable: Sector

Figure 1 shows international trade cost means of industries for OECD countries with the US. It is clear that international mean cost of agriculture is higher than manufacturing and total trading, and international mean cost of manufacturing and total trading is very close to each other.

Figure 1. International Trade Cost Means of Industries for OECD Countries with the US



4. CONCLUSION

International trade is very important issue for global economic growth and welfare of the global society. On the other hand, there are many factors affecting international trade volume among the countries. In this study, it is analyzed international trade cost of industries for OECD countries with the US for the year 2014.

Kruskal-Wallis test statistics results, as P<0.05, null hypothesis is rejected, meaning that there is significant difference among international trade cost of industries for OECD countries with the US for the year 2014. On the other hand, As P<0.05, null hypothesis is rejected by Mann-Whitney U test, meaning that there is significant difference for both international trade cost of agriculture and manufacturing and international trade cost of agriculture and total trading. On the other hand, as P>0.05, null hypothesis fails to be rejected by Mann-Whitney U test, meaning that there is not significant difference for international trade cost of manufacturing and total trading. It is clear that international mean cost of agriculture is higher than manufacturing and total trading, and international mean cost of manufacturing and total trading is very close to each other for OECD countries with the US for the year 2014.

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