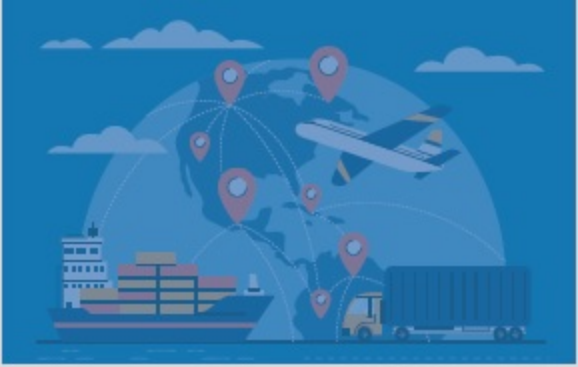


Current Studies in International Trade
InTraders 2021

Editor
Ferhat ÇITAK

Project Coordinator
Kürşat ÇAPRAZ

hiperyayın

Current Studies in International Trade

InTraders 2021

Editor

Ferhat ÇITAK

Project Coordinator

Kürşat ÇAPRAZ

hiperyayın

Publisher: Hiperyayın 911
International Research Book

e-book: 19

Editor
Ferhat ÇITAK

Editor-in-Chief
Hatice BAHTİYAR

Project Coordinator
Kürşat ÇAPRAZ

Cover Page Design
Senem ILGIN

Publisher Certificate No: 16680

e- ISBN: 978-625-8461-66-4

Current Studies in International Trade, InTraders 2021

First Edition: İstanbul, December 2021

Current studies in international trade : InTraders 2021 / editör Ferhat Çıtak ; Project coordinator Kürşat Çapraz. -- 1. Baskı. -- İstanbul: Hiperyayın, 2021.

159 sayfa: şekil, tablo; 24 cm. – (Hiperyayın; 911 e-Kitap; 19)

e-ISBN: 978-625-8461-66-4

Kaynakça bölüm sonlarındadır.

1.Sosyal bilimler -- Araştırma. 2. Sosyal bilimler -- Güncel yaklaşımlar. I. Çıtak, Ferhat. II. Çapraz, Kürşat. III. Dizi.

HN656.5.A8/C8 2021 306.09561/CUR 2021

General Merchandise and Publishing House

Hiperlink Eğitim İletişim Yayıncılık San. Paz. ve Tic. Ltd. Şti.
Tozkoparan Mah. Haldun Taner Sok. Alparslan İş Merkezi
No: 27 Kat: 6 D: 21 Merter- Güngören / İstanbul
Telefon: 0212 293 07 05-06 Faks: 0212 293 56 58
www.hiperlink.com.tr/ info@hiperlink.com.tr

Editor

PhD, Faculty Member Ferhat ÇITAK

Hitit University, Çorum, Turkey

Ferhat ÇITAK obtained a bachelor of arts in Economics from Gazi University in 2008. He received his Master degree in Economics from University of Missouri at Kansas City, and his PhD. degree in Applied Economics from Auburn University. He currently works at the Department of Economics and Finance, Hitit University. In general, he conducts research in applied econometrics, behavioral economics, energy economics, and financial economics.

Appreciation

This book is project of InTraders Academic Platform. The main objective of the book is to provide a platform for researchers to present and discuss their studies in the international field. The scope of the studies included in the book; international trade. We would like to express our gratitude to the authors of the studies in the book.

Kürşat ÇAPRAZ

Project Coordinator

InTraders Academic Platform

www.intraders.org

Scientific Board

PhD.	Adriana BURLEA-SCHIOPOIU	University Of Craiova, Romania
PhD.	Teodora Vatuiu	Titu Maiorescu University Bucharest, Romania
PhD.	Asena Boztaş	Sakarya University of Applied Sciences
PhD.	Liza Alili Sulejmani	International Balkan University, Macedonia
PhD.	Omar Khalid Bhatti	Istanbul Medipol University, Turkey
PhD.	Yurdagül Meral	Istanbul Medipol University, Turkey

CONTENTS

The Impact Of Energy Diversity On Financial Development..... 13
Abdulhanan ZARIFY
Muhammet Yunus ŞİŞMAN

The Nexus Of Export And Economic Development In Turkey: Evidence From FMOLS - DOLS Estimations..... 37
Volkan HAN
Gazi POLAT

Impact of Agricultural Supports on Agricultural Foreign Trade in Turkey: Spatial Panel Econometrics Modelling Approach 53
Hakan USLU

Ease Of Doing Business Index In Global Trade And Turkey: A Comparative Review..... 83
M. Mustafa AKKAN
Tufan YAYLA

A Rise of Tourism in Mediterranean Countries: Dutch Disease or Sustainable Growth 97
Abidin Öncel
Ali Kabasakal
Nadege Clemence Sourou Yabo Agossou

Foreign Trade Balance and Sustainability in Turkey: Analysis of the 2000-2020 Period..... 127
Hilal ALPDOĞAN

Dynamics of Consumers' Behavior in Food Waste: Income, Education, and Date Label 147
Suzan ODABAŞI

The Impact Of Energy Diversity On Financial Development[1]

Abdulhanan ZARIFY[2]
Muhammet Yunus ŞİŞMAN[3]

Abstract

Energy sources have always been an essential part of world economies. Availability of energy resources has a vital role for a country's economic growth and financial development. Contrary to fossil fuels, many countries have the potential to power their economies by renewable energy sources. This study aims to investigate the effects of different energy resources on the financial development of countries. In particular, the paper analyzes the impact of renewable, non-renewable, and nuclear energy resources on the financial development of 28 countries with nuclear energy reactors for 2001-2019. Empirical results show that natural gas and renewable energy resources have a positive and significant impact on financial development of a country.

Keywords: Financial Development, Renewable Energy, Nuclear Energy, Fixed Effect, Discroll-Kraay

1 This study is derived from the thesis submitted to Dumlupınar University.

2 KDPU, zarify.hannan@gmail.com
3 KDPU, Asst. Prof. Dr. Department of International Trade and Finance, myunus.sisman@dpu.edu.tr

Introduction

The financial structure is a set of organizations, instruments, markets, and legal and regulatory frameworks that allow processes to be made through credits. The development of an economy or sector requires the development of its financial sector. Moreover, the financial industry's development establishes and grows institutions, tools, and markets that sustain large investments and growth that help reduce poverty. Fundamentally, the financial sector's development helps execute contracts and transactions effectively and reduces the cost of acquiring knowledge from the financial system. Furthermore, an innovative and expanding financial system increases welfare and inculcates the economy in structural change and dynamic efficiency.

Since the onset of the global financial crisis in 2007-2008, the financial sector is at the top of the policymakers' agenda. While the vast literature has demonstrated the position of financial sector development for economies' growth and equity, an overly frangible financial structure can also create major crises, as the world's economies are currently experiencing. An extensive set of evidence shows that the financial sector's development is vital in economic development. Increasing the amount of savings, collecting and mobilizing savings, making investment information, facilitating and promising foreign capital inflow, and optimizing capital assignment advances economic development through the capital collection and innovative progression. For an impression of the vast literature on the finance and growth relationship, see (Beck & Demirguc-Kunt, 2009, p. 200; Levine, 2005). Developing the financial structure can help small and medium-sized enterprises (SMEs) grow by accessing financial resources. SMEs are usually labor-intensive and create more jobs than large companies. They play an essential role in economic development, especially in developing economies. The improvement of the financial sector goes beyond having a disinterested party and financial infrastructure.

It needs sound policies to regulate and control all critical assets. The worldwide financial crisis featured the calamitous results of powerless financial sector strategies. The financial crisis featured the possibly terrible sequels of frail, and weak financial sector approaches for financial development and their effect on financial results. Finances are essential for development when it works well and performs poorly (Demirguc-Kunt & Levine, 2008). The Covid-19 pandemics have challenged traditional thinking in financial sector policy and sparked much debate about sustainable development. A reassessment of post-crisis financial sector policies is an essential step in informing this trend.

Financial Development Determinants

Financial development has been uneven worldwide, and prominent descriptions for its changes relate to a country's macroeconomic stability, corporate and securities law organizations, its legal origins, trade aperture, financial liberalization, and most recently, confidence in natural resources. Financial development's correct measurement is crucial to assessing financial structure development and understanding economic development's influence on economic growth and poverty reduction. Therefore, before 2017, both the World Bank and economists and researchers developed different determinants and methods to measure Financial Development. For example; (Boyd et al., 2001and economically important, negative relationship between inflation and both banking sector development and equity market activity. Further, the relationship is nonlinear. As inflation rises, the marginal impact of inflation on banking lending activity and stock market development diminishes rapidly. Moreover, we find evidence of thresholds. For economies with inflation rates exceeding 15 percent, there is a discrete drop in financial sector performance. Finally, while the data indicate that more inflation is not matched by greater nominal equity returns in low-inflation countries, nominal stock returns

move essentially one-for-one with marginal increases in inflation in high-inflation economies.","container-title":"Journal of Monetary Economics","DOI":"10.1016/S0304-3932(01, Demirgüç-Kunt & Detragiache, 20052005, and Bittencourt, 2012)or more widespread access to finance, in generating economic growth in four Latin American countries between 1980 and 2007. The results, based on panel time-series data and analysis, confirm the Schumpeterian prediction which suggests that finance authorises the entrepreneur to invest in productive activities, and therefore to promote economic growth. Furthermore, given the characteristics of the sample of countries chosen, we highlight not only the importance of a more open, competitive and therefore active financial sector in channelling financial resources to entrepreneurs, but also the relevance of macroeconomic stability (in terms of low inflation rates demonstrated the significance of macroeconomic steadiness, where economies with high inflation charges have smaller, less effective, and less competent banks and stock markets and are likely to cause a crisis. The World Bank's Global Financial Development Database has developed a complete but relatively simple conceptual 4 by 2 outline for measuring financial development worldwide. This structure defines 4 sets of proxy variables that characterize a well-working financial system: financial depth, reach, efficiency, and stability. These 4 measurements are then estimated for the financial sector's two main components: financial institutions and financial markets (World Bank, 2021).

Financial development evaluation covers the role of key institutional actors, including the central bank, commercial and commercial banks, savings institutes, development financial foundations, insurance corporations, mortgage institutions, pension funds, and financial market organizations. Law and Habibullah (2009) emphasized the importance of trade openness and financial liberalization (S. H. Law & Habibullah, 2009). According to (S.-H. Law & Demetriades, 2006), (Beck et al., 2006), and (S. H. Law et al., 2013), institutional quality is a major factor

of financial development. To sum up, all the determinants of financial development mentioned above and collected by (Badeeb & Lean, 2017) are summarized in figure 3.2 below.

Figure 3.2: Financial Development Determinants

Source: Compiled by author from the above sources.

As referenced above, the broad literature predicts FD's effect (financial development) on economic growth, disparity, and stability. All standard observational examinations address FD in one of two financial depth measures: the amount of private credit to GDP or the amount of stock-market capital to GDP. However, these indicators do not consider the complex multidimensional nature of financial development. Hence, to correct this omission, this study will use for the first time the Financial Development Index (FDI) set up by IMF in 2017. The index sums up how developed financial institutes and financial business sectors are identified with their depth, access, and efficiency.

Empirical Literature Review on Energy and Financial Development

A limited number of papers analyzed the impact of financial development on energy utilization. Dan and Lijun (2009) used Granger causality to see the sights of the link between financial development and energy utilization. They suggest that energy utilization and financial development has Granger cause (Dan & Lijun, 2009). Karanfil (2009), using a similar method, obtained the same results (Karanfil, 2009). Sadorsky (2010) also explores several different financial development measurements such as stock market variables and banking variables for 9 Central and Eastern European nations. The paper concludes that bank-related factors have a more considerable influence on energy utilization than stock market variables. Kakar et al. (2011) studied the association of energy utilization, financial development, on Pakistan's economic growth using standard integration and error correction methods. The outcomes show that financial development touches energy utilization in the long run but remains ineffective in the short run. Xu (2012) used GMM method forecasting methods to examine the dynamic impact of financial development on China's energy utilization. The outcomes show a positive and genuinely huge connection between financial development of events and energy utilization (Xu, 2012).

Shahbaz, and Lean (2012), analyzed the association of energy utilization, financial progress, economic growth, industrial development, and urbanization for Tunisia. They confirm the existence of a long-run linkage among these variables. Islam et al. (2013) and Tang and Tan (2014) investigated FD's effect and economic growth on Malaysia's energy utilization. They found that FD and economic growth positively affected energy consumption in Malaysia. Çoban and Topcu (2013) examined the association of financial development and energy utilization for the EU nations. They divided the financial development into two as bank index

and stock index. When using a bank index, the effect of financial development is inverted U-shaped, while no significant link is detected when measured as the stock index (Çoban & Topcu, 2013). Al-Mulali and Lee (2013) investigate the influence of the financial development on energy utilization in the GCC (Gulf Cooperation Council) nations. The dynamic OLS model shows that financial development, GDP, urbanization, and total trade have a positive long-term effect on energy utilization. Chang (2015) investigated the indirect influences of financial development and income on energy utilization. In the lower-income regime, he reported that when private and local credit used as financial development pointers, energy utilization increased with financial development (Chang, 2015). Aiming to guess the special effects of financial development and trade aperture on German energy utilization, Rafindadi (2015), as a result, the paper found that economic growth increased energy request in Germany. Unexpectedly, financial development, assets, and apertures to trade have been showing to reduce energy demand (Rafindadi, 2015). In Asian nations, Furuoka (2015) explored the association of energy utilization and financial development. Their findings show a long-term balance link between finance and energy consumption in these countries. Panel causality test detects a one-sided causal relation from energy utilization to financial development, but vice versa, no valid (Furuoka, 2015). Another study that examines the influence of financial development on energy utilization through Pakistani economic growth channels using the system GMM forecasting technique belongs to Komal and Abbas (2015). The study concluded that energy utilization was positively and significantly affected by financial development and economic growth.

Rafindadi and Ozturk (2016) examined the short and long-time impacts of financial development, exports, imports, economic growth, and assets on Japan's electricity use. They concluded a positive correlation among electricity use and FD, economic growth, exports, and imports in Japan in the short and long run

(Rafindadi & Ozturk, 2016). Mahalik et al. (2017) applied time-series statistics of Saudi Arabia from 1971 until 2011 to explore energy consumption and financial development's relationship. They incorporated Bayer-Hanck's joined the cointegration test and Pesaran's Autoregressive Distributed Lag (ARDL) model. Also, they used the Innovative Accounting Approach (IAA) to explore the causal link among the variables. Their test resulted in cointegration in their data series, and they find out that in the long-term FD adds to energy demand for Saudi Arabia.Moreover, evidence of one directional causality running from financial development to energy request is found in their research (Mahalik et al., 2017)this study explores the relationship between financial development and energy consumption for Saudi Arabia by endogenizing economic growth, capital and urbanization as additional determinants in the energy demand function. The combined cointegration test proposed by Bayer-Hanck (2013.

Shahbaz et al. (2017) encompassed the quarterly data of Indian Economy from 1960 first quarter until 2015 fourth quarters in their research paper. The research paper inspects the asymmetric correlation among economic growth and energy utilization by including financial development. The article applies the indirect autoregressive distributed lad bounds testing method to observe lop-sided cointegration among the variables. To see the causal association between the variables, a lop-sided causality test is done. In the presence of lop-sided, cointegration among variables is found in the results. The paper's final asymmetric causality findings indicate that just adverse shocks in energy consumption impact economic growth and lone negative shocks in FD have influences on economic growth. In last the paper also discusses the result implication for growth policies in India (Shahbaz et al., 2017). Suggesting that financial development increases electricity use, Sbia et al. (2017) examined the association of economic growth, urbanization, FD, and electricity use in the UAE with the ARDL boundary test approach. Gungor and Simon (2017) examined the

link among energy utilization, FD, economic growth, industrial development, and suburbanization for the South African example. The fallouts approve a long run balance link among these variables. Also, urban development, FD, and industrial development are positively associated with energy utilization in the long-term time (Gungor & Simon, 2017)

Farhani and Solarin (2017) aimed to check whether there is a long-term link between energy demand, FD, economic growth, FDI (foreign direct investment), trade, and assets for the USA. The results show that FD, FDI, and real GDP decrease energy demand, while energy use is positively pushed by trade and assets in the long term. Financial development, FDI, and trade stimulate energy demand in the short term (Farhani & Solarin, 2017). Pradhan et al. (2018), using the panel VEC model, stated that both energy consumption and financial sector development are important long-term economic growth drivers in FATF countries. They declare that it will contribute to the increase of FATF countries' economic well-being in the long time. Ouyang and Li (2018) shows that FD has a meaningful and negative influence on economic growth, and energy utilization adds significantly to economic growth. Moreover, financial development in terms of M2, loan, inventory turnover, and comprehensive indicators are significantly reduced energy consumption in all regions (Ouyang & Li, 2018).

Finally, Gomez and Rodriguez (2019) explored the association of energy, economic growth, urban development, and FD in the North American Free Trade Agreement (NAFTA) countries. They find a positive correlation between economic growth and energy consumption. In contrast, a negative relationship was found with all other variables (Financial development, Urbanization, Trade openness, Consumer price index)

Data and Methodology

This paper aims to determine the effects of renewable energy, non-renewable energy, and nuclear energy resources on financial development in 28 countries. There is a total of 32 countries around the world actively generate energy from nuclear reactors. However, Armenia, Iran, Belarus, and UAE were removed from the list because of having no access to data for the selected period. The list of these countries, number of the reactor, and net electrical capacity shown in Table 1.

Table 1: Nuclear Power Reactors and Total Net Electrical Capacity by Country, 2020

Country	Number of Reactor	Total Net Electrical Capacity (GWe)
USA	94	96,55
FRANCE	56	61,37
CHINA	49	46,52
JAPAN	33	31,68
RUSSIA	39	28,58
SOUTH KOREA	24	32,17
CANADA	19	13,55
UKRAINE	15	13,73
UK	15	8,92
GERMANY	6	8,11
SWEDEN	7	7,74
SPAIN	7	7,12
INDIA	22	6,25
BELGIUM	7	5,93
CZECH REPUBLIC	6	3,93
SWITZERLAND	4	2,96
FINLAND	4	2,79
BULGARIA	2	2,01
HUNGARY	4	1,9
BRAZIL	2	1,88
SOUTH AFRICA	2	1,86

SLOVAKIA	4	1,81
ARGENTINA	3	1,64
MEXICO	2	1,55
UAE	1	1,34
PAKISTAN	5	1,32
ROMANIA	2	1,3
BELARUS	1	1,11
IRAN	1	0,92
SLOVENIA	1	0,69
NETHERLANDS	1	0,48
ARMENIA	1	0,38

Source: (PRIS - Reactor Status. Reports-Operational & Long-Term Shutdown-By Country).

The sample size includes data from 2001 to 2019, which is 19 years. The period has been selected based on all data series' availability. As a dependent variable, Financial Development is measured as an index established by IMF. As mentioned above, up to now, in all studies on energy and financial development, has been measured as a variable from either one or two determinants of financial development reported in Figure 1. However, many financial development determinants show the whole financial structure with one or two determinants with inconsistent results. Therefore, we will use the Financial Development Index as the dependent variable. Information about the symbols, measurement and references of the financial development variable are presented in Table 3.2.

One of the most critical problems of today's economy has been the current account deficit problem. One of the most important reasons for the current account deficit is the energy import of developing countries from developed countries, in other words, energy dependency. Diversifying energy and suitable production reduces the foreign trade deficit and plays a vital role in increasing economic growth. Table 2 presents information regarding variables and sources of data.

Table 2: Symbols, Explanations, and Data Sources of Variables Used in the Study

Variables	Explanation	Source
logFD	Logarithmic form of Financial Development (Financial Development Index)	IMF
logOil	Oil Consumption (Thousand Barrels Daily) logarithmic form	British Petroleum Statistical Review Of World Energy (BP Stats Review, 2020).
LogNue	Logarithmic form of Nuclear Energy Consumption (Terawatts Per Hour).	British Petroleum Numerical Review Of World Energy (BP Stats Review, 2020).
LogNG	Natural Gas Consumption (Billion Cubic Meters), whose logarithm is taken.	British Petroleum Statistical Review Of World Energy (BP Stats Review, 2020).
logCoal	Logarithmic form of Coal Consumption (Terawatt Hours)	British Petroleum Numerical Review Of World Energy (BP Stats Review, 2020).
logRenw	Logarithmic form of Renewable Energy Consumption (Terawatt Hours)	British Petroleum Numerical Review Of World Energy (BP Stats Review, 2020).

Source: Author's elaboration.

Panel Unit Roots

An initial phase is to analyze the stationary situations of the variables by using the unit root test. Before applying any test, the stationarity (stability) of the data set series will test. All series used in the analysis should be stationary or brings to a stationary state. If the string is not static, this will lead to deviations in the results. Therefore four-panel unit root tests are applied to test the stationarity of the data set used in this study: 1) Liven, Li, and Chu (2002) hereafter denoted LLC; (2) Lm, Pesaran, and Shin (2003) hereafter "IPS"; (3) Augmented Dickey-Fuller hereafter "ADF"; and (4) Phillips-Perron hereafter "PP" Panel Unit Root Tests (Im et al., 2003; Levin et al., 2002)followed by N (the cross sectional dimension.

Table 3 contains the results of the reported panel unit root tests and of financial development variable. When we look at the table, it seems that FD variable is stationary at the level, likewise in the wake of taking the principal difference, the data in all tests have reached the stationary state. This means that the null hypothesis is "data contain unit root" rejected. In other words, there is no unit root issue in the data set.

Table 3: The Results of Panel Unit Root Test

Variables	Tests	LLC t-statistics	LPS w-statistics	ADF-Fisher-Chi Square	PP- Fisher-Chi-Square
logFD	Level	(-6.44) ***	(-4.53) ***	(111.60) ***	(121.94)***
	I(1)	(-12.72) ***	(-13.50)***	(278.62)***	(388.84)***
LogOIl	Level	(0.43)	(1.50)	(51.00)	(41.34)
	I (1)	(-13.14) ***	(-13.34) ***	(265.74) ***	(414.69) ***
LogNue	Level	(4.70)	(-0.19)	(84.70) ***	(116.26) ***
	I (1)	(-18.88) ***	(-21.18) ***	(489.97) ***	(753.62) ***
LogNG	Level	(-1.41) *	(0.21)	(65.02)	(73.15)
	I (1)	(-16.64) ***	(-14.09) ***	(280.10) ***	(386.28) ***
LogCoal	Level	(-1.34) *	(2.90)	(54.07)	(48.03)
	I (1)	(-15.85) ***	(-15.93) ***	(314.95) ***	(698.26) ***
LogRenw	Level	(14.358)	(19.380)	(5.8188)	(2.24)
	I (1)	(-3.55) ***	(-3.06) ***	(125.71) ***	(134.70) ***
***, **, and * Represent %1, %5 and %10 Statistical Significance Level Respectively.					

FD's standard deviation is 0.228, indicating how diverse our sample is concerning financial development. The highest level of financial development is found in Switzerland in 2007 (1.000). The smallest value of this variable was found for Ukraine, with 0.1233 in 2002. The mean value of the oil variable is 2161.728. While the

maximum value of this variable is 20531.54, the minimum value decreases to 4.874. Among the variables, the variable with the highest value is the GDP per capita (GDP) variable with a value of 79406.661. Likewise, the minor value variable is the nuclear energy consumption (NUE) variable with 0.001.

Table 4: Descriptive Statistics

Variables	Observation	Mean	Std. Dev.	Minimum	Maximum
FD	532	0.589	0.228	0.123	1.000
Oil	532	2161.728	3.819	4.874	20531.547
Nue	532	2.447	443.164	0.001	2.254
NG	532	745.539	1.413	0.7280	8.466
Coal	532	1.248	3.649	1.191	22900.253
Renw	532	9.668	2.267	.002707	1.840

Methodology

Unlike the studies in the literature, this section aims to examine the effects of energy diversity on financial development or Financial Structure by using the Financial Development Index. Here the financial development is given as a function of energy resources. In other words, we want to know the impact of different energy resources on a country's financial development. For this, the below Equation (1) is set up as a model:

$$(logFD)_{it} = \beta_0 + (logOil)_{it} + \beta_2(LogNue)_{it} + \beta_3(LogNG)_{it} + \beta_4(Coal)_{it} + \beta_5(Renw)_{it} + \varepsilon_{it} \ldots \quad (1)$$

where (i) shows the subscript of the countries, the time is denoted by the subscript t. β0, β1, and β2 are the constants of the regressors estimated by the regression analysis. Assuming that the other variables are constant, they show that a unit change in the instructive variable change (increase or decreases) the financial

development by β units. ε_{it}, symbolize the random error term taking all aspects that affect financial development but are not included in the model specifications variables.

The theoretical framework and literature on this topic have been reported above. Therefore, here we will go straight to empirical practices. As can be seen from the literature, the link between energy utilization and financial development has been studied. Renewable energy has been of interest recently as it is clean and sustainable. Here, we aim to examine the influence of energy sources on financial development. The Equation (1) model represents a general specification to observe the impact of Energy Resources on Financial Development.

As we highlighted in energy-economic growth analysis, panel data's econometric framework is mainly based on three principal methods; Pooled OLS, Fixed effect, and Random Effects. According to the F test's significant probability value (not reported here, but available upon request), Pooled OLS model is not an appropriate model for our data set. Therefore, we are continuing with fixed effect or random effect models. Hausman test was applied to know which model is applicable. The Hausman test's p-value is significant at 1%, which means that the Fixed Effect method is appropriate to our data set (Pothen & Welsch, 2019).

The following equation can explain the general properties of the fixed effects model:

$$\boldsymbol{Y_{it}} = \boldsymbol{\alpha_i} + \boldsymbol{X_{it}} \times \boldsymbol{\beta} + \boldsymbol{\varepsilon_{it}} \ldots \quad (2)$$

Here, is the dependent variable detected for nation *i* at time *t*. In our study, FD, is the regressor matrix with time variables; α_i represents a country-specific unknown constant (Fixed Effect), and is the error term.

One of the main limitations of panel data analysis is cross-country dependence, autocorrelation among the variables, and heteroscedasticity, leading to misleading inference. We applied the Pesaran test to examine the data set's cross-sectional dependence problem, the Wooldridge Autocorrelation test, explore the Autocorrelation, and the Breusch-Pagan/Cook-Weisberg test to investigate the heteroscedasticity. The results of the mentioned tests were all significant at the 1% significance level, which means there are cross-country dependence, autocorrelation, and heteroscedasticity problems in the data set. Therefore, as before, it will not be possible to use the classical panel data estimator. We need to use estimators that robust to these problems. The Driscoll-Kraay estimators are consistent with heteroscedasticity and autocorrelation and are potent against common cross-sectional and temporal forms of dependence.

Empirical Results

Results indicate that oil consumption, natural gas consumption, and renewable energy resources have a significant impact on Financial Development. Natural gas and renewable energy variables have positive impact on FD. The coefficients of both LogNG and LogRenw variables are positive. It means that the influence of these variables on financial development is positive. Likewise, these variables' significance level was significant at the 5% and 1% significance levels. That is, a unit percent increase in natural gas consumption level will drive the dependent variable (FD) to an increase of 0.096%, and this effect is statistically significant at the level of 1%.

Table 5: Analysis Results of the Estimated Model

Variables	Coefficient	Std. Error	P-Value
logOIl	-0.249	0.128	0.068

logNue		0.018	0.020	0.380
LogNG		0.096	0.031	0.007
logCoal		0.026	0.047	0.588
LogRenw		0.040	0.012	0.004
_cons		-0.399	0.330	0.243
Group N: 28	Obs: 532	R^2: 0.25	F-statistic: 231.73	P-value: 0.0000
*, and ** represent %5, and %1 statistical significance level respectively				

Likewise, a unit percentage increase in renewable energy consumption level will drive the financial development to an increase of 0.040%. Overall, our results show that consuming environmentally friend energy sources like natural gas and renewable energy resources are essential for countries' financial development, a green and decarbonized environment, and sustainable development. Understanding how renewable energy consumption leads to financial development gives countries the chance to improve an ambitious, well-established, and sustainable energy sector while encouraging a reduction in countries' dependence on energy imports (natural gas, coal, and oil,).

Conclusion

Energy sources have always been an essential part of world economies. Availability of energy resources has a vital role for a country's economic growth and financial development. Contrary to fossil fuels, many countries have the potential to power their economies by renewable energy sources. This study attempts to explore the effects of a variety of energy resources on the financial development of countries. The model of the study was set up to examine the impact of renewable, non-renewable, and nuclear energy resources on financial development. This model is used as the dependent variable of the financial development index model published by the IMF. Oil, nuclear energy, natural gas, coal, and renewable energy sources constitute the model's explanatory

variables. The results of the fixed effects panel models highlight a significant positive impact of natural gas and renewable energy resources on countries' financial development. According to the empirical findings, a 1% increase in natural gas consumption and a 1% increase in renewable energy consumption are associated with a 0.096% and a 0.040% increase in financial development. These effects are statistically significant. Overall, our results show that consuming environmental friend and renewable energy resources is essential for countries' financial development, a green and decarbonized environment, and sustainable development. Renewable energy resources are environmentally friendly, low-cost, and sustainable, and therefore the most convenient choice for investment. Especially, developed countries could begin to act accordingly in terms of investment based on our study results. Investing in renewable energy will contribute to a country's financial development, supply its energy demands, and create a cleaner environment. According to our study result especially, developed countries could begin to act accordingly in terms of investment in renewable energy sector. Investing in renewable energy will contribute to a country's financial development, supply its energy demands, and create a cleaner environment.

Empirical evidence from this study presents important implications for policymakers who need to consider the economic cycle's specific stage when designing energy savings, financial development, and environmental policies. Diversifying energy resources may be advantageous for some nations, especially throughout economic crises, for the reason that energy-saving strategies throughout economic prosperity will hinder economic growth in these countries. Therefore, energy is an essential contributor for economic enhancement of the countries. Climate change and environmental deprivation can be lessened by using fewer fossil energy and more renewable clean energy resources. Furthermore, diversifying energy use will promote more stingy and effective energy utilization, reducing the undesirable externalities

of energy production and usage. As a result, energy diversity will also help energy-consuming governments to reduce excessive energy and energy dependency to generate better economic growth and financial development and raise their living standards.

References

Al-mulali, U., & Lee, J. Y. M. (2013). Estimating the impact of the financial development on energy consumption: Evidence from the GCC (Gulf Cooperation Council) countries. *Energy*, *60*, 215–221. https://doi.org/10.1016/j.energy.2013.07.067

Badeeb, R. A., & Lean, H. H. (2017). The Determinants of Financial Development in the Republic of Yemen: Evidence from the Principal Components Approach. *Capital Markets Review*, *25*(2), 32–48.

Beck, T., & Demirguc-Kunt, A. (2009). *Financial Institutions and Markets across Countries and Over Time—Data and Analysis*. The World Bank. https://doi.org/10.1596/1813-9450-4943.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of Banking & Finance*, *30*(5), 1581–1603. https://doi.org/10.1016/j.jbankfin.2005.05.010.

Bittencourt, M. (2012). Financial development and economic growth in Latin America: Is Schumpeter right? *Journal of Policy Modeling*, *34*(3), 341–355. https://doi.org/10.1016/j.jpolmod.2012.01.012.

Boyd, J. H., Levine, R., & Smith, B. D. (2001). The impact of inflation on financial sector performance. *Journal of Monetary Economics*, *47*(2), 221–248. https://doi.org/10.1016/S0304-3932 (01)00049-6.

Chang, S.-C. (2015). Effects of financial developments and income on energy consumption. *International Review of Economics & Finance*, *35*, 28–44. https://doi.org/10.1016/j.iref.2014.08.011.

Çoban, S., & Topcu, M. (2013). The nexus between financial development and energy consumption in the EU: A dynamic panel data analysis. *Energy Economics*, *39*, 81–88. https://doi.org/10.1016/j.eneco.2013.04.001.

Dan, Y., & Lijun, Z. (2009). Financial Development and Energy Consumption: An Empirical Research Based on Guangdong Province. *2009 International Conference on Information Management, Innovation Management and Industrial Engineering*, *3*, 102–105. https://doi.org/10.1109/ICIII.2009.334.

Demirgüç-Kunt, A., & Detragiache, E. (2005). Cross-Country Empirical Studies of Systemic Bank Distress: A Survey. *National Institute Economic Review*, *192*(1), 68–83. https://doi.org/10.1177/002795010519200108.

Demirguc-Kunt, A., & Levine, R. (2008). *Finance, Financial Sector Policies, And Long-Run Growth*. The World Bank. https://doi.org/10.1596/1813-9450-4469.

Farhani, S., & Solarin, S. A. (2017). Financial development and energy demand in the United States: New evidence from combined cointegration and asymmetric causality tests. *Energy*, *134*, 1029–1037. https://doi.org/10.1016/j.energy.2017.06.121.

Furuoka, F. (2015). Financial development and energy consumption: Evidence from a heterogeneous panel of Asian countries. *Renewable and Sustainable Energy Reviews*, *52*, 430–444. https://doi.org/10.1016/j.rser.2015.07.120.

Gómez, M., & Rodríguez, J. (2019). Energy Consumption and Financial Development in NAFTA Countries, 1971–2015. *Applied Sciences*, *9*(2), 302. https://doi.org/10.3390/app9020302.

Gungor, H., & Simon, A. U. (2017). *Energy Consumption, Finance and Growth: The Role of Urbanization and Industrialization in South Africa*. *7*(3), 9.

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, *115*(1), 53–74. https://doi.org/10.1016/S0304-4076(03)00092-7.

Islam, F., Shahbaz, M., Ahmed, A. U., & Alam, Md. M. (2013). Financial development and energy consumption nexus in Malaysia: A multivariate time series analysis. *Economic Modelling*, *30*, 435–441. https://doi.org/10.1016/j.econmod.2012.09.033.

Kakar, Z. K., Khilji, B. A., & Khan, M. J. (2011). Financial Development and Energy Consumption: Empirical Evidence from Pakistan. *International Journal of Trade, Economics and Finance*, 469–471. https://doi.org/10.7763/IJTEF.2011.V2.150.

Karanfil, F. (2009). How many times again will we examine the energy-income nexus using a limited range of traditional econometric tools? *Energy Policy*, *37*(4), 1191–1194. https://doi.org/10.1016/j.enpol.2008.11.029.

Komal, R., & Abbas, F. (2015). Linking financial development, economic growth and energy consumption in Pakistan. *Renewable and Sustainable Energy Reviews*, *44*, 211–220. https://doi.org/10.1016/j.rser.2014.12.015.

Law, S. H., Azman-Saini, W. N. W., & Ibrahim, M. H. (2013). Institutional quality thresholds and the finance – Growth nexus. *Journal of Banking & Finance*, *37*(12), 5373–5381. https://doi.org/10.1016/j.jbankfin.2013.03.011.

Law, S. H., & Habibullah, M. S. (2009). The Determinants of Financial Development: Institutions, Openness and Financial Liberalisation. *South African Journal of Economics*, *77*(1), 45–58. https://doi.org/10.1111/j.1813-6982.2009.01201.

Law, S.-H., & Demetriades, P. O. (2006). Openness, Institutions and Financial Development. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.941387.

Levin, A., Lin, C.-F., & James Chu, C.-S. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1–24. https://doi.org/10.1016/S0304-4076(01)00098-7.

Levine, R. (2005). Chapter 12 Finance and Growth: Theory and Evidence. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of Economic Growth* (Vol. 1, pp. 865–934). Elsevier. https://doi.org/10.1016/S1574-0684(05)01012-9.

Mahalik, M. K., Babu, M. S., Loganathan, N., & Shahbaz, M. (2017). Does financial development intensify energy consumption in Saudi Arabia? *Renewable and Sustainable Energy Reviews*, *75*, 1022–1034. https://doi.org/10.1016/j.rser.2016.11.081.

Ouyang, Y., & Li, P. (2018). On the nexus of financial development, economic growth, and energy consumption in China: New perspective from a GMM panel VAR approach. *Energy Economics*, *71*, 238–252. https://doi.org/10.1016/j.eneco.2018.02.015

Pothen, F., & Welsch, H. (2019). Economic development and material use. Evidence from international panel data. *World Development*, *115*, 107–119. https://doi.org/10.1016/j.worlddev.2018.06.008.

Pradhan, R. P., Arvin, M. B., Nair, M., Bennett, S. E., & Hall, J. H. (2018). The dynamics between energy consumption patterns, financial sector development and economic growth in Financial Action Task Force (FATF) countries. *Energy*, *159*, 42–53. https://doi.org/10.1016/j.energy.2018.06.094.

Rafindadi, A. A. (2015). *Econometric Prediction on the Effects of Financial Development and Trade Openness on the German Energy Consumption: A Startling Revelation from the Data Set*. *5*(1), 15.

Rafindadi, A. A., & Ozturk, I. (2016). Effects of financial development, economic growth and trade on electricity consumption: Evidence from post-Fukushima Japan. *Renewable and Sustainable Energy Reviews*, *54*, 1073–1084. https://doi.org/10.1016/j.rser.2015.10.023.

Sadorsky, P. (2010). The impact of financial development on energy consumption in emerging economies. *Energy Policy*, *38*(5), 2528–2535. https://doi.org/10.1016/j.enpol.2009.12.048.

Sbia, R., Shahbaz, M., & Ozturk, I. (2017). Economic growth, financial development, urbanisation and electricity consumption nexus in UAE. *Economic Research-Ekonomska Istraživanja*, *30*(1), 527–549. https://doi.org/10.1080/1331677X.2017.1305792.

Shahbaz, & Lean, L. (2012). Does financial development increase energy consumption? The role of industrialization and urbanization in Tunisia. *Energy Policy*, *40*, 473–479. https://doi.org/10.1016/j.enpol.2011.10.050.

Shahbaz, M., Hoang, T. H. V., Mahalik, M. K., & Roubaud, D. (2017). Energy consumption, financial development and economic growth in India: New evidence from a nonlinear and asymmetric analysis. *Energy Economics*, *63*, 199–212. https://doi.org/10.1016/j.ene-

co.2017.01.023.

Tang, C. F., & Tan, B. W. (2014). The linkages among energy consumption, economic growth, relative price, foreign direct investment, and financial development in Malaysia. *Quality & Quantity*, *48*(2), 781–797. https://doi.org/10.1007/s11135-012-9802-4.

World Bank. (2021). *Financial Development*. World Bank. https://www.worldbank.org/en/publication/gfdr/gfdr-2016/background/financial-development.

Xu, S. J. (2012). *The Impact of Financial Development on Energy Consumption in China: Based on SYS-GMM Estimation*. Advanced Materials Research; Trans Tech Publications Ltd. https://doi.org/10.4028/www.scientific.net/AMR.524-527.2977.

The Nexus Of Export And Economic Development In Turkey: Evidence From FMOLS - DOLS Estimations

Volkan HAN[1]
Gazi POLAT[2]

Introduction

In the economic literature, the export performance of countries has an important place in economic development. There are four basic approaches in the literature. The first approach is the export-led growth model (ELG). According to this approach, export activity leads to economic growth. In addition, exports lead to greater specialization. Increasing exports cause an increase in the import of high-tech and quality products. This has a positive effect on labor productivity and capital efficiency. Production also increases positively. The second approach is the growth-based export model (GLE). This approach argues that economic growth positively affects trade flows. It also leads to greater specialization and facilitates export. These two approaches do not reject each other. Another approach is the existence of a causal relationship between exports and growth that supports each other. The last approach is that there is no relationship between export & growth (Konya, 2006).

This study aims to analyze the factors that determine nexus growth- led export by applying Fmols-Dols cointegrations in Turkey over the period from 1990 to 2015. While establishing a causal relationship, the Growth-led Export (GLE) hypothesis was used instead of the Export-led growth model (ELG). According to the discussions of the GLE hypothesis, economic growth leads to the development of skilled labor and technology, which increases

1 Phd, Faculty Member, Nevşehir Hacı Bektaş Veli University
2 Lect., Kırşehir Ahi Evran University

factor productivity. Thus, it provides a comparative advantage for the country, which has an advantageous position in exports, compared to the goods of other countries. İn addition, exports increase imports of intermediate goods and capital formation. As a result, it can provide foreign exchange flow to developing countries to increase production. Thereby providing foreign exchange that stimulates output growth in developing countries (Dar, vd., 2013).

The other parts of the study are planned as follows, in the second part, the theoretical and empirical studies examining the relationship between exports and economic growth in the literature will be examined, in the third part, the model and data set will be introduced, in the fourth part, empirical findings will be included, and finally in the conclusion part, will take the findings and policy implications.

1. The Export and Economic Growth: Theoretical and Empirical Background

In general, the following four results emerge from the studies in the field of export & growth. These results; An increase in exports causes economic growth, economic growth causes an increase in exports, there is a bidirectional causality relationship between export growth and economic growth, and there is no causal relationship between export growth and economic growth. Most of the studies in the literature have focused on export-led economic growth.

Among the studies showing that the improvement in exports causes economic growth; Sharma et al. (1991) used data for the period between 1960 and 1987 in their research on selected countries (Germany, Italy, Japan, USA and England). The Var approach was performed, and they showed that Germany and Japan experienced export-driven growth. Shan and Sun's (1998) causality study on China with data between 1987 and 1996, and in the Yamamoto causality analysis on the USA (1999), it was concluded that the increase in exports within the two countries increased economic growth. In studies conducted at the sectoral level, Ghatak et al.

(1997) in the Granger causality test study conducted for Malaysia with data between 1955 and 1990, concluded that the increase in exports of manufactured products increases economic growth.

Studies show that there is a bidirectional causality relationship between economic growth and exports; Hatemi-J, (2002) also concluded that there is a bidirectional causality relationship between export growth and economic growth in his study with the data between 1960 and 1999 for Japan.

Studies show that there is no relationship between economic growth and exports; Hatemi J. and Manuçehr (2000) also concluded in their study that there is no relationship between exports and economic growth for Greece and Turkey. Again, in his study in Konya (2004), he concluded that there is no relationship between exports and economic growth for the Netherlands, Luxembourg, Denmark, France, Greece, Hungary and Norway. Alam (2003) also found that there is no relationship between exports of manufactured goods and economic growth in the ARDL-FMOLS study he conducted for Mexico and Brazil.

Studies show that economic growth causes an increase in exports; "Hatemi J. and Manuçehr (2000), in their VAR analysis for Turkey, Greece, Mexico, Ireland and Portugal, concluded that economic growth for Portugal causes an increase in exports. In his granger causality test study, which he conducted in Konya (2004) using data from 1960 to 1997 for 25 OECD countries, he concluded that growth increases exports only for Canada, Japan, Korea, Finland, the USA and Portugal. Christopoulos et al. (2009), a study for Canada, Italy, Japan, England and the USA, their found that economic growth increased exports only for Italy and Japan. Tang et al. (2015) concluded that there is unidirectional causality from economic growth to exports for only South Korea and Taiwan in the bivariate model they created in the Johansen cointegration test study they conducted for Hong Kong, Singapore, South Korea and Taiwan. In the studies conducted at the sectoral level, Biswal and Dhawan (1998) also concluded that economic growth increases the

export of manufactured products in their study using data from the period between 1960 and 1990 for Taiwan. Sahoo et al. (2014) also concluded that economic growth increases the export of mineral products in the VECM Granger causality study, which they conducted for India using the data for the period between 1981 and 2010.

Studies on Turkey examining the relationship between economic growth and increase in exports; Abu Quarn and Abu Bedir (2004) also concluded in their granger causality study that the increase in exports of manufacturing products for Turkey increases economic growth. Çiftçioğlu and Nehil (2005), in their granger causality study, which they conducted using quarterly data between 1987 and 2004, found that the increase in the export of mineral products increased economic growth. Kurt and Terzi (2007) also detected that the increase in the export of manufactured products for Turkey increases the economic growth in the VAR model study they conducted for the period between 1989 and 2003. In his study in 2007, Yapraklı found that there is a bidirectional causality relationship from exports of agricultural and mineral products to economic growth, and a one-way causality relation from exports of manufacturing products to economic growth, using the data for the period between 1970 and 2005 for Turkey. Akbulut and Terzi used data between 1980 and 2010 for Turkey in their study in 2013. As a result of the study, they concluded that there is unidirectional causality from economic growth to exports of agricultural products, and there is a bidirectional causality relation between exports of manufactured products and economic growth. Önder and Hatıralı, in their study in 2014, reached the same conclusions as Akbulut and Terzi (2013) that there is a bidirectional causality relationship between exports of manufactured products and economic growth. Sandalcılar, on the other hand, reached the conclusion that there is no relationship between the export of agricultural products and economic growth in the study he conducted for Turkey in 2012 using the data for the period between 1987 and 2007.

In the literature, studies examining the export&growth relationship at various periods and country examples have

been examined. In this studies, the relationships were basically investigated through 4 channels and in this study, we chose the GLE hypothesis and wanted to examine the growth-driven export process for Turkey and export performance with the selected variables in more detail. In this study, except for growth, the variables included in the model and the selected Fmols-Dols analysis make the difference of the study. Since long-term data were preferred, methods that reveal the short- and long-term relationship more clearly were preferred. One of the remarkable results of the study is the R&D expenditures. R&D expenditures negatively affect Turkey's exports. This shows that the R&D expenditures are not encouraging for exports but restricting imports.

2. Data and Empirical model

This study aims to analyze the factors that determine nexus growth-led export and also R&D expenditures, population growth, financial development, trade openness, carbon emissions and the increase in the ratio of exports to imports on exports by applying Fmols-Dols Cointegrations in Turkey over the period from 1990 to 2015. Table 1 contains the variables used in the model, their explanations and sources.

Table1. Data and Source

Variable	Definition	Source
Ex	Total Exports (constant 2010 $)	WB
Gdpp	GDP per capita (constant 2010 $)	WB
R&D	Gross domestic spending on R&D	OECD
To	Trade (% of GDP)	WB
Co2	CO2 intensity (kg per kg of oil equivalent energy use)	WB
Pop	Population growth (annual %)	WB
FD	Domestic credit to private sector (% of GDP)	WB
Excım	Exports as a capacity to import (constant LCU)	WB

In this study, a model was established to test the Growth-led Export (GLE) hypothesis and to determine the effects of selected independent variables on export performance. The function representation of the empirical model used in Equation 1 is as follows:

$$lnEx_{it} = \gamma_0 + \gamma_1 lnGdpp_{it} + \gamma_2 lnR\&D_{it} + \gamma_3 lnTo_{it} + \gamma_4 lnCo2_{it} + \gamma_5 lnPop_{it} + \gamma_6 lnFD_{it} + \gamma_7 lnExcim_{it} + \mu_{it} \quad (1)$$

In Eq. 1, i and t represent respectively Turkey and the observation interval (1990-2015). Each γ represents the slope coefficient of the corresponding variable and finally, μ_{it} represents the prediction residual. While investigating the GLE hypothesis, all variables except exports were used as independent variables. All data have been converted into logarithms. The data used in the study were obtained from the World Bank's WDI and the OECD.

3.Methodology and Findings

Descriptive Statistics

In order to better understand the data used in the analysis, the descriptive statistics and covariance matrix of the variables are given in Table 2. In the study, which investigates the effect of seven independent variables selected with a single country and 26 observations on exports, when descriptive statistics are viewed, it is seen that there is no problem in testing the cointegration results for reliable empirical results.

Table 2. Descriptive Statistics

	EX	GDPp	R&D	To	Co2	Pop	FD	Excım
Mean	2.755281	0.989495	-0.071726	0.402633	0.111124	1.953626	0.346800	2.791401
Median	2.763333	0.979922	-0.073364	0.414707	0.111281	1.954259	0.323738	2.805313
Maximum	2.848595	1.037933	-0.013365	0.432519	0.117868	1.974430	0.451069	2.883575
Minimum	2.638220	0.956339	-0.176633	0.342002	0.102657	1.932242	0.283841	2.665488
Std. Dev.	0.064602	0.024095	0.042594	0.027891	0.002602	0.011969	0.052256	0.067122
Skewness	-0.380048	0.394204	-0.441717	-1.160336	0.123106	-0.065080	0.706752	-0.539289
Kurtosis	1.960937	1.939487	2.470881	3.007026	4.091051	1.879491	2.102105	1.985480
Sum Sq. Dev.	0.429859	0.059799	0.186864	0.080122	0.000697	0.014756	0.281266	0.464053
Observations	26	26	26	26	26	26	26	26

Covariance Matrix

EX	**1.00000**							
GDPP	0.89507	**1.00000**						
R_D	0.85922	0.78043	**1.00000**					
TO	0.75392	0.70126	0.71247	**1.00000**				
CO2	0.23823	0.20052	0.29088	0.26997	**1.00000**			
POP	0.96788	0.87415	0.88461	0.7225	0.2442	**1.00000**		
FD	0.54480	0.59970	0.57729	0.371919	0.06086	0.56273	**1.00000**	
EXCIM	0.96676	0.88349	0.84167	0.743091	0.242345	0.94361	0.51829	**1.00000**

Unit Root Tests

In empirical studies, before analyzing the relationship between the variables in the model, it should be examined whether the series contains a unit root (whether it is stationary or not) and This test results ensure that the variables are integrated. Table 3 shows the outcomes from the Phillips-Perron (PP) unit root test following Phillips and Perron (1988). According to the test results, the null hypothesis stating the variables are not stationary was rejected at 1% significance level, and the series was found to be stationary at the first difference.

Table 3. Unit Root Test Results

Variables	(Trend and intercept)	
	Level	1.Dif.
Ex	-1.337	-5.589***
GDPp	-2.122	-5.648***
R&D	-3.058	-6.290***
To	-1.226	-5.470***
Co2	-2.534	-5.012***
Pop	-0.616	-8.063***
FD	-1.268	-4.719***
Excım	-1.261	-4.998***
Notes: *** denotes significance at the 1% level. Test critical values:1% -4.050509, 5% -3.454471 and 10% -3.152909.		

Cointegration Test

According to the IPS unit root test results in Table 3, all variables were found to be stationary at the first difference. After that, the cointegration test can be started in the second stage. When the cointegration tests developed by Johansen (1988) and Johansen & Jesulius (1990) are examined in Table 4, it has been determined that the analyzed variables are cointegrated at 1% and 5% significance levels. According to these results, it has been determined that there is a long-term relationship between the variables.

Table 4. Johansen Cointegration Test Results

(Trace and λ_{max})				
Maximum rank	**λ Trace statistic**	**5% Critical value**	**λ_{max}**	**5% Critical value**
r=0	518.4808*	159.5297	167.7007*	52.36261
r≤1	350.7802*	125.6154	148.1101*	46.23142
r≤2	202.6701*	95.75366	59.95196*	40.07757
r≤3	142.7181*	69.81889	52.59328*	33.87687
r≤4	90.12487*	47.85613	41.46483*	27.58434
r≤5	48.66004*	29.79707	29.22357*	21.13162
r≤6	19.43647	15.49471	12.34095	14.26460
r≤7	7.095523	3.841466	7.09676	4.736860
Trace test indicates 8 cointegrating eqn(s) at the 0.05 level. Max-eigenvalue test indicates 6 cointegrating eqn(s) at the 0.05 level. MacKinnon-Haug-Michelis (1999) p-values Unrestricted				

According to the Johansen cointegration test, in which we investigated the long-run relations about exports & growth, the H_0 hypothesis (there is no cointegration between the series) was rejected. In the long run, there is a movement between exports and economic growth in Turkey, and the analyzes show that there is a long-term relationship between the variables.

FMOLS - DOLS approach

After applying the cointegration tests, first of all, to estimate the final unbiased coefficients of this relationship, a traditional linear model such as OLS regression, which assumes that the estimations have a fixed effect, was used to test the consistency of the estimators within the framework. In addition, FMOLS (Full Modified Ordinary Least Square) developed by Hansen and Phillips (1990) and DOLS (Dynamic Ordinary Least Square) developed by Stock & Watson (1993) were used. The FMOLS approach adjusts for deviations in standard fixed-effects estimators caused by problems such as autocorrelation and varying variance. The DOLS method is a dynamic method that includes the potentials and delays of the explanatory variables and eliminates the possible autocorrelation and endogeneity problems of its estimators. In addition, the DOLS approach has a method that can eliminate the deflections in the static regression by bearing dynamic factors in the model (Kao, C. And Chiang M. 2001).

Table 5. Ols, Fmols and Dols Estimate Results (Depandant variable= Export)

	OLS		**FMOLS**		**DOLS**	
	Coef.	Std.Error	Coef.	Std.Error	Coef.	Std.Error
GDPP	0.312739[a]	0.063626	0.295433[a]	0.081623	0.415447[a]	0.126438
R&D	-0.153563[a]	0.022421	-0.176639[a]	0.029318	-0.157167[a]	0.040585
TO	0.469889[a]	0.022119	0.492477[a]	0.028446	0.507343[a]	0.038750
CO2	0.600245[a]	0.081642	0.614740[a]	0.105345	0.845412[a]	0.188688
POP	1.494509[a]	0.125199	1.692176[a]	0.160640	1.522866[a]	0.235116
FD	0.085240[a]	0.017651	0.083974[a]	0.022731	0.054692	0.033787
EXCIM	0.448788[a]	0.024458	0.422667[a]	0.031358	0.409119[a]	0.040707
C	-2.023104[a]	0.198469	-2.331156[a]	0.254770	-2.108246[a]	0.341485
R^2	0.99		0.98		0.99	
Note: lag=0 based on Schwarz Info Criterion, maxlag=10 and Auto lag is selected. a denotes 1% significance.						

Table 5 shows the long-run coefficients obtained from the analysis. When the analysis results are examined, it is seen that all variables have a statistically major effect. According to the results of the OLS, FMOLS and DOLS regressions, the coefficient of economic growth is positive and there is a positive and statistically significant relationship from growth to exports. This finding supports the hypothesis that growth increases exports. This finding is in similar with the findings of Abu Quarn and Abu Bedir (2004), Çiftçioğlu and Nehil (2005), Kurt and Terzi (2007), Akbulut and Terzi (2013) studies in the literature.In addition, the most important variable affecting exports is the population growth rate. Increasing labor abundance provides an advantage in foreign trade as it provides a cheap labor force. On the other hand, trade liberalization and financial development are important factors that support the increase in exports. Among the variables, only the increase in R&D expenditures affects exports negatively. This is due to the opportunity cost of technology investments and limited capital in developing countries. The increase in carbon emissions affects exports positively and this can be explained by the demand for primary energy sources. Finally, Excim, which represents the terms of trade, affects exports positively. Increases in trade terms, that is, increases in the country's welfare, have a beneficial impact on exports.

Conclusion

The aim of this study is to investigate the effect of economic growth on exports in Turkey. The relationship between the variables was estimated using the Ols, Fmols and Dols models with the data covering the period 1990-2015. In the analysis made, trade openness, financial development, carbon emissions, R&D expenditures, population growth and Exports as a capacity to import, which are among the main variables selected on export performance in the selected period for Turkey, are included in the

model. The control variables included in the model enabled us to more clearly evaluate the factors affecting export performance in the selected country.

In the study, whether the variables act together in the long run was examined using the Johansen cointegration test. Findings from this test proved that there is a long-term relationship between all variables. According to the results of the OLS, FMOLS and DOLS regressions, the coefficient of economic growth is positive and there is a positive and statistically significant relationship from growth to exports. This finding supports the hypothesis that growth increases exports. (references). Here, the most important variable affecting exports is the population growth rate. Turkey has the highest population growth rate, especially among European countries. This situation enables the young and dynamic population to be used as a cheap labor force, to reduce production costs and to bring the country to an advantageous position in exports. On the other hand, trade liberalization and financial development are important factors that support the increase in exports. Among the variables, only the increase in R&D expenditures affects exports negatively. This is due to the opportunity cost of technology investments and limited capital in developing countries (Kao, C. And Chiang M. 2001).

In addition, Turkey's production structure and the development of technology investments and channeling them into production have a negative impact on exports as they occur with a certain delay. The increase in carbon emissions affects exports positively and this can be explained by the demand for primary energy sources. Turkey meets a significant portion of its energy needs through imports, which increases the country's demand for cheap energy. Although significant renewable energy investments have been made in recent years, fossil resource consumption is still high. Reducing this and investing in cleaner energy sources is important for the environment-export relationship. Excim, which represents

the terms of trade, has a positive effect on exports. Increases in trade terms, that is, increases in the country's welfare, have a beneficial impact on exports.

As a result, it is concluded that all variables except R&D expenditures support the export development. We can say that R&D expenditures are a reason for limiting imports rather than being export-based for Turkey, and the resources transferred to R&D negatively affect export performance. Developing new technologies is very important for the development of all countries, but it has been concluded that this performance negatively affects exports. As a result, we can say that the GLE hypothesis is valid for Turkey and it can gain a competitive advantage in foreign markets by adopting sustainability strategies in foreign trade policies. The concentration of R&D expenditures on export-oriented and qualified goods can increase the profitability of exports.

References

Abu-Quarn, Aamer S., and Suleiman Abu-Bader. 2004. The validity of the ELG hypothesis in the MENA region: Cointegration and error correction model analysis. Applied Economics (Taylor & Francis Journals) 36: 1685–95

Akbulut, Seval, and Harun Terzi. 2013. Analysis based on export growth by sectors in Turkey (Türkiye'de ihracata dayalı büyümenin sektörler itibariyle analizi). Karadeniz Teknik Üniversitesi Sosyal Bilimler Dergisi 3: 43–58.

Alam, M. Imam. 2003. Manufactured exports, capital good imports, and economic growth: Experience of Mexico and Brazil. International Economic Journal 17: 85–105.

Awokuse, Titus O., and Dimitris K. Christopoulos. 2009. Nonlinear dynamics and the exports–output growth nexus. Economic Modelling 26: 184–90.

Ciftcioglu, Serhan, and Ramzi Nekhili. 2005. New evidence for exports-led growth, tradables-led-growth, and manufacturing-led growth: Causality test results for Turkey. Latin American Journal of Economic Development 5: 135–42.

Dar, A. B., Bhanja, N., Samantaraya, A., & Tiwari, A. K. (2013). Export led growth or growth led export hypothesis in India: evidence based on time-frequency approach. Asian Economic and Financial Review, 3(7), 869.

Dhawan, Urvashi, and Bagala Biswal. 1999. Re-examining export-led growth hypothesis: A multivariate cointegration analysis for India. Applied Economics 31: 525–30

Ghatak, Subrata, Chris Milner, and Utku Utkulu. 1997. Exports, export composition and growth: Cointegration and causality evidence for Malaysia. Applied Economics 29: 213–23.

Hatemi-J, Abdulnasser, and Irandoust Manuchehr. 2000. Time-series evidence for Balassa's export-led growth hypothesis. The Journal of International Trade & Economic Development 9: 355–65.

Johansen, S., (1988). Statistical Analysis of Cointegration Vectors, Journal of Economic Dynamics and Control, 12:231-254.

Johansen, S. & Jesulius, K.. (1990). Maximum Likelihood Estimation and Inference on Cointegration– with Applications to the Demand for Money, Oxford Bulletin of Economics and Statistics, 52(2):169–210.

Kao, C., & Chiang, M. H. (2001). On the estimation and inference of a cointegrated regression in panel data. In Nonstationary panels, panel cointegration, and dynamic panels. Emerald Group Publishing Limited..

Kónya, L. (2006). Exports and growth: Granger causality analysis on OECD countries with a panel data approach. Economic Modelling, 23(6), 978-992.

Kurt, Serdar, and Harun Terzi. 2007. The relationship among foreign trade of manufacturing industry, productivity and economic growth. Atatürk Üniversitesi ˙Iktisadi ve ˙Idari Bilimler Fakültesi Dergisi 21: 25–46.

Onder, Kubra, and Selim Adem Hatirli. 2014. Economic analysis of the relationship between manufacturing industry export and economic growth in Turkey. Journal of Yasar University 9: 5851–69.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. Biometrika, 75(2), 335-346.

Phillips, P. C., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I (1) processes. The Review of Economic Studies, 57(1), 99-125.

Sahoo, Auro Kumar, Dukhabandhu Sahoo, and Naresh Chandra Sahu. 2014. Mining export, industrial production and economic growth: A cointegration and causality analysis for India. Resources Policy 42: 27–34.

Sandalcilar, Ali Rıza. 2012. A causality analysis of relationship among agricultural export, non-agricultural export and economic growth for Turkey. Finans Politik ve Ekonomik Yorumlar Dergisi C49: 65–76.

Sharma, Subhash C., Mary Norris, and Daniel Wai-wah Cheung. 1991. Exports and economic growth in industrialized countries. Applied Economics 23: 697–708.

Shan, Jordan, and Fiona Sun. 1998. On the export-led growth hypothesis: The econometric evidence from China. Applied Economics 30: 1055–65.

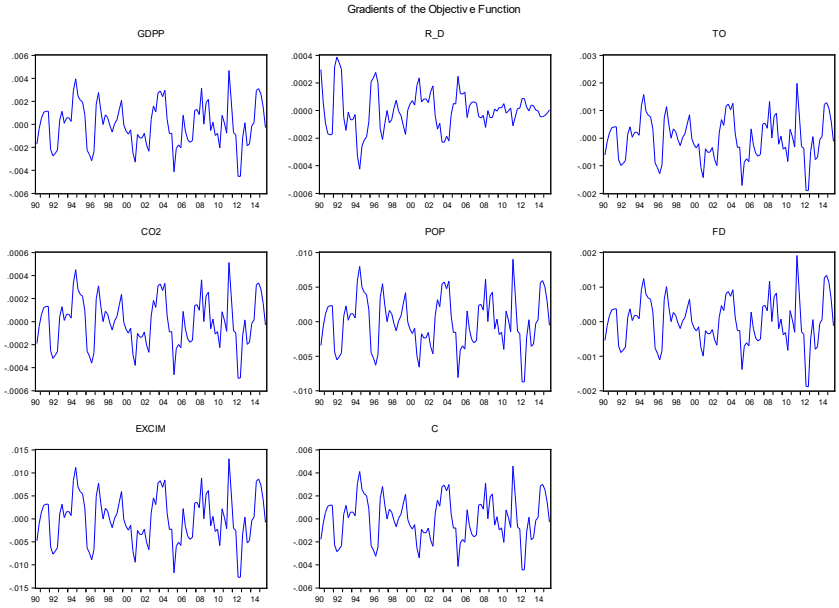
Stock, J. H., & Watson, M. W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. Econometrica: journal of the Econometric Society, 783-820.

Tang, Chor Foon, YewWah Lai, and Ilhan Ozturk. 2015. How stable is the export-led growth hypothesis? Evidence from Asia's Four Little Dragons. Economic Modelling 44: 229–35.

Yapraklı, Sevda. 2007. Causality between exports and economic growth: An econometric analysis on Turkey, ODTÜ Gelişme Dergisi 34: 97–112.

Appendix

Fig.1: Gradients Graps



Impact of Agricultural Supports on Agricultural Foreign Trade in Turkey: Spatial Panel Econometrics Modelling Approach

Hakan USLU[1]

Abstract

In an increasingly globalized and populous world, international trade of agricultural commodities is at the center of the agricultural economy. In order to ensure sustainability in the agricultural production, the importance of various agricultural supports/ subsidies or measures applied by the states is increasing. These supports are important both for the development of the agricultural sector and feeding the growing population, and also play an important role in the economic development of the countries. Therefore, this study aims to measure the effects of agricultural supports given by central governments on the foreign trade of agricultural products. Specifically, based on a panel dataset covering 81 provinces of Turkey for the time period 2002-2020 and spatial panel econometrics models, the current study empirically analyzes the associations between agricultural exports and the two main agricultural supports in Turkey, namely area-based supports and deficiency payments. The findings suggest that the overall effect of the supports on the export of agricultural commodities is negative in Turkey. Results further present that there is a strong spatial correlation of agricultural activities between neighboring provinces.

Keywords: Agricultural Foreign Trade, Agricultural Supports, Agricultural Products, Spatial Econometrics

1 Asst. Professor, Department of Economics. Adıyaman University. Mailing address: The Faculty of Economics and Administration building, central campus, Adıyaman, 02100. E-mail: huslu@adiyaman.edu.tr , hknsl17@gmail.com. ORCID: 0000-0003-1649-6859

Introduction

In order to ensure the sustainability of food supply in the nutrition of the growing world population, the importance of direct income supports and various measures and incentives for agricultural production and producers' income is increasing all over the world. On the other hand, the sustainability of economic development of countries whose economies are heavily dependent on agriculture is closely related to the competitiveness of the domestic agricultural sector in international markets, i.e., willing and able to sale of domestic agricultural products in these markets. Therefore, it is an expected result that the effective subsidies aiming to support the agricultural sector will have a positive impact on economic development process of these countries. Based on these relations, the main purpose of the current study is revealing how the agricultural subsidies given by the central government through the method of direct income support affect the agricultural foreign trade and thus economic development in Turkey where the agricultural sector acts as a locomotive in the economy.

The aim of agricultural supports in Turkey is not only to meet the nutritional needs of the population, but also to increase rural development and obtain agricultural income. The supports given to the sector for these main purposes have been subjected to dramatic changes as a result of various economic and political changes in the historical process. The agricultural policies implemented in the country has been shaped according to the European common agricultural policies with the European Union adaptation process started in the 1960s, the agreements made with the IMF and the World Bank in the 1980s, and the customs union agreement started to be implemented in 1996. Agricultural support practices, which were previously given in the form of input and price supports, were terminated at the beginning of the 2000s and policies for direct agricultural income support were started to be implemented. Today, the supports given for agricultural activities are mostly

applied in the form of area-based supports, deficiency payment supports and animal husbandry supports.

According to Turkish Ministry of Agriculture and Forestry, at the beginning of the 2000s, 85% of the total agricultural supports were area-based supports, while the share of these supports in total agricultural supports decreased to 25% in 2020 due to the problems encountered in practice and ineffectiveness. Area-based supports have been replaced by deficiency payment supports and subsidies for livestock farming. While 10% of the total supports were deficiency payments in 2002, their share increased to 28% in 2020, and the share of animal husbandry in total agricultural supports increased from 4% to 40% in the same period. More specifically, except for the supports given for livestock farming, area-based supports and deficiency payments given particularly for the production of agricultural products still constitute more than half of the total agricultural supports today. While the total amount of supports given to the agricultural sector in 2002 was 1.8 billion Turkish liras, 1.5 billion TL of the total was area-based supports and 185 million TL was deficiency payments supports. By 2020, the total amount of supports for agricultural activities in the country approached 20 billion TL. Although a proportional decrease has been observed in the share of area-based supports in the total since the beginning of the 2000s, area-based supports increased from 1.5 billion Turkish lira in 2002 to approximately 4.5 billion Turkish lira in 2020. However, in US dollar, area-based supports decreased from approximately 1 billion dollars in 2002 to 653 million dollars in 2020. In the same period, the deficiency payment supports increased from 185 million TL ($123 million) to 5.4 billion TL ($765 million).

Area-based agricultural supports are a type of direct income supports for producers that aims to increase productivity and is determined by the amount of area they produce. Deficiency payments are a type of domestic agricultural supports based on

the difference between the price at the target income level and the price in the domestic market. Both types of supports are closely related to factors such as production, income and price levels in the agricultural sector of Turkey, and therefore to economic development, especially in rural areas, and sectoral foreign trade which are strongly dependent on capital accumulation and improvements of efficiency (Greenwood and Jovanvic, 1990; Odedokun, 1992).

In this study, we aim at analyzing empirically the relationship between the above-mentioned domestic agricultural supports and agricultural foreign trade employing spatial econometrics models and a panel dataset covering 81 provinces of Turkey and spanning from 2002 to 2020. In detail, the direct and spillover effects of area-based supports and deficiency payment supports on agricultural exports have been empirically analyzed by the help of an originally created provincial level panel dataset. The main reason for employing spatial econometric modeling in the current study is that the agricultural sectors of the provinces are significantly influenced by each other, since there is no strict political barriers between provinces of Turkey. Therefore, ignoring these interactions among the provinces' agricultural activities in the estimation models will result in inconsistent and ineffective misleading results. Some of the previous studies in the related literature have considered spatial analysis methods that take into account the agricultural interactions between provinces. However, to the best of our knowledge, the spatial relationship between agricultural supports and agricultural foreign trade has not been the subject of the analyses of these studies before.

The results of the study show that area-based agricultural supports are negatively related to the amount of agricultural foreign export in Turkey while deficiency payments supports have limited positive impact on the foreign export of agricultural commodities, *ceteris paribus*. Specifically, the results suggest that the overall effect of the

agricultural supports on the foreign export of agricultural sector is negative since the negative impact of area-based supports on foreign agricultural export is larger than the positive effect of deficiency payment supports. Additionally, our decomposition analyses revealed that the amount of agricultural exports in a province depends on both the agricultural supports and other agricultural activities in that province and the agricultural developments in the neighboring provinces which confirms the spatial dependence between provinces. Moreover, the findings showed that the amount of production and mechanization in agriculture had a positive effect on agricultural exports among other factors such as precipitation, value of products an agricultural income.

The main contribution of the current study to the relevant literature is revealing the overall effects of domestic agricultural supports on the agricultural foreign trade in Turkey. Moreover, the study employs decomposition analyses and provides direct and spillover marginal effects of agricultural supports on the agricultural export separately. Additionally, the empirical analysis employed in the current study adopts to the spatial panel econometrics models which are not considered in the previous studies resulted in misspecified estimation models and inaccurate estimation results.

The following section provides a brief discussion on the related empirical literature. Then, the details on the empirical methodology, the specification of variables and data employed in the study are elaborated in Section 3. The study ends with empirical results and conclusion sections.

Literature Review

The role of agricultural supports in rural development and agricultural foreign trade and the mechanism behind the associations between the states' monetary or fiscal measures and their effects on agricultural sector have been discussed in previous

studies (Darrat, 1999; Chongzheng and Xiwu, 2005; Allanson, 2006; Yuandong *et al.*, 2013; Jayne and Boughton, 2019; Arısoy, 2020). On the other hand, the other direction of the relationship, namely the effects of agricultural foreign trade on sectoral indicators, has also been the subject of various articles. Previous studies suggest that governments in especially developing countries should use fiscal or financial policies/measures to promote agricultural sector and develop rural economies (Benavides-Perales *et al.,* 2018; Spicka *et al.*, 2019). However, as claimed in the studies of Koester (2006), Rioja and Valev (2004) and Monke (2005), there are possibilities that agricultural supports or government controls may cause some negative effects on the sector due to reasons such as the fact that the capital is not effectively shared in rural areas, and that different regions have different economic structures, but the same type of support is given to all of these regions.

There are not many empirical studies that specifically analyze the impact of agricultural supports on the foreign trade performance of the sector in Turkey. However, there are various studies in the literature that refer to agricultural foreign trade and sectoral supports. Koç et al. (2019), for example, attempted to analyze the direct and spillover effects of agricultural measures and credits on added agricultural value employing a spatial panel estimation model and a provincial dataset at annual level covering all the provinces of Turkey and the time period of 2004-2014. They found that increases in agricultural credits positively influence the value-added per hectare; however, agricultural supports cause a reduction in value-added per hectare in Turkey. Arısoy (2020), on the other hand, analyzed the relationship between agricultural supports and foreign competitiveness of agricultural sector in Turkey, adopting VAR estimation methodology and using a time series dataset covering the period 1994 and 2017. The study measures competitiveness of the sector as internal terms of trade, and percentage produces support estimate and producer nominal production coefficients are used for the two indicators of sectoral

supports. The results of the study report that the internal terms of trade developed against the agricultural sector during the period covered by the study and therefore the competitiveness of the agricultural sector has decreased. The study also suggests that policy-makers in Turkey should implement policies for the purposes of increasing the prices of products and the competitiveness of producers especially in foreign markets. The study conducted by Yanıkkaya and Koral (2017) focuses on olive oil, one of Turkey's leading agricultural export commodities, and analyzes the effect of agricultural supports on the export of olive oil using empirical methods. Their findings report that agricultural supports given to the olive and olive oil sector in Turkey do not have increasing effect on the export of the products of this particular sector. Kandemir (2011) examines how changes in agricultural support policies during the last 20 year for the sake of adaptation process to EU agricultural policies affect the sectoral indicators including foreign trade in Turkey. According to the findings of the study, ineffective agricultural support policies negatively affected the foreign trade balance of the sector, while the share of agricultural products in total exports decreased, their share in total imports increased.

In connection with the subject analyzed by the current study, one of the leading studies in the related literature examining the relationship of the agricultural sector with fiscal and financial state supports using spatial econometric analyzes is the study of Yuandong and his colleagues (2013) on China's agriculture sector. Based on spatial econometric modelling approaches and a provincial level panel dataset for the period 1997-2010, their results report that both fiscal/financial supports and agricultural input support policies have promotional effects on agricultural income. They also present that both direct and spatial spillover effects of the fiscal and financial supports on the sector and rural economy are positive and significant suggesting that the agricultural supports given to a particular region promote not only the agricultural activities in that region, but also in other

neighboring regions. Erokhin et al. (2014) implemented a study which aims at revealing how the state supports and measures affect the producers and international trade of agricultural commodities in developed and developing countries. The results of the study can be summarized as developing countries should support import substitution for agricultural products and optimize all factors related to the competitiveness of the sector in order to ensure the sustainable development of agricultural production and trade. Čechura (2008) assessed how funds provided by the governments for the agricultural activities in the republic of Czech are related to the sectoral indicators including farmer's income, investments and competitiveness etc. Both empirical and theoretical results of the study indicate that the role of the funds in financing of Czech agricultural sector is positive and further suggest that the agricultural funds cause more effective capital employment and increase the competitiveness of the sector. On the other hand, Benavides-Perales et al. (2018) empirically analyzed the impact of agricultural support fund programs and loans used by producers from commercial or developments banks on agricultural exports and selected sectoral indicators in Mexican agricultural sector. Based on a quarterly time series dataset for the period 1995-2015 and VAR estimation modelling, they found a causality between the loans and growth in the sectoral indicators and suggested that the Mexican government must provide more support to the sector to improve foreign trade of agricultural products. Yang *et al.,* (2017) developed a modelling approach to explore the effect of China's agricultural domestic support and incomplete price transmission on agricultural production and their demand on international markets. Running a set of simulations based on a database, their results reveal that domestic agricultural supports in China reduce the demand pressures in international markets and increase the production in the long term.

A variety of factors such as exchange rates, volatilities, trade liberalization or international trade agreements that have direct or

indirect effects on the foreign trade of the agricultural sector in Turkey have also been examined by empirical studies. Karakaş and Erdal (2017), for example, investigated the relationship between real effective exchange rates, volatilities and agricultural foreign trade in Turkey. Employing FMOLS model and a panel dataset covering 25 countries and the period 1990-2012, they found that real exchange rates have positive effect on both agricultural export and import while volatilities in exchange rates negatively influence agricultural import. Sever (2012), Erdal *et al.* (2012) and Özkul and Öztürk (2019) report similar results to Karakaş and Erdal (2017)'s findings. Using a time series dataset spanning from 1982 to 2011, Terin *et al.* (2012), on the other hand, employ regression analyses to explore the impact of the customs union agreement on the foreign trade of agricultural products between Turkey and European Union countries. Their results show that customs union does not cause a structural change in Turkey's agricultural export, however; during the study period, the increase in agricultural imports between Turkey and Europe is approximately 4.5 times greater than the increase in exports which suggests that the customs union agreements negatively affect the country's agricultural sector and foreign trade deficit. The effects of customs union and other types of international trade agreements on agricultural foreign trade in Turkey have become the subject of many studies such as Ay and Yapar (2005), Eruygur (2008), Gündüz *et al.* (2017), Kalaycı (2017) and Özdemir-Bektaş (2018).

Research methodology

In this part of the study, detailed information such as source and measurement method will be given about the variables that are the subject of the analysis, and then the spatial panel data analysis models will be provided.

Measurements and descriptive statistics of variables

The analyses applied in the current study employs an annual level panel dataset spanning from 2002 to 2020 for 81 provinces of Turkey. In order to analyze the impact of agricultural supports on agricultural foreign export, we construct the following baseline empirical model:

$$lnAgrExp_{i,t}=\alpha + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \varepsilon_{i,t} \qquad (1)$$

In Eq. (1), the dependent variable is , the logarithm of total agricultural export in province *i* and year *t*. The data of agricultural export (in US dollar) are obtained from the Turkish Statistical Institute (TUIK). Our main independent variables are area-based agricultural supports and deficiency payments for agricultural activities (deficiency supports) symbolized as and in Eq. (1), respectively. The yearly provincial level information for the main explanatory variables is available in the databases of the Ministry of Agriculture and Forestry of Turkey. The data for the agricultural supports are provided in Turkish Liras. Since the dependent variable is in US dollars, we converted agricultural support variables into US dollars using the Turkish Central Bank foreign exchange rates. Area-based agricultural supports and deficiency payments constitute a large part (%57 in 2019) of the total supports given to the agricultural sector in the country. The deficiency payments support is the direct payments of the difference between producer prices and national/international market prices to the producers. The deficiency supports among other agricultural support types aim to pay higher prices for the products of the farmers by the government and to increase the sales of the products, especially in foreign markets. Hence, the deficiency payments supports have direct and significant effects on the amount of agricultural exports of the country. Area-based supports, on the other hand, include supports for the inputs of agricultural products, direct

income supports, energy supports, and soil analysis support given to producers based on the amount of area they produce. The main purpose of this particular support is to increase the competitiveness of the sector by increasing production, productivity and income levels in agricultural sector. unlike deficiency payments, area-based agricultural supports have indirect effects on agricultural exports.

The baseline model specified in Eq. (1) also includes control variables, symbolized as $X_{i,t}$, that might influence agricultural export. First, agricultural production ($Product_{i,t}$) measures the amount of grain and other plant products in tons within the provinces. Increasing amount of agricultural products have long been recognized as a key contributor of agricultural foreign trade, we thus expect that production growth in agricultural sector of a province will rise the agricultural international trade in that province. Second, agricultural GDP ($AgrGDP_{i,t}$) captures total monetary value of agricultural products produced within the study provinces at the end of the sample year. It is expected that more affluent agricultural provinces will be associated with more agricultural activities, which will result in larger agricultural foreign trade. Third, the value of products ($Value_{i,t}$) controls the market value of agricultural products calculated as multiplying the production amount by the unit price for each province of the country. The relative increase in the value of agricultural products among other goods and services in the market causes a rise in the profitability of the producers and the expansion of agricultural activities. Therefore, the increases in the value of agricultural products are expected to have a positive effect on agricultural foreign trade. Finally, mechanization in agricultural sector ($Mech_{i,t}$) measures the number of tractors, plows, fertilizing machines, water pumps, irrigation machines and combine harvesters used for agricultural activities in each study province. It is expected that the increase in the number of machineries used in the agricultural sector will lead to a capital-intensive production structure in the country and will positively affect the productivity of the sector.

Therefore, the mechanization will likely to increase the price competitiveness of the domestic agricultural sector, especially in foreign markets, and hence positively affect the amount of foreign agricultural trade in the study provinces. The dataset of above-mentioned control variables is obtained from TUIK at yearly basis. The data of Agricultural GDP and the value of agricultural products are reported as in Turkish Lira in their related databases and are converted into US dollars based on the Turkish Central Bank foreign exchange rates.

In addition to these control variables, we also include a series of weather-related factors identified in the previous research that will affect the agricultural foreign trade in the provinces of the country. For this purpose, we employ the precipitation ($Prep_{i,t}$) which captures the annual average precipitation amounts and the temperature ($Temp_{i,t}$) to control the changes in annual average temperatures in the study provinces. Previous studies have shown that climatic changes have serious effects on the agricultural sector. Considering the fact that the agricultural sector cannot be considered independently of environmental and climatic conditions, the impact of precipitation and temperature factors on agricultural foreign trade is inevitable. Additionally, considering that most of the agricultural areas in Turkey do not have irrigation systems and that the products grown in the country need water, it is expected that the increase in precipitation amount will positively affect the sector and hence foreign agricultural trade. However, it is expected that increasing temperatures due to climate change and global warming may cause drought and the scarcity of irrigation opportunities, which are already scarce, will adversely affect the sector and foreign trade.

In Eq. (1), subscripts i and t denote provinces and year, respectively. Since all the variables are included in the model in their logarithmic forms, the coefficients of β represent elasticities of the variables. ε stands for random disturbance term.

Table 1 presents the descriptive statistics of these aforementioned variables including a brief variable description, mean, standard deviation, minimum and maximum values of each variable employed in the analyses.

Table 1: Descriptive statistics

Variables	Description	Obs.	Mean	Std. Dev.	Min.	Max.
AgrExp	Agricultural Export	1,539	5.740	6.662	0	14.092
AreaSupp	Area-based Supports	1,539	15.944	1.169	11.153	19.088
DiffSupp	Deficiency Support	1,539	12.723	6.421	0	19.553
Prod	Production	1,539	13.318	1.373	5.814	16.669
AgrGDP	Agricultural GDP	1,539	12.966	1.341	7.321	15.239
Value	Value of Products	1,539	12.556	1.140	8.871	15.448
Mech	Mechanization	1,539	10.156	1.451	2.772	12.579
Prep	Precipitation	1,539	3.675	1.697	6.907	5.750
Temp	Temperature	1,539	2.573	0.3558	0	3.069

Spatial Panel Models

The current study employs spatial panel data models to conduct the main estimation analysis. Anselin (1988) originally invented the spatial econometric analyses and Elhorst (2010) developed spatial panel data estimation models. Following the methodology provided in these two studies, the main design of the analyses applied in this study is to consider spatial effects of agricultural foreign trade among the neighboring provinces.

In panel data analysis, there may be a neighborhood relationship or spatial interaction/dependency between the variables when the unit of the analysis is geographical locations such as provinces, regions or countries. Failure to take into account this spatial relationship between geographic locations (units) within the scope of panel data models may cause biased estimation results. Therefore, estimations in the current study consider how a

province's contributing factors to agricultural foreign trade influence agricultural foreign trade of its neighboring provinces and vice versa.

The most common and comprehensive spatial panel data model is the general nesting spatial (GNS) model, developed by Manski (1993). GNS model is also known as Manski model and can be expressed in below equation:

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \rho WlnAgrExp_{i,t} + \theta_1 WlnAreaSupp_{i,t} + \theta_2 WlnDiffSupp_{i,t} + \theta_3 WlnX_{i,t} + u_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (2)$$

where $u_{i,t} = \lambda W u_{i,t} + \varepsilon_{i,t}$ and $lnX_{i,t} = lnProduct_{i,t} + lnAgrGDP_{i,t} + lnValue_{i,t} + lnMech_{i,t} + lnPrep_{i,t} + lnTemp_{i,t}$.

In Eq. (2), *AgrExp* is the agricultural export vector of each province *i* at period *t*. *AreaSupp* and *DiffSupp* are the vectors of our main independent variables, area-based supports and deficiency payments supports *X*. represents the matrix of our control variables described above. *W* is the spatial matrix to control spatial correlations in the sample. is for spatial autoregressive coefficient of *WlnAgrExp.* Hence *WlnAgrexp,* is included in the model as one of the regressors denoting spatial lagged term in the model and represents weighted average value of dependent variable *AgrExp* in neighboring provinces. θ symbolizes the spatial correlation coefficient of the spatially lagged exogeneous variables. Hence, *WlnAreaSupp*, *WlnDiffSupp* and *WlnX* stand for the neighborhood effects in spatially dependent economic or social indicators using spatially lagged explanatory variables. is also included in spatially dependent stochastic error term $u_{i,t}$ to capture residuals of each cross-sectional unit in the dataset. λ represents spatial autocorrelation coefficient which measures the strength of dependency between spatial units. α_i symbolizes provincial fixed effect, $\delta_{i,t}$ captures the time effect and $\xi_{i,t}$ stands for independently and identically distributed random disturbances in the model.

In spatial analysis, spatial weight matrix *W* can be generated

based on neighborhood or distance. For spatial panel data models, *W* denotes the presence of interactions between two neighboring areas. Spatial weight matrix takes the value of 1 if two areas have a neighborhood relation (adjacency) and 0 otherwise. In empirical applications, the standardized form of the *W* matrix according to the rows is generally used and presented as follows:

$$w_{i,j} = \frac{w_{i,j}}{\sum_{j=1}^{n} w_{i,j}} \tag{3}$$

where $w_{i,j}$ represents the elements of spatial weight matrix. *i* and *j* denote two different regions. *i* If a region has no neighbors (e.g. an island), $w_{i,j}$ can be calculated as;

$$w_{i,j} = \frac{w_{i,j}}{\max(1, \sum_{j=1}^{n} w_{i,j})} \tag{4}$$

where every element in the rows of spatial weight matrix takes the values between 0 and 1. In our model detailed in Eq. (2), we employ spatial weight matrix with normalized rows to improve statistical properties of estimated models. In the process of creating the spatial weight matrix, we used the queen contiguity method with the help of the GEODA and STATA software.

The spatial econometrics models vary depending on whether the spatial coefficients (ρ and θ) and the spatial autocorrelation coefficient (λ) which are included in the GNS model. In other words, spatial econometrics models vary according to the existence of a spatial relationship in the dependent/independent variables in the model or whether there is a spatial relationship in the error terms obtained for each cross-sectional unit. For example, the GNS model described in Eq. (2) can be simplified by eliminating spatially autocorrelated error term (λ=0) from the model to obtain Spatial Durbin Model (SDM). The SDM model, in which

the spatial autocorrelation coefficient is zero and includes only the spatial effects in the dependent and independent variables, can be expressed in matrix notation as the following equation:

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \rho W lnAgrExp_{i,t} + \theta_1 W lnAreaSupp_{i,t} + \theta_2 W lnDiffSupp_{i,t} + \theta_3 W lnX_{i,t} + \varepsilon_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (5)$$

In Eq. (5), SDM model only estimates spatial correlations among the variables using the interactions of spatial weight matrix W with *AgrExp* and the independent variables. All the variables and symbols presented in Eq. (5) are the same as described above.

When the $\rho=0$ constraint is placed on the GNS model, the Spatial Durbin Error Model (SDEM) is obtained and therefore there is no spatially lagged dependent variable in the SDEM model. Equation (6) below presents the SDEM model mathematically.

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \theta_1 W lnAreaSupp_{i,t} + \theta_2 W lnDiffSupp_{i,t} + \theta_3 W lnX_{i,t} + u_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (6)$$

where $u_{i,t} = \lambda W u_{i,t} + \varepsilon_{i,t}$, β represents direct effects and θ is for the indirect effects.

The GNS model transforms into the Spatial Autoregressive Combined (SAC) model when the spatially lagged correlation coefficient between the explanatory variables is zero $(\theta=0)$. The form of SAC model is expressed as follows:

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \rho W lnAgrExp_{i,t} + u_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (7)$$

where $u_{i,t}=\lambda W ui_{,t} + \varepsilon_{i,t}$. In SAC model, the coefficients of β will be biased due to omitted variable bias if there are exogeneous interactions *WX* (Lesage and Pace, 2009). SAC model is also known as Kelejian-Prucha model in Elhorst (2010) and as SARAR model in Kelejian (2008).

The Spatial Autoregressive (SAR) model is obtained when the GNS model contains only the spatially lagged dependent variable ($\theta=0$ and $\lambda=0$). In matrix notation, SAR model is simply expressed in below equation:

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \rho W lnAgrExp_{i,t} + \varepsilon_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (8)$$

The model in Eq. (8) can be solved for the dependent variable and obtained $AgrExp=(I-\rho W)^{(-1)}\ (X\beta+\varepsilon)$ where inverse matrix is called spatial multiplier.

GNS model turns to Spatial Error Model (SEM) when two constraints $\rho=0$ and $\theta=0$ are applied to the model. SEM model only captures the presence of spatially autocorrelated cross-sectional disturbance term λ and is presented as follows:

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + u_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (9)$$

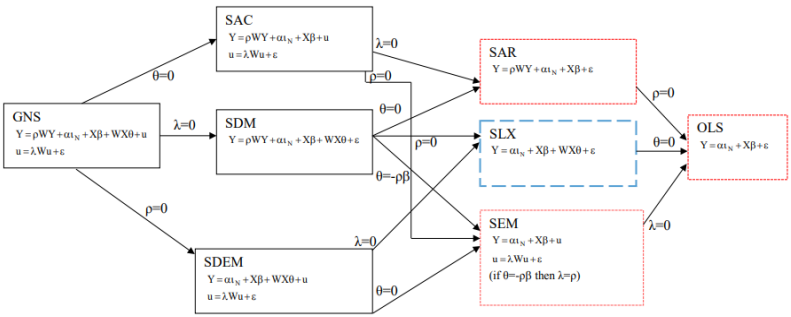
where $u_{i,t}=\lambda W_{ui,t}+ \varepsilon_{i,t}$. SEM model can be considered as a combination of OLS and error term of spatial autoregressive model since there are minor differences between the parameters of SAR and OLS. If the model in Eq. (9) is solved for u , it can be obtained $u_{i,t}=(I-\lambda W)^{-1}\ \varepsilon$. Then, SEM model turns to $lnAgrExp_{i,t}= \alpha_i+\beta_1 lnAreaSupp_{i,t}+\beta_2 lnDiffSupp_{i,t}+\beta_3\ lnX_{i,t}+(I-\lambda W)^{-1}\ \varepsilon+\delta_{i,t}+\xi_{i,t}$.

Finally, when $\rho=0$ and, $\lambda=0$, Eq. (2) can be simplified as Spatial Lagged X (SLX) model which considers only exogeneous interactions. SLX model is the simplest spatial panel data model and only captures spatial relationship of explanatory variables observed in neighboring cross-sectional units. SLX model takes the form;

$$lnAgrExp_{i,t}=\alpha_i + \beta_1 lnAreaSupp_{i,t} + \beta_2 lnDiffSupp_{i,t} + \beta_3 lnX_{i,t} + \theta_1 W lnAreaSupp_{i,t} + \theta_2 W lnDiffSupp_{i,t} + \theta_3 W lnX_{i,t} + \varepsilon_{i,t} + \delta_{i,t} + \xi_{i,t} \quad (10)$$

The relationship between different spatial econometrics models for cross-sectional data is presented in Figure 1. These spatial models can be augmented by allowing variations in neighborhood effects based on neighborhood order, different distances or interactions among the variables and cross-sectional disturbances. The studies should employ several statistical criteria consistent with the economic question under consideration and the sample to select the most appropriate spatial model.

Figure 1: Spatial econometrics models



Source: Elhorst, 2010.

Empirical results

Following the methodology proposed by Lesage and Pace (2009) and Elhorst (2010), this section presents the diagnostic tests applied to the dataset and the statistical test results used in the spatial econometrics model selection. In the second part, the estimation results of the applied spatial econometrics model are provided.

Diagnostic tests and model selection process

When spatial econometrics analyses are employed for panel data models or cross-sectional models, various diagnostic tests must be applied before the model is estimated. Before proceeding to the

tests for the selection of the appropriate spatial model, we first need to test whether there is a unit/spatial effect in the sample in order to decide between the classical regression models and the fixed/random effects models. For this purpose, we apply Breusch-Pagan LM and ALM tests for the most comprehensive spatial models (SDM, SAC, SEM and SAR) and the test statistics are reported in Table 2. According to the results, we reject the null hypothesis of no spatial/cross-sectional effect and thus confirm that the classical regression model is not appropriate for the sample and either spatial fixed or random effect models must be conducted in the spatial analyses. In order to decide between fixed or random effect spatial models, we employ Hausman test and the results are provided in Table 2. The results reject the null hypothesis which specifies the deficiency between fixed and random effects estimators is not systematic and suggest the fixed effect is more appropriate for the dataset. We also apply Pesaran's test of cross-sectional dependence to examine the existence of correlation between the cross-sectional units. We obtain Pesaran's test statistic result as 13.625 with a p-value of 0.000 and reject the null hypothesis of no correlation between cross-sectional units. We thus confirm that there is a correlation between the residuals from the models applied to the cross-sectional units which can also be considered a sign of spatial correlation.

Table 2: Beusch-Pagan LM and Hausman Tests Results

Tests/Models	**SDM**	**SAR**	**SEM**	**SAC**
Breusch-Pagan LM	3035.611	3091.652	3091.652	3091.652
	(0.000)	(0.000)	(0.000)	(0.000)
Breusch-Pagan ALM	2318.351	2354.877	2354.877	2354.877
	(0.000)	(0.000)	(0.000)	(0.000)
Hausman	66.822	82.291		
	(7.220)	(1.690)		

Note: Numbers in parentheses represents p-values. The statistics of SAR and SEM models are the same as SAC model because the two models are nested within SAC model.

In order to validate the existence of spatial effect in the sample, we apply spatial panel autocorrelation tests, including Moran's MI test, Geary's GC test and Getis-Ord's GO test, following the methodology of Elhorst (2010). Table 3 reports test statistics of these three tests. According to the results, we reject the null hypothesis which specifies error has no autocorrelation (λ=0) and thus confirm that there are spatial correlations in the sample.

Table 3: Spatial Autocorrelation Tests

Moran's MI test			Geary's GC test			Getis-Ord's GO test		
Statistic	P-value	Z-Value	Statistic	P-value	Z-Value	Statistic	P-value	Z-Value
-0.034	0.041	-2.047	1.061	0.025	2.242	0.166	0.041	2.047

Elhorst's (2010) methodology for appropriate spatial model selection suggests applying Lagrange Multiplier tests to the sample. Hence, In the next step of spatial model selection, we use LM error test proposed by Burridge (1980) and LM lag test originally developed by Anselin (1988) and Anselin *et al.* (1996) to examine whether error has general spatial autocorrelation and whether spatial lagged dependent variable has spatially autocorrelated. The results of the Lagrange Multiplier tests are provided in Table 4.

Table 4: Lagrange multiplier tests for spatial error and lag dependent variable

	Burridge LM Error		Anselin's LM Lag		General LM SAC (LMerror+LMlag)	
	Standard	**Robust**	**Standard**	**Robust**	**Standard**	**Robust**
Statistic	3.836	9.133	0.028	5.326	9.162	9.161
P-value	(0.050)	(0.002)	(0.866)	(0.021)	(0.010)	(0.010)

Note: Burridge H_0: Error has no spatial autocorrelation. Anselin H_0: Spatial lagged dependent variable has no spatial autocorrelation. General LM SAC H_0: No general spatial autocorrelation.

According to Table 4, General LM SAC test, which tests the spatial error and spatial lag together, shows that at least one of the spatial correlations (spatial error or spatial lag) is exist in the sample. According to the LM error test, the null hypothesis is rejected and it is confirmed that there is a spatial error in the sample. The LM lag test reports that there is also a spatial autocorrelation in the spatial lag dependent variable. Results from spatial autocorrelation tests presented in Table 3 and LM tests in Table 4 consistently suggest the existence of both spatial error and spatial lagged effects in the sample which confirms the necessity to consider spatial interactions among the dependent variables and the residuals of cross-sectional units (provinces) in the estimation models. Accordingly, the most appropriate model for the data set used in the current study is the SAC model, which is detailed in Eq. (7) above and captures the effect of the spatially autocorrelated error terms and the spatially lagged independent variable ($\rho \neq 0, \lambda \neq 0$ and $\theta = 0$).

Estimation results

Main results of the spatial econometrics analysis and decomposition of marginal effects are presented in Table 5. Results in the second column of the table report the estimation results of SAC model and the following columns stand for the marginal effects of the independent variables on agricultural export based on the methodology suggested by Lesage and Pace (2009). In addition, spatial lag term is presented as *W*AgrExp and W* error* denotes spatial error term and ρ and λ represents the coefficient of spatial correlations described in the previous section.

Table 5: Spatial Regression Estimation Results and Decomposition of Spatial Effects for SAC Model

Variables	SAC Model	LR Direct Effect	LR Indirect Effect	LR Total Effect
AreaSupport	-0.786***	-0.815***	-0.517***	-1.332***
	(0.160)	(0.167)	(0.132)	(0.253)
DiffSupport	0.033*	0.034*	0.021	0.055*
	(0.019)	(0.019)	(0.013)	(0.031)
Production	0.716**	0.782***	0.505**	1.286***
	(0.280)	(0.280)	(0.219)	(0.474)
AgrGDP	0.029	0.030	0.019	0.049
	(0.084)	(0.087)	(0.057)	(0.143)
Value	-0.009	-0.008	-0.004	-0.013
	(0.277)	(0.268)	(0.183)	(0.447)
Mechanization	0.847*	0.897*	0.563*	1.460*
	(0.560)	(0.570)	(0.381)	(0.925)
Precipitation	-0.036	-0.036	-0.022	-0.059
	(0.089)	(0.097)	(0.065)	(0.161)
Temperature	0.245	0.238	0.148	0.386
	(0.488)	(0.466)	(0.311)	(0.769)
W*AgrExp (ρ)	0.411***			
	(0.064)			
W*error (λ)	-0.451***			
	(0.086)			
σ^2	10.669***			
	(0.462)			
Observations	1,539	1,539	1,539	1,539
Number of Provinces	81	81	81	81

Note: Coefficients show elasticities. Numbers in parentheses represent standard errors.
* shows p-values of the coefficients, * %10, ** %5 and *** %1.

The results reported in Table 5 show that spatial correlation coefficients of the model are significant at 1% level suggesting that there is a significant spatial correlation in the effect of two main explanatory variables, *AreaSupp* and *DiffSupp*, and other control variables on agricultural foreign trade in the sample. In detail, the coefficient of spatial lag term (ρ) is significant and positive with an estimated value of 0.411, suggesting that an average one percent increase in agricultural export in neighboring provinces will lead to an increase of 0.41% in agricultural export of the focal province, *ceteris paribus*. Based on this particular result, it can be said that there are strong spatial spillover effects on agricultural export. The coefficient of spatial error term (λ) is also highly significant indicating that a random shock in a spatially omitted variable that might affect agricultural export in a particular province triggers a change in agricultural export. The estimated coefficient of area-based agricultural supports (*AreaSupp*) is negative and significant recommending that every 1% increase in area-based agricultural supports will result in 0.786% reduction in agricultural export. This particular result proposes that area-based agricultural supports are inefficient and have negative effects on the agricultural foreign export in Turkey. The negative impact of area-based agricultural supports on international trade is not a surprising result because previous studies have revealed that such agricultural supports are not effective and cause negativities on the sector (Kandemir, 2011; Aktaş *et al.,* 2015). However, the results also report that agricultural deficiency payments have positive effect on provincial agricultural exports. More specifically, the estimated coefficient of deficiency supports (*DiffSupp*) is significant and positive with an estimated value of 0.033 suggesting that a 10% rise in deficiency supports will lead to a 0.3% increase in the amount of agricultural export in the study provinces. Compared to the negative effect of area-based agricultural supports, the positive effect of deficiency payment supports on agricultural exports is quite small. This fact prpounds that overall agricultural supports contribute to the foreign trade

deficit of the country and reduce the competitiveness of producers in foreign markets.

The estimated results of the control variables report that only agricultural production (*Prod*) and mechanization (*Mech*) in the sector have statistically significant influences on the provincial agricultural export. Specifically, estimated coefficients *Prod* of and *Mech* variables are positive with a value of 0.716 and 0.847, respectively, suggesting that every %1 increase in agricultural production and mechanization is associated with an increase of 0.7% and 0.8% in agricultural export in the study provinces. All other control variables employed in the estimation model have no significant effect on the amount of agricultural export in the study provinces.

The columns 3 to 5 in Table 5 present marginal effects of the independent variables on agricultural exports based on the methodology of Lesage and Pace (2009). In detail, the direct, indirect and total effects are the decompositions of the effects of contributing factors on agricultural export estimated by spatial panel regression model. More specifically, the direct effect here refers to the marginal effects of an explanatory variable on the focal province's agricultural export. The indirect effect, on the other hand, can be considered as a spatial spillover effect since it captures the marginal effect of neihgboring provinces' explanatory variables on agricultural export of focal province. Moreover, the total effect provides an aggregated composite marginal effects between variables. Based on the results, the direct elasticity of *AreaSupp* to *AgrExp* is -0.815 which indicates that increasing area-based agricultural supports in the focal area by %1, the amount of agricultural export in the focal province will directly decrease by %0.815. Indirect effect *AreaSupp* of *AgrExp* on is -0.517 recommending that a 10% increase in area-based agricultural supports in the neighboring provinces will result in 5.17% reduction in agricultural export of the focal province. Taken

together, the total effect is -1.332 indicating that a 1% rise in area-based agricultural supports will lead to an overall 1.3% reduction in the amount of agricultural exports in the focal province. However, marginal effects of deficiency payments support on agricultural exports are positive and significant at 10% level except for its indirect effect. Specifically, a 10% increase in deficiency supports will directly rise the focal province's agricultural export by 0.34% while the same increase experienced in the neighboring states have no statistically significant indirect effect on the focal province's agricultural export. However, the total effect of the increases in deficiency supports on the focal province's agricultural export is positive and significant with a value of 0.055. Among the control variables, only the direct and spillover effects of agricultural production and mechanization variables on agricultural export are statistically significant. More specifically, while a 1% increase in agricultural production in the focal province directly increases the agricultural exports of that province by 0.782%, the rise in the agricultural production of neighboring provinces indirectly rises the agricultural exports of the focal province by 0.5%. On the other hand, agricultural mechanization has the similar direct and indirect marginal effects on agricultural exports of the study provinces.

Conclusion and Policy Recommendation

Agricultural foreign trade is among the leading factors in the economic development of developing countries such as Turkey. In recent years, financial incentives for the agricultural sector in the country have increased steadily and it has been revealed by the previous studies that these agricultural supports have significant effects on sectoral indicators. The agricultural supports are of great importance especially for the competitiveness of the producers in foreign markets. Therefore, this study aimed to examine the effects of agricultural supports, along with other related factors,

on agricultural exports. Using spatial econometric techniques and a panel dataset covering 81 provinces and spanning from 2002 to 2020, we spatially investigate how the agricultural supports and other factors affect agricultural export in Turkey. More specifically, we examine how changes in area-based supports and deficiency payments supports, which constitute the large part of the total agricultural support given in the country, are related to the changes in the amount of agricultural exports in the study provinces. Taking into account the spatial effects of the variables used in the current study, we employed spatial econometrics models for the study time period on the basis of econometric test techniques such as spatial autocorrelation and Lagrange multiplier error and lag tests. We also estimate the direct and spillover effects of the financial supports for the agricultural sector on agricultural export.

Our findings suggest that area-based agricultural supports have negative impact on agricultural export while deficiency payments supports are positively correlated with the amount of agricultural exports in the study provinces. The results obtained from the decomposition analyses propose that a province's agricultural export is not only influenced by the agricultural supports given for that province but also affected by the supports given for agricultural activities in neighboring provinces. Therefore, based on this particular result, it can be said that agricultural export in a region is subject to spatial spillover effect of adjacent provinces' agricultural activities. More specifically, the fact that the direct and indirect elasticities of agricultural supports to agricultural export are close to each other indicates that the amount of agricultural exports is not mainly affected by the adjustment of agricultural supports and activities in the focal province but also influenced by the changes in agricultural sector of contiguous provinces. In addition, our empirical results indicate the improving effects of agricultural production and mechanization in the sector on the agricultural exports.

According to the study results, although deficiency payment supports play promotional effects on agricultural exports, the negative effect of area-based supports on agricultural foreign trade is greater than the positive effect of deficiency payment supports. Therefore, it can be said that the support given by the government to the sector does not increase the competitiveness of the producers in foreign markets. The findings of previous studies also show that area-based supports affect the agricultural sector in Turkey negatively (Kandemir, 2011; Aktaş *et al.,* 2015). Therefore, it is obvious that agricultural supports have a negative impact on the current account balance of the country. For this reason, policy makers should renounce area-based supports immediately and instead implement policies that reduce input prices for producers and assist them in marketing agricultural commodities. Moreover, as detailed above, since there is no high regional barriers in Turkey's agricultural market, it is inevitable that agricultural activities in a region will be positively or negatively affected by agricultural developments in neighboring regions and thus policy makers should make the necessary policies by taking these regional interactions into account.

Although the current study is applied in Turkey, it may also have implications for other developing countries where the agriculture is the locomotive sector and no existence of high regional barriers. Future studies may develop the current study by examining the factors affecting the agricultural foreign trade in the country using spatial econometric models at different regional classifications.

References

Aktaş, E., Altiok, M., & Songur, M. (2015). Farklı ülkelerdeki tarımsal destekleme politikalarının tarımsal üretim üzerine etkisinin karşılaştırmalı analizi. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, *15*(4), 55-74.

Allanson, P. (2006). The redistributive effects of agricultural policy on Scottish farm incomes. *Journal of agricultural economics*, *57*(1), 117-128.

Anselin, L. (1988). Model validation in spatial econometrics: a review and evaluation of alternative approaches. *International Regional Science Review*, *11*(3), 279-316.

Anselin, L., Bera, A. K., Florax, R., & Yoon, M. J. (1996). Simple diagnostic tests for spatial dependence. *Regional science and urban economics*, *26*(1), 77-104.

Arısoy, H. (2020). Impact of agricultural supports on competitiveness of agricultural products. *Agricultural Economics*, *66*(6), 286-295.

Ay, A., & Yapar, S. (2005). Dünya ticaret örgütü tarim anlaşmasi ve Türkiye. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (13), 57-80.

Benavides-Perales, Guillermo, Isela Elizabeth Téllez-León, and Francisco Venegas-Martinez. "The impact of banking and external sectors on Mexican agriculture in the period 1995–2015." *Agricultural Economics* 64, no. 1 (2018): 36-49.

Burridge, P. (1980). On the Cliff-Ord test for spatial correlation. *Journal of the Royal Statistical Society: Series B (Methodological)*, *42*(1), 107-108.

Čechura, L. (2008). Theoretical-empirical analysis of the role of the SGAFF in financing of farmers' activities. *Agricultural Economics*, *54*(10), 476.

Chongzheng X., Xiwu G. (2005). An empirical analysis on the support status of rural finance increasing farmer income. *Journal of Financial Research, 9*.173–185.

Darrat, A. F. (1999). Are financial deepening and economic growth causally related? Another look at the evidence. *International Economic Journal*, *13*(3), 19-35.

Elhorst, J. P. (2010). Applied spatial econometrics: raising the bar. *Spatial economic analysis*, *5*(1), 9-28.

Erdal, G., Erdal, H. ve Esengün, K. (2012). The Effects of Exchange Rate Volatility on Trade: Evidence from Turkish Agricultural Trade. *Applied Economics Letters, 19*(3), 297-303.

Erokhin, V., Ivolga, A., & Heijman, W. J. M. (2014). Trade liberalization and state support of agriculture: effects for developing countries. *Agricultural economics*, *60*(11), 524-537.

Eruygur, H. O. (2008). Tarımda AB ortak dış tarifesi ve Türkiye: Üçüncü ülkelere dış ticaret etkileri. *Iktisat Isletme ve Finans*, *23*(265), 17-33.

Greenwood, J., & Jovanovic, B. (1990). Financial development, growth, and the distribution of income. *Journal of political Economy*, *98*(5, Part 1), 1076-1107.

Gündüz, M. A., Afşar, B., & Kalayci, S. (2017). Tarım ürünleri ihracatında döviz kuru ve petrol fiyatlarının etkisi: Türkiye örneği. *Journal of Business Research, 9*(4), 805-819.

Jayne, T. S., & Boughton, D. (2019). What kind of agricultural strategies lead to broad-based growth: Implications for country-led agricultural investment programs. *Gates Open Res*, *3*(901), 901.

Kalaycı, C. (2017). Serbest ticaret anlaşmalarının Türkiye'nin dış ticaretine etkileri: açıklanmış karşılaştırmalı üstünlükler endeksi uygulaması. *Uluslararası Ekonomi ve Yenilik Dergisi*, *3*(2), 133-147.

Kandemir, O. (2011). Tarımsal destekleme politikalarının kırsal kalkınmaya etkisi. *Ekonomi Bilimleri Dergisi*, *3*(1), 103-113.

Karakaş, G., & Erdal, G. (2017). Döviz kuru oynaklığının Türkiye'nin tarımsal dış ticaretine etkisi. *Gıda Bilim ve Teknoloji Dergisi, 5*(6), 668-675.

Kelejian, H. H. (2008). A spatial J-test for model specification against a single or a set of non-nested alternatives. *Letters in Spatial and Resource Sciences*, *1*(1), 3-11.

Koç, A. A., Yu, T. E., Kıymaz, T., & Sharma, B. P. (2019). Effects of government supports and credits on Turkish agriculture: A spatial panel analysis. *Journal of Agribusiness in Developing and Emerging Economies*.

Koester U. (2000): CAP is Something we Can be Proud of. Working Paper, University of Kiel.

LeSage, J., & Pace, R. K. (2009). *Introduction to spatial econometrics*. Chapman and Hall/CRC.

Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The review of economic studies*, *60*(3), 531-542.

Monke, J. (2005). Agricultural Credit: Institutions and Issues. Available at https://crsreports.congress.gov/product/pdf/R/R46768 (Access date: 28.10.2021).

Odedokun, M. O. (1992). Supply-leading and demand-following relationship between economic activities and development banking in developing countries: an international evidence. *Singapore Economic Review*, *37*(1), 46-58.

Özdemir-Bektaş, E. (2018). *Dünya Ticaret Örgütü Tarım Anlaşması ve müzakerelerinin tarım ürünleri dış ticaretine etkisi–Türkiye örneği* (Master›s thesis, Dış Ticaret Enstitüsü).

Özkul, G., & Öztürk, A. (2019). Yapisal kirilmalar eşliğinde döviz kuru oynakliği ile türkiye'nin sektörel diş ticareti arasindaki etkileşim. *Bolu Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *19*(4), 1069-1095.

Rioja, F., & Valev, N. (2004). Finance and the sources of growth at various stages of economic development. *Economic Inquiry*, *42*(1), 127-140.

Sever, E. (2012). Döviz Kuru Dalgalanmalarının Tarımsal Dış Ticarete Etkisi: Türkiye Örneği. *Akademik Araştırmalar ve Çalışmalar Dergisi, 4*(7), 17-35.

Spicka, J., Hlavsa, T., Soukupova, K., & Stolbova, M. (2019). Approaches to estimation the farm-level economic viability and sustainability in agriculture: A literature review. *Agricultural Economics*, *65*(6), 289-297.

Terin, M., Keskin, A., & Terin, S. (2012). Gümrük Birliği'nin Türkiye-AB Tarım Ürünleri Dış Ticareti Üzerine Etkileri. *Atatürk Üniversitesi Ziraat Fakültesi Dergisi*, *43*(2), 133-139.

Yang, F., Urban, K., Brockmeier, M., Bekkers, E., & Francois, J. (2017). Impact of increasing agricultural domestic support on China's food prices considering incomplete international agricultural price transmission. *China Agricultural Economic Review*, *9*(4), 535-557.

Yanıkkaya, H., & KoraL, Z. A. (2017). Do Agricultural Support Payments Raise Olive Oil Exports in Turkey? *Economic Issues, Crises, Finance and Agriculture*, 170.

Yuandong, G., Tao, W., Wen, Y., & Xiaohua, W. (2013). A spatial econometric study on effects of fiscal and financial supports for agriculture in China. *Agricultural Economics*, *59*(7), 315-332.

Ease Of Doing Business Index In Global Trade And Turkey: A Comparative Review

M. Mustafa AKKAN[1]
Tufan YAYLA[2]

Abstract

The Ease of Doing Business Index, which has been prepared annually by the World Bank since 2004, analyzes the business regulations affecting the investment climate in member countries. In the index; a comparative evaluation is presented based on various indicators such as company formation, tax policies, employment, licensing process, investor protection. The top countries are those that are easy to do business with, regular and have strong protections for their assets. Improving the investment environment facilitates the inflow of foreign direct investment and gives countries momentum towards economic growth. Turkey, on the other hand, seems to have failed to make the expected economic leap since the 2008 crisis. Foreign direct investments in the country have decreased significantly, especially in the last three years. In this study, the situation of Turkey, the main countries and developing countries in the Ease of Doing Business Index will be examined comparatively. The change in foreign direct investments in the relevant countries will be analyzed and discussed together with the Index data.

Keywords: International Trade, Economic Growth, Ease of Doing Business, Foreign Direct Investment

1 Lect. KTO Karatay University, muhammet.mustafa.akkan@karatay.edu.tr
2 Lect. Bilecik Şeyh Edebali University, tufan.yayla@bilecik.edu.tr

Introduction

Today, the inflow of foreign capital in the form of foreign direct investment (FDI) has increased significantly in developing countries over the past few decades. FDI entry meets increased investment requirements to boost economic growth at a higher rate and helps macroeconomic stability in the economy. The inflow of foreign capital relieves the pressures on the balance of payments and makes it somewhat easier for countries. Thanks to FDI, information and technology are transferred from developed countries to developing countries. This positively affects the development of developing countries.

In order to invest in a country, the availability of that country's investment ecosystem is very important. The appropriate investment environment shows that the owners of the capital can do business with the relevant country and allows them to choose the country. Empirical evidence suggests that ease of doing business is the most important factor determining the investment environment and that the investment environment is one of the reasons that triggers the inflow of foreign direct investment. Therefore, it is an important fact that the convenience of doing business needs to be improved in order to increase domestic investments and foreign direct investments and to make economic growth more stable. When investing in relevant countries, there are certain indicators that foreign investors take into account and use (Yasar ve Yasar, 2017: 102). In this context, the "Ease of Doing Business Index" is used to evaluate the suitability of the investment environment in a country and the index analyzes the business regulations affecting the investment environment in member countries. In the index; a comparative assessment is offered based on various indicators such as corporate establishment, tax policies, employment, licensing process, investor protection. The top countries are those that are easy to do business with, regular and have strong protections for their assets.

In this study, the situation of Turkey, the main countries and developing countries in the Ease of Doing Business Index will be examined comparatively. The change in foreign direct investments in the relevant countries will be analyzed and discussed together with the Index data.

1. Ease of Doing Business Index

The "Ease of Doing Business Index" published by the World Bank since 2003 is one of the world's leading reports and reveals important data on the world economies that may affect the investment environment of these countries (Koc, Kaya & Senel, 2017:19). The main purpose of the report is to make a ranking by evaluating the arrangements made in the name of the suitability of the investment environment of the countries and the ease of doing business by country. The World Bank defines its Ease of Doing Business Index as "encouraging economies to compete towards more efficient regulation and providing measurable criteria for reform by collecting and analyzing comprehensive quantitative data to compare business regulatory environments in the economy and over time." (Kangal, Eroglu & Coban, 2018:24).

In these reports, an annual comparative evaluation is presented based on various indicators such as company establishment, tax policies, employment, licensing process, and investor protection. The report sets forth the duration and costs of transactions such as fulfilling the conditions set by the government in establishing and maintaining a business, international trade, paying taxes and closing a business (Yardımcıoglu, Ilhan & Gerekli, 2014: 3). The indices that make up the report can be thought of as consisting of two types of indicators. First; The aim is to evaluate the efficiency of such processes, such as establishing a company or accessing electricity, to measure the complexity and costs incurred of regulatory procedures. The second is; measure of the strength of legal institutions. The specific features of the labor laws implemented

by the countries are evaluated. An example of this is the protection of foreign investors or the convenience of obtaining loans (Kılıc & Aktas Senkardesler, 2020: 171). The most recent report, published in 2020, assesses and ranks 190 countries according to 12 criteria. The 12 criteria for evaluation are as follows (Doing Business 2020: 20):

1. Business establishment/start-up procedures: It covers the procedures that the entrepreneurs have to implement in order to establish an official business, the completion times of these procedures, the capital requirement and costs.

2. Construction permit acquisition procedures: It covers the procedures required for entrepreneurs to build a place for the official business established, the completion time, cost, building quality control mechanisms of each of these procedures.

3. Access to electricity connection: Procedures for its supply to the electricity grid cover time and cost, reliability of electricity supply and transparency of tariffs.

4. Real estate registration: Procedures for the transfer of a property, time and cost and the quality of the land management system for entrepreneurs are measured.

5. Access to credit: It covers the content and accessibility of credit information of credit reporting organizations, while looking at the legal rights, collateral transactions and bankruptcy laws of borrowers and creditors regarding how much existing laws and regulations facilitate the provision of credit.

6. Investor protection: Covers the protection of minority shareholders' rights in related party transactions and corporate governance.

7. Tax payment: Payments, time and total tax and contribution ratio processes are measured for a company to comply with all tax regulations.

8. Cross-border trade: Time and costs for facilitating import and export processes are measured.

9. Implementation of contracts: The time and cost required to resolve a commercial dispute and the quality of judicial processes for entrepreneurs are measured.

10. Liquidation transactions: The return rate for the liquidation of the enterprise and the framework of liquidation activity cover the index.

11. Labor regulations: Covers issues such as the content of the employment regulation and flexibility.

12. Agreement with the Government: It covers procedures and time-regulating structure to participate in and win a construction work contract through public procurement and public procurement.

2. Foreign Direct Investment

Foreign investment is defined as the movement of capital funds from one country to another. The movement of capital from one country to another is through international money and capital markets or in the form of direct investment. Foreign direct investment can be defined as the establishment of a new company in foreign countries, alone or with partners, by spreading the production of a company beyond the borders of the country where the head office is located, or the acquisition of an existing domestic company or making it dependent on itself by increasing its capital (Kurtaran, 2007:367).

The issue of foreign direct investment can be handled in two ways, in terms of host countries and foreign investors. Host countries seek to gain some social and economic benefits through foreign investments. These include increasing employment, utilizing natural resources, improving management and production knowledge, reducing the foreign trade deficit, and increasing economic growth. For foreign investors, being close to cheap input sources and benefiting from the profit opportunities offered by an unsaturated market can be counted as priority

targets. The employment effects that foreign direct investments will create in the host countries, among other effects, is one of the issues that host countries, especially developing economies give the most importance (Karagoz, 2007: 931).

Foreign direct investments are considered as one of the necessary and important tools for the realization of economic growth and development goals all over the world. When a foreign direct investment is made, the firm making this investment enters into a relatively long-term relationship with the country in which it invests. Therefore, it is not possible for such foreign investments to suddenly leave the host countries. Moreover, foreign direct investments often bring other opportunities such as new technology, new management techniques, employment creation and new access channels to world markets, as well as capital, to the host countries that accept them (Saray, 2011: 384). Therefore, host countries mostly prefer foreign direct investment types. Because the expectations of the host country are realized only through direct investments. For this reason, countries have to attract such investments and give them legal assurance. Governments are trying to attract foreign investments to their lands by providing more favorable political and economic environmental conditions and applying various incentive measures (Kurtaran, 2007: 369).

Well-planned and effectively directed foreign direct investments create various positive economic effects on the economy of the host country where the investment is made. These are effects such as production, employment, income, export growth, balance of payments, economic development and general welfare. The main effect of foreign direct investments is the net contribution of the host country to the national income (Mucuk & Demirsel, 2009: 366). However, in addition to the positive effects mentioned, foreign direct investments increase the control of foreigners over the economy by providing a direct control over the business management, while applying advanced production techniques

on the one hand, disrupting the economic integrity by laying the groundwork for the continuation of the traditional structure on the other, removing protective restrictions such as customs tariffs and import bans. It also discusses possible negative effects such as creating unfair competition against small-scale domestic companies, causing exclusion and resulting in technological dependency (Ullah, Shah & Khan, 2014: 2).

3. Analysis of Turkey and Selected Countries

In the study, the ease of doing business index and foreign direct investment data were examined between 2015-2019. When making comparisons between countries, two separate country communities were formed. The first of these is the countries that are mostly in the top 10 among the selected years in the ease of doing business index. The second community includes 10 developing countries. In addition to the countries in these two communities, Turkey's position in the index and foreign direct investment inflows to the relevant countries will be analyzed together.

The first country community includes New Zealand, Singapore, Hong Kong, Denmark, Korea, United States, Georgia, United Kingdom, Norway, Sweden, and Turkey. The rankings of the relevant countries between 2015 and 2019 in the ease of doing business index are shown in the table below.

Table 1. Ease of Doing Business Ranking 2015-2019

Ease of Doing Business Ranking					
Economy/Year	**2015**	**2016**	**2017**	**2018**	**2019**
New Zealand	2	2	1	1	1
Singapore	1	1	2	2	2
Hong Kong	3	5	4	5	4
Denmark	4	3	3	3	3

Korea Rep.	5	4	5	4	5
United States	7	7	8	6	8
Georgia	15	24	16	9	6
United Kingdom	8	6	7	7	9
Norway	6	9	6	8	7
Sweden	11	8	9	10	12
Turkey	55	55	69	60	43

Source: Doing Business 2015-2019, https://www.doingbusiness.org/

According to Table 1, New Zealand and Singapore were the countries that consistently ranked in the top two in the data years. Georgia, on the other hand, has jumped the list especially in the last two years and has found itself in the top ten. The change in the ranking of other countries has not changed much over the years. Turkey fell from 55th place in 2015 and 2016 to 69th place in 2017 and reached 43rd place on the 2019 list.

Table 2. Foreign Direct Invesment, Net Inflows

Foreign Direct Investment, Net Inflows (Million USD Dollars)					
Economy/Year	**2015**	**2016**	**2017**	**2018**	**2019**
New Zealand	-73.372	1.875	2.093	2.614	2.943
Singapore	69.774	67.912	100.786	83.110	120.439
Hong Kong	181.047	133.259	125.716	97.036	58.299
Denmark	1.850	7.804	3.607	8.142	-7.499
Korea Rep.	4.104	12.104	17.912	12.182	9.634
United States	511.434	474.388	366.995	261.482	351.631
Georgia	1.735	1.658	1.918	1.259	1.341
United Kingdom	45.333	324.813	125.358	81.158	2.236
Norway	7.274	-18.668	5.900	-5.664	17.055
Sweden	10.254	15.642	28.044	-952	16.611
Turkey	19.263	13.835	11.042	12.822	9.266

Source: World Bank Data Base, https://databank.worldbank.org

Table 2 shows foreign direct investment net inflows to the relevant countries between the years. Foreign direct investment inflow to New Zealand, which is at the top of the list, has increased since 2016. Foreign direct investment in second-placed Singapore decreased in 2018 after the rise in 2017 and increased again in 2019. Although the economy ranks high in the ease of doing business index, the data on foreign direct investment inflows has declined over the years.

Similarly, the inflow of foreign direct investment into the United Kingdom has decreased significantly since 2017. In this context, when we look at Turkey's situation, it is seen that the inflow of foreign direct investors to the country has decreased since 2015. Although 2018 was an increase compared to the previous year, a significant decrease is observed in 2019. It should be noted that Covid-19 also had an impact on the overall decrease in foreign direct investment in 2019.

Table 3. Ease of Doing Business Ranking 2015-2019

Ease of Doing Business Ranking					
Economy/Year	2015	2016	2017	2018	2019
China	90	84	78	78	31
Russian Federation	62	51	40	35	28
India	142	130	130	100	63
Mexico	39	38	47	49	60
Brazil	120	116	123	125	124
Argentina	124	121	116	117	126
South Africa	43	73	74	82	84
Indonesia	114	109	91	72	73
Hungary	54	42	41	48	52
Korea Rep.	5	4	5	4	5
Turkey	55	55	69	60	43

Source: Doing Business 2015-2019, https://www.doingbusiness.org/

Table 3 shows the ranking of emerging economies, as a second country community in the ease of doing business index between 2015 and 2019. Looking at the list, it is seen that China, Indonesia, the Russian Federation, India and Indonesia in particular have shown a significant rise. On the other hand, the opposite is true for Mexico, Argentina, South Africa and Hungary. Korea Republic, has maintained its top position over the years. Turkey, has shown a remarkable increase in ranking since 2017.

Table 4. Foreign Direct Invesment, Net Inflows

Foreign Direct Investment, Net Inflows (Million USD Dollars)					
Economy/Year	2015	2016	2017	2018	2019
China	242.489	174.749	166.083	235.365	187.169
Russian Federation	6.852	32.538	28.557	8.784	31.974
India	44.009	44.458	39.966	42.117	50.610
Mexico	35.737	38.779	33.016	37.643	29.375
Brazil	64.738	74.294	68.885	78.162	69.174
Argentina	11.758	3.260	11.516	11.872	6.663
South Africa	1.521	2.215	2.058	5.569	5.116
Indonesia	19.779	4.541	20.510	18.909	24.993
Hungary	-5.266	69.881	-12.133	-64.701	92.164
Korea Rep.	4.104	12.104	17.912	12.182	9.634
Turkey	19.263	13.835	11.042	12.822	9.266

Source: World Bank Data Base, https://databank.worldbank.org

Table 4 shows foreign direct investment net inflows to selected countries between 2015 and 2019. In this context, foreign direct investment inflows in China decreased in 2016 and 2017, and a significant increase was recorded in 2018. In 2019, despite the rise in the ease of doing business index, there was a decrease in foreign direct investment inflows. The inflow of foreign direct investment into Russia increased significantly, especially in 2016. After the

significant decline in 2018, a significant increase in the inflow of foreign direct investment was observed in parallel with the ease of doing business index ranking. In addition, foreign direct investment inflows in India and Indonesia have increased similarly to the rise in the index position.

In South Africa, the opposite is true. Although the country's index ranking has decreased over the years, foreign direct investment inflows have increased at a certain level. There are significant fluctuations in Hungary. For example, although there was an increase in the index ranking in 2017, a negative situation emerged in the inflow of foreign direct investment. Looking at Mexico, it is seen that foreign direct investment inflows have changed in parallel with the decrease and increase in the index ranking.

When the situation of Turkey in this group is analyzed, a decrease was observed in foreign direct investment inflow in parallel with the decrease in the index ranking in 2017. However, despite the significant increase in the index ranking in 2019, a significant decrease was recorded in foreign direct investment inflows.

4. Conclusion

The ease of doing business index is one of the reports that investors frequently examine. In the related report, the development of the countries and the facilities provided in the relevant headings affect the decisions of the investors positively. In this context, significant capital and investment inflows have been realized in the last 20 years, especially to developing countries. It is possible to say that foreign direct investments made to countries develop according to the situation of the countries in the ease of doing business index. As a matter of fact, this issue was expressed in the review section of the study.

However, as can be seen, foreign direct investment inflows to some countries and economies are not compatible with the change in index rankings. The reason for this is that investment decisions are not made only according to the rankings in the index. There are many factors that affect investment decisions, the ease of doing business index is one of them, but it does not cover all of them. Economic, political, social and natural factors also significantly affect the investment decision. Investors make decisions by taking all the facts into account. On the other hand, it seems that foreign direct investment inflows decreased in most of the countries examined in the study in 2019. It should be known that the Covid-19 pandemic has a serious impact on this situation.

Looking at the situation of Turkey in the light of the relevant data in the study, it is seen that the foreign direct investment inflow moves in parallel with the index data. The exception to this situation is 2019. While Turkey showed a significant increase in the index rankings in 2019, a significant decrease was recorded in foreign direct investment inflows.

References

Ilhan, A. & Yardimcioglu, M. & Gerekli, I. (2014). 2010-2013 Yılları Arasında Iş Yapma Endeksi Göstergelerine Göre Türkiye ve Meksika Ülkelerinin Karşılaştırılması. KSU İİBF Dergisi. 04. 1-34. https://www.researchgate.net/publication/283645223_2010-2013_YILLARI_ARASINDA_IS_YAPMA_ENDEKSI_GOSTERGELERINE_GORE_TURKIYE_ve_MEKSIKA_ULKELERININ_KARSILASTIRILMASI

Kangal, N., Eroglu, İ. & Coban, M. N. (2018). İş Yapma Kolaylığı Kapsamında Mint Ülkeleri Üzerine Bir Değerlendirme. Sosyal Bilimler Araştırmaları Dergisi, 13 (2), 21-48. https://dergipark.org.tr/tr/pub/gopsbad/issue/41638/502367

Karagoz , D. K. (2007). Türkiye'de Doğrudan Yabancı Yatırım Girişlerini Belirleyen Faktörler: 1970 – 2005. Yaşar Üniversitesi E-Dergisi, 2 (8), 929-948. https://dergipark.org.tr/tr/pub/jyasar/issue/19120/202896

Kılıç, F. & Aktaş Senkardesler, R. (2020). İş Yapma Kolaylığı ve Ekonomik Büyüme Arasındaki İlişki. Beykoz Akademi Dergisi, 8 (2), 170-179. DOI: 10.14514/byk.m.26515393.2020.8/2.170-179

Koc, E. & Senel, M. C. (2017). Dünyada ve Türkiye'de Ekonomik Göstergeler-İş Yapma/İş Kurma Kolaylığı Endeksi. Mühendis ve Makina, 58 (685), 17-42. https://dergipark.org.tr/tr/pub/muhendismakina/issue/48831/622065

Kurtaran, A. (2010). Doğrudan Yabancı Yatırım Kararları ve Belirleyicileri. Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 10 (2), 367-382. https://dergipark.org.tr/tr/pub/ataunisosbil/issue/2820/38025

Mucuk, M. & Demirsel, M. T. (2009). Türkiye'de Doğrudan Yabancı Yatırımlar ve Ekonomik Performans. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, (21), 365-373. https://dergipark.org.tr/tr/pub/susbed/issue/61797/924404

Saray, M. O. (2011). Doğrudan yabancı yatırımlar-istihdam ilişkisi: Türkiye örneği. Maliye Dergisi, 0(161), 381-403. https://www.academia.edu/31346298/Do%C4%9Frudan_yabanc%C4%B1_yat%C4%B1r%C4%B1mlar-istihdam_ili%C5%9Fkisi_T%C3%BCrkiye_%C3%B6rne%C4%9Fi

Ullah, I., Shah, M., & Khan, F. U. (2014). Domestic Investment, Foreign Direct Investment, and Economic Growth Nexus: A Case of Pakistan. Hindawi Publishing Corporation Economics Research International, 1-5. http://dx.doi.org/10.1155/2014/592719

World Bank Doing Business 2016, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB16-Full-Report.pdf

World Bank Doing Business 2017, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB17-Report.pdf

World Bank Doing Business 2018, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2018-Full-Report.pdf

World Bank Doing Business 2019, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2019-report_web-version.pdf

World Bank, Doing Business 2015, https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB15-Full-Report.pdf

World Bank, Foreign Direct Invesment, https://databank.worldbank.org/reports.aspx-?source=2&series=BX.KLT.DINV.CD.WD&country=#

Yasar, E. & Yasar, M. (2017). İş Yapma Kolaylıkları: Farklı Gelir Gruplarındaki Ülkeler Arasında Bir Karşılaştırma. Uluslararası Afro-Avrasya Araştırmaları Dergisi, 2 (4), 101-112. https://dergipark.org.tr/tr/pub/ijar/issue/33037/368534

A Rise of Tourism in Mediterranean Countries: Dutch Disease or Sustainable Growth [1]

Abidin Öncel[2]

Ali Kabasakal[3]

Nadege Clemence Sourou Yabo Agossou[4]

Abstract

Investigating whether the Mediterranean countries can rely on tourism for sustainable economic growth or they get trapped by the Dutch disease is worthwhile. For that purpose, fixed effect, ARDL, and Error Correction model analyses with panel data are used. While developed countries experience the spending effect, developing countries face the resource movement effect. The long-run results also bear out the evidence that developing countries are not exposed to the disease whereas the developed countries suffer. Evidence indicates that Albania, Algeria, Egypt, and Turkey have the disease while Morocco, Tunisia, and Israel don't show any sign of the disease in the short-run. Also, Croatia, Italy, Greece, Spain, and Slovenia don't show any sign but France and Malta show symptoms of the disease in the short-run.

Keywords: Dutch Disease, Tourism, Mediterranean Countries, Economic Growth, Auto Regressive Distributed Lag Model, Error Correction Model

JEL Classification: F63, O11, O47, Z32

1 This paper had been presented in International Economics, Finance, and Econometrics Syposium (EFEOS) in 17-18 May 2017

2 Assoc. Prof. Dr, Sakarya University, Sakarya, Turkey aoncel@sakarya.edu.tr

3 Prof. Dr, Sakarya University, Sakarya, Turkey kabasakal@sakarya.edu.tr

4 Postgraduate Student, Sakarya University, Sakarya, Turkey nadetubenies@gmail.com

1. Introduction

Achieving a high and sustainable economic growth is a common objective of both developed and developing countries. For many decades economists were interested in understanding the primary determinants conducive to it. Thus, many studies conclude that division of labor (by Adam Smith), trade facilities with a comparative advantage (by David Ricardo), substantial investment and saving rate that facilitate more cumulative capital per worker (by Solow), human capital institutions, and, policies (by Lewis) are viewed as necessary for economic growth. Furthermore, tourism is also perceived as a significant contributor to economic growth. Rapid expansion in tourism sector contributes to underemployment by creating new and diversified jobs (Yavuz, 2006). It is said to have provided to the total world revenue at 10.17% in 2016 (World Travel and Tourism Council [WTTC], 2016).

However, even though tourism sector presents the benefits mentioned above, in some circumstances, it is recognized to cause a decline in economic growth. This adverse effect may occur, for example, in the case of an over-exploitation of natural resources or in Dutch disease. This particular problem also called the curse of natural resources refers to the coexistence within an economy of a booming industry alongside with a lagging one. The Dutch disease model has been adjusted and expanded to the case of tourism instead of commodity exports in the economy by Copeland (1991).

By considering the different destinations of international tourism, the Mediterranean basin appears to have tremendous importance. In fact, due to its geographic advantages, it is the most significant destination for tourists: It contributes to the GDP at 11.32 %, more than 10.1%, the average contribution of tourism globally. According to the World Trade Organization (WTO), it is also expected to reach 500 million international arrivals by 2030 (WTO, 2012 as cited in GRID-Arendal, 2013). Since tourism can even have negative consequences, it's legitimate to ask the

following question: Apart from all these benefits and attractiveness of Mediterranean travel, is there any possibility of a downturn in these tourism-dependent countries, that is to say, is there any evidence of Dutch disease symptoms in Mediterranean countries?

In this study, the existence of Dutch disease in Mediterranean countries is investigated via static panel estimation frameworks followed by a dynamic panel model to check for the endogeneity problems (ARDL framework). The rest of the paper is organized as follows; the literature dealing with the relationship between tourism and Dutch disease is briefly summarized in Section 2. The methodology, model specification, and employed data in this paper are examined in Section 3 while section 4 deals with data analysis and discusses the findings. The conclusions and policy implications are presented at the end.

2. Literature Review

2.1. Theoretical Framework

The theory of the Dutch disease or paradox of plenty describes how a massive inflow of foreign capital can cause the real exchange rate to appreciate in a given country. Traditionally, the massive inflow of foreign capital results usually from natural resource discovery. It may also arise from any situation where bountiful in the wealth such as foreign capital, aid, remittances, or tourism revenues is conducive to economic growth followed by instances of slow growth and adverse development. This economic fainting occurred first in Holland in the 1960s, where a significant natural gas reserve discovery caused the Dutch guilder appreciation that harmed the economy.

Among other countries, various symptoms of the Dutch disease affected Equatorial Guinea, Iran, Mexico, Nigeria, Iraq, Saudi Arabia, Russia, Sudan, Norway, Venezuela, and Botswana in the past. Nevertheless, however, Botswana is a vibrant example of the success of a country that managed it well.

Spending and Resource Movement in Tourism

Theoretical works on resource curse can occur through several channels. In this paper, the channels are organized into two essential components: The spending effect (SE) and the resource movement effect (RME) (Rudd, 1996). Considering that a small open economy is producing two kinds of products, tradable (such as tourism, manufacturing, and agriculture), and non-tradable good both of which are available in the domestic market. Prices of tourism, manufacturing, and agriculture are determined exogenously by international supply and demand whereas the non-tradable good price is determined by the local market.

In the model, the booming causes either SE or RME. RME arises following the shift in labor from the two other sectors into the booming one provided that the resource boom causes the marginal product of labor to rise (Mieiro et al. 2012). This shift leads to a contraction of the lagging sector M causing "direct deindustrialization" and increase the demand for and the price of the non-tradable good.

SE is the increase in domestic spending due to the resource boom. The resources generated by the booming industry increases non-tradable good's relative price. Since the demand for non-tradable good goes up, factors of production will be more needed in the sector. As a result labor shifts towards the non-tradable good, indirect deindustrialization, further contraction of the lagging industry M occurs.

Comparison of Tourism and Extractive Resources in Dutch Disease Model Framework

Even though the literature on Dutch disease has focused predominantly on natural resources (oil, gas, and minerals), there is still an increase of articles considering tourism as the booming sector. In this respect, similarities and differences

between trade in tourism and commodity export need to be pointed out. In similarities concern, firstly, both industries enjoy some market power and are capable of generating rents due to a lack of substitutes, their unique characteristics such as the natural landscape, or the convenient geographical location, etc. (Sheng, 2011). Moreover, as stressed by Hobson (2013), both sectors require high-quality managerial staff that is often difficult to recruit and a tourism boom could be comparable with a resource boom in term of its generated revenue (Capó, et al. 2007).

Regarding the differences between trade in tourism and commodity export, Sheng (2011), argues that tourism is mainly labor intensive while extractive industries are capital-intensive. Additionally, according to Copeland (1991) unlike conventional trade, in the case of tourism, the consumer moves instead of the product and tourists must visit the exporting country before consuming the products. Touristic products include various goods and services such as accommodation and restaurant meals that considered being traditionally nontradable and unpriced natural goods such as climate, nature, and scenery. Furthermore, Goorochurn and Blake (2005) specify that distortions are occurring in the real world for commodity exports are not taken into account in tourism sector analysis. Nowak and Sahli, (2007) argue that through a price increase, these distortions in full employment and perfect competition benefits the host country and need to be considered when analyzing the net benefits of a tourism boom in the domestic economy.

2.2. Empirical Literature

Most of these empirical studies come up with evidence of the Dutch disease symptoms which can undermine the economic growth in the future. Few studies, on the other hand, reveal that some tourism-dependent nations experience sustainable economic growth and do not present any signs of Dutch disease. Table 1 gives

a summary of the previous empirical analysis related to the Dutch disease.

Table 1. Empirical Evidence of Dutch Disease

Authors	Methods	Findings
Rudd (1996)	Ordinary least squares (OLS) on cross-section data from 1960-1990 with analysis of Dutch disease in the energy sector in Netherland, Nigeria, and Indonesia.	The author noticed a contraction of traditional exports in the counties resulting from Dutch disease. The results also indicate some non-Dutch disease factors.
Eugenio-Martin, et al. (2004)	Tourism and economic growth in Latin American countries	Low-income countries seem to need adequate levels of infrastructures, education, and development to attract tourists. Medium-income countries need high levels of social development like health services and high GDP per capita levels. Finally, the results disclose that price of the destination, in terms of exchange rate and PPP is irrelevant for tourism growth.
Capó et al. (2007)	Panel data estimation on the Canary Islands and Balearics.	The findings show that the countries present some symptoms of Dutch disease that might be compromised their economic growth in the coming years.
Kenell (2008)	Investigation of Dutch disease in tourism in Thailand using a general equilibrium model.	The investigation shows that tourism has not lead to Dutch disease.
Sequeira and Nunes (2008)	A panel GMM model in 90 countries between 1980 and 2002 is used.	Findings suggest that tourism sector promotes the economic growth but this tourism effect is less significant in small countries.
Holzner (2010)	134 countries, for the 1970-2007 period. A cross-country and panel analysis are employed to estimate Cobb-Douglas production function.	The author finds that tourism is conducive to economic growth in tourism-dependent countries there is no danger of Dutch disease

Holzner (2011)	A panel analysis is conducted to analyze the Dutch disease effects in tourism-dependent countries.	Tourism had a positive impact on countries output levels, and Dutch disease couldn't jeopardize in countries which were dependent upon tourism in the long run.
Mieiro et al., (2012)	An empirical domestic export growth rate model is used to investigate the Dutch disease effects in Macau.	In Macau, they find some signs of deindustrialization and suspect the Dutch disease presence.

Source: Developed by authors

This paper searches for a clue to what the actual situation is in the Mediterranean countries. It utilizes two different econometrics tools namely fixed effects or random effects models and long-run relationship models to solve, at least partially, these model specification problems. Moreover, developed and developing countries are categorized to take into account some critical and specific differences between the two subsets to have more robust results.

3. Methodological Issues

The data is summarized and retrieved the essential patterns through descriptive statistical analysis and compute an econometric model. Firstly, the countries classification table of the World Economic Situation and Prospects (2012) is used to divide the dataset into two homogeneous subsets: developed and developing countries. The developed nations are Croatia[5], Cyprus, France, Greece, Italy, Malta, Slovenia, Spain whereas the developing countries are Israel, Turkey, Albania[6], Algeria, Egypt, Lebanon, Morocco, and Tunisia. This distinction allows making sharp and precise hypotheses needed for Dutch disease core model.

5 Croatia is considered as a transition country but assumed as a developed country because of its high value added in manufacturing compared to agricultural sector.

6 Albania is considered as a transition country but assumed as a developing country because of its high value added in agriculture compared to manufacturing sector.

3.1. Dutch Disease Static Model

This study uses a mode similar to the one developed by Rudd (1996). Thus, an empirical model for Dutch disease is constructed while keeping in mind the two effects of Dutch disease depending on whether the country is developed or developing. In the model, the measure of Dutch disease is the dependent variable and as an explanatory variable including RME, SE, and some control variables.

In this paper, the following three sectors are focused on the Dutch disease core model:

1- The booming sector is tourism and traded internationally, at exogenously determined prices.

2- The lagging sector (the manufacturing for developed countries or agriculture for developing countries) is also traded globally, at exogenously determined prices.

3- The third sector is the non-tradable goods sector.

A. Dependent Variable

For the developed countries, the dependent variable refers to the manufacturing sector's contraction and the contraction of the agricultural sector for the developing countries. The decrease of the manufacturing or agriculture is measured by their contribution to the non-booming sector's GDP which is described as non-tourism GDP (Nyatepe-Coo, 1994). Thus, by subtracting tourism revenues from the GDP help to perceive the real decline of the manufacturing sector (Rudd, 1996).

B. Dutch Disease Explanatory Variables

Spending Effect

As described before, the SE refers to the increase in domestic expenditures resulting from the massive increase in revenues in

tourism flow. Since the government is the principal manager of touristic sites and places in a country, the SE would predominantly stem from the government. Thus, government expenditures or appreciation of the real exchange rate variable may capture the SE. The high correlation between the real exchange rate and government expenditures makes it necessary to decide which one to be used (Rudd, 1996). In developing countries, the SE's proxy is real exchange rate variable because government expenditures might cover much more than just the increase in tourism revenue (e.g., these countries may use seigniorage to finance their expenditures) and use government expenditures variable in developed countries.

Resource Movement Effect

The RME means a new allocation of production factors. The wage variable is used as a proxy for this effect (Rudd, 1996). But due to data constraints, the number of jobs created per year in the tourism sector is instead considered in this paper. As tourism sector becomes more productive and produces, massive revenue workers are more interested in this sector. Consequently, the workforce migrates to the tourism sector thereby reducing the workforce of the other sectors. Faced with fewer workers and lower demand the traded goods sector would end up lower production.

C. Control Variables

Control variables capture the other alternative explanations for the manufacturing or agricultural sector's contraction. In fact, agriculture in the developing countries can decline due to a natural process of development or rapid growth in urbanization. For instance, Rudd (1996) states that Johnston and Kilby (1975) gives the following information regarding the American agricultural sector of the 1820s, at its developing stage, 79% of the labor force in the United States got involved in the agriculture, accounting for more than 60% of the GDP. However, in 1996 at its developed stage,

only 3% of the workers were employed in agriculture accumulating 2% of the American GDP (Rudd, 1996). The country's development process forced a dramatic shrinkage in the agriculture, and that justifies the usage of per-capita GDP (one of the measures of a country development) to capture this effect for developing countries. Another variable that is important to consider is urbanization. In fact, as the urban population expands labor force decreases in agriculture and the sector declines. The urban population is used to control for this effect in developing countries.

Regarding the developed countries, the law of marginal capital productivity can cause the manufacture production to stagnate. That is to say when the capital in the sector reaches its maximum value the next unit of capital is less productive than the other one and the production does not increase proportionally. Moreover, Rudd (1996) reports that for many reasons other than the Dutch diseases such as lack of research and development, recessions, foreign competition, etc., most European manufacturing sectors have declined since the late 1960s. Since most of the developing countries are European, in this paper, real GDP is used to account for development trend that causes the manufacturing sector to decline.

The list of all the variables and their expected signs are presented in Table 2. The data are collected from the World Development Indicator (WDI), the World Travel and Tourism Council, and the World Trade Organization databases for the period of 1995-2015.

Model 1 for the Developed countries: Decline in Manufacturing = f (Real GDP, Government Expenditures, Jobs)

Model 2 for the Developing countries: Decline in Agriculture = f (Real Exchange Rate, Jobs, Per Capita GDP, Urban Population)

Table 2. List of Variables in the Static Model

Variable Name	Type of Variable	Variable Meaning	Expected Sign
Developed Countries			Model 1
Manufacturing	Dependent variable	Share of manufacture value added in of GDP	
Government Expenditures	Dutch disease: SE	General Government Expenditure (% of GDP)	+
Jobs	Dutch disease: RME	Number of Jobs Generated by Tourism Sector	-
Real GDP	Control variable	Real Gross Domestic Product	-
Developing Countries			Model 2
Agriculture	Dependent variable	Share of agriculture, value added in of GDP	
Real Exchange Rate	Dutch disease: SE	Real Effective Exchange Rate Index (2010 = 100)	-
Jobs	Dutch disease: RME	Number of Jobs Generated by Tourism Sector	-
Urban Population	Control variable	Urban Population(% of total)	-
GDP Per Capita	Control variable	Per-capita Gross Domestic Product	+

Source: Developed by authors

3.2. Dutch Disease Dynamic Analysis: A Cointegration Framework

Finally, in order to control for endogeneity problems a dynamic panel data analysis in both developed and developing countries are run to assess the existence of a long-run relation between the non-tourism GDP and tourism-related variables such as investment in tourism, visitors' spending. The stationarity is checked before applying the test. In fact, non-stationary variables can be made stationary by differentiation after determining their integration orders. But this method has for the disadvantage of the loss of the information in the long term. The cointegration method, however; allows getting around this problem and makes it possible to test the existence of a long-term relationship. There are several approaches to examining this long-term relationship: the two-step method of

Engle-Granger developed in 1987 and the ARDL approach which is explored in this paper.

In the ARDL approach, delayed independent and delayed dependent variables can be introduced into the model. The term "autoregressive" means that the delayed independent variable can determine the dependent variable present while the term "distributed lag" means the delay of the independent variables. Thus, this technique can be used even if the independent variable does not lead to an instantaneous variation of the dependent variable as envisaged in the theoretical model. The approach of ARDL is preferred to other cointegration techniques because it is best suited for small sample sizes to obtain a valid result. Also solving the problem of endogeneity conveys a convergent estimator of the long-term coefficients independently and allows the variables to be purely stationary I (0), stationary after first difference I (1) or mutually cointegrated (Pesaran, et al. 2001).

Table 3. List of Variables in the Dynamic Model

Variable Name	Type of Variable	Variable Meaning	Expected Sign
Developed countries/ Developing countries			
Non-tourism GDP	Dependent variable	GDP less Share of tourism in GDP in $	
Visitors spending	Independent variable	Visitors Exports (Foreign spending), % of exports	-/+
Investment in tourism	Independent variable	Investment (Capital investment), % of exports	-/+

Source: Developed by authors

4. Data Analysis and Interpretation3.2. Methodology and model specification

4.1. Panel Estimation Results

In regression for the developed countries, a fixed effect model is conducted since the Hausman test result allows to do so. The variable representing the government expenditures (SE) is significant and has the predicted signs. Ceteris paribus, an increase of 10% in government expenditures (due to tourism revenues) contracts manufacturing's contribution to non-tourism GDP by 0.14%. Thus, the SE underpinned deindustrialization in the developed Mediterranean countries.

The models performed well for all the estimations with developed and developing countries, and the results are discussed below.

Table 4. Panel Estimation Results

	Dependent Variable	Constant	Real Exchange Rate	Government Expenditures	Jobs	Real GDP	Per Capita Income	Urban Population
Model 1	Manufacturing (% of GDP)	21.57 (25.41)***		-0.14 (-2.03)*	1.75E-07 (0.08)#	-9.70E-12 (-3.45)*		
Model 2	Agriculture (% of GDP)	30.29 (0.34)#	0.12 (1.13)#		-0.000038 (-6.87)***		-3.60E-06 (5.17)***	-0.76 (0.56)#
*** Significant at 1% level, * significance at the 0.1 alpha level, # non-significant								

However, employment representing the RME is non-significant, meaning tourism does not create RMEs in developed countries. The coefficient for Real GDP control variable (used as a proxy for the developed deindustrialization trend) is also significant and has the

predicted sign. As real GDP increases by 1 billion in the developed countries, manufacturing's contribution to non-tourism decreases by 9.7%. The Real GDP variable has quite a tremendous impact on the manufacturing sector. Thus, apart from Dutch disease, an increase in the real GDP contributes to the manufacturing sector's decline in developed countries: the real GDP growth plays an essential role in developed countries' deindustrialization. This situation can refer to the marginal productivity of capital that is negative. That is to say after a certain level of production, the additional unit of capital used in the production is less productive than the earlier units, then the production becomes less profitable, and the sector becomes less competitive.

In summary, in developed countries, there is evidence of the existence of the SE of Dutch disease but the absence of the RME. Mediterranean developed countries are suffering from Dutch disease, and this is reflecting the SE. But the contraction of the manufacturing sector in developed countries is also due to an increase in GDP.

As for developed countries regression, the Hausman test result allows using a fixed effect model, and only employment in tourism (jobs) and per-capita GDP have significant coefficients. Employment in tourism representing the Dutch disease (RME) is significant and has the predicted sign. Ceteris paribus, an increase of 100 tourism jobs leads to a decrease of 0.383% in agriculture's contribution to non-tourism GDP which is in line with Dutch disease theory. Theoretically, in case of Dutch disease symptoms present, the agriculture sector should decline as the employment in tourism increase and generate more money (RME). In fact, since tourism sector is having a boom, the sector is more profitable than agricultural sector and therefore attracts an increasing number of jobs by allowing a shift of employment from the agriculture to the tourism sector.

However, real exchange rate representing the SE is non-significant, meaning tourism does not create SE in developing countries. The results reveal that even though the tourism industry is helping to create more jobs, the booming does not lead to an increase in domestic expenditures.

The control variable, urbanization, is also insignificant. It was expected that agricultural sector would decline as urbanization population will increase. The reasoning follows that as a development process result if urbanization population rises many farmers would also shift from village to towns and agricultural sector would decline and end up having a low participation to GDP. But the estimations show that urbanization does not have any effect on agrarian share in GDP. It appears that this result is somewhat valid in the short-run, and urbanization may affect agriculture in GDP in the long-run. Per capita income that controls economic development present a significant coefficient. Specifically, a $500 increase in per capita income, leads to a 1.8% decrease in agriculture's share of non-tourism GDP. Thus, as developing expand their manufacturing sector and modernize the development pattern of the agricultural sector is undermined. Dutch disease is not the only cause of agriculture's decline in developing countries.

4.2. Dutch Disease Dynamic Analysis Results

Precursory Stationarity Tests

For both sets, the augmented Dickey-Fuller (ADF) test is applied to check for stationarity and integration order. For both developed and developing countries, ADF test showed that the variables investment in tourism and visitors' spending are stationary at first difference whereas growth of non-tourism GDP is stationary at level.

Table 5. Stationarity Tests

Variables	ADF - Fisher Chi-square Statistic/ Prob.**	Im, Pesaran & Shin W-stat Statistic/ Prob.**	PP - Fisher Chi-square Statistic/ Prob.**	Conclusion
Level	**Intercept**	**And**	**Form**	
$Growth_A$	72.5458 (0.0000)***	-6.62229 (0.0000)***	1613.58 (0.0000)***	Stationary in level I(0)
$Growth_B$	28.7098 (0.0260)	-2.22121 (0.0132)	16.7240 (0.0000)	Stationary in level I(0)
Visitors' $Spending_A$	12.9623 (0.6755)	0.36155 (0.6412)	10.083 (0.8622)	Non-Stationary in level I(0)
Visitors' $Spending_B$	22.8962 (0.1165)		10.0835 (0.4037)	Non-Stationary in level I(0)
Investment in $Tourism_A$	21.5844 (0.1571)		19.2152 (0.2577)	Non-Stationary in level I(0)
Investment in $Tourism_B$	21.7804 (0.1504)		23.8625 (0.0926)	Non-Stationary in level I(0)
First difference	**Intercept**		**Form**	
Visitors' $Spending_A$	43.800 (0.0002)***		78.7578 (0.0000)***	Stationary in first difference I(1)
Visitors' $Spending_B$	49.7783 (0.0000)		59.4388 (0.0000)	Stationary in first difference I(1)
Investment in $Tourism_A$	53.1757 (0.0000)***		90.4923 (0.0000)***	Stationary in first difference I(1)
Investment in $Tourism_B$	36.787 (0.0022)		75.4714 (0.0000)	Stationary in first difference I(1)
A: developing Country; B: developed Country				

There is no stationary variable at second difference among the variables; this allows running the ARDL models. By implementing the Hausman test to choose between the Pooled Mean Group regression (PMG) and the Mean Group regression (MG) models, PMG regression appears to be more consistent for both sets.

The Panel ARDL Lag Determination

Firstly, for the optimal lag length of each variable is tested by using the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). Second, the rule R= 4*(T /100)2/9 suggested by Gengenbach, et al. (2008) with T=21 and R= 2.85 is used to retrieve the optimal lags. As a result, the maximum number of lags is restricted to 2 for developing countries and 3 to developed countries. Further, the unrestricted likelihood ratio test is employed for the optimum lag lengths. This step reveals two models as the best, and finally, Hannan-Quinn Information Criterion (HQIC) is used, the Akaike Information Criteria (AIC) and the Schwarz Criterion (SBIC) to choose between the two models. For developing countries, the best model is (2,1,1) whereas for the developed countries it is (1,1,1).

ARDL Bound Tests

The existence of a long relationship in the chosen model is checked by the bound tests. The F-statistic Wald test is compared to the bound values in the Pesaran table. According to Table 6, if F-statistic is less than 3.793 there is no cointegration relationship, more than 4.855 there is a cointegration relationship. Between 3.79 and 4.855, the result is not conclusive. In this case, as shown in Table 6, F-statistic is more than 4.855 revealing the existence of a cointegration relationship between non-tourism GDP growth and visitors' spending and investment in tourism. Thus, long and short-run analysis can be conducted.

Table 6. The Panel ARDL Cointegration Test

Wald test	Test Statistic	Value	DF	Probability
Developing countries	F-statistic	13.28325	(3, 142)	0.0000
Developed countries	F-statistic	12.94449	(3, 145)	0.0000

Long Run and Short Run Estimation Results

MG and the PMG estimators were used to estimate short-run and long-run coefficients. These estimators are particularly convenient for panels with large T and N. The error correction speed of adjustment parameter and the long-run coefficients are of essential interest. Further, the Hausman test is used to decide which estimator to choose is in favor of PMG model.

Table 7. PMG and MG Estimation Results for the Developing Countries

Long-run				Short-Run			
D.growth	**L1. Investment in Tourism**	**L1. Visitors' Spending**	**ECT**	**D2. Growth**	**D1. Investment in Tourism**	**D1. Visitors' Spending**	**_cons**
PMG Coef.	-0.0539	0.4790647***	-0.689411***	0.1196298*	0.239	-0.6739	1.45951***
P-value	0.601	0	0.002	0.078	0.699	0.214	0.008
MG Coef.	0.2207	0.4811711***	-0.8738***	.074482*	0.198	-0.8372	3.29862
P-value	0.769	0.007	0	0.058	0.758	0.188	0.198

According to both the MG and the PMG estimators, the speed of adjustment parameters is consistently negative and significant (-0.6894 for the PMG estimator and -0.8738 for the MG estimator). This finding shows evidence for a long-run relationship in the model. In the two models, visitors' spending is statistically significant and has a positive effect on non-tourism growth in the long-run. When tourist visitors' spending increases by 1%, the non-tourism growth increases by 0.47-0.48. However, the coefficient of tourism

investment (Investment in tourism) is statistically insignificant at the 10% significance level. Since in these models, short-run results use to differ by countries, this will be considered in the next tables.

Table 8. PMG and MG Estimation Results for the Developed Countries

Long-Run			Short-Run			
D.growth	**L1. Investment in Tourism**	**L1. Visitors' Spending**	**ECT**	**D1. Investment in Tourism**	**D1. Visitors' Spending**	**_cons**
PMG Coef.	0.117615	-0.09657	-1.0014	-0.18935	-1.08703	3.052923
P>z	0.07	0.063	0	0.225	0.532	0
MG Coef	-0.68965	1.084291	-1.018	-0.22759	-0.12435	6.895118
P>z	0.184	0.47	0	0.36	0.969	0.461

According to both the MG and the PMG estimators, the speed of adjustment parameters is consistently negative and significant (-1.001 for the PMG estimator and -1.018 for the MG estimator). This finding confirms that there is a robust long-run relationship in the model. In the PMG model visitors' spending variable is statistically significant and negatively affects the non-tourism growth in the long-run whereas investment in tourism is conducive to neither non-tourism growth in the same model visitors' spending nor investment in tourism is statistically insignificant at the 10% significance level.

In developing countries, Hausman test statistic is 0.08 for long-run homogeneity reveals that under the null hypothesis, the PMG estimator is preferred (p-value =0.9591>0.05). For developed countries, the Hausman test statistic is 3.13 meaning that under the null hypothesis, the PMG estimator is preferred (p-value =0.2089>0.05).

Table 9. ECT and Individual Short-Run Behaviour in Each Developed Country

Developed Countries	Coefficient	P-value	Countries	Coefficient	P-value
Croatia			**Greece**		
ECT	-1.043819	0.000	ECT	-0.9888626	0.000
D1. Investment in Tourism	-0.0907964	0.700	D1. Investment in Tourism	0.3287442	0.509
D1. Visitors' Spending	0.118698	0.903	D1. Visitors' Spending	-0.2604005	0.439
_cons	0.487481	0.674	_cons	3.710759	0.181
Cyprus			**Italy**		
ECT	-0.9596963	0.000	ECT	-1.000469	0.000
D1. Investment in Tourism	0.2822801	0.525	D1. Investment in Tourism	0.1080139	0.674
D1. Visitors' Spending	-8.646861	0.020	D1. Visitors' Spending	0.2845614	0.167
_cons	1.716273	0.107			
France			**Malta**		
ECT	-1.000231	0.000	ECT	-1.013923	0.000
D1. Investment in Tourism	-0.7768661	0.004	D1. Investment in Tourism	-0.5126479	0.001
D1. Visitors' Spending	0.2471519	0.036	D1. Visitors' Spending	-7.462204	0.219
_cons	5.084972	0.045	_cons	1.932662	0.053
Spain			**Slovenia**		
ECT	-1.001806	0.000	ECT	-1.002399	0.000
D1. Investment in Tourism	-0.7525496	0.117	D1. Investment in Tourism	-0.1009976	0.904
D1. Visitors' Spending	0.1073676	0.654	D1. Visitors' Spending	6.915487	0.359
_cons	6.114055	0.032	_cons	1.57633	0.109

For developing countries, according to PMG estimation results, the negative sign of the ECT coefficient (-0.6894118) confirms the existence of disequilibrium in the short run and convergence in the long term and suggests a relatively high speed of adjustment from the short run deviation to the long run equilibrium of non-tourism growth. It indicates that about 68% deviation from the long run non-tourism growth is corrected in each period (Table 10).

In the long run, PMG estimation results show that the coefficient of visitors' spending variable is statistically significant and has a positive sign indicating that developing Mediterranean countries do not suffer from Dutch disease in the long-run, rather tourism revenues enhance their non-tourism growth. Especially for those countries, 1% increase of visitors' spending of the countries expands the non-tourism growth

by up to 0.47%. However, the coefficient of investment in tourism is statistically insignificant at the 10% significance level.

Table 10. ECT and Individual Short-Run Behaviour in Each Developing Country

Developing Countries	Coefficient	P-value	Countries	Coefficient	P-value
Albania			**Lebanon**		
ECT	0.5304322	0.053	ECT	-0.8386907	0.000
D2. Growth	0.5094144	0.000	D2. Growth	-0.0012706	0.355
D1. Investment in Tourism	-1.563897	0.001	D1. Investment in Tourism	0.1627754	0.795
D1. Visitors' Spending	0		D1. Visitors' Spending	-4.238169	0.000
_cons	1.353117	0.016	_cons	1.77153	0.084
Algeria			**Morocco**		
ECT	-.6241848	0.010	ECT	-1.350096	0.000
D2. Growth	0.0582166	0.002	D2. Growth	0.0112139	0.612
D1. Investment in Tourism	3.883922	0.175	D1. Investment in Tourism	-0.3852384	0.393
D1. Visitors' Spending	0		D1. Visitors' Spending	-1.12086	0.182
_cons	2.312502	0.006	_cons	2.534944	0.018
Egypt			**Tunisia**		
ECT	-0.7610423	0.000	ECT	-0.9348889	0.000
D2. Growth	0.0744208	0.002	D2. Growth	-0.010401	0.509
D1. Investment in Tourism	-0.6643978	0.001	D1. Investment in Tourism	0.0467811	0.896
D1. Visitors' Spending	-0.2349668	0.084	D1. Visitors' Spending	-0.3241357	0.732
_cons	0.3778693	0.618	_cons	3.134004	0.012
Israel			**Turkey**		
ECT	-1.351882	0.000	ECT	-0.1849417	0.508
D2. Growth	-0.005539	0.813	D2. Growth	0.3209832	0.046
D1. Investment in Tourism	1.579703	0.032	D1. Investment in Tourism	-1.144771	0..04
D1. Visitors' Spending	-0.2700081	0.621	D1. Visitors' Spending	0.7971809	0.217
_cons	2.165947	0.011	_cons	-1.752816	0.228

Moreover, each country error correction coefficient is statistically significant except Turkey whose ECT is not significant, i.e., Turkey does not show any evidence of a long-run relationship. Apart from these facts ECT coefficients in Algeria, Albania, Egypt, and Lebanon are relatively high (from 53 and 83%) while in Tunisia, Morocco, and Israel are very high (from 90% to 135%). These cases indicate that the speed of reaching equilibrium is very high in the long-run. Notably, in Morocco and Israel, the ECT coefficients are respectively -1.350096 and -1.351882 indicating that about 135 percent of this disequilibrium is corrected within a year; in another word, the equilibrium is restored in less than one year in Israel and Morocco.

Regarding the short-run coefficients of this model, in Algeria and Albania investment in tourism badly affects the non-tourism growth -statistically insignificant at the 1% significance level- and this tourism investment is so highly correlated to the visitors' spending that it causes the visitors' spending to become omitted in the model. Thus, Albania and Algeria investment in tourism spending is highly dependent on visitors' spending amount. In Morocco and Tunisia, short-run results are not significant. Investment in tourism is conducive to non-tourism economic growth in Israel whereas it is harmful to growth in Turkey. In Egypt, as an investment in tourism and visitors' spending increase the non-tourism economic growth declines. As for Lebanon's visitors' spending, it contributes to non-tourism growth contraction.

In summary, in the short-run, Albania, Algeria, Egypt and Turkey show signs of Dutch disease since their visitors' spending or investment in tourism cause the non-tourism growth to decline. However, these disequilibria are recovered in the long-run in Albania, Algeria, and Egypt. But there is no chance for Turkey to overturn the adverse trend in the long-run: this country is in high danger of Dutch disease. Therefore, all the countries except Turkey tend to turn back to the equilibrium in the long-run and tourism revenues from tourists

spending promote their non-tourism economic growth.

Conversely, in Morocco, Tunisia and Israel don't show any Dutch disease sign: Morocco and Tunisia don't present any response of non-tourism growth toward investment in tourism and visitors' spending whereas Israel investment is rather beneficial to non-tourism growth. In fact, Morocco, Tunisia, and Israel most high speed of reaching equilibrium in the long-run stems from the fact that these countries don't experience any disequilibrium in the short-run instead Israel takes even benefits from tourism in the short-run.

According to PMG estimation results, the negative sign of the ECT coefficient (-1.001) shows the existence of disequilibrium in the short run and convergence in the long run for the developed countries. This result confirms the existence of disequilibrium in the short run and convergence in the long run and suggests a relatively high speed of adjustment from the short run deviation to the long run equilibrium of non-tourism growth. It indicates that about 100% deviation from the long run non-tourism growth is corrected in each period.

In the long run, PMG estimation results show that the coefficient of visitors' spending variable is statistically significant and has a positive effect but investment in tourism impedes the non-tourism growth in the long-run; rather tourism revenues enhance their non-tourism growth. Specifically, visitors' spending of the countries increasing by 1% expands the non-tourism growth by up to 0.09% and an increase in 1% of investment in tourism contracts the non-tourism growth by 0.11%. In overall in the long-run, there is a gain of 0.11% and a loss of 0.09% in non-tourism growth meaning that there is a total of 0.11-0.009 = 0.02% of lost in non-tourism growth in the long-run. Thus, in the long-run, Mediterranean developed countries suffer from Dutch disease.

Moreover, all the countries error correction coefficients are statistically significant. Their coefficients are very high (from 90

and 100%) while in Croatia it is 104% and 101% in Malta showing that the equilibrium is restored in less than one year in Croatia and Malta which indicates that in the long-run, the speed of reaching equilibrium is very high for all the countries.

Regarding the short-run coefficients of this model, Croatia, Italy, Greece, Spain and Slovenia non-tourism growth are non-significant thus impervious both to invest in tourism and visitors' spending. However, in France, investment in tourism badly affects the non-tourism growth -statistically insignificant at the 1% significance level- and visitors' spending promotes the non-tourism growth. But the investment in tourism damage is greater than the gain from visitors' spending (0.77% versus 0.24% about 0.53% of the decline in non-tourism growth) In Malta investment in tourism badly affects the non-tourism growth -statistically insignificant at the 1% significance level- while visitors' spending is non-significant.

In summary, in the short-run, Croatia, Italy, Greece, Spain and Slovenia don't show signs of Dutch disease. However, France and Malta show symptoms of Dutch disease causing the non-tourism GDP to decline respectively up to 0.53% and 0.51%. Moreover, in the long-run, all the countries have a very high speed to turn back to the equilibrium that shows evidence for non-tourism 0.02% decrease thus Dutch disease signs.

4. Conclusion

This study examines whether the flourishing tourism sector in Mediterranean countries suffers from the Dutch disease signs. The case of 16 Mediterranean countries has been investigated using the following empirical tools: a static panel data analysis and an Auto Regressive Distributive Lags model.

The findings show that the tourism industry led to Dutch disease in both Mediterranean developed and developing countries but by different means. In developed countries, there are signs of

Dutch disease through the SE (as the government expenditures expand, the manufacturing sector contracts) but there is no RME in these countries (an increase in tourism revenues don't lead to labor force reallocation, and the increase in tourism jobs don't contract the manufacturing sector). However, this contraction of the manufacturing sector is also due to a rise in GDP. On the other hand, in developing countries, there is evidence of Dutch disease through the RME, but there is no SE (real exchange don't appreciate because of tourism increasing and seems to be impervious to the tourism booming). However, as per capita income increases the agricultural sector contracts.

A dynamic analysis shows that developing countries are not exposed to Dutch disease in the long-run whereas developed countries are quite exposed (0.02 lost in non-tourism due to tourism industry). Moreover, in the long-run visitors' spending of the countries increasing by 1% expands the non-tourism growth by up to 0.47%. Short-run results show that Albania, Algeria, Egypt and Turkey show signs of Dutch disease since their visitors' spending or investment in tourism cause the non-tourism growth to decline. All the countries except Turkey tend to turn back to the equilibrium in the long-run and tourism revenues from tourists spending promote their non-tourism economic growth. However, Morocco, Tunisia, and Israel don't show any Dutch disease sign in the short-run. In the developed side, in the short-run, Croatia, Italy, Greece, Spain and Slovenia don't show signs of Dutch disease. However, France and Malta show symptoms of Dutch disease causing the non-tourism GDP to decline respectively up to 0.53% and 0.51%. Moreover, in the long-run, all the countries have a very high speed to turn back to the equilibrium.

Since Dutch disease has different channels and effects in developed and developing countries, dealing with the disease will require appropriate solutions depending on the stages of a country's

development. In developed countries, to deal with the excessive spending that appears to be a mismanagement of resources generated by the tourism industry, fiscal policy, and clear spending rules is the primary instrument that can be used. Appropriate fiscal regulations on tourism revenues should be adopted and spending directed toward manufacturing sector rather than non-tradable domestic goods to constrain the SE in developed countries. Rather than increasing recurrent permanent expenditures, developed countries can also create a Sovereign Wealth Fund and invest this fund wholly abroad on investment projects which will reduce the inflow of capital in the countries.

In developing countries where the main effect of Dutch disease is the resource movement, agricultural sector needs to be restructured, and farmers must be helped by training, microfinance patterns, machines and be aware of the proper techniques to use to increase productivity in agriculture. Moreover, movement of labor between sectors should be reduced and allows skilled labor force to work either in the agriculture or manufacturing. Thus, the new jobs generated by tourism industry would benefit for the numerous unemployed people in the developing countries and enhance the nation wealth instead of decreasing agricultural labor force. One must also reduce the movement of capital between sectors by promoting high international capital mobility.

References

Brunnschweiler, C.N., & Bulte, E.H. (2008a). "The resource curse revisited and revised: A tale of paradoxes and red herrings", *Journal of Environmental Economics and Management*, *55*(3), pp. 248-264.

Brunnschweiler, C.N., & Bulte, E.H. (2008b). "Linking natural resources to Slow Growth and more conflict", *Science*, *320*, pp.616-617.

Capó, J., Font, A.R., & Nadal, J.R. (2007). "Dutch disease in tourism economies: Evidence from the Balearics and the Canary Islands", *Journal of Sustainable Tourism, 15*(6), pp.615-627.

Copeland, B.R. (1991). "Tourism, welfare, and de-industrialization in a small open economy", *Economica, 58*(232), pp.515-529.

Eugenio-Martin, J.L., Morales, N.M., & Scarpa, R. (2004). *Tourism and economic growth in Latin American countries: A panel data approach*, Nota di Lavoro, Fondazione Eni Enrico Mattei, No 26.

Gengenbach, C., Urbain, J.-P., & Westerlund, J. (2008). "Panel error correction testing with global stochastic trends", *Research Memoranda 051*, t, Maastricht Research School of Economics of Technology and Organisation: Maastricht.

Gooroochurn, N. & Blake, A. (2005). "Tourism immiserization: Fact or fiction?", *Economics Division*, Nottingham University Business School, UK.

GRID-ARENDAL, http://www.grida.no/resources/5894 (accessed 10 April 2017).

Holzner, M. (2010). "Tourism and economic development: The beach disease?", *The Vienna Institute for International Economic Studies Working Papers*, No: 66, Vienna.

Holzner, M. (2011). "Tourism and economic development: The beach disease?", *Journal of Tourism Management, 32*(4), pp.922-933.

Hobson, K.R. (2013). *Small states and tourism: A resource curse Phenomenon? A Study in the Context of Grenada,* International Institute of Social Studies, The Hague: The Netherlands.

Johnston, B.F., & Kilby, P. (1975). *Agriculture and Structural Transformation*, Oxford University Press: New York.

Kenell, L. (2008). *Dutch disease and tourism: The case of Thailand* (Unpublished bachelor thesis), Lund University, Department of Economics.

Manzano O., & Rigobon, R. (2001). *Resource curse or debt overhang?*, (NBER Working Paper No. 8390), National Bureau of Economic Research.

Mieiro, S., Ramos, P.N., & Alves, J. (2012). "Dutch disease gaming tourism economy: The case of Macau"*, International Journal of Trade, Economics and Finance*, *3*(6), pp.421-427.

Nowak, J.J. & Sahli, M. (2007). "Coastal tourism and Dutch disease in a small island economy", *Tourism Economics*, *13*(1), pp.49-65.

Nyatepe-Coo, A.A. (1994). "Dutch disease, government policy and import demand in Nigeria", *Applied Economics, 26*(4), pp.327-336.

Pesaran, M.H., Shin, Y., & Smith, R. J. (2001). "Bounds testing approaches to the analysis of level relationships", *Journal of applied econometrics*, *16*(3), pp.289-326.

Rudd, D. (1996). *An Empirical Analysis of Dutch Disease: Developing and Developed Countries*, (Illinois Wesleyan University Honors Projects, Paper 62).

Sequeira, T.N., & Nunes, P.M. (2008). "Does tourism influence economic growth? A dynamic panel data approach", *Applied Economics*, *40*(18), pp.2431-2441.

Sheng, L. (2011). "Taxing tourism and subsidizing non-tourism: A welfare enhancing solution to Dutch disease?", *Tourism Management, 32*(5), pp.1223-1228.

World Economic Situation and Prospects (2012). *Statistical annex* (accessed 10 April 2017).

World Travel and Tourism Council (2016). *Travel & tourism economic impact 2016 World* (accessed 10 April 2017).

Yavuz, N.Ç. (2006). "Türkiye'de turizm gelirlerinin ekonomik büyümeye etkisinin testi: Yapısal kırılma ve nedensellik analizi" [Test for the effect of tourism receipts on economic growth in Turkey: Structural break and causality analysis], *Doğuş Üniversitesi Dergisi*, *7*(2), pp.162-171.

Foreign Trade Balance and Sustainability in Turkey: Analysis of the 2000-2020 Period

Hilal ALPDOĞAN[1]

Abstract

The main goals of countries in open economies are sustainability. Sustainability can be targeted as the sustainability of both economic growth and stability. Sustainability of economic stability in open economies is possible by ensuring internal and external balance. The most concrete indicators of internal and external balance in economies are foreign trade statistics. The development of Turkey's foreign trade since 2000 and the current account balance, which has changed depending on the foreign trade balance, have been examined. The increase in the dependence of exports on imports poses a major obstacle to the sustainability of the foreign trade balance as well as the current account balance. In the study, Turkey's foreign trade balance and sustainability in the 2000-2020 period were examined with the Johansen cointegration test. According to the test result, Turkey's current account deficit is weak and sustainable

1. Introduction

Although expenditures are made within the borders of the country, it is not possible to avoid being a part of the global economy. Either all or some of the purchased goods or services are produced outside the borders of the country.

1 PhD, Faculty Member, Sakarya University of Applied Sciences, Faculty of Applied Sciences, International Trade and Finance, halpdogan@subu.edu.tr

In this study, the sustainability of the foreign trade balance, which is one of the main goals of the country's economies, has been examined. If the concept of sustainability is defined from an economic point of view; It is stated as the situation in which economic variables do not finally reach their limit values without any policy change or other external change. According to the intertemporal approach, the sustainability of the current account deficit is the situation in which the foreign capital inflow, which eliminates the fluctuations that may occur in consumption in the face of shocks in the national cash flow, in other words, the current account deficit level is optimal. The optimal current account deficit calculated according to the intertemporal approach is compared with the real current account deficit and it is decided whether it is sustainable or not (Tunalı, 2008: 164).

In the first part of the study, the concepts of foreign trade and sustainability were evaluated in a theoretical framework. Then, the foreign trade balance in the Turkish economy in the 2000-2020 period; export, import and net export values were evaluated and the importance of the current account balance was emphasized. In the last part of the study, the sustainability of the current account balance due to the foreign trade deficit in the Turkish economy was tested with the help of the Johansen cointegration test. The existence of a long-term relationship between Turkey's exports and imports and the sustainability of the balance were questioned.

2. Foreign Trade Balance and Sustainability

In an open economy, the net export value is added to the national income value calculated by the expenditure method. Goods and services produced in a country are purchased not only by the people and government of that country, but also by the same industry in other countries, and this is called *export*. *Imports* occur as a result of purchasing goods and services produced in other countries. To calculate the national income value through expenditures, it is

necessary to subtract the expenditures made on goods produced in other countries from the sum of domestic expenditures (Consumption (C), Investment (I), Government Expenditures (G)) and exports (X). Calculated national income value; It is expressed by the formula C+I+G+XM. The difference between exports and imports is defined as *net exports* (XN). In this case, the national income by expenditure method; is expressed as C+I+G+XN. It is expressed as the *foreign trade balance in* terms of revealing how the balance situation in which exports and imports are equal is achieved.

Table 1 shows how international flows of goods and capital are defined in different situations. If domestic expenditures in a country are greater than the national income level; It is said that imports are greater than exports, that is, net exports are negative. This is known as the *trade deficit*. Otherwise, if the domestic expenditure in a country is less than the national income level, it is said that exports are greater than imports, that is, the net export value is positive. This situation is described as a *trade surplus* (Ünsal, 2013:50-51). If domestic expenditures and national income are equal and net exports are equal to zero, this reflects a balanced foreign trade. A balanced foreign trade means that net capital outflows are equal to the trade balance. It also shows that investments in the economy are equal to savings. In the case of a foreign trade deficit, it is understood that the savings are less than the investments and that the necessary investments are borrowed from abroad. In this case, net capital outflow will also be negative. This means that the economy receives funds from abroad for financing. In that case, the existence of a balance in foreign trade means that the economy will not have important problems such as financing and borrowing.

Table 1. International Flows of Goods and Capital

Trade Surplus	Balanced Trade	Trade Deficit
Export>Import	Export=Import	Export<Import
Net Export >0	Net Export =0	Net Export <0
Y>C+I+G	Y=C+I+G	Y<C+I+G
Savings>Investing	Saving = Investment	Saving<Investment
Net Capital Outflow>0	Net Capital Outflow=0	Net Capital Outflow<0

Source: Gregory Mankiw, Macroeconomics, pp.132

The main goals of countries in open economies are sustainability. Sustainability can be targeted as the sustainability of both economic growth and stability. When going from the whole to the part; Many targets can be set such as current account balance, foreign trade balance, price stability, sustainability of social welfare. Sustainability of economic stability in open economies is possible by ensuring internal and external balance. The most basic indicators that reveal the balance between domestic and foreign economic actors in the country's economies are the variables of export, import and net export. The net foreign trade indicator, which is revealed by the relationship between exports and imports, is the most basic and determining item of the current account balance. For this reason, trade in goods is considered a concrete indicator of developments in the real economy. Sustainability is defined as the situation in which economic variables do not finally reach their limit values without any policy changes or other external changes.

2.1.Turkey's Foreign Trade Balance

With the decisions of January 24, 1980, the Turkish economy has made an effort to realize the necessary structural transformations for an open economy. In line with this effort, an economic policy based on privatization was carried out to create market conditions

in the economy, increase exports, and ensure price stability at the same time. As a result of these efforts, an increase in exports was achieved, but this increase was realized not as a result of competitiveness, investment and productivity growth provided by structural reforms, but rather as a result of short-term structural monetary applications. By the end of the 1980s, this situation became an important problem in both foreign trade and current account balance (Kaya, 2016:56). The uncontrolled implementation of open economy policies supported by financial liberalization in 1989 exacerbated the problem. By the end of the 1990s, speculative capital inflows increased the public borrowing rate, which in turn increased the interest payments in public expenditures.

Although the economic contraction after the 2001 crisis caused the current account balance to give a surplus in this period, despite the positive developments experienced since 2002, the current account deficit after 2001 started to become an important problem for the Turkish economy and until 2012 the current account deficit became one of the main problems of the Turkish economy. Although it was suppressed temporarily by the increase in the exchange rate as of the end of 2011, a new incentive program was taken by the government in 2012 for permanent solutions to the current account deficit problem (Altunöz, 2014:118). Structural transformation in the banking sector and financial markets in Turkey after 2000 reduced the fragility in the economy and increased the sustainability of the current account deficit (Yayar and Demir: 2014:128).

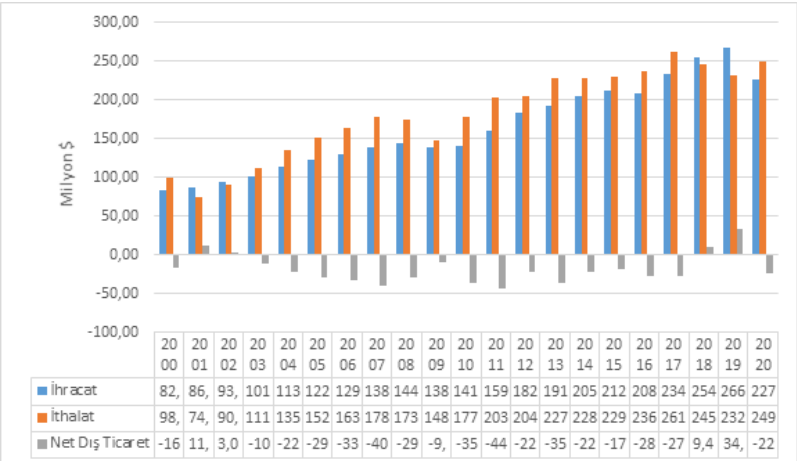
Looking at Chart 2, it is seen that both the foreign trade balance and the current account balance continued to increase, from 2001 to 2011, except for the year in which the negative effects of the global financial crisis were felt the most.

With the Transition to a Strong Economy Program, which was put into practice after the 2001 crisis, reducing public sector debts, ensuring price stability and many structural reforms were

realized and the tight monetary and fiscal policies implemented caused the GDP to shrink and the current account balance to turn positive. However, the current account balance, which started to run deficit again in 2002, reached 626 million dollars in 2002 and 74,405 million dollars in 2011. The same increase is also valid for the foreign trade deficit. While it was 30.5 million dollars in 2002, it reached 76.1 million dollars in 2011. The reason for the current account deficit to lag behind the foreign trade deficit is due to the high rate of tourism revenues. The main reasons for the current account deficit problem in the Turkish economy in the 2000s (Kaya, 2015:58);

- Overvaluation of Turkish Lira as a result of inflation targeting,
- The increase in the foreign trade deficit,
- The increase in the dependence of exports on imports,
- It can be listed as the ever-increasing foreign dependency in energy consumption.

Graph 1. Foreign Trade Values of Turkey for the Years 2000-2020

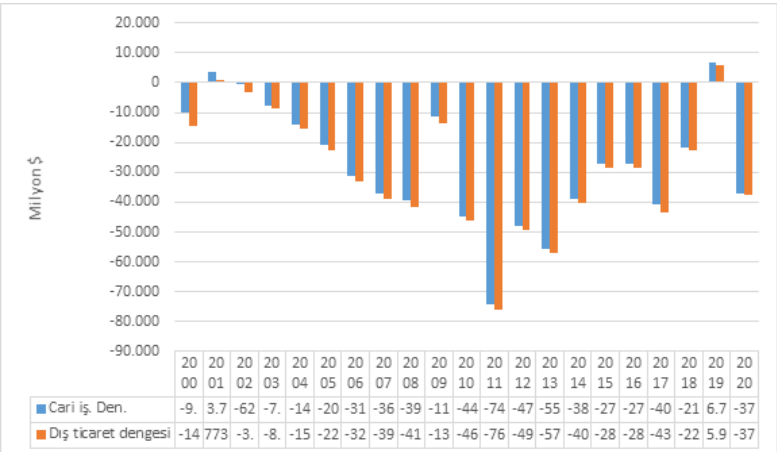


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
İhracat	82,	86,	93,	101	113	122	129	138	144	138	141	159	182	191	205	212	208	234	254	266	227
İthalat	98,	74,	90,	111	135	152	163	178	173	148	177	203	204	227	228	229	236	261	245	232	249
Net Dış Ticaret	-16	11,	3,0	-10	-22	-29	-33	-40	-29	-9,	-35	-44	-22	-35	-22	-17	-28	-27	9,4	34,	-22

Source: Compiled from IMF official website.

In Graph 1, Turkey's export, import and net foreign trade statistics values for the years 2000-2020 are given. Except for 2001, 2002 and 2018, 2019, Turkey's net export value shows negative. This situation means that the realized export value is lower than the import value and foreign trade deficit in the economy. At the same time, it shows that saving is less than investment in the economy and financial support is received from abroad. Foreign trade statistics are among the most important items in the current account balance of countries and determine the current account balance. In Chart 2, it is possible to say that Turkey's foreign trade balance is determinant of the current account balance. In the 2000s, the current account balance moved together with the goods trade balance. Especially after the 2001 crisis, the balance of trade in goods became the most important determinant of the current account balance.

Graph 2. Turkey's Foreign Trade Balance and Current Account Balance for the Years 2000-2020



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Cari iş. Den.	-9.	3.7	-62	-7.	-14	-20	-31	-36	-39	-11	-44	-74	-47	-55	-38	-27	-27	-40	-21	6.7	-37
Dış ticaret dengesi	-14	773	-3.	-8.	-15	-22	-32	-39	-41	-13	-46	-76	-49	-57	-40	-28	-28	-43	-22	5.9	-37

Source: Compiled from IMF official website.

In 2001 and 2019, when Turkey had a foreign trade surplus, the current account balance also gave a surplus. When we look at the last two decades of the Turkish economy, it is possible to see the financial crises of 2001, 2008, the rapid increase in exchange rates since the second half of 2018, and the negative effects of the Covid-19 pandemic on the foreign trade balance.

Looking at the years when the foreign trade and current account balance was positive, the economic crisis of 2001 and the effect of the exchange rate, which started to climb in the second half of 2018, draw attention. While exports decreased as a result of the loss of income in the services sector and decreasing foreign demand in 2016, the stagnation in the manufacturing industry and the upward pressure in the exchange rates caused a decrease in imports and a contraction in the foreign trade volume. Depending on the dynamism in the country's politics and the contraction in domestic demand, export and import levels have entered a downward trend (Genç et al., 2017:97). The reasons for the foreign trade deficit in Turkey;

- Decrease in the ratio of exports to imports
- High imports of raw materials and intermediate goods and increasing dependency on imports.

The increase in dependency on imports of intermediate and capital goods since 2003 is due to the existence of an import-dependent industrial policy.

Table 2. Distribution of Exports and Imports by Classification of Large Economic Groups

	Ratio in Exports			Ratio in Imports		
	Investment (Capital) Goods	Raw Material (With Search)	Consumer Goods	Investment (Capital) Goods	Raw Material (With Search)	Consumer Goods
2000	7,8	41,6	50,4	21,5	66	11,9
2001	8,5	42,7	48,7	20,9	66,1	12,7
2002	7,7	40,6	51,2	16,8	73,2	9,2
2003	9,2	39,1	51,1	16,3	73	9,5
2004	10,3	41,1	48,3	16,3	71,7	11,3
2005	10,9	41,2	47,4	17,8	69,3	12,4
2006	11	44,2	44,2	17,4	70,1	12
2007	12,8	46,1	40,7	16,7	71,4	11,5
2008	12,7	51,3	35,7	15,9	72,7	11
2009	10,8	48,6	39,8	15,2	70,6	13,6
2010	10,3	49,5	39,7	15,5	70,8	13,3
2011	10,5	50,3	38,7	15,4	71,8	12,3
2012	9	54,2	36,4	15,4	73,9	11,2
2013	10,2	49,2	40	14,6	73	12
2014	10,2	47,6	41,2	14,8	72,9	11,9
2015	10,9	47,4	41	16,7	68,7	14,3
2016	11,1	16,7	41,4	17,7	67,1	14,8
2017	11,7	46,5	41,3	14	72,7	12,9
2018	11,8	47,5	40	13	75,6	10,9
2019	11,9	47,2	40,2	12,3	77,2	10
2020	11,6	47,3	40,2	14,5	74,2	10,9

Source: Compiled from TUIK official website.

In Table 2, Turkey's export and import distribution in the 2000-2020 period is given according to the classification of large economic groups. Considering the change in the share of capital goods, intermediate goods and consumer goods in exports and imports over the years, the share of intermediate goods in both exports and imports draws attention. While the ratio of intermediate goods in imports was 66 per cent in 2000, it increased

to 74.2 per cent in 2020. This is an indication that economic growth and the dependence of exports on imports have increased over the years. Increasing dependence on imports will weaken the sustainability of both the foreign trade deficit and the current account deficit. Mainly energy imports, commodities, machinery, iron and steel, advanced technology etc. The fact that intermediate goods cannot be produced within the country in production processes is an important factor in the increase in the foreign trade deficit and current account deficit.

Another reason is the overvaluation of the Turkish Lira in this period as a result of the inflation targeting policy. The overvalued TL has led to a decrease in the competitiveness of exporters in international markets and the substitution of cheap imported intermediate goods for domestic intermediate goods.

3. Literature Review

When we look at the studies in the literature, it is possible to come across studies examining the relationship between export and import. Under the title of sustainability of current account deficit, the relationship between export-import variables of countries was examined and tested with econometric models. Studies examining the sustainability of the current account deficit in the literature through export and import series are given in Table 3.

Table 3. Literature on Sustainability of Current Account Deficit in Turkey

Writer	Examined Period	Method	Finding
Berke (2009)	1989-2006	Piecewise cointegration	There is a long-run relationship between export and import series. The current account deficit is sustainable.
Peker (2009)	1992-2007	Cointegration test	A weak relationship was found in the long run. The sustainability of the current account deficit is weak.

Göçer and Mercan (2011)	1992-2010	Limit Test	It has been found that the current account deficit in Turkey is sustainable in a weak form.
Shahbaz (2011)	2001-2011	Cointegration, Error Correction model	A long-term relationship was found between exports and imports and the current account deficit was interpreted as sustainable.
Hope (2011)	1992-2010	Cointegration test	The current account deficit is sustainable at a low level, but it has shown that there is a long-run relationship between exports and imports.
Mercan and Göçer (2012)	1992-2012	Cointegration test	It has been determined that the current account deficit in Turkey in the relevant period is sustainable in a weak form.
Altunöz (2014)	1994-2013	Cointegration Test	The sustainability of the current account deficit is weak.
Akcayir and its Allure (2016)	1992-2015	Cointegration, Causality	Current account deficits in Turkey are at a sustainable level, albeit at a weak level, with some increased risks.
Koç and Bakırtaş (2016)	1992-2015	Cointegration, ARDL bounds tests	There is a cointegration relationship between imports and exports, but the current account deficit is sustainable in a weak form.
Turan and Barak (2016)	1987-2014	Engle-Granger cointegration test	There is a long-term relationship between imports and exports.
Iron (2019)	1998-2018	Unit Root Tests with Structural Breaks	It has been revealed that current account deficits in Turkey are unsustainable.
Gençoğlu and Ünlü (2019)	1980-2017	Johansen cointegration analysis, VECM, TodaYamamoto causality test	It has been concluded that the current account deficit in Turkey is weakly sustainable.
Star (2020)	1987-2018	Fourier Cointegration	It has been concluded that the current account deficit is sustainable in a weak form.

Looking at Table 3, Demir (2019)'s study concluded that the current account deficit in Turkey is unsustainable. Other studies examined, on the other hand, give the result that the current account deficit in Turkey is sustainable in a weak form at various time intervals.

4. Econometric Analysis

The sustainability of the current account deficit due to Turkey's foreign trade deficit has been analyzed using Turkey's monthly export and import data. Data on export and import variables were obtained from the IMF's data system. The logarithmic forms of the series were included in the model in the study in which the period of January 2000- September 2021 was examined. After examining the relationship stationarity between the series, the Johansen cointegration test was applied. In Table 4, the basic statistical evaluations of the variables used in the analysis are given.

Table 4. Key Descriptive Statistics

Variable	Obser-vation	Average	Standard deviation	Minimum	Maximum
Export (TREX)	261	10338,62	4500,07	2310,00	20870,00
Import (TRIM)	261	13742,08	5889,43	2799,00	22869,00

4.1. ADF Unit Root Test

The long-term feature of a series will be understood by determining how it is affected by the value of the series in the previous period. Therefore, to understand the history of the series, the value of the series in each period must be regressed with the value of the previous period. Within the framework of the econometric

method, the stationarity of the series can be determined by unit root analysis. In this study, the stationarity of the series was tested using the Augmented Dickey-Fuller (ADF) unit root test.

$$\Delta Y_t = b_0 + b_1 t + \partial Y_{t-1} + a_i \sum_{i=1}^{m} \Delta Y_{t-i} + u_i \qquad (1)$$

Equation 1 is the regression that will occur if the error terms of the regression equations used in the DF test are autocorrelated. In this form, lagged difference terms are used. The basic logic in the ADF unit root test is to include enough terms in the model to ensure that the error term is free of autocorrelation in models such as equation 1 (Tarı, 2011:390).

4.2. Johansen Cointegration Test

The concept of cointegration developed by Engle-Granger is a test based on a single equation and the least-squares method is used. While examining the cointegrated relationships between the two series, the cointegration relationship was detected in the equation of one of the variables, but the weakness of the method was revealed that the other variable could not be detected in the equation. Johansen cointegration test was developed to eliminate these deficiencies. It is a method that allows the estimation of all possible cointegration relationships between series. The similarity method is most commonly used in the estimation of cointegrated relationships.

In the Johansen cointegration test, first, the stationarity degrees of the series is determined. Then, a VAR model is created, consisting of the series in the model, and a residual vector is obtained as a result. After this analysis, the residue vector is obtained from the VAR model again. Eigenvalues and eigenvectors are found using residual vectors and two separate test statistics are calculated. Considering the calculated values and test statistics, the existence of a cointegrated relationship between the series is decided (Tarı, 2011:429).

Before analyzing the sustainability of Turkey's current account deficit, whether the variables are stationary or not was examined with the help of the ADF unit root test, and the appropriate lag number was determined. The mathematical form of the model is as follows;

$$lnTREX = \beta_1 + \beta_2 lnTRIM + u \quad (2)$$

The results of the regression equation estimated by the least-squares method of the model expressed in Equation 2 are shown in Table 5. Considering the estimation results, while the constant is not statistically significant; the TRIM variable is statistically significant. If Turkey's total imports increased by 1 percent in the analyzed period, it will positively affect total exports by 0.95 per cent. The explanatory power of the established model is 0.94. In other words, 94 per cent of the changes that occur in the TREX series are explained by the changes arising from the TRIM series.

Table 5. Model Estimation Results

Variable	**Coefficient**	**Std. Error**	**t-statistics**	**Probability Value**
c	0,1651	0,138	1,19	0.234
TRIM	0,9523	0,014	64,71	0.00
TREX=0,1651+0,9523TRIM				
	DW Ist.	**f-ist**	**Probability (F-St.)**	
0,94	0,42	4187,4	0,00	

ADF unit root test results of TREX, TRIM series are shown in Table 6. Considering the results obtained; While Turkey's export (TREX) and import (TRIM) series contain unit roots at the level, they become stationary at their first difference.

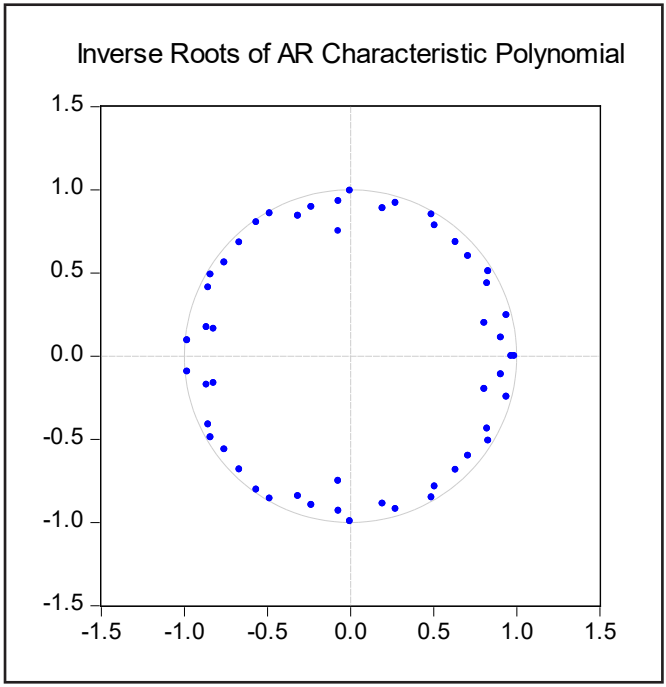
Table 6. ADF Unit Root Test Results

Variables	at the level			First Difference		
	Fixed	Steady -Trend	Fixed- Trend-less	Fixed	Steady -Trend	Fixed -Trendless
TREX	-1,84 (0,36)	-2,27 (0,44)	2,00 (0,98	-17,02 (0,00)	-17,04 (0,00)	-16,77 (0,00)
TRIM	-1,70 (0,42)	-1,91 (0,64)	1,17 (0,93)	-4,06 (0,00)	-4,13 (0,00)	-3,85 (0,00)

Note: Values in brackets Probe. They are values. According to the AIC information criterion, the appropriate lag length was determined to be 26.

Since both series become stationary in their first difference, the relationship between them will be examined with the help of the Johansen cointegration test. Before performing the cointegration test, some prerequisites need to be evaluated. First of all, it is necessary to determine the appropriate lag length of the model to be established. According to AIC, SC, LR, FBE and HQ information criteria, the appropriate lag length was determined as 26. Considering that the variables are monthly, the value of the lag length is normal. To test the stability condition at the appropriate lag length determined in the next step, it is determined whether the inverse roots are inside the unit circle. In Graph 2, it is seen that the roots are within the unit circle.

Chart 3. Stability Test for VAR Model



In the later created VAR model, whether there is an autocorrelation problem between the variables was tested with the help of the LM test and no autocorrelation problem was found with the appropriate lag length. When the relationship between the error terms of the model is examined, it is seen that there is no autocorrelation problem. Finally, the problem of varying variance in the model is examined. White test results are shown in Table 7. The problem of varying variance at the 5 per cent significance level was also not encountered in the model.

Table 7. White Variance Test

Chi-sq	df	Prob.
350,974	312	0,063

Since all the prerequisites for a healthy cointegration test have been met, the Johansen cointegration test was conducted to test the sustainability of Turkey's current account deficit. Model 5 was chosen as the appropriate model. The test results are shown in Table 8. According to the results obtained, it has been determined that there are four cointegrated relationships between Turkey's exports and imports, that is, the existence of a long-term relationship. Looking at the normalized equation; The effect of imports on exports is positive and significant. However, the sustainability of the current account deficit is weak for Turkey in the period under review.

Table 8. Johansen Cointegration Test

Trace Statistics			Maximum Eigenvalue Test Statisti		
hypotheses	**Statistics**	**probe value**	**hypotheses**	**Statistics**	**probe value**
r=0	24,92	0,00	**r=0**	18,57	0,03
r is at least 1 or less than 1	6,35	0,01	**r is at least 1 or less than 1**	6,35	0,01
Normalized equation;					
TREX=0,6383TRIM (0.04136) [-15.4327]					

Note: Values in parentheses show standard errors, values in square brackets show t statistics.

5. Conclusion

Turkey's current account deficit continued to increase rapidly after the 2001 crisis and became one of the top five countries with the highest current account deficit among the world economies. The increase in current account deficits has brought with it the problem of sustainability in the economies of the countries. The decrease in the ratio of intermediate goods (raw materials) in imports as a result of the separation of the actual imports according to the classification of goods and services will put the sustainability of the current account deficit into a deadlock. Considering the share of intermediate goods in Turkey's imports, the rate was 66 per cent in 2000; It increased to 74 per cent in 2020.

When the studies examining the sustainability of Turkey's current account deficit in different periods are evaluated; a weakly sustainable current account deficit was determined. In this study, the sustainability of the foreign trade deficit and current account deficit, which is evaluated over the export and import variables of Turkey in the 2000-2020 period, has been determined as weakly sustainable.

In the study, foreign trade balance and current account balance in Turkey were also evaluated. It is possible to list the reasons for Turkey's current account deficit as follows;

- The low domestic savings rate and the scarcity of related investments,
- The foreign trade deficit,
- Increasing energy prices in imports and foreign dependency on energy,
- High rate of external borrowing due to the inadequacy of domestic savings,
- Overvalued TL with inflation targeting policy.

Considering the reasons for the current account deficit in Turkey, it is necessary to increase domestic savings rates and transform them into investment activities that will increase production. In addition, it is necessary to target energy policies that will reduce the share of energy imports, which have a significant share in the current account deficit, and reduce foreign dependency on energy. In recent years, it will be an important step to make the necessary infrastructure investments in renewable energy sources within the scope of combating global warming and climate change. Again, policies that will transform the foreign trade balance, which is the most important determinant of the current account balance, in favour of the country should be targeted and economic policies should be formed to reduce the dependence of exports on imports.

References

Akçayır, Ö., Albeni, M. (2016). Sustainability Analysis of Chronic Current Account Deficit in Turkey. *Journal of Politics, Economics and Management Studies* , *4* (3), 35-62.

Altunöz, U. (2014). The main causes and sustainability of the current account deficit problem: The case of Turkey. *Istanbul Gelisim University Journal of Social Sciences* , *1* (2), 115-132.

Berke, B. (2009). Sustainability of Current Account Deficit in Turkey: Fragmented Cointegration Analysis, *Akdeniz Journal of FEAS* , *9* (18), 117-145.

Demir, MA (2019). Current Account Deficit Sustainability for Turkey in the Framework of Structural Fractured Unit Root Tests. *Third Sector Social Economic Review* , *54* (1), 261-273.

Genç, SY, Yardimci ME and Göçeri K. (2017). Structural Reasons and Sustainability of the Current Account Deficit Problem in Turkish Economy- 2002-2016, Ecoei Publication No.7.

Gençoğlu, P., Ünlü F. (2019). Sustainability of Current Account Deficit in Turkey: Econometric Analysis, *Journal of Hacettepe University Faculty of Economics and Administrative Sciences* , *37* (4), 627-650.

Göçer, İ., Mercan, M. (2011). Sustainability of Current Account Deficit in Turkish Economy: Boundary Test Approach. *Financial Political and Economic Commentaries* , (562), 33-33.

Kaya, M. (2016). Current Account Deficit Problem in Turkey and Its Causes, Journal of Dicle University Faculty of Economics and Administrative Sciences, 6(10):51-75.

Koç, S., Bakırtaş, İ. (2016). Sustainability of Current Account Deficit in Turkey: Findings from Cointegration Tests, *Dumlupınar University Journal of Social Sciences* , (49), 252-277.

Mercan, M., Göçer, I. (2012). Sustainability of current account deficit in Turkey within the framework of intertemporal external balance and optimization approaches. *Mediterranean FEAS Journal* , *12* (24), 73-101.

Peker, O. (2009). Is Current Account Deficit Sustainable in Turkey? An Econometric Analysis. *Kocaeli University Journal of Social Sciences* , (17), 164-174.

Sahabaz, A. (2011). *Sustainability of Current Account Deficit: The Case of 2001-2011 Turkey.* Published in: Çukurova University Journal of Social Sciences Institute, Vol. 20, No. 3 (15 December 2011): pp. 417-432.

Tari, R. (2011). Econometrics, Umuttepe Publications, 7th Edition

Tunali, C.B. (2008) Sustainability of Current Account Deficit in Turkeyé Journal of Social Sciences, 1:163-177.

Turan, Z., & Barak, D. (2016). Sustainability of current account deficit in Turkey. *Journal of Business and Economic Studies* , *4* (2), 70-80.

Tunali, C.B. (2008). Sustainability of Current Account Deficit in Turkey, Journal of Social Sciences, 1:163-177

Umit, A. O. (2011). Evaluation of the sustainability of the current account deficit in Turkey with time series analysis: 1992-2010 period, Anadolu University Journal of Social Sciences, 11(3): 135–148.

Ünsal, Erdal M. (2013) Macro Economics, İmaj Publishing House

Yayar, R., Demir İ. (2014). Sustainable Current Account Deficit in Turkey, Volume/Volume VII Issue/Number 1 April/April 2014 Journal of Social Sciences/Journal of Social Sciences: 118-148.

Yildiz, S. (2020). Sustainability of current account deficit in Turkey, *Journal of Humanities and Tourism Research* , *10* (2), 289-304.

Dynamics of Consumers' Behavior in Food Waste: Income, Education, and Date Label

Suzan ODABAŞI[1]

Abstract:

In recent years, food waste has become an increasingly important problem for nations. During the food production and distribution process, food requires a large amount of energy, water, fertilizer, and other resources. The Food and Agriculture Organization reported that the global volume of food wastage is nearly 1.6 billion tons of primary product equivalents, with 1.3 billion tons being the edible part of the total food waste in the world. Because of the social, economic, and environmental impacts of food waste, food waste is seen as a priority by policymakers and academicians. A number of international organizations (including the World Economic Forum, European Commission, and the OECD) have started a global campaign to increase the efficiency of resource use and reducing food waste. To understand how much food is wasted by consumers, different social-economic indicators are examined in few studies. This study aims to review the literature on identifying which social-economic indicators have impact on consumers' behavior in food waste. According to the common review in the literature, while food waste is concentrated in the early stages of the food supply chain (harvesting and distribution) in developing countries, consumer-level food waste is concentrated in the developed countries.

Keywords: Food waste, Food Policy, Agricultural economics

JEL Codes: L66, Q18, O13

1 Department of Economics, Faculty of Economics and Administrative Sciences, Uşak University Uşak-TURKEY Suzan.gurgil@usak.edu.tr

1. Introduction

In recent years, food waste has become an increasingly important problem of the nations. During the food production and distribution process, food requires large amount of energy, water, fertilizer and other resources. The Food and Agriculture Organization reported that the global volume of food wastage is nearly 1.6 billion tons of primary product equivalents, with 1.3 billion tons being the edible part of the total food waste in the world.

Because of the social, economic, and environmental impacts of the food waste, food waste is seen as a priority by policy makers and academicians. A number of international organizations (including the World Economic Forum, European Commission and the OECD) have started a global campaign to increase the efficiency of resource use and reducing food waste (Koester, 2014). To understand of how much food is wasted by consumers, different social-economic indicators are examined in few studies. This study aims to develop an approach to identify which social-economic indicators have impact on consumers' behavior in food waste. Therefore, this present study provides a summary of the previous studies about which factors in the literature have an impact in food waste and why food waste occurs at the consumer level.

Relatively to the other product types, milk has a very significant environmental cost. Scientists have calculated nearly 360.000 tons of milk is wasted each year. This amount creates greenhouse gases equivalent to 100,000 tons of carbon dioxide. This is the same as emitted in a year by 20,000 cars (Connor , 2012).

In addition, the limited data suggest that losses are much higher at the immediate post-harvest stages in developing countries and higher for perishable foods across industrialized and developing economies alike (Parfitt, Barthel, & Macnaughton, 2010). Thus, some of the variables which are related to identifying developing/ developed countries are used as an indicator and tested for their impact on the food waste.

The remainder of this paper is organized as follow: section 1 provides a summary of literature on economic indicators and food waste, also summarizes the impact of socio demographic indicators on food waste. Section 2 presents the results and discussion.

2. Literature Review

2.1. Economic determinants of food waste

As a results of rapid urbanization and changing lifestyles food insecurity has emerged as an important problem of nations. Due to global risks, a growing literate focus on to identify which factors have impact on the food waste. A recent report released by the United States Department of Agriculture, Economic Research Service (USDA ERS) provides an economic framework on the economic factors of fresh-produce loss. Thus, in the present study provides review on three factors and food waste: (1) income level, (2) education, and (3) date labels.

2.1.1 Socioeconomic characteristics and food waste

According to United Nation's report (2015), about 650 million people in the world are suffering from undernourishment. Reducing food waste plays an important role to for hunger reduction. As a result, during the last two decades, researchers have been focusing on dynamics of food waste on production, distribution, or household level. Based on the growing literature on consumer level food waste, individuals' demographic background might be associated with food waste behaviors (Stancu, Pernille, & Lähteenmäki, 2016; Ponis, Papanikolaou, Katimertzoglou, Ntalla, & Xenosb, 2017; Fami, Aramyan, Sijtsemab, & Alambaigi, 2019).

Household size, income level, age, and educational background have been discussed main drivers of food waste at the consumption level. To identify which socio-economic factors have impact on individuals' food waste behaviors in Tehran, Fami et al. (2019),

conducted 1197 interviews with urban women. Information use, knowledge, and several socioeconomic characteristics of households were analyzed. The authors point out that food consumption management plays an important role to reduce food waste in consumer level. Also, their findings support that economic power of the families and knowledge on food waste are positively associated. An increase on the economic power is likely to increase sensibility to food waste. As a result, one can see that higher economic welfare decreases food waste (Fami, Aramyan, Sijtsemab, & Alambaigi, 2019).

Income level and food waste:

While the relationship between income level and food waste is not clearly explained, several studies point out that there is an association between households' income level and food waste behaviors (Abdelradi , 2018; Setti , Falasconi, Segrè , Cusano , & Vittuari , 2016; Ellison & Lusk, 2018). By using a cross sectional dataset with 1200 responses, Abdelradi (2018) investigate the impact of social and economic characteristics on food waste behaviors. The findings from the structural equation modelling show that households with higher income level are more likely to produce more food waste (Abdelradi , 2018). Another empirical study about per capita income level and food waste is conducted in Italy by including 1,403 survey participants. The findings confirm the complex relationship between income level and food waste behaviors. Also, individuals from lower income level show a greater attitude to waste certain food typologies (Setti , Falasconi, Segrè , Cusano , & Vittuari , 2016). Lastly, Ellison and Lusk (2018) highlight that food waste is an economic decision and individuals have both benefits and costs. To analyze the individuals' food waste decisions, a large survey is conducted in the U.S. safety, price, and opportunity costs are included to in the research objective. The results show that medium-income households are more likely

to throw out the leftovers relative to low-income households. In addition, higher-income households are more likely to waste dairy (Ellison & Lusk, 2018).

Education and food waste

Studies show that education level is an important factor which has impact in food resource management (Pocol, Pinoteau, Amuza , Burlea-Schiopoiu, & Glogoveţan, 2020; Secondia, Principato, & Laureti, 2015; Lanfranchi, Calabrò, Pascale, Fazio, & Giannetto, 2016).

To investigate the food waste beheviours at the nation level in Romania, Pocol et al. (2020) conducted an online survey. A sample of 2541 responses are used to employ a K-means clustering model. Three clusters are "careless", "precautious", and "ignorant". The findings support that "ignorant" respondents are genearlly from urban areas and have higher education levels. Another imporatnt finding is that education level is not always positively related to positive food waste behaivors. So, the authors highlights the importance of global awareness on reducing food waste (Pocol, Pinoteau, Amuza , Burlea-Schiopoiu, & Glogoveţan, 2020).

Secondia, Principato, and Lauretti (2015) investigates the household level dynamics towards food waste in EU-27 citizens. The Flash Eurobarometer (FE) survey "Attitudes of Europeans towards resource efficiency" is used to explain the individuals' food waste behaviour in the European teritories. Two important findings on the relationship between education level and food waste is seen. Firstly, lower level of education might be results in lower level of food waste. The authors remind that individuals with lower education level might not able to estimate correctly how much food they wasted. In addition, the authors mention that further researches are needed to understand this phenomenon (Secondia, Principato, & Laureti, 2015).

Lastly, Talia et al. (2016) analyzed the factors which cause food waste in the rural areas. By using multiple correspondence analysis MCA and cluster analysis, the authors point out three important findings: (i) household size is an important factor on food waste, (ii) income level does not show any impact on food waste, and (iii) a higher level of education is associated with domestic food waste.

Date labels and food waste

To analyze the effect of date labels on food waste, Wilson et al. (2017), developed a laboratory experiment. In this study, the effects of product, date, and size on the willing to waste is analyzed. For different products, different date labels are included: (i) best by, (ii) fresh by, (iii) sell by, and (iv) use by. The authors use a mixed-design ANOVA with repeated measures. The findings show that the label , "use by" increases the consumers' food waste. When the product is beyond , the consumers focus on product safety than product quality. Lastly, the results evidence willing to waste is higher for "use by" and "Fresh by" relative to "Best by" and "Sell by" (Wilson et al., 2017).

A recent study is conducted by Gong et al. (2021). During the data collection process, Amazon Mechanical Turk (MTurk) is used. The authors tested four hypotheses by using One-way analysis of variance (ANOVA). The findings support that Hypothesis 1 tests that "use by" or no explanatory phrases will decrease the willing to consumption. Hypothesis 2 tests that "use by" or no explanatory phrases will result in higher levels of safety concerns. Hypothesis 3 tests the relationship between the food date labels and people's willingness to consume the food products. Lastly, hypothesis 4 test that if odor and color are normal, the consumers will continue to consume the beyond-date food product. The findings show that if odor and color are normal, consumers are like to use several beyond-date food products (Gong et al., 2021).

Results and Discussions

Reducing consumer loss of food is very important to improve food security. Additionally, an economic and environmental implication of the food waste takes considerations of the academics and policy makers. According to the common review in the literature, while food waste is concentrated in the early stages of the food supply chain (harvesting and distribution) in developing countries, consumer level food waste is concentrated in the developed countries.

This study aims to contribute consumer level- food waste literature by summarizing the recent empirical studies. The findings show that a positive nexus exists between per capita income and food waste. Also, data label is another important factor which affects the consumers' food consumption decision.

References

Abdelradi , F. (2018). Food waste behaviour at the household level: A conceptual framework. *Waste Management*.

Baker, D., Fear, J., & Denniss, R. (2009). *What a waste: an analysis of household expenditure on food.* The Australia Institute.

Buzby, J. C., Wells, H. F., & Hyman, J. (2014). *The Estimated Amount, Value, and Calories of Postharvest Food Losses at the Retail and Consumer Levels in the United States* .

Connor , S. (2012, May 13). Retrieved from http://www.independent.co.uk/life-style/food-and-drink/news/drink-your-milk-waste-is-equal-to-gas-emissions-from-20000-cars-7743521.htm

Edwards, C. (2009, June). Retrieved from http://www.downsizinggovernment.org/agriculture/regulations-and-trade-barriers

Ellison, B., & Lusk, J. L. (2018). Examining Household Food Waste Decisions: A Vignette Approach. *Applied Economic Perspectives and Policy*, Volume40, Issue4 613-631.

FAO. (2011). *Global food losses and food waste – Extent, causes and prevention.* Rome: Food and Agriculture Organization of the United Nations.

Fami, H. S., Aramyan, L. H., Sijtsemab, S. J., & Alambaigi, A. (2019). Determinants of household food waste behavior in Tehran city: A structural model. *Resources, Conservation & Recycling*, vol:143 pg:154-166.

Godfray, H. C. (2010). Food Security: The Challenge of Feeding 9 Billion People. *Science*, 812-818.

Gong, Z. , Leona Yi-Fan Su, Jennifer Shiyue Zhang, Tianli Chen, Yi-Cheng Wang (2021). Understanding the association between date labels and consumer-level food waste, Food Quality and Preference, 104373, ISSN 0950-3293, https://doi.org/10.1016/j.foodqual.2021.104373.

Hysen, B., Mensur, V., Muje, G., Hajrip, M., Halim, G., Iliriana, M., & Njazi, B. (2008). *Analysis of consumer behaviour in regard to dairy products in Kosovo.* Food and Agriculture Organization of the United Nations.

Koester, U. (2014). Food Loss and Waste as an Economic ans Social Problem. *Intereconomics*, 348-354.

M.,Macnaughton,S. (2010), Food waste within food supply chains: quantification and potential for change to 2050, Philos Trans R Soc Lond B Biol Sci.

Mellor , J., & Johnston , B. (1984). The World Food Equation:Interrelations Among Development, Employment, and Food Consumption. *Journal of Economic Literature*, 531-574.

Minor, Travis, Gregory Astill, Sharon Raszap Skorbiansky, Suzanne Thornsbury, Jean Buzby, Claudia Hitaj, Linda Kantor, Fred Kuchler, Brenna Ellison, Ashok Mishra, Tim Richards, Brian Roe, and Norbert Wilson, Economic Drivers of Food Loss at the Farm and Pre-Retail Sectors: A Look at the Produce Supply Chain in the United States, EIB-216, January 2020.

Oelofse , S. H., & Nahman , A. (2013). *Estimating the magnitude of food waste generated in South Africa.* Waste Management & Research : the Journal of the International Solid Wastes and Public Cleansing Association.

Ponis, S. T., Papanikolaou, P. A., Katimertzoglou, P., Ntalla, A. C., & Xenosb, K. I. (2017). Household food waste in Greece: A questionnaire survey. *Journal of Cleaner Production*, vol: 149 1268-1277.

Secondia, L., Principato, L., & Laureti, T. (2015). Household food waste behaviour in EU-27 countries: A multilevel analysis. *Food Policy*, Volume 56, Pages 25-40.

Setti , M., Falasconi, L., Segrè , A., Cusano , I., & Vittuari , M. (2016). Italian consumers' income and food waste behavior. *British Food Journal*, Volume 118 Issue 7.

Stancu, V., Pernille, H., & Lähteenmäki, L. (2016). Determinants of consumer food waste behaviour: Two routes to food waste. *Appetite*, vol:96 7-17.

Norbert L.W. Wilson, Bradley J. Rickard, Rachel Saputo, Shuay-Tsyr Ho (2017). Food waste: The role of date labels, package size, and product category, Food Quality and Preference, Volume 55, Pages 35-44.

Elisa Di Talia, Mariarosaria Simeone, Debora Scarpato (2019., Consumer behaviour types in household food waste, Journal of Cleaner Production, Volume 214, Pages 166-172, ISSN 0959-6526, https://doi.org/10.1016/j.jclepro.2018.12.216.

Table and Figures

Table 1: Income level and Food waste

Title	Author	Model	Data	Results
Italian consumers' income and food waste behavior	Setti et al.	Proportional odds models that adopt stepwise procedures and genetic algorithms.	Survey data	association between income level and food waste behavior is not conclusive.
Food waste behaviour at the household level: A conceptual framework	Fadi Abdelradi	Structural Equation modeling (SEM)	Survey data	households with high-income levels produce more food waste compared to low-income levels
Examining Household Food Waste Decisions: A Vignette Approach	Brenna Ellison, Jayson L Lusk	Ordered Logit Regression	Survey data-	Medium-income households were overall more likely to throw out the leftovers

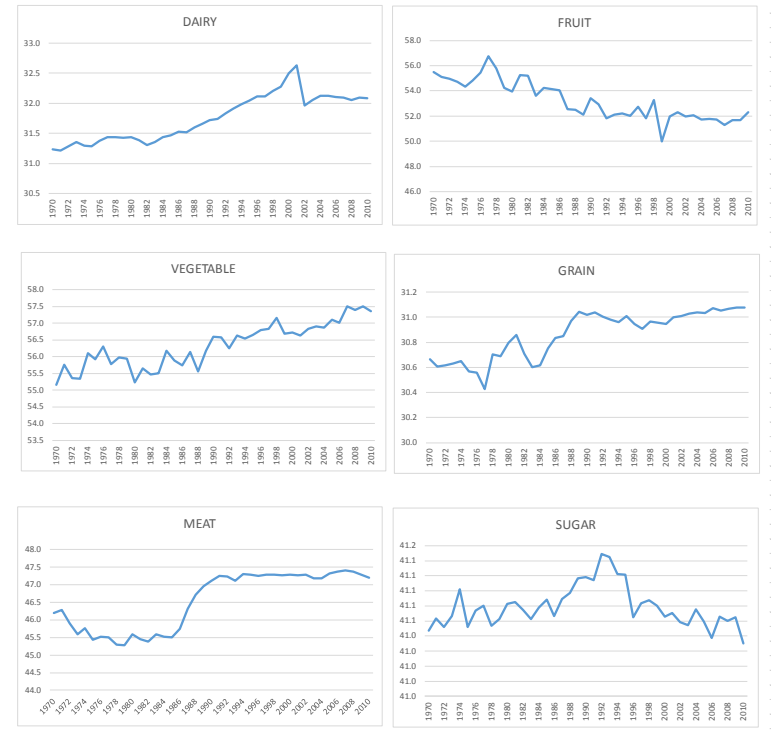
Table 2: Education level and Food waste

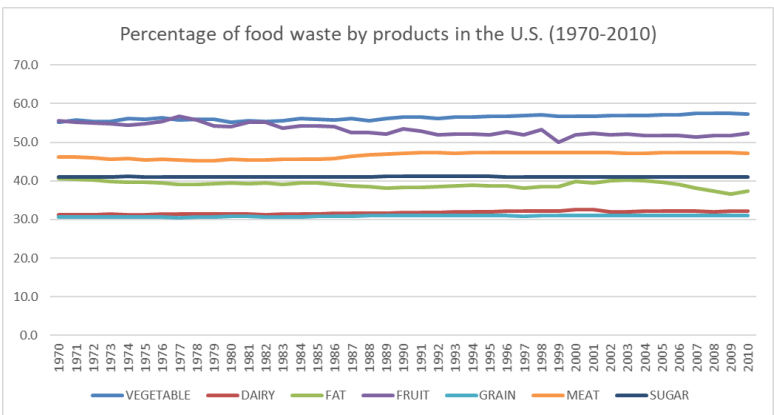
Title	Author	Model	Data	Results
Food Waste Behavior among Romanian Consumers: A Cluster Analysis	Cristina Bianca Pocol , Margaux Pinoteau , Antonio Amuza , Adriana Burlea-Schiopoiu and Alexandra-Ioana Glogovet	A Cluster Analysis	Survey data	Education level is not always an important determinant of food waste behavior
Consumer behaviour types in household food waste	ElisaDi Talia, Mariarosaria Simeone; Debora Scarpato	MCA and cluster analysis	Survey data	a higher level of education is associated with domestic food waste.
Household food waste behaviour in EU-27 countries: A multilevel analysis	Luca Secondi, Ludovica Principato, Tiziana Laureti	Multilevel logistic regression -random effect model	the Eurobarometer data	education level is associated with individuals' food waste behaivor.

Table 3: Date labels and Food waste

Title	Author	Model	Data	Results
Food waste: The role of date labels, package size, and product category	Norbert L.W.Wilson, Bradley J.Rickard, RachelSaputo, Shuay-TsyrHo	a mixed-design ANOVA with repeated measures	a controlled laboratory experiment	willing to waste is higher for "use by" and "Fresh by" relative to "Best by" and "Sell by"
Understanding the association between date labels and consumer-level food waste	Ziyang Gong, LeonaYi-Fan Su, JenniferShiyue ZhangbTianliChendYi-ChengWang	One-way analysis of variance (ANOVA)	Amazon Mechanical Turk (MTurk)	support that "Use By" labels concerns more safety and quality than "Best if Used By".

Graph 1 : food waste percentage in the U.S. (1970-2010).





InTraders Academic Platform

Topics based on economy and business topics. Under InTraders trademark, we conduct InTraders Autumn Conferences, Spring Conferences, InTraders International Trade Academic Journal, Conference Alerts and Foreign Market Research.

"We caress the souls of researchers"

InTraders Academic Platform
www.intraders.org

Autumn Conferences
www.intraders.org/october

Spring Conferences
www.intraders.org/may

Academic Journal
https://dergipark.org.tr/tr/pub/intraders

Foreign Market Research
https://www.intraders.org/market/

Conference Alerts
www.intraders.org/news

ISBN:978-625-8461-66-4

hiperyayın