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Araştırma Makalesi

The Effects of Trade Liberalization and Export Diversification on Unemployment: An Empirical Analysis

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Abstract

This study investigates the effects of trade liberalization and export diversification on unemployment rate for a group of OECD countries for the period between 1991 and 2014. Using several liberalization and export diversification indices as well as various control variables, the results of the empirical analysis show that as countries engage more in international trade and diversify their export baskets, unemployment rate decreases. Thus, it can be argued that OECD countries should follow policies that are in favor of trade liberalization rather than protectionism. Moreover, diversification of export baskets instead of specialization is of great importance in decreasing the unemployment rate.

Keywords: Panel Data, Trade Liberalization, Trade Openness, Economic Globalization, Export Diversification, Unemployment Rate.

Jel Classification Codes: F14, F66.

Ticaretin Serbestleştirilmesi ve İhracat Çeşitlendirmesinin İşsizlik Üzerindeki Etkileri: Ampirik Bir Analiz

Öz

Bu çalışma, ticaret liberalizasyonu ve ihracat çeşitlendirmesinin işsizlik üzerindeki etkisini bir grup OECD ülkesi için 1991-2014 yılları arasında incelemektedir. Liberalizasyon ve ihracat çeşitlendirmesi endekslerinin yanı sıra çok sayıda kontrol değişkeni kullanılarak yapılan ampirik analizin sonuçları, ülkelerin uluslararası ticaretlerini arttırdıkça ve ihracat sepetlerini çeşitlendirdikçe işsizlik oranlarının azaldığını göstermektedir. Dolayısıyla, OECD ülkelerinin korumacılıktan ziyade ticaretin serbestleştirilmesi lehine politikalar izlemeleri gerektiği söylenebilir. Ayrıca, ihracat sepetlerinin uzmanlaşma yerine çeşitlendirilmesi, işsizlik oranının azaltılmasında büyük önem taşımaktadır.

Anahtar Kelimeler: Panel Veri, Ticaret Liberalizasyonu, Dışa Açıklık, Ekonomik Globalleşme, İhracat Çeşitlendirmesi, İşsizlik Oranı.

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1. Introduction

Globalization around the world has been growing constantly, and perhaps one of the most important components of this globalization takes place among exports and imports. Countries are engaging in trade agreements and looking for new markets to improve their economic performance. According to the World Bank data, trade openness[1] has increased from 27% to almost 60% between the years 1970 and 2014. This rapid increase in international trade has gained attention among economists and its implications on various economic variables such as economic growth, exchange rates, inflation, current account etc. has been analyzed rigorously. However, as Dutt, Mitra and Ranjan (2009) states, many trade models usually assume full employment with flexible wages, which suggest that economists mostly ignore the effects of trade liberalization on unemployment. On the other hand, in recent years, there is a rapidly growing research effort on the link between unemployment and international trade[2].

Among the studies between unemployment and trade liberalization, there are several papers that analyze the theoretical relationship between these two variables. For example, Davis (1998) considers the U.S. and European cases in a Heckscher Ohlin framework combined with flexible and rigid wages, and finds that free trade actually increases unemployment rate. Moore and Ranjan (2005) examine whether trade globalization affect unemployment and wage inequality by using a sectoral search model and conclude that although globalization increases inequality, its effects on unemployment is ambiguous. Felbermayr et.al (2011a) set up a model that includes symmetric countries interact on product markets, and also, they introduce search frictions and find that liberalization lowers unemployment and cause an increase in real wages as long as it generates improvements in productivity. As the abovementioned examples from the literature suggest, there are various theoretical explanations on the relationship between unemployment and liberalization. However, theoretical models have mostly found controversial results, depending on their assumptions and structure of their models. Therefore, empirical analysis gains significant importance in examining the link between unemployment and trade liberalization. There are several controversial empirical studies on the effects of the trade liberalization on unemployment. Various studies find a negative effect[3] (that is, as trade liberalization increases, unemployment decreases), and some other studies find a positive effect[4]. Moreover, there are also studies that find the effect is uncertain[5]- can be both positive and negative - depending on model and econometric

[1] The ratio of exports plus imports to GDP
[2] See for example Felbermayr, Prat, and Schmerer (2011a), Dutt, Mitra and Ranjan (2009), Agénor and Aizenman (1996), Gozgor (2014), Davidson, Martin and Matusz (1999), Moore and Ranjan (2005).
[3] Melitz (2003), Mitra and Ranjan (2010), Felbermayr, Prat and Schmerer (2011a,b), Gozgor (2014).
[4] Davis (1998), , Egger and Kreickemeier (2009), Helpman and Itskhoki (2010), Nwaka, Uma and Tuna (2015).
[5] Şener (2001), Moore and Ranjan (2005), Dutt et al. (2009), Yanikkaya (2003).

specification. In addition to trade liberalization, there are also various studies examining the link between export or import volume and unemployment rate. For example, Ruiz-Nápoles (2004) and Fu and Balasubramanyam (2005) investigate the relationship between exports and unemployment and argue that although an increase in exports positively contribute to employment levels, domestic production is found to be more important in generating new jobs.

The theoretical models about trade and unemployment relationship usually build their theory up on two frameworks: The first one is suggested by David Ricardo, who argues that countries should specialize on specific products and the second one is the Heckscher-Ohlin model, which establishes that trade is determined by endowments, so that the most important component in trade is factor accumulation (Cadot, Carrère and Strauss-Kahn, 2011). However, these arguments and many trade models analyzing the trade-employment relationship ignore an important concept, namely export diversification. Agosin, Alvarez and Bravo-Ortega (2012) state that almost all of the developed countries have a diverse set of exports, whereas developing countries' export baskets mostly concentrated on few goods. Diversifying the export basket has several benefits on the performance of an economy. For instance, Melitz (2003) argue that a rise in variety of exports could yield an increase in productivity. Also, Agosin (2007) states that as the diversification of exports goes up, the instability in export income goes down, which is directly associated with a less volatile economic growth. Furthermore, Hesse (2009) states that a strand of endogenous growth literature highlights the significance of learning by doing, and export diversification could create spillover effects through new techniques or practices, which in turn boosts growth. Furthermore, by adding new goods to their export basket, countries could gain both from domestic and foreign demand, which also contributes to economic growth and its stability.

The explanations above suggest that diversification might increase economic growth and allow countries to reach high income per capita levels. Considering the fact that countries with higher growth rates usually have lower unemployment rates, the first benefit of diversification in terms of employment is due to its positive impact on economic growth. More importantly, diversification could also directly affect unemployment. Since specializing on few goods could create volatility, diversification is a precaution against possible shocks and instabilities. Frenken, van Oort, Verburg and Boschma (2005) state that sectors with a diversified structure is expected to get less affected by a negative demand shock. Similarly, Izraeli and Murphy (2003) argue that unemployment is lower in diversified economies, since it is easier to find a new job in the case of a lay-off. Rodrik (2005) also suggest that employment inequality (Gini coefficient of unemployment) is lower in economies with a diversified setting.

Only a few papers have addressed the empirical relationship between export diversification and unemployment. On regional/industry level, Izraeli and Murphy (2003), and Malizia and Ke (1993) find a positive link, whereas Trendle and Shorney (2003) state that the positive link is dependent on the size of labor force. On the country level, Naudé and Rossouw (2011) find diversification decreases unemployment in South Africa, and UNCTAD (2018) analyze this relationship for selected African Countries and show that diversification lowers the unemployment rate.

The evidence from the literature discussed above suggests that trade openness together with export diversification might lower the unemployment rate. In this context, the aim of this paper is to examine the nexus between trade liberalization, export diversification and unemployment. For this purpose, empirical relationship between these variables is investigated for a group of OECD countries. Although there are several studies analyzing these links separately, to the best of our knowledge, this paper is the first to consider the effects of interaction between trade liberalization and diversification on the level of unemployment.

The rest of the paper is organized as follows. Second section examines the data set by analyzing the variables included into the econometric regression and describes the empirical methodology. Third section presents the empirical results and analyzes their implications. Last but not least, section four concludes and also examines the policy implications.

2. Data and Empirical Methodology

The data set consist of 26 OECD countries[6] for the years between 1991 and 2014. The reason for choosing OECD countries is due to the reliability of the data. As Felbermayr, Prat and Schmerer (2011b) states, data reliability in terms of unemployment rates is a serious issue in non-OECD countries, therefore it is chosen to limit the sample by OECD countries only. Although the initial aim is to use all OECD countries, some of them had to be eliminated due to the data availability.

The dependent variable is unemployment rate and is taken from World Bank World Development Indicators database. The main variables of interest are the trade liberalization, export diversification and globalization indices. To capture the effects of liberalization and diversification on unemployment, various indicators have been chosen for a detailed analysis. The first indicator is the trade openness, which is the ratio of export plus imports to Gross Domestic Product (GDP). Secondly, the ratio of exports and imports to GDP are also considered separately to evaluate their effects on unemployment. Moreover, to capture the impact of trade globalization and diversification, several globalization and export

[6] The list of the countries can be found in the Appendix.

diversification indices have also been introduced into the model. The first one is the KOF trade globalization index, which is calculated by using three different variables: Trade in goods, trade in services and trade partner diversification. By controlling for trade partner diversification, this index allows examining the importance of diversification in terms of export destinations. There are also additional KOF globalization variables to account for international integration. The first one is KOFECGIDF and the second one is KOFECGI. Both indexes try to measure the level of trade and financial openness and used as trade liberalization proxies by many papers such as Samimi, Ghaderi, Hosseinzadeh, and Nademi (2012) and Gozgor (2014). These indexes are obtained from Gygli, Haelg, Potrafke and Sturm (2019) and detailed information about these indices can be found in the Appendix.

Although using KOF indices allows to capture the effects of liberalization and trade partner diversification on unemployment, using partner diversification only might generate misleading results in terms of export performance of countries. Therefore, to further control for diversification, an interaction variable, which consist of trade openness data from the World Bank, and export diversification[7] data from International Monetary Fund (IMF, 2014) is also used. Export diversification data of IMF take into account both type of goods exported and their market value. In this context, this variable is a better indicator of export basket diversification. By interacting this variable with trade openness, it is possible to control for the effect of trade openness together with export diversification. Initially, this variable is a positive number approximately fluctuates between 0 and 6, and a higher value indicates lower diversification. Therefore, when it is interacted with trade openness it could generate misleading results. Thus, firstly this variable is normalized between 0 and 1, and secondly every value is subtracted from 1 to get a positive index, where a higher value indicates higher diversification.

In addition to these indicators, several control variables that are expected to affect unemployment are also used in the empirical estimation. Among these, there are some macroeconomic variables, such as inflation rate, investment rate, population growth, foreign direct investment and logarithm of GDP per capita levels. Furthermore, there exist some labor market variables, as an indicator for country specific conditions, such as minimum wage setting, union density and coordination wage. All of the variables, their definitions and sources and summary statistics can be found in the Appendix.

To evaluate the effects of trade and diversification on unemployment, the following econometric specification is used:

[7] Calculation of Export Diversification can be found in the Appendix.

$$UNE_{i,t} = \beta_0 + \beta_1 TRD_{i,t} + \beta_2 X_{i,t} + \Omega_i + u_{i,t} \quad (1)$$

Where UNE is the unemployment rate, TRD is either trade liberalization index, measured by trade openness, exports to GDP ratio, or imports to GDP ratio depending on the model specification, X represents other control variables, Ω stands for the individual fixed effects and u is the error term. Following this specification, several variations of the model in the equation (1) are estimated in the following forms:

$$UNE_{i,t} = \beta_0 + \beta_1 TRD * EXDIV_{i,t} + \beta_2 X_{i,t} + \Omega_i + u_{i,t} \quad (2)$$

$$UNE_{i,t} = \beta_0 + \beta_1 GLO_{i,t} + \beta_2 X_{i,t} + \Omega_i + u_{i,t} \quad (3)$$

In the equation (2), $TRD * EXDIV_{i,t}$ is an interaction variable that consist of export diversification and trade openness, and in the equation (3) GLO is a variable that represents a globalization index. To estimate the above models, this study employs panel data estimation technique. The first step of estimating a panel data model is to check whether fixed or random effects is the suitable estimator. This can be done by Hausman test, and according to the results, random effects is the preferred technique between two models. Moreover, to avoid the heteroscedasticity and auto correlation problem, robust standard errors are used. Furthermore, to check whether cross sectional dependence exist, Pesaran test is employed and the results show no cross-sectional dependence. The results for these specification tests can be found in Appendix.

3. Estimation Results

The empirical results are divided into two parts for a clearer analysis. In Table 1, the effects of trade on unemployment are analyzed by using different trade proxies. In Table 2, the effects of export diversification, trade and economic globalization indices on unemployment are examined.

Table 1: Estimation Results with Trade Proxies

Variables	(1) UNE	(2) UNE	(3) UNE
Inflation	-0.032**	-0.031**	-0.032**
	(0.015)	(0.015)	(0.016)
Investment Rate	-0.419***	-0.429***	-0.404***
	(0.071)	(0.074)	(0.069)
Log of GDP P.C.	-1.138**	-1.167**	-1.143**
	(0.574)	(0.579)	(0.566)
Pop. Growth	-1.495**	-1.472**	-1.519**
	(0.716)	(0.713)	(0.720)
Min. Wage Set.	0.017	0.019	0.016
	(0.115)	(0.118)	(0.111)
Coord. Wage	-0.747***	-0.746***	-0.746***
	(0.254)	(0.252)	(0.256)
FDI	-0.003	-0.003	-0.004
	(0.014)	(0.014)	(0.014)
Union Density	-0.002	0.000	-0.002
	(0.032)	(0.032)	(0.031)
Trade Open.	-0.024*		
	(0.012)		
Exports to GDP		-0.041*	
		(0.025)	
Imports to GDP			-0.051**
			(0.024)
Constant	34.276***	34.461***	34.108***
	(5.793)	(5.820)	(5.766)
Observations	575	575	575
Number of countries	26	26	26

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 1 shows the estimation results of the baseline model. In the first column, trade openness is used as a proxy of trade liberalization in order to determine the relationship between trade liberalization and unemployment[8]. Trade openness is significantly and negatively associated with unemployment rate, which is parallel with the findings of Mitra and Ranjan (2010), Melitz (2003), Felbermayr et.al (2011a, 2011b) and Gozgor (2014). In order to strengthen the model, various control variables are also applied. The first control variable is the investment rate and its coefficient is found to be negative and statistically significant, which is

[8] Coe and Helpman (1995), Frankel and Romer (1999), Ades and Glaeser (1999), Alesina, Spolaore, and Wacziarg (2000), Dinopoulos and Thompson (2000), Alcala and Ciccone (2004), Gozgor (2014) also used exports plus imports relative to nominal GDP referring to trade openness in their studies.

parallel with the expectations and also foregoing literature. As the investment rate increases in a country, there will be an increase in job opportunities and it would be easier to find a job, therefore unemployment rate is expected to decrease. The second control variable is the inflation rate. The inverse relationship between unemployment and inflation is affirmed by the model as the coefficient of inflation is negative and statistically significant, consistent with Phillips curve. Logarithm of GDP per capita is also another control variable and it is found to be negative and statistically significant, which satisfies Okun's law. Population growth is also used to control for the effect of the demographic structure among an economy and it is an important determinant of the unemployment rate and its coefficient is negative and statistically significant. The effect of population growth on unemployment rate is ambiguous in the literature. In the Neo-classical framework, as population of a country increases, unemployment rate may also increase; however new trade theories support the view that an increase in population and trade openness reduces unemployment. The estimation results support the arguments of new trade theories. Another control variable is the foreign direct investment (FDI) and its coefficient is found insignificant. To analyze the effect of labor market variables, as in Aidth and Tzannatos (2008), union density, coordination of wage settings and minimum wage settings are also added to the model. The results show that coordination wage negatively affects unemployment, whereas union density and minimum wage variables do not seem to affect unemployment. These findings indicate that as wage bargaining is coordinated by the central union, government, employers' associations, authorities etc., unemployment decreases.

In the second column of the Table 1, another model is generated by using exports to GDP ratio for robustness check. The coefficient of the exports is statistically significant and negative, and its coefficient is higher than trade openness. The estimated coefficients and their significance levels of remaining control variables are almost same as the baseline regression. In the third column, imports to GDP ratio is used as a proxy of trade liberalization and its coefficient is found statistically significant and negative. These results indicate that all specifications of trade liberalization have a positive impact on unemployment rates.

Table 2: Estimation Results with Various Indices

Variables	(1) UNE	(2) UNE	(3) UNE	(4) UNE
Inflation	-0.034**	-0.033**	-0.037**	-0.033**
	(0.016)	(0.015)	(0.015)	(0.015)
Investment Rate	-0.405***	-0.420***	-0.420***	-0.432***
	(0.071)	(0.073)	(0.070)	(0.071)
Log of GDP P.C	-1.365***	-1.160**	-1.016	-0.766
	(0.478)	(0.562)	(0.623)	(0.633)
Pop. Growth	-1.585**	-1.526**	-1.609**	-1.501**
	(0.728)	(0.721)	(0.721)	(0.682)
Min. Wage Set.	0.002	-0.000	0.013	-0.012
	(0.113)	(0.096)	(0.113)	(0.102)
Coord. Wage	-0.692***	-0.663***	-0.682***	-0.655***
	(0.266)	(0.250)	(0.239)	(0.245)
FDI	-0.008	-0.005	-0.003	-0.000
	(0.016)	(0.015)	(0.015)	(0.015)
Union Density	0.004	0.003	-0.007	-0.008
	(0.031)	(0.029)	(0.033)	(0.028)
EXDIV*TRD	-0.030*			
	(0.017)			
KOFTRGLDF		-0.044**		
		(0.020)		
KOFECGI			-0.070*	
			(0.037)	
KOFGECGIDF				-0.065***
				(0.020)
Constant	35.814***	34.694***	36.205***	33.081***
	(5.586)	(5.777)	(6.128)	(5.890)
Observations	575	575	575	575
Number of countries	26	26	26	26

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

After analyzing the results of the baseline model, export diversification and several globalization indices are also introduced into the model. The estimation results are shown in Table 2. In the first model, to account for the impact of export diversification on unemployment rate an interaction variable that consist both export diversification and trade openness is included into the model. The coefficient of this variable is negative and statistically significant, which indicates that as a country diversify its exports and liberalize its trade, unemployment rate

will decrease. The coefficients of inflation, population growth, investment, logarithm of GDP per capita and coordination of wage settings are negative and statistically significant, whereas the coefficients of the minimum wage settings, the degree of union density and foreign direct investment are insignificant, similar with the baseline model results.

In the first model in Table 2, interaction variable measures only trade of the goods and services and their diversification. Furthermore, by taking account the destination market, trade partner diversification is also analyzed in the second model. KOF trade globalization index (de facto) (KOFTRGLDF) which includes trade in goods, services and trade partner diversification is introduced into the model and the estimation results indicate that the effect of the trade globalization index on the unemployment is negative. This finding also suggests that an increase in trade globalization reduces the unemployment rate. Moreover, this variable also includes trade partner diversification, which shows that that the more you diversify your export location, the less is your unemployment rate. In the second model, the coefficient and the significance levels of the control variables are exactly the same as in the first one, except the logarithm of GDP per capita. In the third model, KOF economic globalization index is used and the results point out that there is a statistically significant and negative relationship between economic globalization and unemployment. Trade globalization is a part of the economic globalization and the coefficient of the economic globalization is greater than the trade globalization coefficient in the second model as expected. The coefficient of the control variables and their significance levels are exactly the same as in the third model. In the fourth and the last model, KOF economic globalization index (de facto) is employed for further robustness which involves both de facto measures of trade and financial globalization. The effect of the economic globalization index is found to be negative and significant. Among the control variables; the coefficients and the significance levels are the same as the first model except the logarithm of GDP per capita again.

4. Conclusion and Policy Implications

This study aims to investigate the nexus between trade liberalization, globalization, export diversification and unemployment. In this context, the empirical relationship between these variables is investigated by using annual unbalanced panel data for 26 OECD countries for the period between 1991 and 2014. While examining the relationship, in addition to the trade, globalization and diversification indices, macroeconomic control variables as well as labor market variables are also included into to the model to account for country specific characteristics. In order to control for the trade partner diversification, KOF trade globalization index, and to check for further robustness, KOF economic globalization index which involves both de facto measures of trade and financial globalization are used.

The findings indicate that trade liberalization reduces unemployment rate which is parallel with the findings of Mitra and Ranjan (2010), Melitz (2003), Felbermayr, et.al (2011a, 2011b) and Gozgor (2014). The negative relationship continues when trade openness variable is divided into its components; exports and imports. Therefore, it can be concluded that engaging in international markets increases the job opportunities among OECD Countries.

The interaction variable that is calculated by multiplying export diversification and trade openness is also negatively affects unemployment, which means that as a country diversifies its export basket as well as liberalizes its trade, unemployment rate is expected to decrease. Although there are several studies analyzing these links separately, to the best of our knowledge, this study is the first to consider the effects of interaction between trade liberalization and diversification on the level of unemployment. The estimated coefficients of KOF trade globalization index (de facto), KOF economic globalization index (de facto) and KOF economic globalization index is found negative and statistically significant, in line with the findings of Gozgor (2014). These findings suggest that countries that are successful in diversifying their export baskets, through introducing new goods or finding new markets, are able to experience lower unemployment rates.

Interestingly, labor market variables - union density and minimum wage settings- do not have a significant effect on unemployment rate. However, Felbermayr et. al (2011b) also examined whether labor market institution variables have an impact on unemployment, and similar to the findings of the estimation results in this study, their results are also insignificant.

In addition to trade liberalization, export diversification and globalization indices, it is also evident from estimation results that inflation, investment, income level and population growth negatively affects unemployment levels. Although estimated signs of inflation, investment and income level are mostly consistent with the literature, there is an ongoing argument about the effects of population on unemployment. One strand of the literature, namely Neo-classical framework, argues that higher population represents a higher labor supply, and if it is not matched by job opportunities, unemployment might rise. On the other hand, as argued by Gozgor (2014) and Felbermayr et al. (2011b), higher population indicates a larger market size, which suggests that unemployment might decrease. The findings of this paper are mostly in favor of the second view that is along with new trade theories.

The results also emphasize that countries should increase their trade openness and diversify their exports in order to reduce their unemployment rate. These implications of export diversification and trade liberalization in terms of unemployment in this study put forward a crucial question: How it is possible to increase the diversification and/or trade liberalization? Many studies tried to

answer the former one, such as as Agosin et al. (2012), Parteka and Tamberi (2013) and Amurgo-Pacheco and Pierola (2008). Parteka and Tamberi (2013) argue that removing the barriers from trade could allow countries to improve their export performance and increase diversification, whereas Agosin et al. (2012) emphasized that countries should be careful in removing these barriers, since increase in trade openness might also lead to specialization rather than diversification. Interestingly, Amurgo-Pacheco and Pierola (2008) suggest that governments should direct its resources in export promotion activities instead of innovation. Therefore government(s) should implement active export promotion policies for a cure to unemployment and also remove the obstacles among trade openness by eliminating trade barriers, reducing tariff rates or engaging in trade agreements with other countries. At the same time, finding new markets and expanding their export locations is also an important policy in decreasing the unemployment rate.

APPENDIX 1

Table 3: List of Countries

Austria	Japan
Belgium	Korea, Rep.
Canada	Netherlands
Chile	New Zealand
Czech Republic	Norway
Denmark	Poland
Estonia	Slovak Republic
Finland	Slovenia
France	Spain
Germany	Sweden
Iceland	Switzerland
Ireland	Turkey
Italy	United Kingdom

APPENDIX 2

Table 4: Variables, Definitions and Sources

Variable	Definition	Source
Unemployment rate (UNE)	Unemployment refers to the share of the labor force that is without work but available for and seeking employment.	World Bank, World Development Indicators
Inflation (INF)	Inflation as measured by the annual growth rate of the GDP implicit deflator.	World Bank, World Development Indicators
Investment Rate (INV)	Investment rate consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.	World Bank, World Development Indicators
Per capita GDP, in logs (LOG GDP PC)	GDP per capita is gross domestic product divided by midyear population.	World Bank, World Development Indicators
Minimum wage setting (MWS)	A variable change between 0 and 9, where 1 indicates no statutory minimum wage, no sectoral or national agreements and 9 indicates minimum wage is set by government, without a fixed rule.	Visser, J., ICTWSS Database (2019)
Coordination wage (COORD)	A variable change between 1 and 5, where 1 indicates no coordination and 5 indicates maximum coordination in setting of wages.	Visser, J., ICTWSS Database (2019)
Foreign Direct Investment (FDI)	Foreign direct investments are the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy.	World Bank, World Development Indicators
Union Density (UD)	Net union membership as a proportion of wage and salary earners in employment	Visser, J., ICTWSS Database (2019)
Trade Openness (TRD)	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	World Bank, World Development Indicators
Exports (EXP)	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world.	World Bank, World Development Indicators
Imports (IMP)	Imports of goods and services represent the value of all goods and other market services received from the rest of the world.	World Bank, World Development Indicators
Trade*Diversification (EXDIV*TRD)	An interaction variable between trade openness an export diversification.	Author's Calculations, based on World Bank WDI and IMF(2014)
KOF Trade Globalization (KOFTRGLDF-KOFTRGLDJ)	Measured by combining trade in goods, trade in services and trade partner diversification.	The KOF Globalisation Index (2019)
KOF Economic Globalization (KOGECGI)	Measured by combining trade globalization and financial globalization.	The KOF Globalisation Index (2019)

APPENDIX 3

Table 5: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
UNE	624	7.811989	4.042993	1.468	26.094
LOG GDP PC	617	1.983272	3.166738	-14.5599	13.08145
INF	617	5.303126	14.64901	-5.20508	208.1778
INV	616	23.81349	4.423077	13.90409	41.37406
FDI	604	4.200496	6.921543	-5.67091	86.61077
TRD	616	82.30629	36.42727	16.01388	201.9903
MWS	622	4.025723	2.700745	0	9
COORD	622	2.794212	1.402585	1	5
UD	596	34.88557	22.59188	5.5	97.2
EXP	616	42.31606	19.11777	8.971797	110.0255
IMP	616	39.99023	17.62927	6.936023	91.96485
KOFTRGLDF	620	55.31823	17.92303	18.4	89.3
KOFECGIDF	620	63.39306	15.83695	25.6	92
KOGECGI	620	71.28419	12.53841	33.6	91.8

APPENDIX 4

Table 6: Correlation between Variables

	UNE	LOG GDP PC	INF	INV	FDI	TRD	MWS	COORD	UD	EXP	IMP	KOFTRGL DF	KOFECGI DF	KOGECGI
UNE	1													
LOG GDP PC	0.0153	1												
INF	0.005	-0.0089	1											
INV	-0.264	0.3765	0.0211	1										
FDI	-0.0461	0.1046	-0.071	0.0122	1									
TRD	0.0221	0.1391	-0.088	0.1326	0.4278	1								
MWS	0.1123	0.0237	0.0103	0.1288	0.1186	-0.0483	1							
COORD	-0.2867	-0.1415	-0.1183	-0.0516	0.104	0.1425	-0.5417	1						
UD	-0.0889	-0.0814	-0.0174	-0.2637	-0.0493	0.0119	-0.5952	0.5078	1					
EXP	-0.0038	0.1157	-0.1003	0.0821	0.4363	0.9923	-0.0775	0.188	0.0413	1				
IMP	0.0496	0.162	-0.0732	0.1848	0.4113	0.991	-0.0159	0.091	-0.02	0.9669	1			
KOFTRGLDF	-0.1204	0.1242	-0.1037	0.0978	0.3979	0.8955	-0.176	0.2535	0.1572	0.9	0.8751	1		
KOFECGIDF	-0.1266	-0.0417	-0.2691	-0.1696	0.4357	0.7521	-0.2098	0.2681	0.1419	0.7794	0.7098	0.8484	1	
KOGECGI	-0.0318	-0.0859	-0.3224	-0.2824	0.3917	0.5911	-0.2499	0.2676	0.1462	0.6201	0.5497	0.6577	0.9168	1

APPENDIX 5

Model Specification Tests:

Table 7: Hausman Test Results

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Chi Square Stat.	9.42	7.27	5.14	9.37	4.43	6.46	4.63
Chi Square p value	0.3990	0.6092	0.8219	0.4036	0.8809	0.6936	0.8653
Conclusion	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects	Random Effects

Table 8: Pesaran Test Results and p Values

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Cross sectional dependence p value	0.393	0.392	0.394	0.392	0.392	0.381	0.387
Conclusion	No cross sectional dependence	No cross sectional dependence	No cross sectional dependence	No cross sectional dependence	No cross sectional dependence	No cross sectional dependence	No cross sectional dependence

APPENDIX 6

Export Diversification Index:

IMF (2014) calculates three different diversification indexes. To do so, IMF (2014) first classifies products as "Traditional," "New," or "Non-traded." Traditional goods have been exported since the beginning of the sample and non-traded goods are never exported for the whole sample. New goods, on the other hand, should not be exported for at least two years and then be exported by a country in at least two consecutive years. Following these explanations, IMF (2014) assigns a dummy for every product and then calculates the extensive margin as

$$EXM = \sum_n (M_n/M) (\mu k/\mu) \ln(\mu k/\mu),$$

Where n is a group and M_n represent total goods and $\mu k/\mu$ is the relative mean of exports in every group.

Intensive margin can be calculated as,

$$INM = \sum_k (M_n/M) (\mu k/\mu) \{(1/Nk) \sum_{i \in Ik} (x_i /\mu_k) \ln(x_i /\mu_k)\}$$

Where x shows export value.

Export diversification is calculated as the sum of these two measures

APPENDIX 7

Table 9: KOF Globalization Indices

Globalisation Index, de facto	Weights	Globalisation Index, de jure	Weights
Economic Globalisation, de facto	***33.3***	***Economic Globalisation, de jure***	***33.3***
Trade Globalisation, de facto	*50.0*	*Trade Globalisation, de jure*	*50.0*
Trade in goods	38.5	Trade regulations	25.8
Trade in services	45.1	Trade taxes	25.3
Trade partner diversity	16.4	Tariffs	25.4
		Trade agreements	23.5
Financial Globalisation, de facto	*50.0*	*Financial Globalisation, de jure*	*50.0*
Foreign direct investment	27.3	Investment restrictions	32.2
Portfolio investment	16.9	Capital account openness	38.7
International debt	25.7	International Investment Agreements	29.1
International reserves	3.2		
International income payments	26.9		

References

Ades, A., and E.L. Glaeser. (1999). Evidence on growth, increasing returns, and the extent of the market. *Quarterly Journal of Economics* 114(3), 1025–1045.

Agénor, P. R., and Aizenman, J. (1996). Trade liberalization and unemployment. *Journal of International Trade & Economic Development*, *5*(3), 265-286.

Agosin, M. R. (2007). Export diversification and growth in emerging economies. *Working Paper no. 233*, Departamento de Economia, Universidad de Chile.

Agosin, M. R., Alvarez, R., and Bravo- Ortega, C. (2012). Determinants of export diversification around the world: 1962–2000. *The World Economy*, *35*(3), 295-315.

Aidt, T. S., and Tzannatos, Z. (2008). Trade unions, collective bargaining and macroeconomic performance: a review. *Industrial Relations Journal*, *39*(4), 258-295.

Alcalá, F., and Ciccone, A. (2004). Trade and productivity. *The Quarterly journal of economics*, *119*(2), 613-646.

Alesina, A., Spolaore, E., and Wacziarg, R. (2000). Economic integration and political disintegration. *American Economic Review*, *90*(5), 1276-1296.

Amurgo-Pacheco, A., and Pierola, M. D. (2008). Patterns of export diversification in developing countries: intensive and extensive margins. *World Bank Policy Research Working Paper 4473*, The World Bank.

Cadot, O., Carrère, C., and Strauss-Kahn, V. (2011). Export diversification: what's behind the hump?. *Review of Economics and Statistics*, *93*(2), 590-605.

Coe, D. T., and Helpman, E. (1995). International r&d spillovers. *European economic review*, *39*(5), 859-887.

Davidson, C., Martin, L., and Matusz, S. (1999). Trade and search generated unemployment. *Journal of International Economics*, *48*(2), 271-299.

Davis, D. R. (1998). Does European unemployment prop up American wages? National labor markets and global trade. *American Economic Review*, 478-494.

Dinopoulos, E., and Thompson, P. (2000). Endogenous growth in a cross-section of countries. *Journal of International Economics*, *51*(2), 335-362.

Dutt, P., Mitra, D., and Ranjan, P. (2009). International trade and unemployment: Theory and cross-national evidence. *Journal of International Economics*, *78*(1), 32-44.

Egger, H., and Kreickemeier, U. (2009). Firm heterogeneity and the labor market effects of trade liberalization. *International Economic Review*, *50*(1), 187-216.

Felbermayr, G., Prat, J., and Schmerer, H. J. (2011a). Globalization and labor market outcomes: Wage bargaining, search frictions, and firm heterogeneity. *Journal of Economic theory*, *146*(1), 39-73.

Felbermayr, G., Prat, J., and Schmerer, H. J. (2011b). Trade and unemployment: What do the data say?. *European Economic Review*, *55*(6), 741-758.

Frankel, J. A., and Romer, D. H. (1999). Does trade cause growth?. *American economic review*, *89*(3), 379-399.

Frenken, K., van Oort, F. G., Verburg, T., and Boschma, R. A. (2005). Variety and regional economic growth in the Netherlands. *Regional Studies 41(5), 685–697.*

Fu, X., and Balasubramanyam, V. N. (2005). Exports, foreign direct investment and employment: The case of China. *World Economy*, *28*(4), 607-625.

Gozgor, G. (2014). The impact of trade openness on the unemployment rate in G7 countries. *The Journal of International Trade & Economic Development*, *23*(7), 1018-1037.

Gygli, S., Haelg, F., Potrafke, N., and Sturm, J. (2019). The KOF Globalisation Index – Revisited, *Review of International Organizations, 14(3), 543-574*

Helpman, E. and Itskhoki, O. (2010). Labor market rigidities, trade and unemployment. *Review of Economic Studies*, 77 (3), 1100–1137.

Hesse, H. (2009). Export diversification and economic growth. *Breaking into new markets: emerging lessons for export diversification*, 55-80.

IMF (International Monetary Fund) (2014). Sustaining long-run growth and macroeconomic stability in low-income countries—the role of structural transformation and diversification. *IMF Policy paper. International Monetary Fund, Washington, DC.*

Izraeli, O., and Murphy K. (2003). The effect of industrial diversity on state unemployment rate and per capita income, *Annals of Regional Science*, vol. 37, iss. 1, pp. 1-14.

Malizia, E. and Ke, S., (1993). The influence of economic diversity on employment and stability, *Journal of Regional Science*, vol 3, iss. 2, pp. 221-235.

Melitz, M. J. (2003). The impact of trade on intra- industry reallocations and aggregate industry productivity. *Econometrica*, *71*(6), 1695-1725.

Mitra, D., and Ranjan, P. (2010). Offshoring and Unemployment: The Role of Search Frictions Labor Mobility. *Journal of International Economics* 81 (2): 219– 229.

Moore, M. P., and Ranjan, P. (2005). Globalisation vs Skill- Biased Technological Change: Implications for Unemployment and Wage Inequality. *The Economic Journal*, *115*(503), 391-422.

Naudé, W., and Rossouw, R. (2011). Export diversification and economic performance: evidence from Brazil, China, India and South Africa. *Economic Change and Restructuring*, *44*(1-2), 99-134.

Nwaka, I. D., Uma, K. E., and Tuna, G. (2015). Trade openness and unemployment: Empirical evidence for Nigeria. *The Economic and Labour Relations Review*, *26*(1), 117-136.

Parteka, A., and Tamberi, M. (2013). What determines export diversification in the development process? Empirical assessment. *The World Economy*, *36*(6), 807-826.

Rodrik, D. (2005). Policies for economic diversification. *Cepal Review* 87: 7–23

Ruiz-Nápoles, P. (2004). Exports, growth, and employment in Mexico, 1978-2000. *Journal of Post Keynesian Economics*, *27*(1), 105-124.

Samimi, A.J., S. Ghaderi, R. Hosseinzadeh, and Y. Nademi. (2012). Openness and In- flation: New Empirical Panel Data Evidence. *Economics Letters* 117(3): 573– 577.

Şener, F. (2001). Schumpeterian Unemployment, Trade and Wages. *Journal of International Economics,* 54 (1): 119–148.

Trendle, B. and Shorney, G. (2003). 'The affect of industrial diversification on regional economic performance', *Australasian Journal of Regional Studies*, vol.9, no.3, pp. 355-369.

UNCTAD (United Nations Conference on Trade and Development) (2018). *Export Diversification and Employment in Africa*. United Nations, Geneva.

Visser, J. (2019). ICTWSS Database. version 6.1. Amsterdam: *Amsterdam Institute for Advanced Labour Studies (AIAS), University of Amsterdam.*

Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development economics*, *72*(1), 57-89.