TRADE OPENNESS AND GDP GROWTH NEXUS: THE CASE OF OECD COUNTRIES

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ABSTRACT

Economists have argued about the relationship between trade openness and economic growth for a very long time. Despite garnering a lot of attention in the literature for more than a century, we still don't have a satisfying response to this subject. This study aims to examine the relationship between trade openness and GDP growth in the case of OECD countries, in the period from 1988 to 2020. In order to tackle data heterogeneity across countries and to form a robust (outlier resistant) regression, a quantile regression is used. Furthermore, panel dynamic GMM was used due to "more countries than time-period case". Main findings of the paper validate the hypothesis that trade openness facilitates economic growth. Most of the explanatory variables have been significant in the regression models obtaining predicted signs of the regression coefficients, in accordance with the economic theory. The quantile regression modelling showed discrepancies between different quantiles. For tau equal to 0.25 the value of regression coefficient related to trade openness variable was negative.

KEY WORDS: trade openness, GDP growth, OECD countries, quantile regression, panel GMM

1. INTRODUCTION

One of key questions in theory of international economics is whether higher trade openness facilitate economic growth. The percentage of exports and imports to a country's GDP is frequently used to gauge how open that country is to trade. Economic growth, on the other hand, refers to an increase in a country's overall output and income levels over an extended period of time. Despite several empirical studies in the wake of trade liberalization asserting a favorable effect of trade openness on growth, such as Edwards (1998) and Lee, Ricci and Rigobon (2004), this controversy is still going strong today. According to Rodriguez and Rodrik (2000), it is still unclear how trade openness and growth are related. According to Capolupo and Celi (2008), it is unclear if trade and growth are positively associated from both a theoretical and an empirical standpoint. On the other hand, openness can promote growth, according to Chang, Kaltani and Loayza (2009). The majority of recent investigations have not yet reached a final conclusion. Fetahi-Vehapi, Sadiku and Petkovski (2015) concluded that trade openness has a positive effect on economic growth, in contrast to Huchet, Le Mouël and Vijil's (2018) finding that trade openness has a negative impact on the growth of countries that specialize in low-quality goods. A 10% increase in trade shares corresponds to a 0.4% increase in growth rate, according to Dao (2014), who also found that trade openness, as measured by trade shares, has a positive effect on economic growth.

According to Fatima et al. (2020), there is a negative correlation between GDP growth and trade openness. A country's GDP growth may be negatively impacted by trade when there is a low degree of human capital accumulation in that nation. The purpose of this study is to investigate the connection between trade openness and GDP growth for 38 countries that are members of the Organization for Economic Co-operation and Development (OECD). The relationship between trade openness and GDP growth in the context of OECD countries was previously studied by Idris et al. (2018). The authors evaluate the link between openness and economic growth in 86 developing and OECD countries from 1977 to 2011 using the Generalized Method of Moments (GMM) estimations. Empirical evidence suggests that openness generally promotes economic growth in OECD and emerging countries. The endogenous growth theory, which holds that trade openness encourages growth, is in agreement with this. The following describes the research hypothesis for the paper:

H1... Trade openess has positive impact on economic growth in the OECD countries

For this purpose a cross-country panel regression analysis, in the period from 1988 to 2020, has been conducted. Alongside trade openness variable, TRADE, nine control variables, which affect economic growth, have been incorporated into analysis. The novelty in this paper in regards to previous research is the use of quantile regression for OECD countries which improves estimated model uncovering patterns in which the effect of trade openness could vary across countriess. Furthermore, it efficiently tackles the problem of outliers due to data heterogeneity among countries. There are five sections in the paper. Following the introduction, the literature review discusses and expands on empirical studies on the relationship between trade openness and GDP growth. A cross-country panel regression is estimated in the technique and data section utilizing the POLS estimator, the FE, RE, and quantile regression models, as well as the dynamic panel GMM model. The description of the variables and the data sources have also been thoroughly examined. The primary findings of the analysis have been presented in the results and discussion section. The last part describes the paper's limitations in more detail and makes suggestions for additional research.

2. LITERATURE REVIEW

The intensity of the correlation depends on the estimation model specification, however there is often a positive correlation between GDP growth rates and various openness indices, Harrison (1996). Yanikkaya (2003), however, found no link between trade liberalization or openness and economic development. Dufrenot, Mignon and Tsangarides (2010) used a quantile regression approach to investigate the relationship between trade and growth in developing nations. In both the long and short timeframes, it is discovered that there are different relationships between trade and growth. Countries with low growth rates experienced a bigger impact from trade openness on growth than did those with high growth rates. Sakyi et al. (2012) use data from a heterogeneous panel cointegration study to examine the relationship between trade openness, growth, and development for middle-income countries. Middle-income countries' level of external openness has been crucial to their development, but not to their rate of economic expansion. On the other side, Ulaşan (2014) showed that there isn't a solid connection between trade openness and long-term economic growth.

Fetahi-Vehapi, Sadiku and Petkovski (2015) investigated how trade openness affected economic growth in 10 SEE countries between 1996 and 2012. According to the results of the estimation using the GMM method, the baseline per capita income and other explanatory variables are a prerequisite for the positive effects of trade openness on economic growth. There was, however, no conclusive evidence connecting these two variables. From 1965 to 2014, Keho (2017) looked into the connection between trade openness and economic growth in Cote d'Ivoire. It was shown that trade openness had a positive impact on economic growth both immediately and over time. Huchet, Le Mouël and Vijil (2018) found that countries that export commodities of novel varieties and greater quality expand more quickly. Their estimation was based on a GMM estimator that built a panel of 169 countries between 1988 and 2014 using an endogenous growth model. Trade openness seems to have a negative impact on the economic growth of countries that specialize in low-quality items. Burange, Ranadive and Karnik (2019) investigated the connection between trade openness and economic expansion in the BRICS countries. It reveals growth-led trade in services hypotheses for China, India, and South Africa, as well as growth-led export and import hypotheses for China. No clear causal link is found between Brazil and Russia, though. These findings emphasize the need for specific policy considerations depending on the various national settings that make up the BRICS group. In their investigation of the relationship between trade openness and economic growth in Lesotho, Malefane and Odhiambo (2021) discovered that there is no discernible link in either the short- or long-term, regardless of the trade openness metric utilized. According to the study, Lesotho's authorities should concentrate on fostering infrastructure and human capital development in order to achieve the required economic growth threshold for reaping the full benefits of trade openness.

Omoke and Opuala-Charles' analysis on the instance of Nigeria (2021) emphasizes the critical significance of institutional quality in the relationship between trade openness and economic growth. The research shows that whereas import trade negatively affects economic growth, export trade positively benefits it. The study also highlights the importance of boosting Nigeria's governance in order to minimize the detrimental consequences of import trade and maximize the growth-enhancing potential of trade openness. According to Islam, Alsaif and Alsaif (2022), the labor force, government consumption, and trade openness all have a significant impact on economic growth in Saudi Arabia. The analysis shows that government consumption favorably affects GDP in the short run but loses significance over time, whereas trade openness and labor force have a positive impact on economic growth in both the short and long runs. To encourage long-term economic growth in the nation, policymakers should prioritize increasing trade openness, streamlining government spending, and supporting a trained and productive labor force. Using the ARDL cointegration method, Tafirenyika, Tafirenyika and Adeyanju (2023) investigated the effects of exports, imports, and trade openness on Namibia's economic growth. The findings show that whereas exports and trade openness have large and positive connections with economic growth, imports have a considerable negative link with it. The results confirm the significance of export promotion, trade liberalization, and active involvement in international markets for Namibia's economic development.

3. DATA AND METHODOLOGY

This article examines this relationship between GDP growth and trade openness in the case of OECD countries from 1988 to 2020. The study uses ten explanatory factors and one dependent variable, GDP growth, which is measured in constant 2010 U.S. dollars. The gross domestic product (GDP), plus any applicable product taxes and minus any applicable subsidies, is the sum of all the value created by all domestic producers in an economy. The explanatory (control) variables alongside trade openness variable, TRADE, Trade (% of GDP) are AREA, Surface area (in square kilometres), CAB, Current account balance (% of GDP), GFCF, Gross fixed capital formation (annual % growth), GGFCE, General government final consumption expenditure (% of GDP), LEAB, Life expectancy at birth, total (years), POPG, Population growth (annual %), SE, School enrollment, secondary (% gross), TARIFF, Tariff rate, applied, simple mean, all products (%) and TOT, Terms of trade adjustment (constant LCU)

World Development Indicators, World Bank (2023), has the statistics for the selected variables. Coastal waterways and places under water are included in the surface area calculation of the country's total area. Net exports of products and services, net primary and secondary income, and the current account balance are added together. Land improvements, plant, machinery, and equipment purchases, road and railroad construction, etc. are all included in gross fixed capital formation. All current government current outlays for the procurement of goods and services, as well as outlays for national security and defense, are categorized as general government final consumption expenditures. Life expectancy at birth is related to the number of years a newborn is projected to live when mortality rates at the time of a baby's birth remain stable across time.

Population growth is the average annual increase in the number of people living in a given nation. The ratio of overall enrollment to the number of people with a secondary education is known as secondary school gross enrollment. The unweighted average of all effectively applied rates for all items subject to tariffs determined for all traded goods is known as the simple mean applied tariff rate. The relative cost of exports in relation to imports, calculated as the difference between export and import prices, is known as the terms of trade. The total of goods and service imports and exports expressed as a percentage of GDP is the trade variable that measures trade openness. Cross-country panel regression models are being used to estimate the effects of trade openness and explanatory variables. Equation 1 presents the cross-country panel regression model.

$$(GDPG)_{it} = \beta_0 + \beta_1 AREA_{i,t} + \beta_2 CAB_{i,t} + \beta_3 GFCF_{i,t} + \beta_4 GGFCE_{i,t} + \beta_5 LEAB_{i,t} + \beta_6 POPG_{i,t} + \beta_7 SE_{i,t} + \beta_8 TARIFF_{i,t} + \beta_9 TOT_{i,t} + \beta_{10} TRADE_{i,t} + \varepsilon_{i,t} \quad (1)$$

The first models to be estimated are the pooled OLS, fixed effects, and random effects models. Dynamic Panel Generalized Method of Moment (GMM) regression models will also be employed in addition to the aforementioned models (Equation 2).

$$(GDPG)_{it} = \beta_0 + \beta_1 GDPG_{i,t-1} + \beta_2 AREA_{i,t} + \beta_3 CAB_{i,t} + \beta_4 GFCF_{i,t} + \beta_5 GGFCE_{i,t} + \beta_6 LEAB_{i,t} + \beta_7 POPG_{i,t} + \beta_8 SE_{i,t} + \beta_9 TARIFF_{i,t} + \beta_{10} TOT_{i,t} + \beta_{11} TRADE_{i,t} + \varepsilon_{i,t} \quad (2)$$

It yields consistent results when there are several endogeneity sources present, such as "unobserved heterogeneity, simultaneity, and dynamic endogeneity" (Wintoki, Linck & Netter, 2012:588). The Arellano and Bond's (1991) publication introduced the panel generalized method of moments (GMM) estimation for dynamic panel data models. This approach gets over the endogeneity and serial correlation issues in panel data analysis by using lagged difference instruments. The Arellano-Bond GMM estimator is often used in empirical studies to examine the dynamics of panel data and has significantly contributed to the econometric literature on panel data analysis.

Empirical regularity on the beneficial effect of trade openness on growth may not be applicable for specific subsets of countries if there is a heterogeneity bias in the data. According to Dufrenot, Mignon and Tsangarides (2010), the use of quantile regressions beats the standard approaches since it may be used to spot patterns in which the impact of trade openness may vary among countries. It allows for the discovery of heterogeneous effects and provides robustness against outliers. It also incorporates fixed effects to account for individual and temporal features. Data with non-normal distributions can be analyzed using this method, as well as the conditional distribution of variables in panel data sets. Quantile regression models the quantiles of the dependent variable given a series of conditioning factors. The concept was first introduced by Koenker and Bassett (1978), who provided estimates of the linear connection between regressors X and a certain quantile of the dependent variable Y.

4. RESULTS AND DISCUSSION

The paper's key findings will be summarized and presented in this section. Table 1 presents descriptive statistics for the variables. There are 938 total observations. According to the methodology section, there are 10 explanatory factors and one dependent variable, GDP growth.

Table 1. Descriptive statistics of variables

Stat./ Variable	AREA	CAB	GDPG	GFCF	GGFCE	LEAB	POPG	SE	TARIFF	TOT	TRADE
Mean	762003.3	-0.35	2.49	3.44	18.99	78.05	0.55	105.04	3.91	1.43E+10	88.11
Median	131960	-0.75	2.63	3.25	19.34	78.53	0.49	102.8	2.78	-1.11E+09	71.97
Maximum	9879750	16.11	24.37	100.93	28.11	84.35	2.89	163.93	18.83	5.43E+13	377.84
Minimum	2590	-22.93	-14.83	-47.45	8.11	68.77	-2.25	49.48	1.03	-7.04E+13	18.12
Std. Dev.	2056772	5.13	3.33	9.82	4.01	3.4	0.75	17.32	2.52	7.27E+12	50.82
Skewness	3.91443	-0.12	-0.64	0.96	-0.37	-0.55	-0.55	0.6	2.62	-1.12	2.25
Kurtosis	16.95	4.34	8.19	16.29	2.65	2.59	3.72	5.08	11.07	42.47	10.49
Jarque-Bera	10011.96	73.14	1117.53	7057.06	27.27	55.3	20.71	226.98	3627.96	61095.98	2990.33
Sum	7.15E+08	-3.37E+02	2340.31	3231.16	17821.27	73217.78	519.54	98535.8	3675.37	1.34E+13	82648.71
Sum Sq. Dev.	3.96E+15	2.48E+04	10451.18	90414.84	15118.35	10894.37	535.04	281389.8	5973.83	4.95E+28	2420789
Observations	938	938	938	938	938	938	938	938	938	938	938

Source: Author's calculations

Statistical metrics such as mean, median, maximum, minimum, and standard deviation are provided together with descriptive statistics of the variables. The logarithmic transformation of some variables was not feasible since they had both positive and negative values.

Table 2. Correlation matrix of explanatory variables

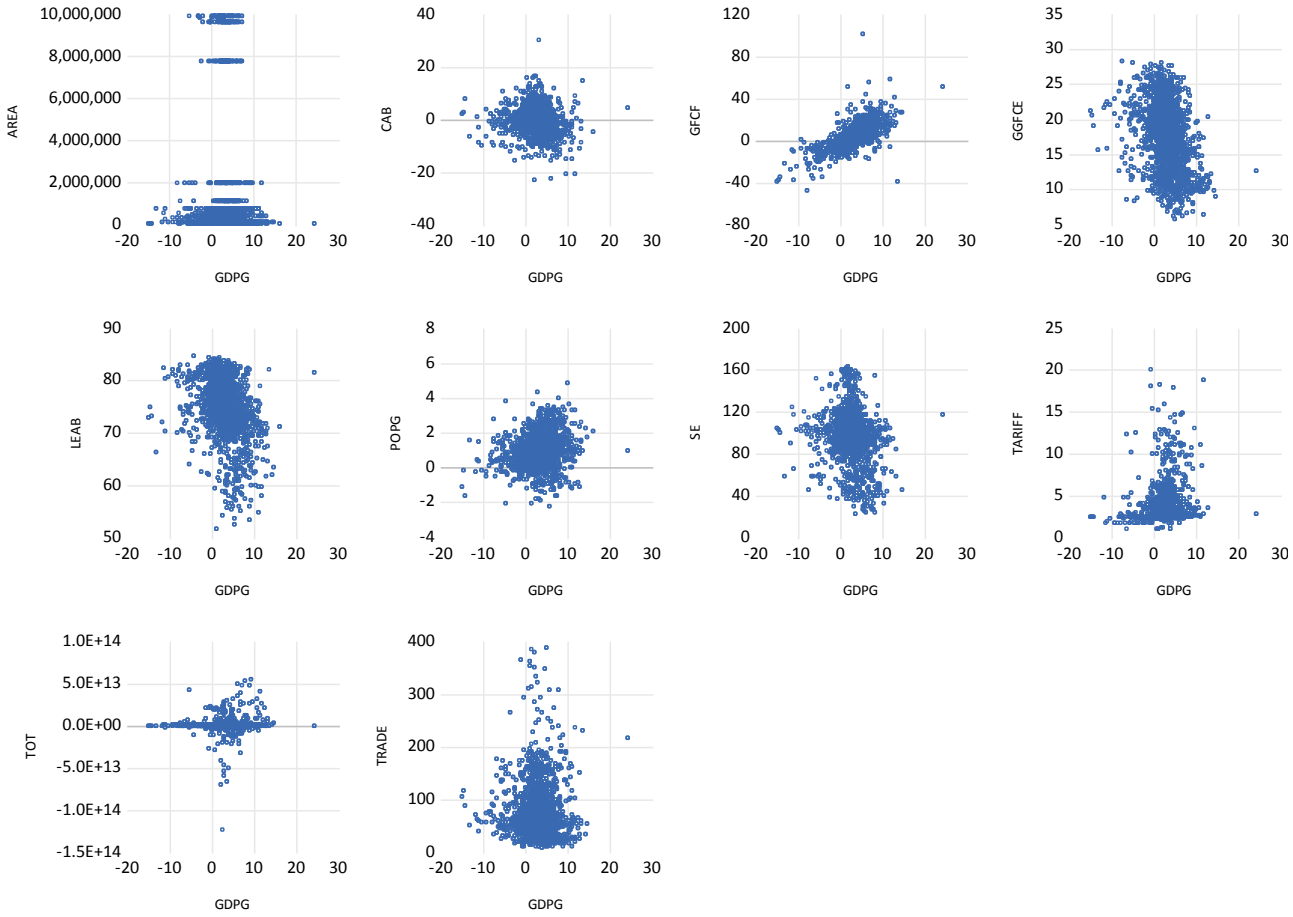
	AREA	CAB	GFCF	GGFCE	LEAB	POPG	SE	TARIFF	TOT	TRADE
AREA	1	-0.075**	-0.222	-0.096***	0.06*	0.214***	0.004	0.112***	-0.007	-0.255***
CAB	-0.075**	1	-0.156***	0.058*	0.411***	0.11***	0.212***	-0.024	-0.013	0.181***
GFCF	-0.222	-0.156***	1	-0.171***	-0.166***	-0.015	-0.058*	0.091***	0.021	0.079**
GGFCE	-0.096***	0.058*	-0.171***	1	0.22***	-0.263***	0.499***	-0.441***	-0.065**	0.038
LEAB	0.06*	0.411***	-0.166***	0.22***	1	0.289***	0.48***	-0.34***	-0.066**	0.071**
POPG	0.214***	0.11***	-0.015	-0.263***	0.289***	1	-0.067**	0.32***	-0.011	-0.061*
SE	0.004	0.212***	-0.058*	0.499***	0.48***	-0.067**	1	-0.397***	0.04	0.155***
TARIFF	0.112***	-0.024	0.091***	-0.441***	-0.34***	0.32***	-0.397***	1	-0.029	-0.291***
TOT	-0.007	-0.013	0.021	-0.065**	-0.066**	-0.01	0.04	-0.029	1	-0.046
TRADE	-0.255***	0.181***	0.079**	0.038	0.071**	-0.061*	0.155***	-0.291***	-0.046	1

Standard errors in parentheses, * denotes significance under 10%, ** denoted significance under 5% and *** denotes significance under 1%

Source: Author's calculations

Table 2 shows the correlation matrix of the explanatory factors together with the correlation coefficient values and its level of significance. Since GDPG is a dependent variable in the model, it was excluded from the correlation matrix. The explanatory variables do not have any significant strong positive or negative correlations. It implies that the regression estimations shouldn't have a multicollinearity issue, making the conclusions more trustworthy. GDP growth is shown as a dependent variable in Figure 1 together with ten explanatory variables.

Figure 1. GDP growth versus explanatory variables



Source: Author's calculations

Table 3 displays the achieved and expected signs of the explanatory factors as suggested by economic theory. For the variables LEAB, SE, and TRADE, the predicted signs of the regression coefficients should be positive. Higher life expectancy at birth, enrolment in education, and trade, in accordance with economic theory, should promote economic growth. The impact of GGFCE on the fiscal policy measure is unclear because there are regional differences in the effectiveness of government operations. On the one hand, public investment initiatives can favorably impact growth, yet excessive government expenditure can increase a nation's debt, so limiting its ability to grow, according to Dao (2014). The regression indications for the GGFCE, CAB, and POPG variables, on the other hand, ought to be negative. In relation to the population variable, the relationship between population and economic growth is still debatable, according to Peterson (2017). The terms of trade variable TOT should have a positive regression sign, according to Dufrenot, Mignon and Tsangarides (2010). According to Silajdzic and Mehic (2017), tariff barriers have not had a negative impact on economic growth in the selected transition countries. There is no obvious correlation between a country's size and economic growth. According to a number of studies, tiny countries suffer disadvantages because of how their size hinders economic expansion. On the other hand, according to Brito (2015), many tiny countries are experiencing faster rates of economic growth.

Table 3. Signs of regression coefficients related to explantory variables in various models

	Model/sign							Expected sign
Variable/sign	POLS	FE	RE	PGMM	QR1	QR2	QR3	
AREA	-	-	-	-	+	-	-	+/-
CAB	-	-	-	-	-	-	-	-
GFCF	+	+	+	+	+	+	+	?
GGFCE	-	-	-	-	-	-	-	-
LEAB	-	-	-	-	-	-	-	+
POPG	+	+	+	+	+	+	+	+/-
SE	+	+	+	+	+	+	+	+
TARIFF	+	+	+	+	+	+	+	+
TOT	+	-	+	+	+	+	+	+
TRADE	+	+	+	+	+	-	+	+

Source: Author's calculations

The findings of the panel regression models in the case of 38 OECD nations for the years 1988 to 2020 are shown in Table A1 in the Appendix. Regression models such as POLS, FE, RE, PGMM, and quantile models are used to estimate the models. There are 938 total observations. The calculated regression models' adjusted R-squared values, which vary from 0.35 to 0.6, are quite good. To distinguish between the POLS and FE models, a redundant fixed effects test was performed. The outcomes show that the FE model fits the data better. Additionally, Hausman test shows that the FE model fits the data better than the RE model. In the majority of regression models, some explanatory factors - such as AREA, CAB, and TARIFF - were not significant. These variables are highlighted in in Table 3. As predicted by economic theory, the obtained regression coefficient for the trade openness variable, TRADE, is significantly positive. The positive and significant relationship between the trade openness variable and economic growth was confirmed by the PGMM model. Different quantiles differed, as seen by the quantile regression modeling. The value of the regression coefficient for the trade openness variable was negative for tau equal to 0.25. Additional study should be conducted, ideally on a country-by-country basis, to get results that are more exact.

The results from Idris et al. (2018) significantly supported the idea that trade openness generally causes OECD nations to experience higher growth. It was discovered that government spending in the OECD countries virtually advanced development. The outcomes of this study are comparable to earlier outcomes. Trade openness promotes economic growth, according to panel GMM and cross-country panel regression models. The findings of the quantile regression modeling, on the other hand, revealed discrepancies between various quantiles, highlighting the need for a more thorough examination.

5. CONCLUSION

The purpose of the study was to examine how trade openness and GDP growth in 38 OECD countries over the period of 1988 to 2020. The study's key findings can be summed up as follows: The central hypothesis of the paper is supported by the following findings: (1) trade openness and economic growth are positively and significantly correlated; (2) quantile regression analysis revealed differences across quantiles; and (3) the signs of the regression coefficients for the control variables were, for the most part, consistent with economic theory. The limitation of the article results from the absence of data for specific variables or countries. The analysis may be subject to endogeneity issues because the direction of causality between trade openness and GDP growth is not explicitly addressed. This makes it challenging to show a causal connection and opens the door to competing theories or reverse causality. Future studies should examine the connection between GDP growth and trade openness, ideally by country. The results of this study can act as a strong starting point for a comprehensive analysis of the growth literature using state-of-the-art econometric techniques, both theoretically and empirically.

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POVEZANOST IZMEĐU TRGOVINSKE OTVORENOSTI I EKONOMSKOG RASTA: SLUČAJ OECD ZEMALJA

SAŽETAK

Dugo su vremena ekonomisti raspravljali o povezanosti između trgovinske otvorenosti i gospodarskog rasta. Ovo pitanje privlači veliku pozornost u ekonomskoj literaturi više od jednog stoljeća, no još uvijek ne postoji zadovoljavajući odgovor. Cilj rada je istražiti neksus trgovinske otvorenosti i rasta bruto domaćeg proizvoda (BDP) u slučaju zemalja OECD-a, u razdoblju od 1988. do 2020. godine. Kvantilna regresija korištena je zbog problema heterogenosti podataka, dok je dinamički GMM model značajan zbog slučaja "više zemalja negoli vremenskih razdoblja". Glavni zaključci rada potvrđuju hipotezu da trgovinska otvorenost olakšava gospodarski rast. Većina eksplanatornih varijabli bila je značajna u regresijskim modelima s predviđenim predznacima regresijskih koeficijenata prema ekonomskoj teoriji. Kvantilno regresijsko modeliranje pokazalo je odstupanja između različitih kvantila. Za tau jednak 0,25 vrijednost koeficijenta regresije vezana uz varijablu otvorenosti trgovine bila je negativna.

KLJUČNE RIJEČI: trgovinska otvorenost, ekonomski rast, OECD, kvantilna regresija, panel GMM

Appendix 1

Table A1. Panel regression models for investigation of nexus between trade openess and GDP growth, OECD (38 countries), 1988-2020

Independent variable/ Model	POLS	Fixed effects	Random effects	PGMM	Quantile regression (tau=0.25)	Quantile regression (tau=0.5)	Quantile regression (tau=0.75)
Constant	14.11250*** (2.33982)	21.76625*** (4.41835)	16.22598*** (2.55897)	4.58105*** (4.46510)	7.61619*** (2.01916)	12.84296*** (2.37533)	15.15058*** (3.09728)
GDPG(-1)				0.10097*** (0.02671)			
AREA	-3.58E-08 (3.76E-08)	-1.66E-06 (-2.97E-06)	-4.21E-08 (4.63E-08)	-4.59E-08 (5.33E-08)	-1.25E-08 (2.27E-08)	-1.71E-08 (2.74E-08)	-1.05E-08 (-2.91E-08)
CAB	-0.02361 (0.01629)	-0.05719*** (0.02137)	-0.02468 (0.01739)	-0.11343*** (0.02996)	-0.00207 (0.01906)	-0.03554** (0.01652)	-0.03136* (0.01949)
GFCF	0.22226*** (0.00769)	0.19958*** (0.00777)	0.21804*** (0.00739)	0.36761*** (0.03773)	0.25894*** (0.01248)	0.23778*** (0.01735)	0.22508*** (0.01699)
GGFCE	-0.09835*** (0.02300)	-0.50465*** (0.05523)	-0.14515*** (0.02708)	-0.06114* (0.03447)	-0.11403*** (0.02170)	-0.08256*** (0.02202)	-0.09965*** (0.02412)
LEAB	-0.16393*** (0.03055)	-0.178896*** (0.06460)	-0.18324*** (0.03388)	-0.05812*** (0.05511)	-0.08991*** (0.02547)	-0.14209*** (0.02855)	-0.16321*** (0.03833)
POPG	0.41646*** (0.11795)	0.41031** (0.20114)	0.42672*** (0.13182)	0.50033*** (0.17114)	0.28806** (0.12431)	0.37559*** (0.10138)	0.29399* (0.15426)
SE	0.01463*** (0.00555)	0.01830** (0.00813)	0.01825*** (0.00603)	0.00802*** (0.00787)	0.02111*** (0.00438)	0.00980** (0.00456)	0.01011* (0.00597)
TARIFF	0.06517* (0.03892)	0.03135 (0.05005)	0.05030 (0.04104)	0.10337 (0.06705)	0.02634 (0.03816)	0.00769 (0.03910)	0.08203* (0.05030)
TOT	1.58E-14 (1.02E-14)	-6.37E-15 (1.02E-14)	1.10E-14 (9.77E-15)	1.91E-14 (1.53E-14)	8.88E-15 (1.54E-14)	7.20E-15 (1.74E-14)	1.99E-14** (7.65E-15)
TRADE	0.00314** (0.00162)	0.00043 (0.00629)	0.00281*** (0.00194)	0.00253*** (0.00215)	-0.00266* (0.00144)	0.00429** (0.00178)	0.00951*** (0.00238)
Diagnostics							
Adjusted R-squared	0.55758	0.60406	0.54933	0.35914	0.36428	0.35991	0.37465
S.E. of regression	2.22141	2.10147	2.17567	2.68869	2.46822	2.24197	2.54250
Prob. (F-stat.)	0	0	0				
Mean dep. variable	2.49500	2.49500	2.49500	2.39463	2.49500	2.49500	2.49500
S.D. dependent variable	3.33974	3.33974	3.24923	3.35862	3.33974	3.33974	3.33974
Prob(Quasi-LR stat.)					0	0	0
Quasi-LR statistic					820.3952	906.1364	731.9492
Quantile dep. variable					1.14358	2.63053	4.19494
Durbin-Watson	1.82933	1.92404	1.87360	2.08585			
Redundant FE	Cross-sect. F 3.941, Prob. 0.0 Cross-sect. Chi-square 142.33478, Prob. 0.0						
Hausman test	Chi-Sq. Stat. 75.37, Prob. 0.0						
Observations	938	938	938	849	938	938	938

Standard errors in parentheness, * denotes significance under 10%, ** denoted significance under 5% and *** denotes significance under 1%

Source: Author's calculations