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IMPACTS OF TRADE FLOWS ON HOUSEHOLD WELFARE DURING COVID-19 PANDEMIC: EVIDENCE FROM OECD COUNTRIES

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Abstract

While there are studies examining the relationship between COVID-19 policies and international trade, there is still limited evidence examining the relationships between international trade and household welfare during the COVID-19 pandemic. To fill this gap, this study examined the presupposed associations between international trade and household welfare in OECD countries. The study applies the fixed effects regression method to analyze panel data compiled from the UN COMTRADE and the OECD Social and Welfare Statistics databases. The findings reveal that international trade flows show significant associations with various aspects of household welfare indicators including unemployment rate, labor underutilization rate and household savings. Furthermore, the results show that the COVID-19 pandemic had significant effects on labor underutilization, household consumption, and household savings. Policy recommendations are addressed based on the key findings.

Keywords: Trade; household welfare; panel data; fixed effects regression, COVID-19

1. INTRODUCTION

Global trade is a significant driving force for macro-level economic growth as well as household (HH) welfare (Marchand, 2017). Data from the United Nations Conference on Trade and Development (UNCTAD) showed that global trade in goods and services finally accelerated between January and March 2023; however, prospects for the remainder of 2023 were less optimistic (UNCTAD, 2023). Nevertheless, trade in goods increased by almost 2% from the previous quarter, while global services trade also increased by about 3% compared to the last quarter of 2022. International trade enables countries to expand their markets and provides access to goods and services that are not available domestically. International trade forms a competitive market and leads to more competitive prices and cheaper products.

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Regional trade boosts economic growth as many jobs are generated through trade (Salvatore, 2019). In turn, unemployment rates go down and business opportunities increase as trade creates domestic jobs throughout value chains (Salvatore, 2019). Therefore, international trade can be beneficial to households by directly and indirectly raising living standards.

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Following the spread of COVID-19, countries began to impose multiple restrictions on people and international trade activities; as a result, economic growth in countries around the world declined significantly during and following the COVID-19 pandemic (Hayakawa, 2021). Following the lift of certain trade restrictions in 2021, countries began to gradually recover from the pandemic (Srisawasdi et al., 2021). The first wave of COVID-19 led to a contraction in the volume of international trade. Trade volume in 2020 was reported to decline by approximately 5.3% compared to 2019 (WTO, 2021). Overall, the pandemic profoundly affected the world economy, healthcare, and globalization, through disturbances in trade, travel, events, employment, food supply chains, academia, and healthcare capacity (Shrestha et al., 2020).

Given the above background, while existing studies provide some evidence regarding the impact of international trade on household welfare, evidence of the impact of international trade during the COVID-19 pandemic in OECD (Organization for Economic Cooperation and Development) countries is still lacking. A literature gap remains in terms of quantitative evidence showing how international trade affected household welfare during the pandemic. Therefore, this study aims to fill this gap by examining macro level data from the OECD and World Bank databases using a fixed effects regression method. It is expected that the findings of the study will not only contribute to filling the existing research gaps, but also yield policy-relevant evidence.

This paper is structured into five sections. The first section is the introduction. The second section following the introduction is a literature review. The third section presents the methodology and provides descriptions of the variables. This is followed by presentation of the results and a discussion of the key findings. Finally, the paper ends with the conclusion section.

2. LITERATURE REVIEW

Several studies have shown relationships between international trade and household welfare (Molnar et al., 2008; Hayakawa et al., 2021; Decerf et al., 2021; Wang & Mo, 2022). Molnar et al. (2008) investigated the relationships between employment and globalization in OECD countries, finding that wages and returns to capital are likely to increase at a higher rate for more skilled workers in comparison to the wages of less skilled workers. Hayakawa et al. (2021) examined the impact of Chinese import penetration on employment in Japan, finding negative impacts on total employment, particularly in industries that produce competing products to Chinese imports. Positive impacts were also found in industries from which firms purchase their inputs.

Past studies have shown the effects of trade policies on household welfare. Finot et al. (2011) analyzed the effects of trade policy on household welfare indicators in Chile, finding that the impact of lower effective tariffs resulted in lower domestic prices and gains in household welfare. Murakami (2021) analyzed the impacts of reductions in tariff from the proliferation of regional trade agreements on wage inequality in Chile, finding that reduction in final goods tariffs leads to an increase in industry wages and skill premiums and that the impact on wages and skill premiums is larger for skilled workers compared to unskilled workers. This leads to the conclusion that reduction in output tariffs leads to an increased demand for skilled workers. Nicita (2009) examined the effect of tariff liberalization from the perspective of household welfare; their study found that tariff liberalization had a net positive

effect on household welfare, mainly due to reductions in the cost of consumption basket, while there were differences in effects across different income levels and geographic regions.

Furthermore, several existing studies on OECD countries have shown associations between trade and various indicators of economic growth, including welfare gains (Amirkhalkhali & Sal, 2010; Lu et al., 2022; Anderson & Croser, 2011). Amirkhalkhali & Sal (2010) empirically examined the degree of trade openness for total and individual factor productivity growth on a group of 19 OECD countries, finding that the relative importance of trade openness on economic growth significantly varies across countries and that the role of capital and labor accumulation on fostering economic growth varies across degrees of trade openness. Lu et al. (2022) investigated the impact of the international trade potential index to measure the welfare gains from trade using an unbalanced panel dataset of 36 OECD countries, finding that international trade potential is positively associated with renewable energy consumption and that per capita income and per capita carbon dioxide emissions and energy prices are associated with an increase in the demand for renewable energy. Anderson & Croser (2011) presented a case study of new theory-based policy indicators to monitor the impact of policy interventions on international trade and economic welfare in OECD countries. Nasif et al. (2023) estimated the potential economic gains from a reduction in trade administration costs in relation to sea border trade, finding that improving trade administration costs can result in economic savings between USD 1.25 billion to 1.5 billion annually.

While global trade volumes accelerated in the first two quarters of 2023, the ongoing global supply chain challenges triggered by COVID-19 and further exacerbated by the war in Ukraine are likely to affect global trade flows (UNCTAD, 2023). Logistic disruptions, shortages of semiconductors, and increasing energy prices, continue to pose major challenges to global supply chains. Decerf et al. (2021) found that the COVID-19 pandemic caused increases in mortality, ill-health, and suffering from the closing of schools. Furthermore, due to the economic downturn caused by the pandemic, global GDP is expected to drop by 4.8% to 8.9%. Moreover, the pandemic resulted in over 4 million lost years and over 68 million additional poverty years (Decerf et al., 2021). Wang et al. (2022) revealed how COVID-19 influenced global imports and exports. First, it influenced the simultaneous reduction of export and import trade under the global supply chain system. Second, pandemic prevention policies that complicated import procedures boosted regional trade. During COVID-19, it was difficult to strike a balance between imports and exports since many countries took measures to control or restrict export for epidemic prevention and food security. Third, consumer behavior resulted in a decline in demand and therefore reduced imports of commodities. Srisawasdi et al. (2023) analyzed the impact of COVID-19's non-pharmaceutical interventions on international trade flows, finding that containment and stringent interventions had negative effects on international trade flows, while economic support interventions had positive effects.

3. METHODOLOGY

3.1 Variables

This study used a macro-level dataset made available by the OECD. The OECD is a unique organization in which the governments of the 38 democratic member countries work together to address the economic, social and environmental challenges of globalization (OECD, 2005). The OECD was founded as an intergovernmental organization with the purpose to stimulate economic progress and global trade (Shields, 2021). The OECD has helped governments to respond to economic and social challenges such as information economy, ageing populations and welfare development (OECD, 2006). The OECD was among the first

international organizations to regularly examine international trade issues by creating a specific body dedicated to the subject (Potier, 2008).

Panel data were drawn from the OECD Social and Welfare Statistics database. This study therefore only includes OECD countries. The time series data were collected for a twelve year period from 2011 to 2022. All variables are continuous with the exception of the "COVID-19 year" variable, which is a binary variable (year 2020, 2021 and 2022 were designated as a "COVID-19 year"). Table 1 summarizes the key variables in this study including their definitions.

Table 1 Summary of Variables Included in the Study

Variable	Definition	Source
Household savings, %	The portion of disposable household income that is not used for final consumption expenditure.	OECD Social and Welfare Statistics, (2022)
Household consumption growth, %	The growth rate of final household expenditure on goods and services.	OECD Social and Welfare Statistics, (2022)
Unemployment rate, %	The percentage of people in the labor force who are unemployed.	OECD Social and Welfare Statistics, (2022)
Labor underutilization, %	The sum of the number of unemployed people and underemployed expressed as a percentage of the labor force.	OECD Social and Welfare Statistics, (2022)
Total trade value (million USD)	The sum of total annual imports and exports in million USD.	UN Comtrade, (2022)
COVID-19 year (dummy)	A dummy representing COVID-19 years where 1 = a COVID-19 year and 0 = not a COVID-19 year (year 2020, 2021 and 2022 are COVID-19 year).	WHO, (2022)
Trust in government (0-100)	The confidence of citizens and businesses in the actions of the government to do what is right and perceived as fair.	OECD Social and Welfare Statistics, (2022)
Consumer confidence index	A statistical measure of consumers' feelings about the current and future economic conditions used as an indicator of the state of the economy.	OECD Social and Welfare Statistics, (2022)
Population (million)	The number of people in each country expressed in millions.	OECD Social and Welfare Statistics, (2022)
GDP (million, USD)	The monetary value of all final goods and services bought by the final user.	OECD Social and Welfare Statistics, (2022)

3.2 Methods

The impact of trade flows and the COVID-19 pandemic on various indicators of household welfare in OECD countries was examined statistically. The indicators of household welfare assigned as dependent variables included household savings, growth in household consumption, unemployment rate, and labour underutilization. First, descriptive analyses were carried out. The descriptive statistical analyses included measures of central tendency, measures of dispersion, correlation analysis, and trend analysis. We then carried out the fixed effects regression analysis.

There are three commonly used panel data regression methods for analyzing panel data, namely the random effects, fixed effects, and mixed effects models. Each method is applicable depending on the nature of the data and the research question being investigated. Essentially,

the most fundamental difference between the fixed and random effects models is the predicted coefficient results. The random effects model allows for predicting the coefficients for time invariant variables that do not change over time. Those variables that remain unchanged over time can have a marginal effect on the predicted outcome variable. Thus, in a case where the panel dataset consists of variables that remain unchanged over time such as gender, religion and nationality, the random effects model is the preferred method to use. This is because the random effects regression method allows for estimation of the coefficients of constant variables that remain unchanged over time. However, in the fixed effects model, the influence of variables that remains unchanged over time on the outcome variable are included in the intercept term. Therefore, the predicted coefficient on unchanged variables over time will be equal to zero. Thus, the fixed effects method is not the preferred method when the dataset includes variables that remain constant over time. Another panel data regression method is called the mixed effects model. A mixed effects model is a regression model that combines both fixed effects and random effects. A mixed effects model is often used in research settings where repeated measurements are made on the same statistical units. The mixed effects model is useful in dealing with a dataset with missing values.

In this study, the fixed effects regression method was used as the primary tool to perform the empirical analyses in the study. The fixed effects method was prioritized over the random effects model to analyze the collected panel dataset in this study. Firstly, fixed effects regression is widely accepted in economics for addressing unobserved heterogeneity that is constant over time. Secondly, the results between fixed and random effects regression showed minimal differences, with all relevant signs consistent and most estimate sizes remaining similar. Therefore, the fixed effects regression was prioritized over the random effects regression method due to its ability to address the unobserved constant heterogeneity over time.

The fixed effects regression model can be expressed as shown in Equation 1.

$$Y_{it} = \beta_i X_{it} + \alpha_i + U_{it} + \varepsilon_{it} \qquad \text{Eq. (1)}$$

where Y_{it} represents the value of trade flows for a given country i and year t,
α is the intercept,
X_{it} is a vector of the observed explanatory variables
β is a vector of the coefficients for the explanatory variables
U_{it} represents the time-invariant country-specific effects
and ε_{it} stands for the error term.

4. RESULTS

4.1 Descriptive statistics

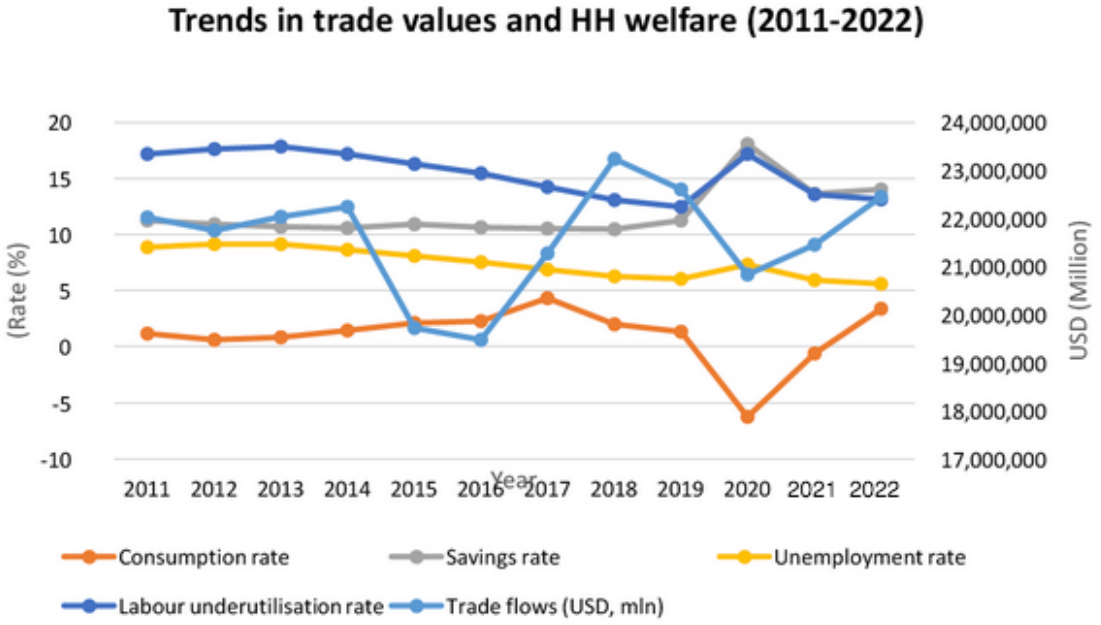
The descriptive statistics for all variables used in the analysis of the data gathered from 2011 to 2022 are summarized in Table 2.

Figure 1 illustrates the trends in trade values and household welfare between 2011 and 2022. It can be observed that trade flows decreased sharply between 2018 and 2020, and gradually increased in 2021 and 2022. At the same time, the unemployment rate and labor underutilization rates showed a positive trend, while household consumption rate decreased sharply in 2020 and gradually rebounded in 2021 and 2022. Household savings rate and labor underutilization followed similar downward trends in 2020, probably in anticipation of economically difficult times amid the pandemic.

Table 2 Summary of Descriptive Statistics for the Variables Included in Panel Regressions (n = 412)

Variable	Mean	Std. Dev.	Min	Max
Household savings, %	11.9	5	-6	25
Household consumption, %	1.1	3	-12	11
Unemployment rate, %	7.8	4	2	27
Labor underutilization, %	15.4	7	3	39
Total trade value (million USD)	588,431	789,412	8,790	4,388,741
Trust in government	45	16.4	11	85
Consumer confidence	100	2	93	105
Population (million)	36	57	0	333
GDP (million USD)	1,551,382	3,124,078	13,059	25,460,000

Figure 1: Trends in Trade Flow Values and Household Welfare Indicators in OECD Countries (Source: OECD, 2022).



Based on the correlation analysis results (Appendix 1), there was a slight negative correlation between international trade flows and the unemployment rate and labor underutilization rate (-0.2058 and -0.1468). Furthermore, there was a slight positive correlation between international trade and household savings (0.2646). A weak positive correlation could be observed between international trade and consumer confidence (0.0357). Additionally, there was a very strong positive correlation between GDP and population size (0.9553). Unsurprisingly, there was also a relatively strong positive correlation between GDP and international trade (0.8847).

4.2 Panel Regression

The results of the fixed effects regression analysis are summarized in Table 3. It can be observed that trade values were significantly associated with different aspects of household welfare. More specifically, international trade was significantly and negatively associated with

unemployment rate (ß = -2.46, SE = 0.88) and labor underutilization rate (ß = -7.79, SE = 1.68). On the other hand, when controlling for other factors, trade was found to be significantly and positively associated with household savings (ß = 5.39, SE = 0.74), and had no statistically significant effect on household consumption. Considering the effect of COVID-19 (years 2020-2022), it was found to have a significant positive effect on the labor underutilization rate (ß = 4.06, SE = 0.58) and household savings (ß = 8.84, SE = 0.54), while household consumption was found to be negatively associated (ß = -14.31, SE = 0.48) with this time period. As expected, GDP was found to be negatively associated with the unemployment rate (ß = -8.64, SE = 0.81) and labor underutilization rate (ß = 21.74, SE = 1.98). However, GDP was also negatively associated with household consumption (ß = -2.54, SE = 0.46). This result might be affected by the effect of the population size of the country. For example, it might be that the overall GDP of Luxemburg is smaller than that of Mexico, but the opposite is true when taking GDP per capita into account. As expected, consumer confidence was found to be significantly and positively associated with household consumption (ß = 0.98, SE = 0.08), and negatively associated with unemployment (ß = -0.67, SE = 0.04) and the labor underutilization rate (ß = -58.77, SE = 7.31).

Table 3 Fixed Effects Regression Results

DV	Unemployment	Labor underutlization	Household consumption	Household savings
	ß (SE)	ß (SE)	ß (SE)	ß (SE)
Trade value	-2.46**	-7.79**	-0.78	5.39**
	(0.88)	(1.68)	(0.41)	(0.74)
COVID-19 year	-1.76	4.06***	-14.31***	8.84***
	(0.59)	(0.58)	(0.48)	(0.54)
Trust in government	0.08	-0.64***	0.02	0.04
	(0.02)	(0.67)	(0.01)	(0.42)
Consumer confidence	-0.67***	-58.77**	0.98***	-11.21
	(0.04)	(7.31)	(0.08)	(7.19)
GDP	-8.64***	-21.74***	-2.54**	0.41
	(0.81)	(1.98)	(0.46)	(2.09)
Population size	10.71***	31.44***	3.01***	-3.46
	(0.91)	(1.67)	(0.32)	(1.84)
Constant	187.37	412.11	-68.79	-8.32
	(15.41)	(38.51)	(7.64)	(28.84)
N	412	364	412	286
R-sq	0.36	0.41	0.81	0.38

Note. The standard errors are in parentheses. * P ≤ .1, ** P ≤ .05, and *** p < .01

5. DISCUSSION

The fixed effects regression results reveal that international trade has a significant negative impact on unemployment and labor underutilization, while having a significant positive impact on household savings. In terms of unemployment and labor underutilization, Felbermayr (2009) found that, in the long-run, higher trade is associated with a lower rate of unemployment and labor underutilization. Seshan (2005) investigated the impact of trade liberalization on household welfare in South-East Asia, finding that trade liberalization did not impact income inequality, but did generate gains for rural households. Our findings showed that international trade increases household savings, which is consistent with past literature.

In terms of the effect of COVID-19 on household welfare, the findings revealed that the COVID-19 pandemic had a significant negative impact on household consumption and a positive impact on labor underutilization and household savings. These findings are consistent with several existing studies. For example, Webster (2021) examined the effects of COVID-19 on labor markets in Southern Europe and found a significant number of firm closures with a consequent loss of employment, leading to a substantial loss of labor weeks. Shimizutani (2021) examined the impacts of COVID-19 on household welfare in Tajikistan and found that household migration and remittances contributed to the mitigation of adverse economic outcomes during the COVID-19 pandemic. Therefore, it is logical to conclude that the pandemic led households to consume less and save more, while having a negative impact on labor utilization.

In terms of trust in government, the results revealed that trust in government had a negative impact on labor underutilization. It should be noted that trust, welfare gains, and poverty, have been thoroughly studied in different combinations, particularly the linkages between receiving welfare and government trust (Soss et al., 2007; Nannestad, 2008; Kumlin et al., 2018). It has been shown that trust, both in social and political contexts, can significantly affect general welfare gains. Furthermore, several empirical studies also found consistent links between government trust and the design of welfare policies (Rothstein & Uslaner, 2005; Kumlin et al., 2018).

With regards to the potential impact of consumer confidence on household welfare, the results revealed that consumer confidence has a negative impact on three different indicators of household welfare: unemployment rate, labor underutilization rate, and household consumption. Many studies have found that psychological motives such as consumer confidence may affect household decisions, particularly decisions related to household expenditure (Dragouni et al., 2016; Larson & Shin, 2018). Mynaříková & Pošta (2023) examined the role of consumer confidence via selected indicators of well-being measures on a broad set of 22 OECD countries, finding that consumer confidence played a positive and statistically significant role in expenditure development and that consumer confidence was a significant determinant of almost all expenditure. Therefore, the results of this study regarding the impact of consumer confidence on household welfare are consistent with the existing literature.

Existing studies on OECD countries also showed similar results. Kim (2011) analyzed the data for twenty OECD countries for the years 1961-2008, finding that an increase in trade may reduce aggregate unemployment if the labor market is characterised by flexibility. Almeida (2021) analyzed the impact of the COVID-19 crisis on household income in the European Union (EU), finding that the COVID-19 pandemic significantly affected households' disposable income in the EU, with lower income households being more severely hit.

6. CONCLUSION

This study examined the effect of trade flows on household welfare in OECD countries. The rate of unemployment, labor underutilization, household consumption, and household savings, were used as proxy indicators of household welfare. We found that trade values have significant negative impacts on unemployment rate and labor underutilization, while having a significant positive impact on household savings. Furthermore, the COVID-19 pandemic had a significant negative impact on household consumption and a positive impact on labor underutilization and household savings.

Based on our findings, several policy recommendations can be made. First, international trade flows showed significant negative effects on unemployment rate and labor underutilization rate. This means that an increase in trade flows will likely decrease

unemployment rate and labor underutilization rate. Therefore, policymakers can reduce unemployment rate and labor underutilization rate through the stimulation of international trade. Secondly, the findings reveal that trade flows positively affect household savings, while the COVID-19 pandemic negatively affected household savings. Therefore, policymakers can increase household savings, particularly during a pandemic, by increasing trade flows. Third, because the COVID-19 pandemic is shown to have a negative effect on household consumption while having a positive effect on household savings, policymakers should aim to implement economic support measures in order to stimulate household consumption as well as easing the financial burden of households during the pandemic. Additionally, labor underutilization was also affected by the COVID-19 pandemic. Therefore, policymakers should aim to decrease labor underutilization rate during a pandemic by creating more jobs and increasing labor wages.

This study presents advancement of knowledge in the area of the effects of international trade flows and the COVID-19 pandemic on household welfare. However, it should be pointed out that there are certain limitations in the study. First, the panel data used in this study only covers a certain time period from 2011 to 2022, which leads to a limited sample size. Second, several missing values were observed across the OECD member countries. Therefore, the empirical analysis results could be subjected to some bias due to missing values. Third, this study only included a limited number of explanatory variables. It did not consider variables representing the environmental and governance aspects that could potentially impact household level welfare. Furthermore, certain economic variables frequently encountered in empirical research on international trade such as the trade openness index, country average tariff and economic freedom index were not included in this study. Finally, this study did not take any intra-regional or intra-country effects into account. Therefore, it is recommended that future studies should consider more comprehensive databases and more sophisticated analyses to contribute further evidence towards this policy relevant to the research theme. Furthermore, more key explanatory variables, particularly those that measure environmental and governance factors, should be added to widen the scope of the analysis. Additionally, key economic variables related to international trade openness and tariff barriers should be included in future research in order to strengthen the empirical analysis.

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APPENDIX

Appendix 1 Pearson Correlation Coefficient Matrix

	Unemploy-ment	Labor un-derutilization	Savings	HH consump-tion	Interna-tional trade	Consumer confidence	Trust in government
Unemployment	1						
Labor underutilization	0.7767	1					
Savings	-0.545	-0.2861	1				
HH consumption	-0.096	-0.2234	-0.2995	1			
International trade	-0.2058	-0.1468	0.2646	-0.0815	1		
Consumer confidence	-0.4323	-0.4646	0.1367	0.5198	0.0357	1	
Trust in government	-0.2318	-0.1137	0.1165	-0.1165	0.056	0.0507	1
GDP	-0.1251	-0.0891	0.1273	-0.0398	0.8847	0.0058	-0.0378
Population	-0.11	0.0001	0.1464	-0.0318	0.8605	-0.0356	-0.0636

	GDP	Population
GDP	1	
Population	0.9553	1

Appendix 2 Random Effects Regression Results

DV	Unemployment ß (SE)	Labor underutlization ß (SE)	Household consumption ß (SE)	Household savings ß (SE)
Trade value	-1.88*** (0.61)	-5.84*** (1.68)	-0.46 (0.32)	3.84*** (0.98)
COVID-19 year	-0.68 (0.39)	3.04*** (0.69)	-7.17*** (0.38)	6.12*** (0.34)
Trust in government	0.012 (0.01)	-0.78*** (0.59)	0.004 (0.01)	0.07 (0.48)
Consumer confidence	-0.76*** (0.04)	-48.94*** (7.31)	0.68*** (0.06)	-7.12 (6.89)
GDP	-6.33*** (0.73)	-12.98*** (1.45)	-1.89*** (0.46)	0.69 (1.21)
Population size	7.91*** (0.85)	18.79*** (1.67)	1.79*** (0.32)	-2.86 (1.32)
Constant	151.67*** (13.32)	412.11*** (38.51)	-49.59*** (5.72)	-7.11 (31.14)
N	412	364	412	286
R-sq	0.32	0.29	0.73	0.34

Note. The standard errors are in parentheses. * P ≤ .1, ** P ≤ .05, and *** p < .01