Deciphering Trade Balance Dynamics: An Analysis of Key Determinants among G-20 Countries

By Yunshu Liu and Ivan Sapozhnikov

Introduction

The research consisst of identifying and analyzing the most important factors influencing the trade balance between countries; the dataset includes the G-20 countries. The report aims to answer questions such as why some countries trade more than others and what factors influence a country's trade balance. Understanding the drivers of trade balances is critical for preserving macroeconomic stability, informing trade policies, managing international relations, and making sound business decisions. Aside from international affairs, businesses and individuals impacted by international trade may benefit from understanding different countries' trade balances in order to make informed decisions about their career or business strategies.

Literature Review

Kiliç, Balan, Kurt and Ünzüle (2015) identified important variables that affected the trade balance of G-20 countries such as oilprices, currency exchange rates, and institutional quality. They examine the key factors influencing G-20 trade balances using data from 1996 to 2012. To estimate the relationship between the trade balance and several independent variables, including the real effective exchange rate index, world oil price, institutional quality index, 2008 financial crisis, and linear time trend, the study employs a fixed effects model. The empirical findings show that the exchange rate index, world oil price, and institutional quality index are important factors in explaining the trade balance of the G-20 countries. The study also discovers that depreciation has no short-run positive effect on trade balance, implying that certain economies may not be able to use exchange rate policy to increase exports and promote economic growth in the long run. To control for the presence of a unit root in the series and obtain unbiased estimates, the study used several different panel unit root tests. Im et al. (2003), Maddala and Wu (1999), and Choi (2001) were the panel unit root tests used in this study. Furthermore, cross-section dependence tests were performed using the approaches of Pesaran (2004) and PUY (2008).

Data Description

The World Bank’s primary goal is providing financial assistance, through loans and grants, to developing countries in order to encourage economic development. The World Bank also provides pulicly available datasets and infographics. We used the World Bank data set from 2007 to 2021 on G-20 countries, which includes the following variables: trade balance, monetary difference in USD between a country’s total exports and total imports, exchange rate between local currecny and USD, and the level of infrastructure using the Logistics Performance Index (LPI) rating of trade/transport. LPI is a measure created by the World Bank to quantify the quality of different infrastructures in a country. We use the average cost of crude oil for a given year from Macrotrends.net, a site which provides data on different financial and economic variables. More specifically, we used the average closing price Of crude oil per barrel as our baceline statistic.

Empirical Model

Our Model:

*TRADE\_BALANCEi,t = TRADE\_INFRi,t + EXCHANGEi,t + OILt+ FEi + εi,t*

Where:

*i* : country

*t*: time in Years (2007-2021)

TRADE\_BALANCEi,t: : Difference in value of a country’s (i) exports and imports for a given year (t).

TRADE\_INFR: LPI quality of trade and transport-related infrastructure (1=low to 5=high) for a given country (i) in a given year (t)

EXCHANGEi,t: The official exchange rate between the countries (i) currency and US$ for a given year (t).

FEi : County Fixed Effect

εi,t: Error term

: Constant term

We estimate our model using the data we collected and the results are presented in Table 1 below:

| **Residuals:** | **Min.** | **1st Qu.** | **Median** | **3rd Qu.** | **Max.** |
| --- | --- | --- | --- | --- | --- |
|  | -276.49167 | -5.65403 | 0.13365 | 6.04263 | 204.90543 |

|  | Estimate | Std. Error | t-value | Pr(>|t|) |
| --- | --- | --- | --- | --- |
| Average Oil Price  (OILt) | -0.1358315 | 0.0656886 | -2.0678 | 0.0391 |
| Trade Inferestructure  (TRADE\_INFRi,t) | 5.5653046 | 7.6025396 | 0.7320 | 0.4644 |
| Exchange\_Rate  (EXCHANGEi,t) | -0.0016465 | 0.0039126 | -0.4208 | 0.6740 |

[Link to Country Fixed Effects](https://docs.google.com/document/d/1l_Dy3RznZE7GQit34MzgWu5myxBXtDUnuF1L3GWPXnU/edit?usp=sharing)

DATA SETS:

[Oil\_price\_csv.xlsx](https://1drv.ms/x/s!AtLmvCRq4Jx3pmwP_kNkcY4ZoQng?e=3FGkyc) from [MacroTrends](https://www.macrotrends.net/1369/crude-oil-price-history-chart)

[Econometrics\_Data\_set\_Table\_csv.xlsx](https://1drv.ms/x/s!AtLmvCRq4Jx3pm7JtmvTmHY0FUj_?e=FrW1Co) from [The World Bank](https://databank.worldbank.org/source/world-development-indicators#)

Results Interpretation

In terms of coefficient signs, our findings were consistent with the papers. We found that higher Oil prices have a negative effect on trade. Similarly, a higher exchange rates discourage trade, as is consistent with Macro Economic theory. Most significantly, as the paper suggests, infrestructure has a positive effect on trade. Unlike the original model, we found p-values are greater than a = 0.05 for Inferestructure and Exchange rate which suggesting that, there is evidence for them being insignificant. This may suggest that over time—likely due to rising global political, economic, and trade policy uncertainty—structural changes have developed which have decreased the significance of these variables. It should be noted that the model by Kiliç, Balan, and Kurt includes the variable CRISIS for 2008, which may explain why their p-values satisfied a = 0.05 more often than not.

Limitations and Improvements

When using regression analysis to investigate the relationship between trade balance and independent variables such as oil price, currency exchange rate, and institutional quality index, there are several limitations to consider. Among these limitations are: Endogenity, Omitted Variable Bias, Causality, Data Quality, and Non-linear relationships. A country's level of economic development is an example of an omitted variable in the regression of trade balance on oil price, currency exchange rate, and institutional quality index. Regardless of the other independent variables in the regression, countries with higher economic development tend to have higher trade balances than less developed countries. If economic development is not included in the regression model, the estimates for the other independent variables may be biased, resulting in incomplete or inaccurate analysis results. One way to address the limitations of the regression is by using an instrumental variable, and the distance between trading partners is one potential instrumental variable that could be used to address endogeneity in the regression of country trade balance on independent variables such as oil price, currency exchange rate, and institutional quality index. Distance between countries can have an impact on their trade balance, as well as transportation costs, cultural differences, and political relations. Distance, on the other hand, is likely to be correlated with the error term in the trade balance equation, and it is likely to be correlated with the independent variables of interest. As a result, distance can be used to identify the causal effects of the independent variables on trade balance. Using distance as an instrumental variable may have some potential effects on the regression's independent variables. Distance, for example, may influence oil prices through transportation costs, as oil is a globally traded commodity that requires transportation from producing to consuming countries. Similarly, distance can influence currency exchange rates via international trade flows and demand for various currencies in different countries. This satsiffies the relevance factor of the covariance between distance and the independent variables as not being 0, and if we consider a potential unobservable random variable in the error term as economic development of the G-20 countries, distance between them is not likely going to have a direct effect on economic development, thus it satisfies the exclusion assumption and affects trade balance only through the independent variables because it is also unlikely that distances between countries can directly affect trade balance.

References:

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