<u>Analyzing the Efficacy of Aid for Trade</u>

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<u>Abstract</u>

This paper studies the relationship between bilateral foreign aid from the United States to developing nations and the imports of goods and services that those same developing nations purchase from the United States. I put forth the hypothesis that countries that receive more bilateral aid will import more goods and services, to the credit of the motivations behind global trade initiatives such as Aid for Trade by the World Trade Organizations. The results of my OLS double-log model show that bilateral foreign aid increases the US dollar amount of imports from the United States to the recipient country.

Acknowledgments

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I.   Introduction

Foreign aid for developing countries has been an initiative with varying support within

the United States. While generally garnering bipartisan support in Congress, the general public

seems to have a much less favorable opinion on the practice. A recent poll conducted by Rasmussen Reports in 2017 found 57.69% favor a cut in foreign aid compared to 6% who want increased aid. In the fiscal year 2017, the United States Agency for International Development (USAID) contributed $49.87 billion in foreign aid, totaling about 1.2% of the federal budget (USAID, 2019). In a general sense, the goal of foreign aid is to allow developing nations temporary assistance until those nations reach sustainable economic levels. This implies that aid should be given for a defined period of time or decrease after a given time period. However, many nations that the United States gives foreign aid to have been receiving aid since as early as 1945, with only stagnant economic development to show for it.

The Doha Round of World Trade Organization (WTO) negotiations that started in 2001 was based on the recognition that trade liberalization was not enough for the development prospects of many low-income countries. In 2005, the World Trade Organization launched the Aid for Trade initiative at the Hong Kong Ministerial Conference. The WHO outlines four successive goals of Aid for Trade (AfT) as an answer to the concern of economic sustainability mentioned above: mainstreaming and prioritising trade (demand), trade-related projects and programmes (response), enhanced capacity to trade (outcome), and improved trade performance and reduced poverty (impact) (OECD, 2018).

Similar to studies before, this paper will examine the effect of foreign aid on the volume of trade through observation of U.S. imports entering recipient countries, collected by World Integrated Trade Solutions (WITS). Bilateral foreign aid is the explanatory variable in question that will be added into the gravity model of international trade and tested for significance. The purpose of this study is to analyze the relationship between bilateral foreign aid and its impact on the imports of U.S. goods and services in recipient countries.

II.   Survey of the Literature

There is extensive literature on the topics of foreign aid, bilateral trade; and, on a more specific level, Aid for Trade initiatives. Articles on both topics share a similar theoretical framework which will be covered in the next section. The overlap of foreign aid and bilateral trade is thoroughly examined in a comprehensive survey of literature on both topics in the *Oxford Review of Economic Policy* (Suwa-Eisenmann and Verdier, 2007). The article evaluates literature from 1949 to 2006, theoretical and empirical, explores the relations between aid and trade, and asks about the complementarity or substitution effects at work. The article also distinguishes the effects of aid on trade flows as well as trade policies, of the donor as well as the recipient countries. Suwa-Eisenmann and Verdier cite an article by Nilsson (1997); where a sample restricted to EU countries during the period 1975–92, finds that $1 of aid generates $2.60 of exports from donor to recipient. Furthermore, the study suggests the effect of aid on exports is mostly due to bilateral aid (as opposed to multilateral aid, for which the coefficient on exports is negative and significant for Denmark, Italy, and France).

These effects are more closely examined by Nowak-Lehmann et al (2013) where the authors focused only on exports from recipient countries during the 1988–2007 period. The empirical analysis of the paper showed that the direct impact of bilateral development aid on recipient countries' bilateral exports to donor countries is insignificant on average in the 1988–2007 period. A similar paper by Gradeva and Zarzoso (2016) find similar results, albeit with a focus on the foreign aid coming from the European Union's "Everything But Arms" initiative. The study considers exports from 79 ACP countries to the EU-15 for the time period of 1995-2013 using panel data techniques. The empirical analysis shows that eligibility for the EBA

scheme alone does not contribute significantly to the increase in exports from the ACP LDCs to the EU □ 15.

On the contrary to the previously mentioned papers, some studies do find that foreign aid has a significant impact on trade flows. Temple and Van De Sijpe (2017) study the relationship between foreign aid and domestic absorption. Domestic absorption refers to how much of the foreign aid given to a developing country is used for household consumption, government consumption, or gross investment. The evidence suggests that aid is absorbed at least partially and that absorption seems to arise mainly via increased imports. Huhne et al (2014) estimate and compare the effects of the WTO's Aid for Trade initiative on the exports of both donor and recipient countries. The empirical analysis of this paper is based on data for the 1990-2010 period with trade data obtained from the United Nations Comtrade database. The authors of the article find that AfT increases recipient exports to donors as well as recipient imports from donors. However, the authors also point out that their results point to important limitations in the effectiveness of AfT. AfT appears to promote the exports of middle income countries, most of which are probably less dependent on aid to overcome supply constraints.

III. Theoretical Model

The theoretical underpinning that inspires the hypothesis of this project comes from the theory of income transfers in international trade theory. This development of international trade theory is mainly attributed to the works of Paul Samuelson in his 1952 article *The Transfer Problem and Transport Costs: The Terms of Trade When Impediments are Absent*. Before Samuelson had offered his clarification of the relationship between international transfers of

resources and the terms of trade; it was assumed by previous economists, namely John Maynard

Keynes, that an international transfer between two countries is likely to have important terms-of-

trade effects between the donor and the recipient countries, usually in the form of the

deterioration of said terms of trade for the donor country. After exhaustively examining the

arguments of this "orthodox" view of international transfers in his article, Samuelson came to the

conclusion that in the absence of transport costs, tariffs and other trade barriers, "...there is no

presumption that the terms of trade will deteriorate rather than favour the paying country"

(Samuelson, 1952). Following the work of Samuelson, there have been significant efforts to

consider the 'anti-orthodox' view that an income transfer improves the donor country's terms of

trade, such as the works of Jones (1970) and Li & Mayer (1990). The findings of these empirical

studies suggest further confirmation to Samuelson's corrections, with some finer attention to the

details of differences in consumer preferences, quantity of factor supplies and production

technologies in the paper by Li and Mayer.

      With the intuition from this theory, I pose the hypothesis that bilateral aid from the

United States should result in a greater number of imports of US goods for recipient countries,

potentially giving credit to the motivations for Aid for Trade initiatives.

IV.   Empirical Model

      The empirical model that this paper draws inspiration from is the Gravity Model of

International Trade, which states in its most basic form, that bilateral trade flows can be

predicted based on economic sizes and distances between economies.

$$F_{ij} = G * M_i * M_j / D_{ij}$$

Above is the traditional form of the model. The response variable, F, stands for trade

flow. G is a constant, D stands for the distance and M stands for the economic dimensions of the

countries that are being measured. This equation, in words, states that bilateral trade between two

countries is proportional to their respective sizes, measured by their GDP, and inversely

proportional to the geographic distance between them. For econometric applications, the model

can be linearized by using logarithms.

$$\ln(F_{ij}) = \beta_0 + \beta_1 \ln(M_i) + \beta_2 \ln(M_j) - \beta_3 \ln(D_{ij}) + \varepsilon_{ij}.$$

Adoption of the gravity model of trade is seen by many economists as an improvement

on previous theoretical models, namely the Hecksher-Ohlin model and its predecessor, the

Ricardian model. The Hecksher-Ohlin model relies on differences in factor endowments among

countries as the basis for trade while the Ricardian model works to explain trade patterns in

terms of differences in technology. A limitation to both of these models is that they do not

consider economy size as an explanatory variable for trade flow, which the gravity model

introduced.

V.   **Data**

The cross-sectional dataset used in this study is constructed from macroeconomic data

from the World Bank, World Integrated Trade Solutions (WITS) and the CEPII databases. It

contains data from 114 observed recipient countries in the year 2007. The set contains data on

GDP, bilateral aid, distance, and imports of US goods by the recipient country to be used as the

response variable. Also included are the natural log values of each variable which are used in the

form of a double-log model to linearize the standard trade gravity model.

The CEPII database was constructed to provide useful data for empirical economic research including geographical elements and variables.

Variable	Description of Variable	Source
blaid	Net bilateral aid flows from DAC donors, Total (Current US$)	https://data.worldbank.org/ indicator/DC.DAC.TOTL.CD
GDP	GDP (Current US$)	https://data.worldbank.org/ indicator/NY.GDP.MKTP.CD
imports	Imports of goods and services from the United States (thousands of current US$)	https://wits.worldbank.org/ CountryProfile/en/Country/ USA/Year/2007/TradeFlow/ Export
distance	Internal distance of country (kilometers)	http://www.cepii.fr/pdf_pub/ wp/2011/wp2011-25.pdf
usshare	Share of total exports made up by recipient country (% of exports)	https://wits.worldbank.org/ CountryProfile/en/Country/ USA/Year/2007/TradeFlow/ Export
countryshare	Share of total import made up by the U.S. for the recipient country (% of imports)	https://wits.worldbank.org/ CountryProfile/en/Country/ USA/Year/2007/TradeFlow/ Export

Results

With the discussion of limitations out of the way, we can now look at the implications of the model to draw our conclusions. In the context of the gravity model of trade, it is important to understand that the intercept coefficient of a regression output does not yield economically significant results. If the results were economically significant, it would imply a country with no

distance from the US and a GDP of $0 exists, which we know not to be the case. For this reason, I encourage a disregard of that coefficient in this draft and drafts in the future.

Bilateral Aid appears to show a positive relationship between a recipient country's import of US goods, with a coefficient value of 0.06405. This is to be interpreted as an increase in imports of US goods by .06405% US dollars for every 1% increase of bilateral aid the country receives. This variable is just barely insignificant at the 5% level, however, with a p-value of .0586.

Next, kilometer distance from the US shows a negative relationship with recipient imports with a coefficient value of -.49178, indicating a .49178% decrease in imports of goods and services for every 1% increase in kilometer distance a country is from the US. The variable is statistically significant at the 5% level in this model with a p-value of .0097. This result runs in agreement with the gravity model of trade, which predicts a negative relationship between distance between countries and trade flow.

The GDP variable carries a coefficient value of 0.52520, which should be interpreted as a 1% increase in GDP would translate to a 0.52520% increase in US imports by the recipient country. This variable is significant at the 5% level with a p-value of $< .0001$.

The variables *usshare* and *countryshare* are both expressed in percentages, as in, the percentage of imports for the recipient country that are goods from the US for *countryshare* and percentage of exports from the US that go to a respective recipient country for *usshare*. *Countryshare* did find some significant results, however, with a coefficient interpretation of .05559% increase in imports for every 1% of share the US makes of a country's number of imports; the p-value for this results is <.0001. *Usshare* did not find the same significance in this model though, with a p-value of .1686. The results are interpreted as a country importing .10%

fewer goods for every 1% increase in their share of total US exports. The results of these two variables seem to be the most puzzling, as intuition might expect these variables to either be both significant or insignificant. In further drafts, this phenomenon will be further investigated.

Conclusions and Limitations

The results of the model suggest against what was proposed by the hypothesis stated earlier; and although the results for bilateral aid were slightly insignificant at the 95% confidence level (p = .0586), there is significance in other levels of confidence, such as the 90% level. Limitations to this model certainly can exist, as omitted variable bias can only be reduced and never eliminated, theoretically. The gravity model of trade is also limited in the number of variables it accounts for; and given that bilateral aid is not a variable traditionally used in the model, it might also be worth looking into the effect of variables such as capital investment, public consumption, and other items that the paper regarding Aid for Trade practices look into.

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VIII. Appendix

The SAS System

The REG Procedure
Model: MODEL1
Dependent Variable: logimports

Number of Observations Read	118
Number of Observations Used	114
Number of Observations with Missing Values	4

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	564.34129	112.86826	179.44	<.0001
Error	108	67.93158	0.62900		
Corrected Total	113	632.27288			

Root MSE	0.79309	R-Square	0.8926
Dependent Mean	12.35947	Adj R-Sq	0.8876
Coeff Var	6.41688		

logusgdp =	30.3018 * Intercept

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	B	2.32343	1.62585	1.43	0.1559
loggdp	1	0.52520	0.05727	9.17	<.0001
logkmdist	1	-0.49178	0.18678	-2.63	0.0097
logblaid	1	0.06405	0.03351	1.91	0.0586
logusgdp	0	0	.	.	.
usshare	1	-0.10086	0.07277	-1.39	0.1686
countryshare	1	0.05559	0.00570	9.75	<.0001

The MEANS Procedure

Variable	N	Mean	Std Dev	Minimum	Maximum
blaid	117	109668634	380051472	20000.00	3749340088
logblaid	117	16.6735216	2.3559078	9.9034875	22.0448457
kmdist	116	10135.72	3630.94	1629.00	16836.00
logkmdist	116	9.1275614	0.4978758	7.3957216	9.7312747
imports	116	3284162.88	14257371.40	367.0300000	136520317
logimports	116	12.3408303	2.3495100	5.9054436	18.7319840
gdp	117	108518080193	381682760130	132671743	3.55E12
loggdp	117	23.3236877	2.0805289	18.7033885	28.8979687
usgdp	117	1.45E13	0	1.45E13	1.45E13
logusgdp	117	30.3018470	0	30.3018470	30.3018470
usshare	117	0.2791453	1.2211502	0	11.7400000
countryshare	117	21.3279487	23.0179469	0.2800000	95.6500000