

Dirghayu Shah
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Neighborhood Trade Effects on Landlocked Countries

Introduction:

Landlocked developing countries are amongst the poorest in the world. Out of the 44 landlocked countries, 32 are considered low income. The United Nations has included 17 of the 32 landlocked developing countries in its list of countries considered to be least developed. (United Nations, n.d.) The obvious disadvantage is that they have no access to the sea and often must depend on their immediate neighbors for trade and face higher trade costs. This has often been cited as one of the reasons why landlocked countries have fallen behind in development.

Landlocked developing countries have lagged their seafaring counterparts, but landlocked countries in Europe have access to a developed trade market which has helped their growth. Most of the economic research on landlocked countries has thusly focused on trade and what was called the “landlocked penalty” in trade by Moore (2017). Paudel (2015) also looks specifically at the effects of landlocked-ness on non-European landlocked countries. Both papers hve a similar conclusion of landlocked-ness being a barrier for growth in low-income countries.

This paper looks at trade with neighboring countries on the Gross Domestic Product (GDP) per capita of a landlocked country. The analysis includes 30 landlocked countries over a five-year period from 2014 to 2018. The study designs two indexes to quantify the trade power of the neighboring countries. Most of the research done on landlocked countries looks at the disadvantage of being landlocked as shown by Moore (2017) and Paudel (2015). This paper looks more at how trading with neighbors may offset that disadvantage. The results of the paper

do not confirm that trade with neighboring countries is a significant factor of economic growth in landlocked countries.

It is expected that landlocked countries that trade in higher quantities with their neighbors may find higher GDP growth than landlocked countries that do not. The rest of the paper is divided into five sections. There will be a literature review in in section II that will look at relevant research on landlocked countries and neighborhood effects on trade growth. Section III will introduce the empirical model and describe the data used in the study as well as present the theoretical model that the empirical model is based on. The discussion of the regression results will be done in section IV and the conclusion and discussion of the result with respect to policy will be done in the final section.

Literature Review:

This paper will put two strands of literature together and look at neighborhood effects of trade on landlocked countries. While there has been research done on neighborhood effects of trade, this paper will look at whether neighborhood effects of trade can offset some of the loss in trade faced by landlocked countries due to not owning a seaport. Countries cannot choose their own neighbors and as it happens many of the world developed economies are clustered together and many of the least developed economies are clustered together. There is evidence that landlocked countries in Europe have taken advantage of this neighborhood effect. This paper seeks to corroborate this evidence and highlight the importance of neighborhood trade for landlocked countries.

The paper looks at the effects of trade with neighboring countries on GDP per capita in landlocked countries. A significant amount of trade for landlock countries occurs with their

immediate neighbors. The paper looks at whether trading with their close neighbors can offset some of the loss in economic growth that they may face as a result of not having access to larger markets.

There is substantial difference between trade volumes of landlocked and non-landlocked countries. In addition to having a smaller pool of countries that they can trade with easily, the costs associated with trade means that the volume that is traded is also smaller for landlocked countries. Landlocked countries also face a “landlocked penalty” in trade. Only developing landlocked countries faces this kind of penalty as found by Moore (2014). European landlocked countries were among those that do not face this penalty, and this may be due to them having access to a very high-level and connected market. Paudel (2015) in his paper does not include European countries, but still finds landlocked-ness to be a limiting factor in GDP growth for landlocked developing countries. The presence of this landlocked penalty for only developing countries seems to indicate that neighbors also play a role in the volume that a country may export.

In addition to having access to an advanced market European landlocked countries also have highly developed neighbors. Vilarrubia (2006) argues that location plays a substantial role in a country’s growth rate. Growth is higher for countries with highly developed neighbors, but they also have a higher demand for their exports. Redding & Venables (2003) also attributes a country’s poor export performance to its poor foreign market access. Countries in sub-Saharan Africa had poor export performance as the countries around them are also not developed and thus have less import demand. For a landlocked country which is even more limited in choice of trade partners, having a neighbor that does not have a developed trade market might severely limit the amount they can export.

Davidová & Benáček (2014) examine the determinants of trade in Austria and find that its export performance was very closely dependent on the German market. Germany is of course a large market within the much larger market of the European Union. This implies that the existence of a developed market as a neighbor dictates the export of a landlocked country. In addition to this, their research also finds that as time has progressed so has Austria's export to other countries especially in Eastern Europe. The increased import demand in these growing economies was fulfilled by Austrian export. This shows that growth in neighboring countries also stimulates increased trade activity with its neighbor.

Data

To analyze the impact of close trade off with local strong economies, the paper uses data from the World Bank's World Development Indicators (WDI) database and its World Integrated Trade Services (WITS) database. The paper uses panel data for all landlocked countries over a period of five years between 2014 and 2018. Country level data is used for GDP per capita and trade as a percent of GDP. The income level classifications are based on the World Bank's yearly classifications. The bilateral trade data which includes the export share to neighbors and import volume of neighbors is from the WITS database.

In detail, among the 44 landlocked countries data were not used for the microstates like Andorra, Liechtenstein, San Marino and the Holy See. Complete data was unavailable for an additional ten countries, so the sample of analysis is made by 30 countries followed over five years bringing the total number of observations to 150. Data for some countries was unavailable for certain years like for trade as % of GDP for Laos in 2017 and 2018 and export share to neighbors for Nepal in 2018 and Lesotho in 2018. The last reported data was used to fill this gap in data for these observations.

Table 3 includes the summary of all key variables used in the model. The table is divided into two groups. Group 1 includes all countries that are classified as high income and Group 2 includes all countries that are classified as low income as of 2018. The table shows that without controlling for other factors higher income countries have a lower trade deficit with neighboring countries, a lower export share with neighboring countries and a higher trade as percent of GDP.

Table 4 includes the correlation matrix which shows the correlation between the coefficients. There are no variables that have high correlation with any other variables but, trade as a percent of GDP and income level have a moderate correlation.

Figures 1, 2, 3 are graphs of the log of the dependent variable *GDP (per capita)* on the independent variables, ratio of trade with neighbors, share of trade with neighbors and trade as a percent of GDP respectively. Figure 1 does not show a conclusive pattern but there does seem to be a convergence at around 8 for the log of GDP (per capita). Figure 2 also does not have a conclusive pattern but countries with higher ratios of trade with neighbors seem to have a lower level of *GDP (per capita)*. Figure 3 has a positive linear relationship which agrees with previous research that landlocked countries with higher trade as a percent of GDP have a higher *GDP (per capita)*.

Methodology

The model looks at the effect of trade with neighbors on GDP per capita of a landlocked country. The model used is based on the one in Paudel (2015) but omits the index for distance to the nearest market as only effects of trade with neighbors is observed. The model that is used is:

$$\log(GDPPC_{i,t}) = \beta_0 + \beta_1 NTShare + \beta_2 NTRatio + \beta_3 trade_pct_{i,t} + \beta_4 income_{i,t} + \beta_5 inflation_{i,t} + \beta_7 unemployment_{i,t} + \varepsilon_{i,t} \quad (1)$$

The dependent variable is *GDPPC* is GDP per capita (in thousands of current US dollars) of landlocked country *i* between a *t* of 2014 and 2018. A higher income level for a country could mean that the country already has a developed market or has access to one so a dummy variable for income is present in the model to capture its effects. High trade activity could also be associated with a higher GDP so trade as a percentage of total GDP (*trade_pct*) is also included in the model. *Inflation* and *unemployment* are also added to the model as non-trade indicators of the economy. A high value for either could have a negative effect on a country's per capita GDP.

Two indexes are also calculated which are the neighbor trade share (*NTShare*) and the neighbor trade ration (*NTRatio*). *NTShare* measures the share of export that a landlocked country has with all its neighboring countries. A higher value for this could indicate that the landlocked country does not have other options to trade with and could have a negative impact on the country's GDP. *NTShare* is calculated as follows,

$$NTShare_{i,t} = \frac{\text{exp_neigh}_i}{\text{exp_total}_i} (2)$$

This is the ratio of the total export to all neighboring countries by country *i* (*exp_neigh*) against the total global exports of country *i* (*exp_total*). *NTRatio* is the ratio of exports to all neighboring countries (*exp_neigh*) against the imports from all neighboring countries (*imp_neigh*) of country *i*. A value of greater than 1 for this index would indicate a positive balance of trade and could impact the GDP of a country positively. *NTRatio* is calculated as follows,

$$NTRatio_{i,t} = \frac{\text{exp_neigh}_i}{\text{imp_neigh}_i} (3)$$

Another model will also be used to estimate how changes in our GDP relates to our dependent variables and is based on the modelled above,

$$\Delta GDP_{i,t} = \beta_0 + \beta_1 \Delta NTShare + \beta_2 \Delta NTRatio + \beta_3 \Delta trade_pct_{i,t} + \beta_4 \Delta inflation_{i,t} + \beta_5 \Delta unemployment_{i,t} + \varepsilon_{i,t} \quad (4)$$

Empirical Analysis

Table 1 shows the results of the panel-data least squares regression with fixed cross-section effects for GDP per capita of a landlocked country. The results suggest that high income landlocked countries have a GDP per capita of 0.107% higher than that of low-income landlocked countries holding other variables in the model constant. But it is not statistically significant.

Unemployment rate is statistically significant and suggests that an increase of one percent in inflation decreases the GDP per capita of a landlocked country by 0.023%, holding other variables in the model constant. Trade as a percentage of GDP is also significant and suggests that a one percent increase in trade as a percentage of GDP decreases the GDP per capita by 0.003%, holding other variables in the model constant. This is inconsistent with the result found in Paudel (2015). An increase of one percent in the inflation rate decreases the GDP per capita by 0.002% holding other variables in the model constant but it is not statistically significant.

An increase of one in the neighbor trade share increases the GDP per capita by 0.037% holding other variables in the model constant but is not statistically significant. An increase of one in the neighbor trade ratio decreases the GDP per capita by 0.056% holding other variables in the model constant but is also not statistically significant.

The F-statistic is significant and suggest that the model is a good predictor of GDP per capita in landlocked countries and the adjusted R^2 suggests that 99.1% of the variation in GDP per capita is explained by the model.

Table 2 shows the result of the panel least squares regression with fixed cross-section effects for change in GDP per capita of a landlocked country.

An increase of one percent in the change in unemployment rate across one year is associated with a \$982 decrease in the change in GDP per capita of a landlocked country, holding other variables in the model constant. This is statistically significant.

Change in trade as a percentage of GDP is not significant and suggests that a one percent increase in trade as a percentage of GDP decreases the GDP per capita by \$67, holding other variables in the model constant. An increase of one percent in the change in inflation rate increases the GDP per capita by \$26 holding other variables in the model constant but it is not statistically significant.

An increase of one in the change in neighbor trade share increases the GDP per capita by \$1747 holding other variables in the model constant but is not statistically significant. An increase of one in the neighbor trade ratio decreases the GDP per capita by \$122 holding other variables in the model constant but is also not statistically significant.

The F-statistic is not significant and suggest that the model is not a good predictor of change in GDP per capita in landlocked countries and the adjusted R^2 suggests that none of the variation in change in GDP per capita is explained by the model.

Conclusion

This paper examined the effect of trade with neighboring countries on the economic growth of landlocked countries. The results do not show evidence that trade with neighboring countries is a substitute for overall trade. There is evidence that unemployment negatively affects economic growth in landlocked countries which could mean that non-trade factors could have more of an impact on economic growth in landlocked countries. More research needs to be done about trade with neighboring countries to show what kind of effect it has for landlocked countries and on possible non-trade factors that specifically affect landlocked countries.

A policy inference that can be made from the paper is that landlocked countries are better off trying to improve their overall trade rather than focusing on only improving their trade with neighboring countries.

References:

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Tables and Figures

Table 1: Panel Least Squares Regression

Dependent Variable = GDP per capita in log

Key Variables	Coefficient	Standard error
Neighbor Trade Share	0.037	0.258
Neighbor Trade Ratio	-0.056	0.075
Trade as % of GDP	-0.003**	0.002
Income level	0.107	0.078
Inflation rate	-0.002	0.002
Unemployment Rate	-0.023**	0.010
Constant	8.72	---
Adj. R2		.995
F-statistic		811.202***
Number of observations		150

*, ** and *** denote significance at the .10, .05 and .01 levels, respectively (2-tailed test).

Table 2: **Panel Least Squares Regression**

Dependent Variable = Δ GDP per capita in thousands

Key Variables	Coefficient	Standard error
Δ Neighbor Trade Share	1.747	6.554
Δ Neighbor Trade Ratio	-0.122	1.604
Trade as % of GDP	-0.067	0.054
Δ Inflation rate	0.026	0.042
Δ Unemployment Rate	-0.982*	0.577
Constant	-9.247	---
Adj. R2		-0.271
F-statistic		0.263
Number of observations		108

*, ** and *** denote significance at the .10, .05 and .01 levels, respectively (2-tailed test).

Table 3: Summary Statistics					
	Group 1		Group 2		t-statistic
Key Variables	Mean	S.D.	Mean	S.D.	
GDP (per capita)	24851.48	32925.33	1652.72	1228.50	49.295
Neighbor Trade Share	0.332	0.164	0.407	0.277	-17.940
Neighbor Trade Ratio	0.874	0.379	0.781	0.554	10.580
Trade as % of GDP	129.518	70.959	70.240	29.672	54.916
Inflation rate	3.523	4.838	5.800	7.507	-19.538
Unemployment Rate	9.660	6.889	6.463	6.883	24.457
Number of countries	14		16		

Table 4: Correlation Matrix

	TRADE_SHARE	TRADE_RATIO	TRADE_PCT	NEIGHBORS	INCOME	INFLATION	UNEMPLOYMENT
TRADE_SHARE	1.000000	0.368349	0.170109	-0.376818	-0.085866	0.009103	-0.133300
TRADE_RATIO	0.368349	1.000000	0.038120	0.182722	0.150903	-0.074556	-0.214594
TRADE_PCT	0.170109	0.038120	1.000000	-0.086301	0.508322	-0.146334	0.179714
NEIGHBORS	-0.376818	0.182722	-0.086301	1.000000	0.262681	-0.077199	-0.075168
INCOME	-0.085866	0.150903	0.508322	0.262681	1.000000	-0.148946	0.165328
INFLATION	0.009103	-0.074556	-0.146334	-0.077199	-0.148946	1.000000	-0.050871
UNEMPLOYMENT	-0.133300	-0.214594	0.179714	-0.075168	0.165328	-0.050871	1.000000

Figure 1

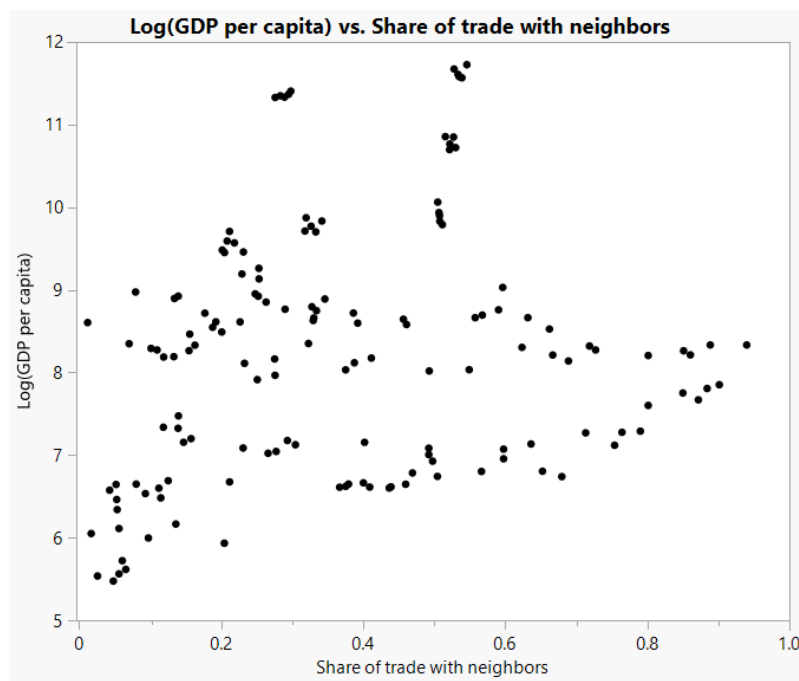


Figure 2

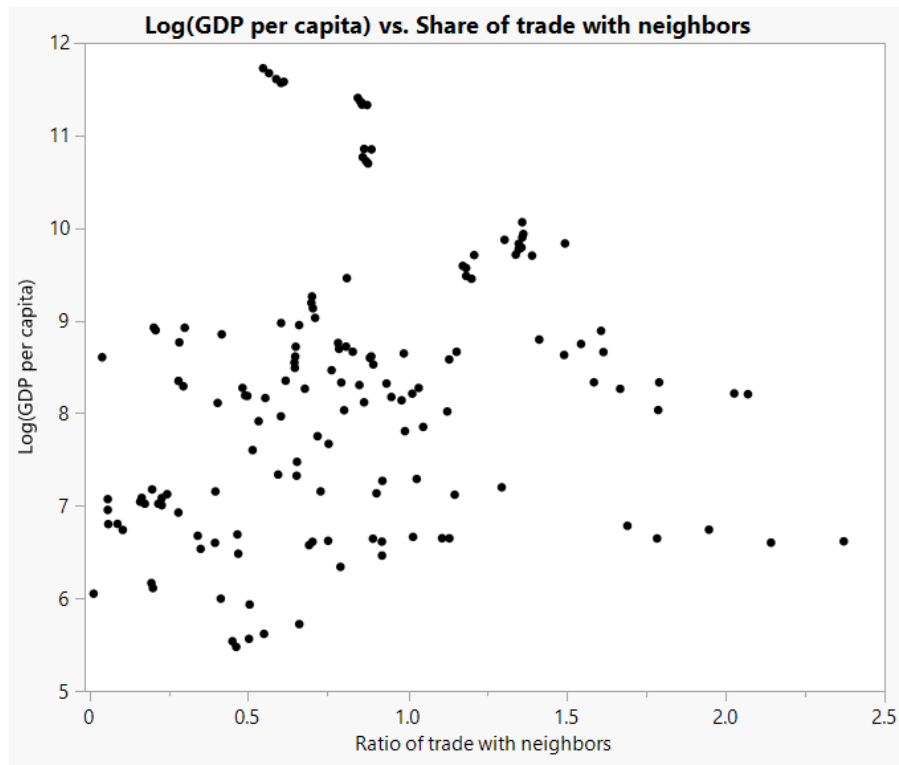


Figure 3

