Growth volatility and trade: evidence from the 1967-1975 closure of the Suez Canal

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Abstract

This paper examines the effects of trade on economic growth and growth volatility. Using the 1967-1975 closure of the Suez Canal as an instrument for trade, I find that trade leads to higher economic growth, and lower probability of recession or economic slowdown. There is no evidence that trade reduces growth volatility, however.

Keywords: economic growth, volatility, trade, IV method

JEL classification: F13, F43

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1. Introduction

What are the effects of trade on economic growth and growth volatility? Does trade lead to higher economic growth? Will it cause growth to be less volatile?

Theoretically, trade may promote high- and more stable economic growth. Trade helps allocating resources more efficiently, induces knowledge spillovers, and spurs innovation, which improve productivity and stimulate growth. Trade also helps countries diversifying their production, which may reduce their vulnerability to idiosyncratic sectoral shocks.[1]

Empirically, the relationship between trade and economic growth has been well researched.[2] Early papers establish the correlation between trade and growth. Many of these papers are silent about the causal relationship between trade and income or growth, though some find that, using time series analysis, trade Granger-causes growth. More recent papers, like Frankel and Romer (1999), focus more on the causal relationship between trade and income by identifying the effect of trade openness using instrumental variable methods.[3] These papers show that trade openness increases income or spurs economic growth.

Papers that look into the relationship between trade openness and growth volatility find mixed results, however. Cavallo (2008), for example, finds that trade openness reduces growth volatility. Haddad, Lim and Saborowski (2010) conclude that trade openness reduces growth volatility in economies with well-diversified economic structures. However, di

[1] See, for example, Grossman and Helpman (1991), Melitz (2003), Bernard, Redding and Schoot (2006) and Acemoglu and Zilibotti (1997).

[2] See Harrison and Rodriquez-Clare (2009) and Singh (2010) for a review on this line of literature.

[3] See also Dollar and Kraay (2004), Alcala and Cicone (2004), Romalis (2007), and Estevadeordal and Taylor (2008).

Giovanni and Levchenko (2009), examining sectoral volatility and trade openness, find that, overall, trade openness increases aggregate volatility.

The main challenge in identifying the effects of trade on economic growth and growth volatility is endogeneity problem. For example, economic growth and trade are positively correlated, but the causality may run from economic growth to trade: Richer countries can afford to open up their economies. Moreover, because many factors affect economic growth and growth volatility, and some of these factors are unobserved, it is also difficult to avoid omitted variables bias problem.[4]

To address the endogeneity between trade and income or economic growth, many papers have used the geographic determinants of trade in the gravity equation as instruments for trade openness. Recently, however, a few papers have come up with other instrumental variables. Romalis (2007), for example, uses MFN tariffs of the US as instruments for developing country trade shares. Estevadeordal and Taylor (2008) use the interaction between GATT membership in 1975 and the pre-Uruguay Round tariff level as well as the interaction between Great Depression intensity and past tariff level as instruments for trade liberalization. Perhaps more interestingly, Feyrer (2009) uses the 1967-1975 closure of the Suez Canal to identify the effect of trade on income.

This paper follows Feyrer (2009) and uses the same event, the 1967-1975 closure of the Suez Canal, as a natural experiment to examine the effects of trade on economic growth and growth volatility. The closure of the Suez Canal changed the sea distances among a large number of countries exogenously. The increase in the sea distances in turn reduced

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[4] Rodriguez and Rodrik (2000), for example, criticize many papers in this literature for not properly addressing omitted variable bias problems, in addition to for using poorly defined measures of trade openness.

bilateral trade. Using the changes in the sea distances because of the closure of the Suez Canal as an instrument for bilateral trade, in a regression of economic growth on trade, I find that trade leads to higher economic growth. I also find that trade makes recession or economic slowdown less likely to happen. There is no evidence that trade reduces growth volatility, however.

This paper contributes to the literature in at least two ways. First, using a natural experiment, I provide another piece of evidence that there is a causal relationship between trade and growth volatility: Trade leads to higher economic growth and lower probabilities of recession or low growth. Second, compared to some papers in this line of literature, my identification strategy is arguably cleaner. Other than a set of country- and year fixed effects, I introduce trade as the only independent variable, which rules out the possibility that there are endogeneity problems in my specifications once I use the closure of the Suez Canal as an instrument for trade.[5]

This paper proceeds as follows. Section 2 explains the method of identification. Section 3 describes the data. Section 4 presents the empirical results. Section 5 concludes.

2. Method of Identification

Regressing economic growth or growth volatility on trade may not give us an unbiased estimate of the effects of trade. We could estimate the following model:

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[5] Papers on the relationship between trade and growth volatility such as Cavallo (2008) often include many control variables in addition to trade or trade openness. While these control variables help lowering the standard errors of the estimate of interest, they may invite back-door endogeneity problems.

$$ln(y_{it}) = \alpha + \beta ln(Trade_{it}) + \gamma X_{it} + \delta_i + \xi_t + \varepsilon_{it} \quad (1)$$

where y_{it} is, for example, the economic growth of country i at time t; $Trade_{it}$ is the value of trade between country i and the rest of the world at time t; X is a vector of economic growth determinants; δ_i is the country fixed-effects, which capture country specific time-invariant factors that may affect economic growth; ξ_t is time fixed effects; and ε_{it} is the error term.

But, because some time-varying determinants of economic growth are unobservable, the specification may suffer from omitted-variable-bias problem. Moreover, there may be reverse causality running from economic growth to trade: For example, it is possible that high-growth countries are more likely to open up their economies, and, hence, have larger trade. In a regression of growth volatility on trade, there may be reverse causality if small countries, which are more susceptible to domestic economic shocks, are more likely to diversify their exports by opening up their economies compared to large countries.

We could solve these endogeneity problems if we find an instrumental variable for trade: We could estimate Equation (1) using the two-stage least square. Then, the estimate of the coefficient of the predicted value of trade in the second stage regression would give us an unbiased estimate of the effects of trade on economic growth or growth volatility.

A good instrument for trade would need to satisfy the following two requirements: (1) The instrument is correlated with trade, and (2) it is not related to the dependent variable, i.e., economic growth or growth volatility. In other words, the assignment of trade between countries in country pairs can be considered as good as random, and the effect of the instrument on the dependent variable is only through trade.

There is a plausibly good instrument for trade: the change in sea distances among countries induced by the closure of the Suez Canal for eight years from June 1967 to June

1975.[6] Egypt closed the Suez Canal during the Six Day War in June 1967 between Israel and Egypt, Syria, and Jordan. The closure was a surprise to shipping companies around the world such that fifteen cargo ships were trapped inside the canal when it was closed. After the war ended, the Suez Canal had remained closed because it had become the cease fire line between Israel and Egypt. Only in the aftermath of the Yom Kippur War fought between Israel, Egypt and Syria in October 1973 that there were some possibilities that the canal would be reopened. In 1974, as a part of the peace negotiations, Egypt and Israel agreed to let the canal reopened. After the canal was cleaned up and deemed safe for commercial shipping, it was officially reopened on June 5, 1975. In effect, the canal had remained closed for eight years; the closure was, to a large extent unanticipated; and the reopening might be expected, but perhaps only sometime in 1974.[7]

This closure means that during the years 1967-1975, many country pairs, whose shortest route between their ports are through the Suez Canal, experienced a sudden and large increase in sea distances between their ports. The shortest route between Hamburg in Germany and Port Klang in Malaysia, for example, is 8,344 nautical miles. If the Suez Canal is closed, ships would need to go through the Good Hope, which would increase the sea distance to 11,811 nautical miles, an increase of 42%.

Because distance is an important determinant of trade as shown by the gravity equation, the closure of the Suez Canal is correlated with trade. Because the latitude and longitude of each country in a country pair relative to the Suez Canal have arguably nothing

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[6] As far as I know, Feyrer (2009) is the first paper that uses the closure of the Suez Canal to identify the effects of trade. He examines the effect of trade on income. In this paper, I focus on the effect of trade on economic growth and growth volatility.

[7] See Feyrer (2009) for a detailed discussion on the use of the closure of Suez Canal as an instrument for trade.

to do with economic growth or growth volatility, changes in sea distances due to the closure of Suez Canal is not correlated with the dependent variable in Equation (1). These two features of the closure of the Suez Canal mean that the closure is a good instrument for trade in the estimation of the coefficient of *Trade* in Equation (1).

First, I estimate the effect of sea distances on trade by estimating the following model:

$$ln(Trade_{ijt}) = \alpha + \beta ln(Distance_{ijt}) + \delta_{ij} + \xi_t + \varepsilon_{ijt} \quad (2)$$

where $Trade_{ijt}$ is the value of trade between country *i* and *j* at time *t*; $Distance_{ijt}$ is the sea distance between a main port in country *i* and a main port in country *j* at time *t*; δ_{ij} is the country pair fixed-effects, which capture country pair specific time-invariant factors that may affect trade; ξ_t is time *t* fixed effects; and ε_{ijt} is the error term.

Second, following Frankel and Romer (1999), I predict the value of trade of country *i* at time *t*, $Trade_{it}$, as the sum of bilateral trade of country *i* with all of its trading partners at time *t*, using the estimates of Equation (2), i.e., $Trade_{it} = \sum_{i \neq j} e^{\hat{\alpha} + \hat{\beta}\ln(Distance_{ijt}) + \hat{\delta}_{ij} + \hat{\xi}_t}$.

Then, I use this predicted trade to instrument for $Trade_{it}$ in the estimation of the effects of trade on economic growth or growth volatility as follows:

$$ln(y_{it}) = \alpha + \beta \ln(Trade_{it}) + \delta_i + \xi_t + \varepsilon_{it} . \quad (3)$$

where δ_i is the country fixed-effects, which capture country specific time-invariant factors that may affect economic growth or growth volatility; ξ_t is time *t* fixed effects; and ε_{it} is the error term.

I drop the vector of determinants of economic growth, *X*, in Equation (1) to make the identification cleaner. It is tempting to include some determinants of economic growth such as physical capital, human capital, labor, and some measures of institutional quality as additional independent variables. However, their inclusion may make the identification less clean. If we include, for example, the quality of institution as an additional independent variable, then we may have to worry about the possibility that institution is endogenous.

By dropping X from Equation (1), as long as the closure of the Suez Canal is a good instrument for trade and it is not a weak instrument, we will get a clean identification of the effects of trade on economic growth or growth volatility. The coefficient of predicted values of trade in the second stage regression would give us an unbiased estimate of the effects of trade on economic growth and growth volatility.

3. Data

I obtain the data on bilateral trade from Frankel and Rose (2004).[8] Trade in this dataset (i.e., *ltrade*) is the logarithm of real value of bilateral trade. I obtain the dependent variable, economic growth, from the Penn World Table. I use the growth rate of Real GDP Chain per capita (RGDPCH) available in this dataset.[9]

I get the bilateral sea distances from the World Shipping Register's website.[10] First, I identify the primary port in each of the countries. Then, using a tool provided by the website, I identify the shortest route between ports for each country pair. If the shortest route

[8] The data is downloadable from http://faculty.haas.berkeley.edu/arose/RecRes.htm.

[9] The data is downloadable from http://pwt.econ.upenn.edu/.

[10] The data is available at http://e-ships.net/dist.htm.

is through the Suez Canal, then I find the shortest alternative route. Before the closure of the Suez Canal, and after its reopening in 1975, I use the distance of the shortest route as the sea distance between countries in a country pair. During the closure of the Suez Canal, I use the same sea distances unless the shortest route is through the Suez Canal, in which case I use the distance of the shortest alternative route instead.[11]

I focus on the years 1961-1982. Because the Suez Canal was closed in June 1967 and reopened in June 1975, I exclude the years 1967 and 1975 from the sample. Because Feyrer (2009) shows that the years 1967-1969 and 1975-1977 are transition periods during which trade started decreasing and increasing, respectively, I also exclude these years in some specifications. As part of robustness checks, I also estimate the models by excluding the two two-year transition periods of 1967-1968 and 1975-1976.

I will therefore use three samples: (1) the two one-year transition periods, i.e., 1967 and 1975, are excluded, (2) the two two-year transition periods, i.e., 1967-1968 and 1975-1976, are excluded, and (3) the two three-year transition periods, i.e., 1967-1969 and 1975-1977, are excluded. Because I will be exploiting changes in sea distances among countries, I exclude landlocked countries such as Nepal and Laos. Following Feyrer (2009), I also exclude oil exporters as well as countries involved in the conflict and their immediate neighboring countries. In the end, I have 86 countries in my sample, with about 3,000 country pairs, for 16-18 years.[12]

Table 1 shows the summary statistics of these key variables, before the closure,

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[11] For example, the shortest route between Hamburg in Germany to Port Klang in Malaysia is through the Suez Canal. Before the closure of the Suez Canal, and after its reopening, the sea distance between Germany and Malaysia is the one through the Suez Canal. During the closure, the sea distance between the two countries is the shortest alternative route, which is through the Good Hope.

[12] The list of countries in the sample is available in Appendix 1.

during the closure, and after its reopening.

[**INSERT TABLE 1 HERE**]

The average of economic growth during the closure (i.e., 1970-1974) is smaller than that before the closure. After the reopening of the Suez Canal (i.e., 1978-1982), economic growth is even lower on average. Growth volatility as indicated by the cyclical component of GDP calculated using Hodrick-Prescott Filter on the logarithm of GDP declines over time. Therefore, because the value of trade does not seem to be smaller during the closure of the Suez Canal, without controlling for trade and fixed-effects, we cannot say whether trade increases economic growth or growth volatility.

As expected, the average distance during the closure (i.e., 1970-1974) is larger: Sea distances during the closure are 11% longer on average.

4. Results

First, I discuss the effect of the closure of the Suez Canal on trade. Then, I examine the effects of trade on economic growth and growth volatility.

The Effect of the Closure of Suez Canal on Trade

Table 2 presents the effect of the closure of the Suez Canal on trade. In columns (1-3), I estimate Equation (2) using OLS with data that excludes the two one-year, the two two-year, and the two three-year transition periods, respectively. I find that sea distances and trade are negatively correlated: An increase in sea distances by one percent is associated with about

0.5 percent decrease in trade. The estimates are also significant statistically. In columns (4-6), I estimate the equation using the fixed effect estimator, i.e., by including the country-pair and year fixed effects. The degree of association between sea distances and trade is smaller. If I exclude the two one-year transition period in column (4), the coefficient is not significant statistically. In column (5) in which I exclude the two two-year transition periods, the estimate is 0.12 and significant statistically at ten percent level of significance only. If I exclude the two three-year transition periods in column (6), the estimate is 0.16 and becomes significant statistically at five percent level.

[**INSERT TABLE 2 HERE**]

The results show that sea distances are inversely related to the value of bilateral trade. Moreover, because the closure of the Suez Canal is arguably an exogenous shock, sea distances between countries in any country pair before, during, and after the closure can be considered as good as randomly assigned. In other words, because the closure of the Suez Canal is unlikely to be related to economic growth or growth volatility of any country, sea distance is a good instrument for trade in Equation (1).

The statistical significance of the estimates in columns (4-6) suggests that the results would be more conclusive if I exclude the two three-year transition periods. In what follows, I will consider the results using data that excludes the two three-year transition periods as my main results. I will present the results using data that excludes the two two-year transition periods as well, however, to find out how robust the results are.

Economic Growth

Table 3 presents the results for Equation (3) in which the economic growth is the dependent variable. Each column provides a different specification, with and without country fixed-effects, estimated using OLS or IV estimator. The odd-numbered columns are regressions using a sample that excludes the two two-year transition periods, i.e., the years 1967-1968 and 1975-1976; the even-numbered columns using a sample that also excludes the years 1969 and 1977.

[**INSERT TABLE 3 HERE**]

Columns (1-2) show that, after controlling for year fixed-effects, economic growth and trade are positively correlated. The estimates suggest that a one-percent increase in trade is associated with 0.3 percentage point increase in economic growth. Even though the coefficients are significant statistically, they are not, of course, the causal effect of trade on economic growth.

Controlling further for time-invariant variables using country fixed-effects in columns (3-4), I find that trade is positively correlated with economic growth. Using the sample that excludes the two three-year-transition periods in column (4), trade is associated with 1.4 percentage point higher economic growth. The estimate is also significant statistically.

Columns (5-6) show the results in which I use the predicted trade from Equation (2) as the instrument for trade. Excluding the two two-year-transition periods in column (5) yields a large positive effect of about 1.9, and it is significant statistically. Excluding the two three-year transition periods in column (6), the estimate is slightly larger and remains significant statistically. The estimate suggests that one percent increase in trade leads to about two percentage point increase in economic growth, a large increase considering that countries grow by only three percent annually on average.

These results suggest that trade leads to higher economic growth. The magnitude of the effects is also large. More importantly, to the extent that the closure of the Suez Canal is exogenous, and its effect on economic growth is only through trade, these estimates are the causal effect of trade on economic growth.

Growth Volatility

Table 4 shows the effects of trade on growth volatility. First, I use the standard deviation of economic growth as a measure of growth volatility. To calculate this measure, first I define three time periods: (1) The period before the closure of the Suez Canal; (2) the period during the closure; and (3) the period after the reopening --- excluding the two two-year or the two three-year transition periods. Second, for each time period, I calculate the standard deviation of economic growth of each country. Third, I regress the standard deviation of growth on trade.

Row (1) in Table 4 presents the results. Each column provides a different specification, excluding the two two-year or two three-year transition periods, estimated with OLS or IV technique.

[**INSERT TABLE 4 HERE**]

The OLS estimates without country pair fixed-effects in columns (1-2) show that trade is associated with less volatile growth. Including the country pair fixed effects in columns (3-4), however, makes the estimate insignificant statistically. Columns (5-6) display the IV estimates: They are positive and the magnitude is large, but they are not significant statistically.

These results seem to suggest that trade does not affect growth volatility. However, given that the sample size falls considerably to about 240 observations only, it is also possible that I simply do not have power to reject the null hypothesis.

I also examine the effect of trade on growth volatility using four other measures: (1) economic fluctuation, which I define to be the residual of a regression of economic growth on country fixed effects and time effects; (2) the cyclical component from the application of Hodrick-Prescott Filter on the logarithm of GDP; (3) the deviation of annual growth of each of the countries from their long-term averages, and (4) the change in growth from one year to another.

Rows (2-3) show the effects of trade on the economic fluctuation and cyclical component of GDP. Trade seems to lower economic fluctuation and increase the cyclicality of GDP. The estimates from the IV methods are not significant statistically, however, even though now the sample size is much larger, about 1,200-1,400. Moreover, the magnitude of the estimates of the effects of trade on the cyclicality of GDP is very small. (The figures in row (3) have been multiplied by 100.)

Row (4) presents the effects of trade on the deviation of annual growth from long-term averages. Except in column (6), I find that trade is negatively associated with growth volatility. However, the coefficients are mostly insignificant statistically. They are significant statistically only in columns (1-2) in which I use OLS to estimate Equation (3).

Row (5) presents the effects of trade on the change in growth from one year to another. Similar results arise. Once I control for country fixed-effects, or address endogeneity problems using IV technique, the coefficients become insignificant statistically. There seems to be no evidence that trade affects growth volatility.

Economic Recession and Slowdown

Table 5 presents the effects of trade on the likelihood of economic slowdown or recession. The figure in each cell is the coefficient of trade in Equation (3). Each column provides a different specification. Each row shows the measure of growth fluctuations used as the dependent variable.

[**INSERT TABLE 5 HERE**]

Row (1) displays the results using economic recession as the dependent variable, which I define to be one if the economic growth of a country is negative, and zero otherwise. The coefficient of trade in row (1) would then indicate the effects of trade on the likelihood of an economic recession. In all specifications, I find that trade is associated with a lower probability of recession. The estimates using IV method in columns (5-6) are about 0.1, which suggest that that an increase in trade by one percent would lower the probability of recession by ten percentage point.

In row (2), I consider the effects of trade on the likelihood of low economic growth, which I define to be one if economic growth is smaller than one percent and zero otherwise. Again, the estimates of *Trade* in all specifications are negative, which suggest that trade is associated with lower probability of experiencing low growth. The magnitude of the IV estimates in columns (5-6) is large, about 0.1: An increase in trade by one percent leads to a decrease in the probability of having low growth by ten percentage point. Along with the results in row (1), they suggest that an increase in trade would not only prevent economic recession, but also low economic growth.

In row (3), I examine the effect trade on economic slowdown. I define economic slowdown to be one if economic growth in one year is smaller than the growth in the previous year, and zero otherwise. All of the estimates are positive except the estimate in column (6). They are all insignificant statistically, however. I do not find evidence that trade leads to lower probability of experiencing economic slowdown.

These results on the effects of trade on recession and low growth suggest that trade is associated with the growth volatility: An increase in trade leads to lower probability of economic recession and low economic growth. Again, because the Suez Canal is a good instrument for trade, the estimates are the effects of trade on these measures of growth volatility.

5. Concluding Remarks

I examine the relationship between trade and economic growth or growth volatility. I show that an increase in trade is associated with higher economic growth, and lower probability of economic recession or low growth. There seems to be no evidence that trade lower growth volatility, however. Because I use the closure of the Suez Canal as a natural experiment, these results can be considered as the causal effects of trade on economic growth and growth volatility: Trade causes higher economic growth and prevents recession and low growth.

The magnitude of these estimates is also large economically. A one percent increase in trade leads to about two percentage point higher economic growth, and ten percent less likely recession or low growth.

There are concerns about the external validity of the results of this paper, however. Trade may cause higher- and more stable economic growth if the increase in trade is induced by lower transportation costs as we have seen in this natural experiment. The same effect cannot perhaps be said on the effects of trade on economic growth or growth volatility if the increase in trade is induced by trade liberalization or the proliferation of free trade agreements. Moreover, the effects of trade identified here may be the true effects in the 1960s and 1970s, when many countries were not as open as they are now. The effects of trade liberalization implemented by many countries today may be different than the ones I find in this paper.

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Appendix 1: List of Countries

Algeria	Ecuador	Jamaica	Poland
Angola	El Salvador	Japan	Portugal
Antigua and Barbuda	Fiji	Kenya	Romania
Argentina	Finland	Liberia	Samoa
Australia	France	Madagascar	Senegal
Bahamas	Gambia	Malaysia	Sierra Leone
Bangladesh	Germany	Malta	Singapore
Barbados	Ghana	Mauritania	South Africa
Belize	Greece	Mauritius	South Korea
Benin	Guatemala	Mexico	Spain
Bermuda	Guinea	Morocco	Sri Lanka
Brazil	Guinea-Bissau	Mozambique	Suriname
Bulgaria	Guyana	Myanmar	Sweden
Cameroon	Haiti	Netherlands	Thailand
Canada	Honduras	New Zealand	Togo
Chile	Hong Kong	Nicaragua	Tunisia
China	Iceland	Norway	United Kingdom
Colombia	India	Pakistan	United States
Costa Rica	Indonesia	Panama	Uruguay
Cyprus	Ireland	Papua New Guinea	Venezuela
Denmark	Italy	Peru	
Dominican Rep.	Ivory Coast	Philippines	

Table 1: Summary Statistics

Variable	**1961-1966**	**1970-1974**	**1978-1982**
Economic growth	3.48	3.26	1.95
	(7.50)	(5.37)	(6.83)
Growth volatility	0.15	0.06	-0.14
	(3.95)	(3.14)	(3.99)
ln(Trade)	16.07	16.56	17.09
	(1.75)	(1.74)	(1.92)
ln(Distance)	8.31	8.42	8.38
	(0.83)	(0.87)	(0.81)

Notes: The figures are the means and standard deviations, the latter in parentheses. Growth volatility is the cyclical component of GDP calculated using Hodrick-Prescott Filter; the figures have been multiplied by 100. The numbers of observations of the first two variables are about 490, 660, and 680 for the years 1961-1966, 1970-1974, and 1978-1982, respectively.

Table 2: The First-Stage Regressions

Dependent variable: ln(Trade)						
	OLS					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ln(Distance)	-0.47	-0.48	-0.48	-0.09	-0.12	-0.16
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.08)
Dummy variables						
Country pair				✓	✓	✓
Year				✓	✓	✓
Sample (years excluded)						
1967 and 1975	✓			✓		
1967-1968 and 1975-1976		✓			✓	
1967-1969 and 1975-1977			✓			✓
Country pairs	3,274	3,263	3,248	3,274	3,263	3,248
Observations	46,183	41,702	36,783	46,183	41,702	36,783

Notes: The dependent variable is the logarithm of the value of trade. *Distance* is the sea distance between countries in a country pair. The numbers in parentheses are robust standard errors, clustered by country pair.

Table 3: The Effects of trade on Economic Growth

Dependent variable: Economic growth rate						
	OLS				**IV**	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ln(Trade)	0.32	0.28	1.34	1.35	1.85	2.06
	(0.11)	(0.10)	(0.44)	(0.43)	(0.75)	(0.82)
Dummy variables						
Country			✓	✓	✓	✓
Year	✓	✓	✓	✓	✓	✓
Sample (years excluded)						
1967-1968 and 1975-1976	✓		✓		✓	
1967-1969 and 1975-1977		✓		✓		✓
Countries	85	85	85	85	85	85
Observations	1,402	1,248	1,402	1,248	1,402	1,248

Notes: *Economic growth rate* is the annual percentage change in real GDP. The numbers in parentheses are robust standard errors, clustered by country. The instrument is the predicted trade.

Table 4: Growth Volatility

Dependent variables: Growth volatility							
		OLS				**IV**	
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Standard deviation of growth	(1)	-0.79	-0.82	-0.07	-0.11	1.20	1.43
		(0.17)	(0.18)	(1.11)	(1.17)	(2.93)	(2.94)
Economic fluctuation	(2)	-0.62	-0.65	-0.48	-0.45	-0.26	-0.32
		(0.13)	(0.13)	(0.38)	(0.37)	(0.58)	(0.54)
Cyclical component of GDP	(3)	0.09	0.10	0.62	0.60	0.25	0.37
		(0.04)	(0.05)	(0.29)	(0.27)	(0.32)	(0.31)
Deviation from average growth	(4)	-0.57	-0.58	-0.27	-0.21	-0.02	0.02
		(0.13)	(0.14)	(0.36)	(0.37)	(0.58)	(0.53)
Change in growth	(5)	-0.10	-0.14	-0.27	-0.17	-0.06	0.22
		(0.05)	(0.05)	(0.21)	(0.23)	(0.44)	(0.35)
Dummy variables							
Country				✓	✓	✓	✓
Year or period		✓	✓	✓	✓	✓	✓
Sample (years excluded)							
1967-1968 and 1975-1976		✓		✓		✓	
1967-1969 and 1975-1977			✓		✓		✓

Notes: The numbers displayed are the coefficient of *ln(Trade)*. The dependent variable in rows 1, 2, 3, 4, and 5 are the standard deviation of growth before, during, and after the closure; the residual of a regression of growth on country fixed effects and time effects; the cyclical component from the the application of the Hodrick-Prescott Filter on ln(GDP); the deviation of annual growth from the average; and the change of annual growth from the previous year, respectively. The numbers in parentheses are robust standard errors, clustered by country. The figures in row (3) have been multipled by 100. The instrument is the predicted trade. The number of observations in row 1 is about 240; that of observation in rows 2 and 4 is about 1,200-1,400. The number of countries is 85.

Table 5: The Likelihood of Recession, Low Growth and Economic Slowdown

Dependent variables: Recession, low growth, or economic slowdown							
		OLS				**IV**	
		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Recession	(1)	-0.04	-0.04	-0.09	-0.09	-0.09	-0.11
		(0.01)	(0.01)	(0.03)	(0.03)	(0.06)	(0.06)
Low growth	(2)	-0.04	-0.04	-0.10	-0.09	-0.09	-0.10
		(0.01)	(0.01)	(0.04)	(0.03)	(0.05)	(0.06)
Economic slowdown	(3)	0.01	0.01	0.02	0.02	0.01	-0.002
		(0.01)	(0.01)	(0.03)	(0.03)	(0.04)	(0.04)
Dummy variables							
Country				✓	✓	✓	✓
Year		✓	✓	✓	✓	✓	✓
Sample (years excluded)							
1967-1968 and 1975-1976		✓		✓		✓	
1967-1969 and 1975-1977			✓		✓		✓

Notes: The numbers displayed are the coefficient of *ln(Trade)*. *Recession*, *Low Growth*, and *Economic Slowdown* are dummy variables. For example, Recession equals one if economic growth is less than or equal to zero, and equals zero if economic growth is larger than zero. The numbers in parentheses are robust standard errors, clustered by country. The instrument is the predicted trade. The number of observations is about 1,200-1,400; the number of countries is 85.