

# International Trade

## 7. Trade and Growth Empirics

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# 1. Trade and growth

- Theoretical models make assumptions that embody strong abstractions from reality in order to isolate the particular influence of some important variable on the pattern and the gains of trade.
- Models conclude that there are gains from trade through higher utility, higher wages, higher productivity, etc. – in general, better economic performance.
- Basic question: does trade lead to overall gains from trade – is openness to trade correlated with better economic performance and higher economic growth?
- Secondary and related question is whether more open trade leads to higher growth volatility.

# 1. Trade and growth

## Measuring trade openness

- Basic problem of empirical work: how can we measure openness to trade?
- Two major categories of empirical measures:
  - 1. **trade intensity**, e.g.  $(\text{imports} + \text{exports}) / \text{GDP}$ , trade openness indices based on quantities;
  - 2. **trade policy / trade barriers**, e.g. tariffs on imports and/or exports, trade distortion indices, indirect measures such as black market premium.

# 1. Trade and growth

***J. Sachs & A. Warner, 1995. Economic reform and the process of global integration, Brook. P. on Ec. Act., 1: 1-118.***

- Popular trade openness index: the Sachs & Warner openness indicator OPEN
  - zero-one dummy (value 0 for closed economies, 1 for open economies)
  - closed according to any one of the following criteria:
    - it had average tariff rates higher than 40%
    - its non-tariff barriers covered on average more than 40% of imports
    - it had a socialist economic system
    - it had a state monopoly of major exports
    - its black market premium exceeded 20% during either the decade of the 1970s or the decade of the 1980s
- OPEN has a positive effect on growth.

# 1. Trade and growth

<i>Growth rate<sup>b</sup></i>	<i>Always open</i>	<i>Not always open</i>
Average growth >3.0	11	4
Average growth <3.0	4	70

Source: See appendix.

a. In a test of independence the chi square is 41 (significance level = 0.000).

b. The growth variable is *G7089*, the real annual per capita growth in GDP over 1970–89, described in the appendix.

Table 7.1 Developing country growth and openness, 1970-89, according to Sachs & Warner (1995) openness index

# 1. Trade and growth

***Sebastian Edwards, 1998. Openness, productivity, and growth: what do we really know? Economic Journal 108: 383-39.***

- 9 measures of trade openness (capturing either trade intensity or policy) are regressed on total factor productivity (TFP) growth during the 1980s.
- Measures used:
  1. OPEN: Sachs & Warner Openness Index; binary index (1 for open, 0 for closed economies)
  2. WDR: World Development Report Outward Orientation Index; classifies countries in four categories, according to their perceived degree of openness
  3. LEAMER: Leamer's Openness Index; openness index estimated by Leamer (1988) as the average residuals from disaggregated trade flows regressions

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4. BLACK: Average Black Market Premium; avg value of black market premium in foreign exchange rate market in 1980s
  5. TARIFF: Average Import Tariff on Manufacturing
  6. QR: Average Coverage of Non Tariff Barriers
  7. HERITAGE: Heritage Foundation Index of Distortions in International Trade; takes values of 1 to 5 and tries to measure the extent to which government policy distorts trade
  8. CTR: Collected Trade Taxes Ratio; total revenues of taxes on international trade (imports plus exports) to total trade
  9. WOLF: Wolf's Index of Import Distortions; regression-based index of import distortions for 1985.
- Main results: trade openness leads to higher TFP growth regardless of measure used. However: trade openness has less impact than institutions, initial GDP per capita and human capital.

# 1. Trade and growth

Table 7.2 *TFP Growth Regressions\** (Weighted Least Squares)

Eq. No.	Openness Measure	GDP65	HUMAN65	Trade Orientation	R <sup>2</sup>	N
1.	<i>OPEN</i>	-0.011 (-2.41)	0.005 (3.27)	0.94E-2 (2.12)	0.24	51
2.	<i>WDR</i>	-0.013 (-2.53)	0.004 (2.17)	0.75E-2 (3.57)	0.45	32
3.	<i>LEAMER</i>	-0.005 (-0.90)	0.003 (1.94)	0.41E-2 (1.03)	0.23	44
4.	<i>BLACK</i>	-0.008 (-2.43)	0.003 (2.53)	-0.022 (-3.59)	0.28	75
5.	<i>TARIFF</i>	-0.010 (2.69)	0.003 (2.99)	-0.045 (-2.77)	0.24	67
6.	<i>QR</i>	-0.008 (-2.06)	0.004 (3.19)	-0.005 (-0.54)	0.16	66
7.	<i>HERITAGE</i>	-0.007 (-2.81)	0.002 (2.58)	-0.58E-2 (-4.56)	0.42	58
8.	<i>CTR</i>	-0.017 (-3.24)	0.004 (3.34)	-0.484 (-3.04)	0.34	45
9.	<i>WOLF</i>	-0.009 (-1.91)	0.004 (2.83)	0.35E-4 (0.27)	0.14	53

\* Each row corresponds to a TFP growth regression using a different openness indicator. The indicator being used is identified in column 2 (openness measure), and its estimated coefficients appears in column 5 (trade orientation). All the regressions were estimated using weighted least squares. GDP per capita in PPP dollars in 1985 was used as a weight. These equations were estimated with a constant. Its estimated value, however, is not reported due to space restrictions. The numbers in parentheses are t-statistics.

# 1. Trade and growth

***Halit Yanikkaya, 2003. Trade openness and economic growth: a cross-country empirical investigation, J. Dev't Econ. 72: 57– 89.***

- Edwards' results mostly confirmed in similar study by Yanikkaya, who also found prevailing *positive and significant effects of trade intensity measures on growth*.
- However, Y. shows that *trade barriers often had a positive effect on growth*, probably due to the influence of East Asian countries (bias in results due to inclusion of East Asian economies).
  - East Asian countries had large trade volumes, but also large trade barriers, together with very strong growth. The main point is that their trade barriers were essentially trade neutral (i.e. applied to both imports and exports).
  - The trade barriers of Latin American countries that pursued import substitution policies (i.e. high barriers to imports, low or none to exports) were distortionary trade barriers. These countries also had lower trade volumes and growth rates.

# 1. Trade and growth

***Athanasios Vamvakidis, 2002. How Robust is the Growth-Openness Connection? Historical Evidence, J. of Economic Growth 7: 57-80.***

- Extends growth-openness analysis to as early as 1870, using different openness measures (trade intensity and trade barriers) for different periods.
- Results:
  - 1970-1990: clear positive relationship between trade openness and growth.
  - 1950-1970: no relationship between trade openness and growth.

# 1. Trade and growth

- 1920-1940: fairly strong positive link between higher trade protection and growth.
- 1870-1910: no relationship between trade openness and growth.
- No positive trade-growth relationship before 1970.
- The possibility of positive growth effects from open trade depends on trade policy of (potential) trade partners.

# 1. Trade and growth

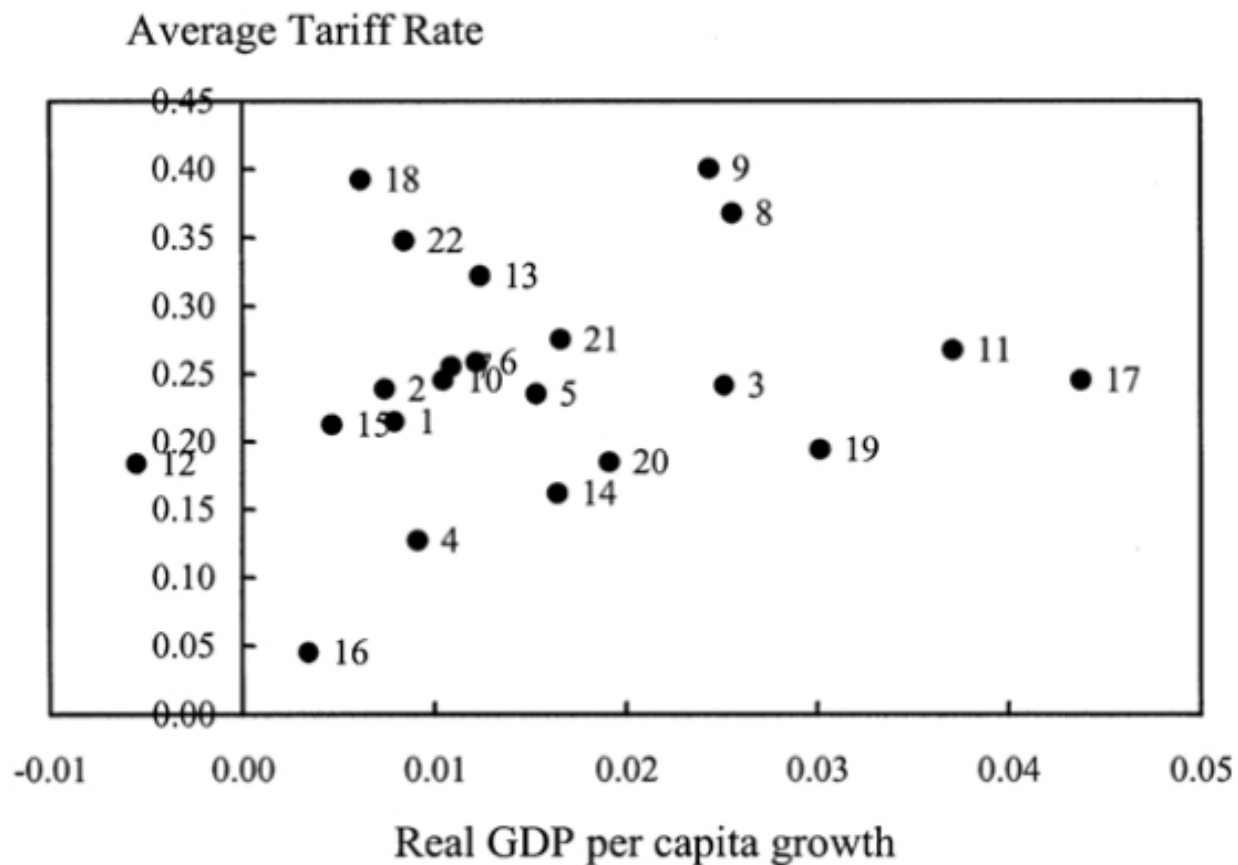


Figure 7.1 Growth and tariff rate, 1920-1940 (Vamvakidis 2002)

# 1. Trade and growth

***Francisco Rodríguez and Dani Rodrik, 2000. Trade Policy and Economic Growth: a Skeptic's Guide to the Cross-National Evidence, in: Ben S. Bernanke and Kenneth Rogoff (eds.), NBER Macroeconomics Annual 2000, Vol. 15, Cambridge and London: MIT Press.***

- Critical look at several recent empirical studies on openness and growth, focusing on the measures of trade openness and policy employed, as well as the methodology.
- Main result: no bullet-proof evidence in favor of positive growth effects of trade openness in recent decades.
- Confirms difficulty of measuring trade openness empirically.
- R&R on Edwards: only subjective trade openness indices remain significant to robustness checks.

# 1. Trade and growth

- R&R on Sachs and Warner openness index: strength relies on Black Market Premium and state export monopoly; other three sub-indicators do not contribute much.
  - OPEN is mainly determined by MON and BMP and is a proxy for many different policy and institutional aspects, only marginally openness to trade → bias in favor of positive growth effects of trade openness in empirical studies.
  - BMP classifies countries as closed if it maintains black market premium in excess of 20 percent for a whole decade → it captures general macroeconomic and policy imbalances, including institutional weakness (corruption, unreliable bureaucracy, weak rule of law), which have little to do with trade but a lot with growth.

# 1. Trade and growth

- MON is near-perfect proxy for Sub-Saharan Africa, since only African countries undergoing a structural adjustment program are considered in the first place. What MON can tell us is that SSA countries grew more slowly during the 1970s and 1980s.
  - Example: Indonesia and Mauritius rated as open, since Indonesia not in Africa and Mauritius was not undergoing adjustment programme. Yet, both countries would seem to satisfy conditions necessary to be rated as closed according to the MON criterion. Indonesia and Mauritius are among the fastest growing economies in the SW-sample.

## 2. Trade and volatility

- Higher output / growth volatility related to lower growth rates; trade openness may increase volatility and therefore decrease growth rate indirectly.
- Possible transmission mechanisms:
  - Open trade may expose firms to external shocks;
  - Open trade may change comovement properties of trading with non-trading sectors;
  - Open trade may increase specialization of production and vulnerability to external shocks.

## 2. Trade and volatility

*Julian di Giovanni and Andrei A. Levchenko, 2009. Trade openness and volatility, R. of Econ. and Stat. 91 (3): 558-585.*

- Use industry-level data on manufacturing output to answer questions on transmission channels and overall effect of trade openness on growth volatility 1970-1999.
- Trade openness measured as  $(X_i+I_i)/GDP_i$  at sectoral level

# 2. Trade and volatility

- Results:
  - Open sectors are more volatile;
  - Open sectors show less correlation in growth with whole economy, leading to reduction in aggregate volatility;
  - Open trade leads to greater specialization and higher volatility.
  - Overall effect is economically significant and negative: moving from 25th to 75th percentile in trade openness is associated with increase in aggregate volatility of 17.3% of average variance in data.
  - Volatility increases five times more in developing countries than in developed countries with same change in trade openness.
  - Overall impact and channel impacts have increased over time.

## 2. Trade and volatility

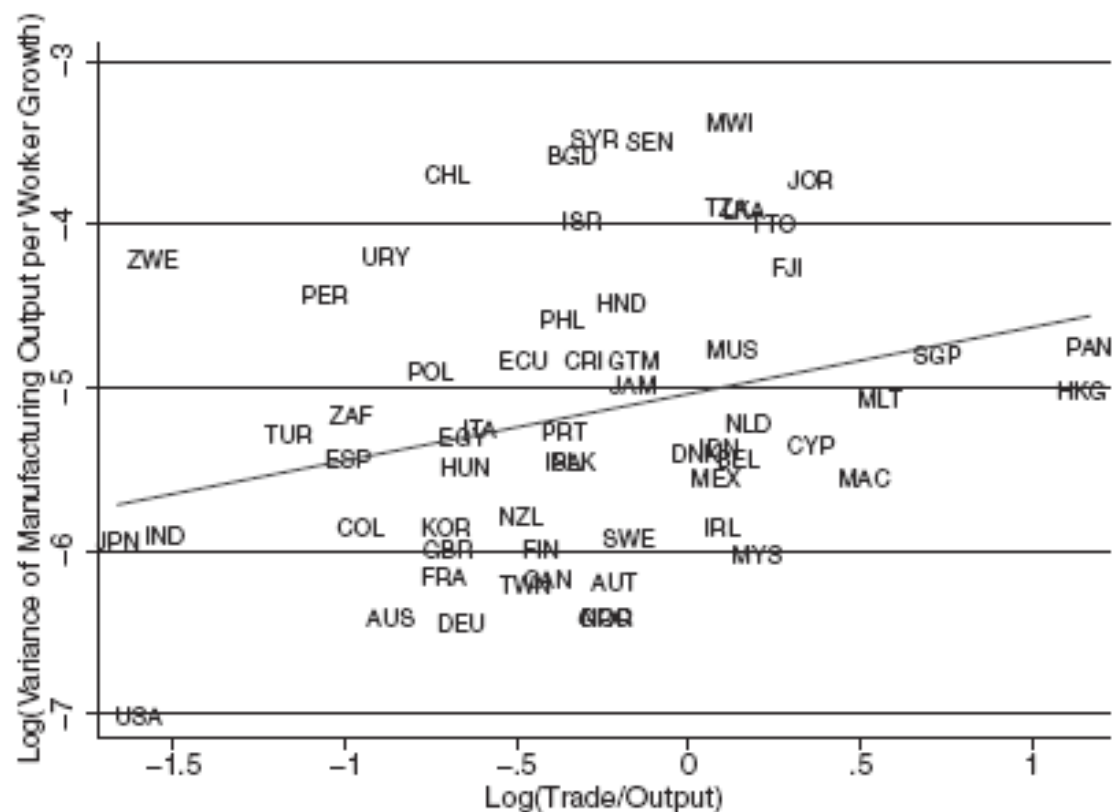


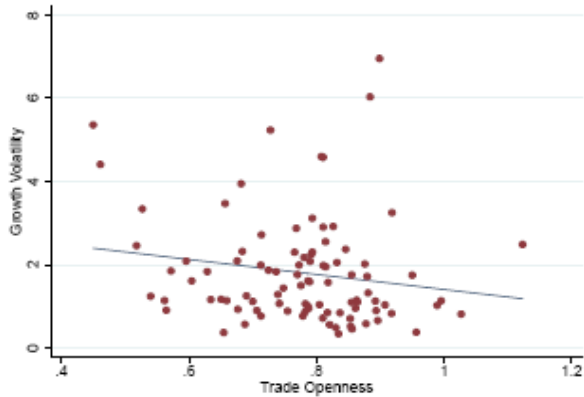
Figure 7.2 Comparison of manufacturing and aggregate volatility (di Giovanni & Levchenko 2009)

# 2. Trade and volatility

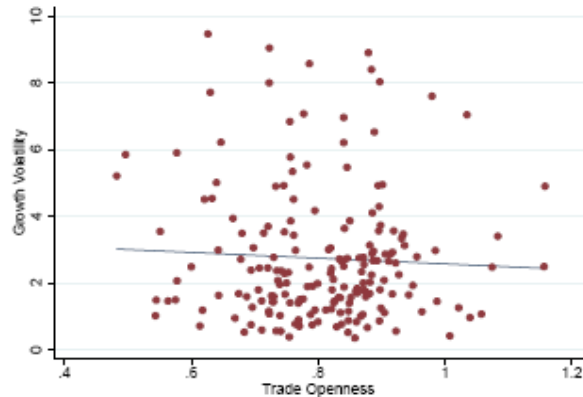
***Mona E. Haddad, Jamus J. Lim, and Christian Saborowski, 2010.  
Trade openness reduces growth volatility when countries are  
well diversified, World Bank WP 5222.***

- Export diversification – particularly product vs market diversification – reduces growth volatility;
- Most countries are above the critical diversification threshold, meaning that trade openness reduces volatility.
  - All high-income countries except Norway and Ireland; several low-and middle-income countries.
- Trade openness together with export diversification reduces growth volatility.

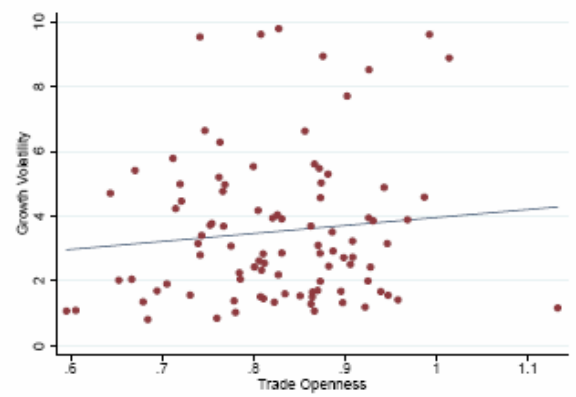
# 2. Trade and volatility



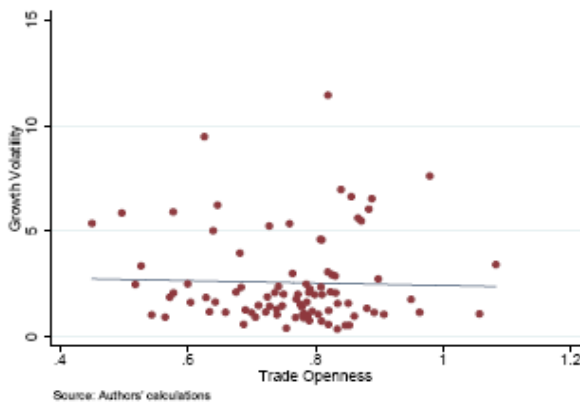
(a) Product Herfindahl is low



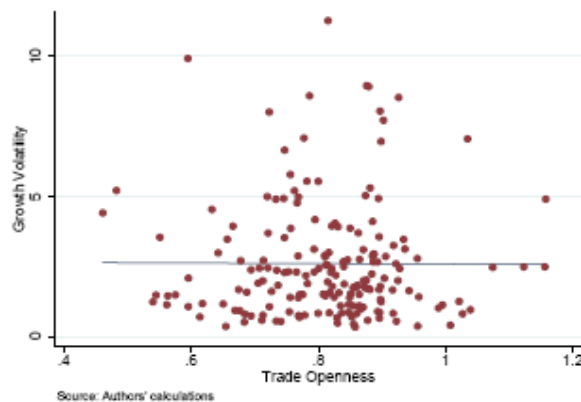
(c) Product Herfindahl is medium



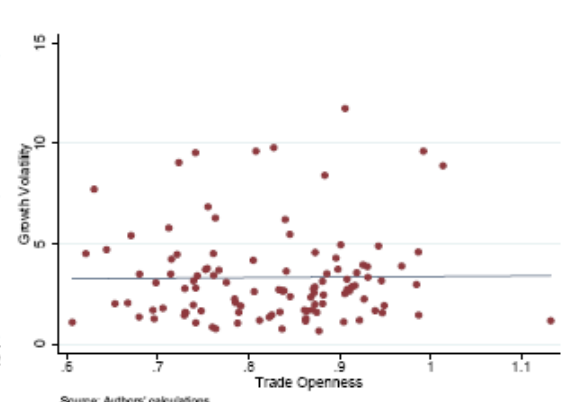
(e) Product Herfindahl is high



(b) Market Herfindahl is low



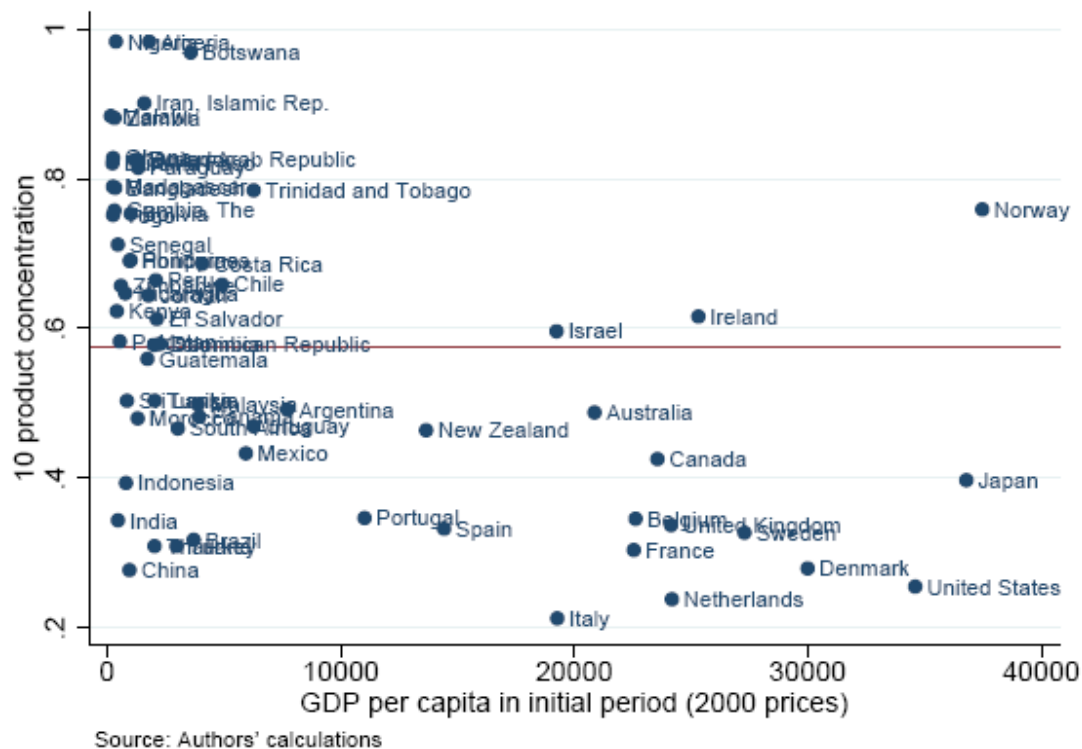
(d) Market Herfindahl is medium



(f) Market Herfindahl is high

Figure 7.3 Growth volatility and trade openness by diversification index (Haddad et al. 2010)

# 2. Trade and volatility



(b) Income per capita

Figure 7.4 Diversification (10-product index) and income per capita. Countries below line benefit from trade openness (Haddad et al. 2010)

# 3. Conclusions

- Substantial evidence in favor of positive growth effects from trade since 1970.
- Positive trade-growth links are not confirmed for earlier time periods.
- Trade intensity measures seem most robust across various studies.
- However, trade openness measurement problems remain – the debate goes on!
- Trade openness is also associated with higher growth *volatility*, particularly in highly specialized and developing countries.