

Does financial sector development affect the growth gains from trade openness?

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Trade openness and economic growth

- Importance of openness to international trade for economic development.
- The main point of view of the literature ([Young, 1991](#); [Grossman and Helpman, 1991](#)) states that openness has a positive impact on economic growth:
 - ▶ promotes the efficient allocation of resources,
 - ▶ allows the dissemination of technological progress,
 - ▶ and encourages competitive practices.
- However, if market or institutional imperfections exist ([Sachs and Warner, 1995](#); [Rodrik and Rodriguez, 2001](#)), it can be detrimental for economic growth:
 - ▶ sub-utilization of human and capital resources,
 - ▶ concentration in extractive economic activities,
 - ▶ or no specialization in technologically advanced sectors.

Trade openness and economic growth

- This theoretical ambiguity is reflected in the empirical evidence:
 - ▶ Positive effects: [Dollar \(1992\)](#), [Sachs and Warner \(1995\)](#), [Edwards \(1998\)](#), [Frankel and Romer \(1999\)](#), and [Brueckner and Lederman \(2015\)](#).
 - ▶ No significance or negative effects: [Harrison \(1996\)](#), [Rodrik and Rodriguez \(2001\)](#), [Rodriguez \(2007\)](#), and [Ulasan \(2015\)](#).
- Evidence that its effect varies across countries and depends on the structure of the economies and their institutions ([Sachs and Warner, 1995](#); [Chang et al., 2009](#)).
- The competitiveness of an economy will determine how well it can convert the potential that openness offers into opportunities.
- Thus, we investigate the role of financial development.

Financial development and trade openness

- Financial development as a source of comparative advantage.
 - ▶ Financial development lowers the search costs and increases the level of external finance in the economy; thus, economies with better-developed financial systems are net exporters of the goods with high scale of economies ([Beck, 2002](#)).

- Financial development as a insurance mechanism.
 - ▶ As trade liberalization also increases exposure to world markets fluctuations, the development of a financial system as an insurance mechanism reduces barriers to trade ([Kim et al., 2010](#)).
 - ▶ If risk can be fully diversified, special interest groups have no incentive to lobby for protection. Thus, the development of financial markets that mitigates informational asymmetries could lead to more trade liberalization and trade flows ([Feeney and Hillman, 2004](#)).

Financial development, Trade openness and growth

- In this paper, we investigate how financial development affect the relationship between trade openness and economic growth.
- We estimate a panel threshold growth model for 80 countries from 1970 to 2015. We explore for the existence of a threshold financial development level that conditions the growth gains from trade.
- We find a threshold of 27% (credit/GDP). For countries and periods above that threshold, trade openness has a positive effect on economic growth.
- Related to our study, [Zghidi and Abida \(2014\)](#) find for a panel of 3 North African countries, and [Chang et al. \(2009\)](#) for a larger panel, a positive and statistically significant interaction effect between the two variables.

Methodology and data

- Standard economic growth model:

$$y_{it} - y_{it-1} = \mu_i + \kappa y_{it-1} + \beta x_{it-1} + \theta' Z_{it-1} + \epsilon_{it}, \quad (1)$$

where $y_{it} - y_{it-1}$ is the growth rate, μ_i is a country fixed effect, x_{it-1} a measure of trade openness, and Z_{it-1} are other growth determinants, i indexes countries and t indexes time periods.

- Economic growth threshold model:

$$y_{it} - y_{it-1} = \begin{cases} \mu_i + \kappa y_{it-1} + \beta_1 x_{it-1} + \theta' Z_{it-1} + \epsilon_{it} & \text{if } q_{it-1} < \gamma \\ \mu_i + \kappa y_{it-1} + \beta_2 x_{it-1} + \theta' Z_{it-1} + \epsilon_{it} & \text{if } q_{it-1} \geq \gamma, \end{cases} \quad (2)$$

where q_{it-1} is the threshold variable (financial depth) and γ the threshold parameter to be estimated.

- Thus, we follow the static and dynamic methodologies developed by [Hansen \(1999\)](#) and [Ramírez-Rondán \(2018\)](#), respectively.

Methodology and data

Data

- Balanced panel data: 80 countries. Five-year averages from 1970 to 2015.
- GDP per capita growth: Log difference of real GDP per capita.
- Structure-adjusted trade openness, the residual of a regression of the log of the ratio of exports and imports to GDP (in 2005 US\$), on the logs of area and population, and dummies for oil exporting and for landlocked countries: [Pritchett \(1996\)](#), [Loayza *et al.* \(2005\)](#), [Chang *et al.* \(2009\)](#), among others.
- Financial depth: Ratio of domestic credit claims on private sector to GDP.
- Other growth determinants: transitional convergence, human capital index, public infrastructure, institutions (ICRG), stabilization policies (prices instability, systemic banking crises, and output instability), and external conditions.

Results - Linear model

Table 1: Estimation results of the linear model

Dependent variable: GDP per capita growth	Full sample		Industrialized countries		Non-industrialized countries	
	LS	ML	LS	ML	LS	ML
Trade openness	0.622	1.371***	4.056***	3.475***	0.437	0.757
Structure-adjusted trade volume/GDP, in logs	(0.459) [0.528]	(0.386) [0.466]	(0.893) [0.753]	(0.781) [0.961]	(0.529) [0.570]	(0.433) [0.568]
Financial depth	-0.217	-0.460**	-0.163	-0.071	-0.03	-0.120
Domestic credit to private sector/GDP, in logs	(0.257) [0.251]	(0.225) [0.216]	(0.356) [0.299]	(0.295) [0.344]	(0.315) [0.290]	(0.267) [0.260]
Transitional convergence	-4.628***	-3.817***	-4.184***	-2.701***	-4.547***	-4.009***
Initial GDP per capita, in logs	(0.492) [0.616]	(0.391) [0.411]	(1.020) [1.250]	(0.903) [0.863]	(0.576) [0.678]	(0.443) [0.550]
	Controls	Controls	Controls	Controls	Controls	Control
Number of countries	80	80	21	21	59	59
Number of periods, five year average	9	9	9	9	9	9
Time period	1971-2015	1971-2015	1971-2015	1971-2015	1971-2015	1971-2015
Negative log-likelihood	-	1403	-	236	-	1015

Notes: homoscedastic and heteroskedastic standard errors in parentheses and brackets, respectively.

Results - Threshold estimate

Table 2: Tests for threshold effects

	Threshold estimate (%)	Test F	Bootstrap p -value	Critical values
Static methodology	27.429	23.057	0.005	13.708 ^{1/} 15.658 ^{2/} 21.306 ^{3/}
Dynamic methodology	27.338	18.711	0.042	13.802 ^{1/} 17.557 ^{2/} 24.816 ^{3/}

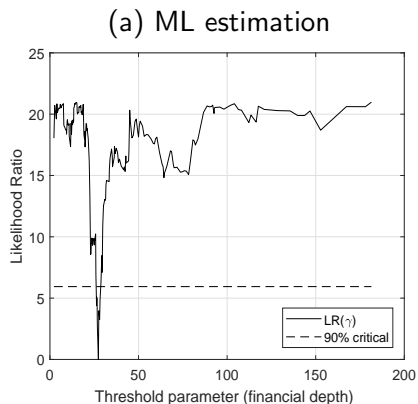
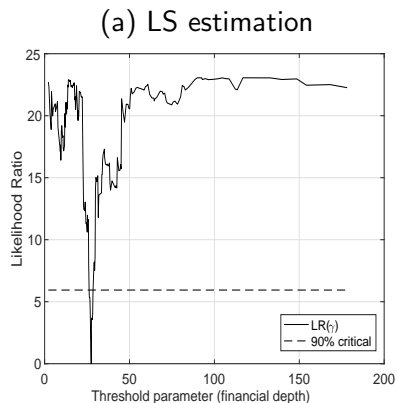
Note: 1/, 2/ and 3/ critical values at 10%, 5% and 1%, respectively. 1000 bootstrap replications were used for the test.

Table 3: Asymptotic confidence interval in threshold model

	Threshold	90% confidence interval	95% confidence interval	99% confidence interval
Static methodology	27.429	[26.306 ; 28.516]	[26.193 ; 28.516]	[25.939 ; 29.720]
Dynamic methodology	27.338	[26.183 ; 28.507]	[25.924 ; 29.457]	[22.925 ; 29.720]

Results - Threshold estimate

Figure 1: Confidence interval construction for threshold



Results - Threshold model

Table 4: Estimation results of the threshold model

Dependent variable: GDP per capita growth	Full sample		Industrialized countries		Non-industrialized countries	
	LS	ML	LS	ML	LS	ML
Threshold financial depth estimate ($\hat{\gamma}$) [90% Confidence Interval]	27.429 [26.3 ; 28.5]	27.338 [26.2 ; 28.3]	38.666 [35.2 ; 47.8]	38.413 [35.3 ; 46.4]	27.429 [26.3 ; 28.4]	27.429 [26.4 ; 28.8]
Trade openness (Financial depth < $\hat{\gamma}$) Structure-adjusted trade volume/GDP, in logs	-0.253 (0.493) [0.541]	0.519 (0.424) [0.468]	1.910** (0.907) [0.995]	1.057 (0.955) [1.255]	-0.369 (0.555) [0.561]	-0.044 (0.460) [0.539]
Trade openness (Financial depth $\geq \hat{\gamma}$) Structure-adjusted trade volume/GDP, in logs	2.590*** (0.635) [0.713]	3.026*** (0.518) [0.615]	4.822*** (0.893) [0.758]	4.354*** (0.776) [0.995]	2.817*** (0.783) [0.872]	2.710*** (0.606) [0.860]
Financial depth Domestic credit to private sector/GDP, in logs	-0.203 (0.252) [0.245]	-0.449** (0.222) [0.219]	-0.088 (0.344) [0.286]	0.065 (0.284) [0.306]	-0.014 (0.308) [0.285]	-0.085 (0.262) [0.267]
Transitional convergence Initial GDP per capita, in logs	-5.275*** (0.504) [0.579]	-4.423*** (0.408) [0.447]	-4.732*** (0.996) [1.172]	-3.402*** (0.879) [0.862]	-5.235*** (0.589) [0.621]	-4.739*** (0.464) [0.560]
	Controls	Controls	Controls	Controls	Controls	Control
Test for threshold effects (p-value)	0.005	0.042	0.060	0.095	0.010	0.018
Number of countries	80	80	21	21	59	59
Number of periods, five year average	9	9	9	9	9	9
Time period	1971-2015	1971-2015	1971-2015	1971-2015	1971-2015	1971-2015
Negative log-likelihood	-	1393	-	228	-	1003

Notes: homoscedastic and heteroskedastic standard errors in parentheses and brackets, respectively.

Results - Countries in each regime

Table 5: Percentage of countries in each regime by quinquennium

Regime	Five-year period								
	1971- 1975	1976- 1980	1981- 1985	1986- 1990	1991- 1995	1996- 2000	2001- 2005	2006- 2010	2011- 2015
Financial depth < 27.338%	57.5%	47.5%	41.3%	46.3%	55.0%	46.3%	43.8%	41.3%	30.0%
Financial depth \geq 27.338%	42.5%	52.5%	58.8%	53.8%	45.0%	53.8%	56.3%	58.8%	70.0%

Table 6: Robustness of the threshold estimate

% of threshold estimates that fall in 90% confidence interval			
	Worldwide countries	Industrialized countries	Non-industrialized countries
Static methodology			
Leave one country out	100%	100%	100%
Leave two countries out	100%	94%	100%
Leave three countries out	100%	89%	100%
Dynamic methodology			
Leave one country out	100%	95%	100%
Leave two countries out	100%	88%	100%
Leave three countries out	100%	79%	99%

Note: For the leave two and three countries out tests, 200 draws from all possible combinations were made in each sample.

Robustness

- 1 Additional control variables:
 - ▶ investment to GDP ratio,
 - ▶ population growth,
 - ▶ time dummy variables,
 - ▶ terrestrial precipitation,
 - ▶ the Chinn-Ito Index of financial openness,
 - ▶ or the debt to GDP ratio.
- 2 Generalized method of moments estimation.
- 3 Trade openness measured at PPP.

The results by including more control variables, in overall, are quite robust.

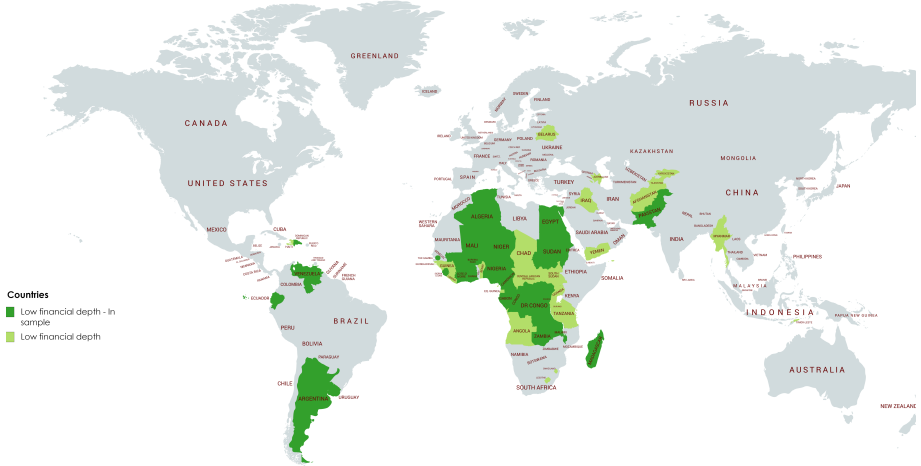
Robustness

Comparison with other nonlinear models (interactions between financial development and trade openness)

- it provides us more evidence for the existence of a nonlinear trade-growth relationship,
- it is not constant across sub-samples,
- it does not point out a specific threshold from which trade openness benefits economic growth,
- the threshold model fits the data better than the interaction model.

Conclusions

- This study investigates the role of financial development in the trade openness and economic growth relationship.
- We use a panel data threshold model, from 1970 to 2015, over five years periods for a sample of 80 countries.
- The results support the existence of a threshold in the level of financial depth at 27%.
- Two categories of countries indicated by the threshold financial estimate, are those with “high financial depth”, for which trade openness has a positive effect on economic growth, and those with “low financial depth”, in which trade openness has a null effect.
- Further, we find that industrialized countries need higher financial depth to benefit from trade, since they export more sophisticated goods, but they also gain sustainably more once the threshold is met.



Countries
■ Low financial depth - In sample
■ Low financial depth

Industrialized and non-industrialized countries

Table 7: Classification of countries

Industrialized countries	Non-industrialized countries		
Australia	Algeria	Ghana	Paraguay
Austria	Argentina	Guatemala	Peru
Belgium	Bangladesh	Honduras	Philippines
Canada	Bolivia	India	Senegal
Denmark	Botswana	Indonesia	Sierra Leone
Finland	Brazil	Iran, Islamic Rep.	Singapore
France	Burkina Faso	Israel	South Africa
Germany	Cameroon	Jamaica	Sri Lanka
Greece	Chile	Kenya	Sudan
Iceland	China	Korea, Rep.	Thailand
Ireland	Colombia	Madagascar	Togo
Italy	Congo, Dem. Rep.	Malawi	Trinidad and Tobago
Japan	Congo, Rep.	Malaysia	Tunisia
Luxembourg	Costa Rica	Mali	Turkey
Netherlands	Cote d'Ivoire	Mexico	Uruguay
Norway	Dominican Republic	Morocco	Venezuela
Portugal	Ecuador	Nicaragua	Zambia
Spain	Egypt, Arab Rep.	Niger	
Sweden	El Salvador	Nigeria	
United Kingdom	Gabon	Pakistan	
United States	Gambia, The	Panama	

Source: [United Nations \(2014\)](#)