Trade, Misallocation, and Capital Market Integration

Laszlo Tetenyi

September 30, 2022

Bank of Portugal & Católica Lisbon School of Business and Economics

How do capital and goods market integration interact?

- Emerging economies that opened up to trade since 1970s followed two paths:
  - Opened up to indirect capital inflows — in the 1990s
  - Kept capital markets closed — recent times
- Integrating capital markets can lead to:
  - Higher growth and faster adjustment to the trade shock
  - …at the expense of misallocation and loss of financial sovereignty
- The policy consensus is to postpone or do not allow indirect capital inflows
- **I study an economy opening up to trade with open or closed capital markets**

This paper

- Focusing on the integration of Eastern Europe (Hungary) to the EU
- I build a general equilibrium trade model of firm dynamics and financial frictions
- Main quantitative exercise:
  - Open up to trade from 1990s level of trade
  - At the same time, open up capital markets, or keep it closed, look at transition path
  - Cheap capital vs. misallocation
  - Compare welfare and productivity
  - Evidence for the model mechanism in the data
- **Result: Immediate and full integration is the most beneficial to Eastern Europe**

Key findings Literature

- Calibrate to Eastern Europe opening up to trade — 20% import share change
- **Capital market integration magnifies both the gains and losses from trade:**
  - Higher output (up 27% from 16%) and consumption (up 5.4% from 4.9%)
  - More misallocation, inequality and lower productivity, but higher welfare
- **Taking the transition path into account:**
  - Welfare gains from increased trade are smaller, since it takes time for the economy to adjust
  - But welfare gains do not decrease along the transition with integrated capital markets
- Without trade liberalization, capital market integration is less useful
- More developed economies are *weakly less* affected by both reforms

Trade liberalization in Europe

1. Large increase in intra-European trade after 1992 until 2008
2. EU countries experienced a rise in misallocation measures of capital, but not in labor
3. Eastern European countries had the choice to integrate capital markets
4. Hungary mostly allowed foreign credit to nonfinancial corporations after 2001
5. In 2008, large Hungarian firms that make losses for years are typically exporters

Outline

- Introduction
- **Model**
- Quantitative analysis

Model overview

- Two countries, Home & Foreign, discrete time incomplete markets economy
- Heterogeneous households: wealth, productivity, occupation
- Dynamic occupation choice: worker, domestic producer & exporter
- Idiosyncratic, autoregressive productivity and entry & variable cost to export
- Markets:
  - Labor
  - Capital — Borrowing only up to a fraction of the capital stock
  - Intermediate goods – imperfect competition & constant markup
  - Final goods

Outline

- Introduction
- Model
- Quantitative analysis
  - **Calibration & Steady state**
  - Welfare & Transition dynamics
  - Additional results

Calibration

- Eastern Europe as Home, Western Europe as Foreign, population 1:4
- Take one country as a representative from each group: Hungary and Germany
- Financial flows, direction and magnitude: discount factors & collateral constraint
- Trade is governed by variable trade costs
- Firm dynamics are determined by the shock process and entry cost to exporting

Trade liberalization under closed and integrated capital markets

Integration	None	Trade	Trade and capital
Productivity			
TFP	100	109	104
s.d. $arpk$	0.33	0.34	0.5
Aggregates			
Output	100	116	127
Income	100	110	110
Consumption	100	104.9	105.4
Capital	100	99	133

Trade liberalization under closed and integrated capital markets

Integration	None	Trade	Trade and capital
Productivity			
TFP	100	109	104
s.d. $arpk$	0.33	0.34	0.5
Aggregates			
Output	100	116	127
Income	100	110	110
Consumption	100	104.9	105.4
Capital	100	99	133

Trade liberalization under closed and integrated capital markets

Integration	None	Trade	Trade and capital
Welfare and Inequality			
Welfare: steady state only	0	8	13
Welfare: transition dynamics	0	5	13*
Top 10% wealth share	46	44	57
Factor prices			
Real wage	100	107	106
Interest rate premium $\%$: $r - r^*$	9	9	0

Trade liberalization under closed and integrated capital markets

Integration	None	Trade	Trade and capital
Trade			
$\frac{\text{Import}}{\text{GDP}}$	21	42	42
$\frac{\text{Export}}{\text{GDP}^*}$	2	4	4
Entrepreneurship rate	21	20	22
Share of exporters	32	46	40
CPI	140	133	137
$\frac{\text{Credit}}{\text{GDP}}$	57	50	62
$\frac{\text{Foreign Credit}}{\text{Credit}}$	0	0	53

Distribution of exporters

- High wealth: $a > 2\times$ national avg.
- High productivity: $z >$ national avg.

Integration	None	Trade	Trade and capital
Low wealth and low productivity	4	8	7
Low wealth and high productivity	25	36	13
High wealth and low productivity	4	6	21
High wealth and high productivity	67	50	59

Supporting empirical evidence

- Country panel data to confirm the productivity loss with capital market integration:

	$\log(\frac{Import}{GDP})$	$\log(\frac{Credit}{GDP})$	$\log(\frac{Import}{GDP}) \times \log(\frac{Credit}{GDP})$	CMI	$\log(\frac{Import}{GDP}) \times CMI$
Log(TFP)	0.184***	0.185***	0.1061***	-0.0343	-0.0889***
s.e.	(0.0183)	(0.0107)	(0.008)	(0.0216)	(0.0168)

Standard errors in parentheses. N = 3983, Country and time FE

- CompNet industry level data to emphasize the effect of trade on exporter dynamics:

	(1)	(2)	(3)	(4)	(5)	(6)
	$\sigma(ARPK)$	$\sigma(ARPL)$	% Zombie firms	Avg. t. Zombie	% firms constrained	$\frac{\text{Fixed capital}}{\text{Assets}}$
$\frac{\text{Export}}{\text{Output}}$	0.0513*	0.0276	0.0377***	0.419***	0.0282*	-37.47**
	(0.0212)	(0.0202)	(0.00910)	(0.109)	(0.0111)	(13.51)
$\frac{\text{Trade credit}}{\text{Assets}}$	0.202**	0.0439	-0.0649*	-0.479	0.0307	-53.08
	(0.0754)	(0.0515)	(0.0281)	(0.298)	(0.0448)	(28.44)
$\frac{\text{Trade credit}}{\text{Assets}} \times \frac{\text{Export}}{\text{Output}}$	-0.245*	-0.104	-0.194***	-1.830***	-0.284***	175.3**
	(0.117)	(0.0934)	(0.0484)	(0.515)	(0.0540)	(60.10)
N	6115	6115	3667	2236	4132	6152

Standard errors in parentheses, country and year fixed effects

Outline

- Introduction
- Model
- Quantitative analysis
  - Calibration & Steady state
  - **Welfare & Transition dynamics**
  - Additional results

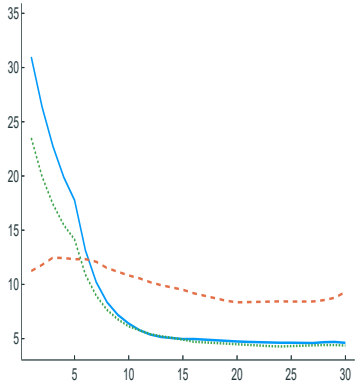
Welfare

- Everyone prefers liberalized trade with closed capital markets
- Inequality still increases
- Debtors - most productive, low net worth agents prefer open CM
- Domestic creditors prefer closed CM, *more* than debtors prefer open CM
- Workers with high net worth disappear
- Owners of export firms benefit

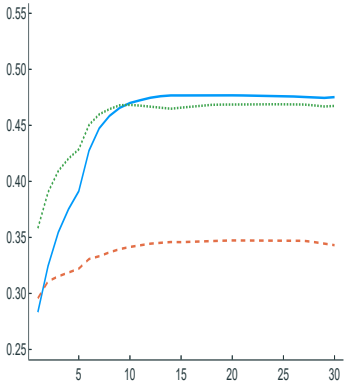
Transition dynamics after a trade shock

- Compare three transition paths:
  - Path 1: Only open up to trade in 4 years and keep capital markets closed
  - Historical: Open up to trade in 4 years and open capital markets after 10 years
  - Path 2: Open up to trade in 4 years and open capital markets in first year
- Are there short term losses after integrating both capital and goods markets? No
- What is the loss of waiting with capital market integration? Limited losses

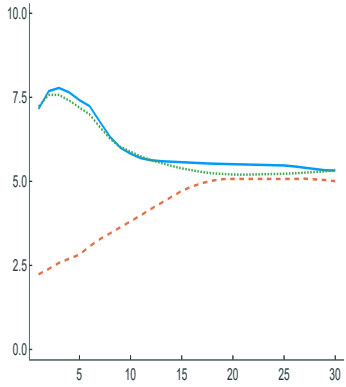
Path 1 (red dashed) vs 2 (blue) vs historical (green dotted)



(a) Productivity



(b) Exporter s.d. $arpk$



(c) Total consumption

Conclusion

- Quantifying the costs of maintaining closed capital markets after opening up to trade
- Sequencing of reforms — waiting after trade liberalization has a welfare cost
- Misallocation from capital market integration:
  - Affects the economy through the increased survival of zombie exporters
  - But is outweighed by the general benefit of having cheap capital available for all
- Without trade liberalization, capital market integration is less useful
- More developed economies are *weakly less* affected by both reforms
- Role of Foreign

Outline

- Introduction
- Model
- Quantitative analysis
  - Calibration & Steady state
  - Welfare & Transition dynamics
  - **Additional results**

Capital market integration alone has limited effect on the economy

Integration	None	Capital	Trade and capital
Productivity			
TFP	100	101	104
s.d. $arpk$	0.33	0.5	0.5
Aggregates			
Output	100	114	127
Income	100	104	110
Consumption	100	100	105.4
Capital	100	126	133
Welfare and Inequality			
Transition dynamics	0	5	13
Top 10% wealth share	46	54	57

Capital market integration alone has limited effect on the economy

Integration	None	Capital	Trade and capital
Factor prices			
Real wage	100	100	106
Interest rate premium $r - r^*$	9	0	0
Trade			
$\frac{\text{Import}}{\text{GDP}}$	21	23	42
$\frac{\text{Export}}{\text{GDP}^*}$	2	2	4
Entrepreneurship rate	21	24	22
Share of exporters	32	24	40
CPI	140	141	137
$\frac{\text{Credit}}{\text{GDP}}$	57	65	62
$\frac{\text{Foreign Credit}}{\text{Credit}}$	0	49	53

Development as in Foreign: reforms affect welfare less

Integration	Initial	Trade	Trade and capital
Productivity			
TFP	100	115	123
s.d. $arpk$	0.14	0.15	0.22
Aggregates			
Output	100	124	135
Income	100	103	100
Consumption	100	103	98
Capital	100	98	93
Welfare change			
Steady state only	0	5	1
Transition dynamics	0	5	7
Top 10% wealth share	20	33	26

Development as in Foreign: reforms affect welfare less

Integration	Initial	Trade	Trade and capital
Factor prices			
Real wage	100	105	106
Interest rate premium $r - r^*$	1	1	0
Trade			
$\frac{\text{Import}}{\text{GDP}}$	22	44	41
$\frac{\text{Export}}{\text{GDP}^*}$	4	6	5
Entrepreneurship rate	17	16	19
Share of exporters	45	57	41
CPI	129	127	128
$\frac{\text{Credit}}{\text{GDP}}$	182	153	136
$\frac{\text{Foreign Credit}}{\text{Credit}}$	0	0	38

Role of Foreign economy

- The economy of Eastern Europe is smaller, but not insignificant to Western EU
- Policy choice could be driven by the interest of Western Europe
- Trade integration only results in small welfare losses for Foreign
- Foreign prefers full integration, but delayed implementation preferred

Contribution to the Literature

Back to Introduction

- Misallocation and Trade:
  - Bai et al. (2019), Berthou et al.(2018), Edmond et al.(2015)
  - **Source of misallocation and firm dynamics matter for trade liberalization**
- Trade liberalization and financial frictions:
  - Brooks & Dovis (2018), Kohn et al.(2017), Ebrahimian & Firooz (2022)
  - **Financial frictions matter for gains of trade only with capital market integration**
- Capital Market Integration:
  - Obstfeld and Rogoff (2000), Mendoza et al. (2009), S. Prasad et al. (2003)
  - **Trade amplifies the effect of capital market integration**