Trade, Misallocation, and Capital Market Integration

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How do capital and goods market integration interact?

- Emerging economies that opened up to trade since the 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 capital market integration of indirect flows
  - Not the path Ukraine is going to take if they are to join the EU quickly
- **I study an economy opening up to trade with open or closed capital markets**

This paper

- Focusing on the integration of Eastern Europe (Hungary) into the EU
  - Measure the impact of capital inflows on the allocation of capital using firm-level data
  - Match the effects of capital inflows with a DSGE trade/financial frictions model
- Main quantitative exercise:
  - Open up to trade from 1990s level of trade in NMS — 20% import share change
  - At the same time, open up capital markets, or keep them closed, look at the transition path
  - Cheap capital vs. misallocation affects welfare and productivity
- **Result: Immediate and full integration is the most beneficial for Eastern Europe**
  - Additional short-term benefits make trade reforms more attractive
  - Not for everyone - the middle class suffers, gains only for the poor and the rich

Key findings Literature

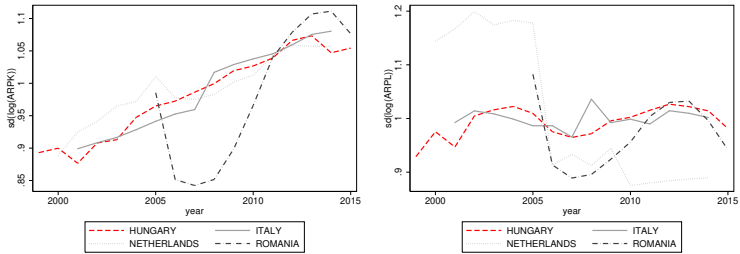
- In the model and in the data:
  - Exporters with above-median equity receive disproportionately more from capital inflows
  - Capital inflows change the lifecycle of exporters
- **Capital market integration magnifies both the gains and losses from trade:**
  - Higher output (up 27% from 16%) and consumption (up 4.4% from 4.0%)
  - 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
  - Postponing capital market integration with commitment decreases welfare gains by 1 %

Outline

- Introduction
- **Empirical evidence**
- Model
- Quantitative analysis

Integration in Europe …

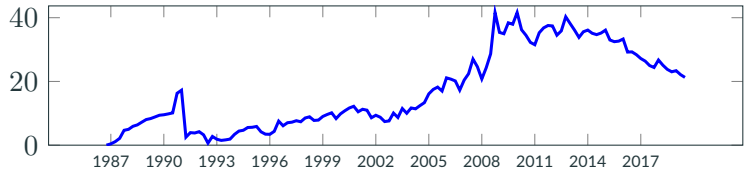
- Large increase in intra-European trade after 1992 until 2008
- EU countries experienced a rise in misallocation measures of capital, but not in labor



(a) σ(ARPK) (b) σ(ARPL)

…and in New Member States & Hungary

- Eastern European countries had the choice to integrate capital markets
- Hungary integrated capital markets in several steps
- Focus on the 2001 reform:
  - Before, banks could not lend to firms using foreign deposits
  - Foreign owners could already lend through shareholder loans — ”DiD”
  - Large effect on credit provided by foreigners to non-financial corporations as % of GDP:



Firms in Hungary

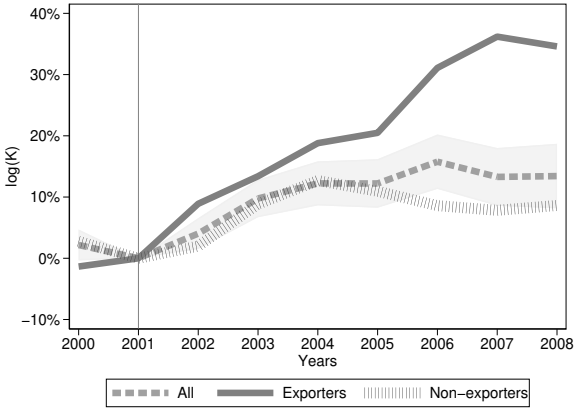
- Foreign-owned firms would not receive additional capital from the reform
- Extensive margin decision to start exporting is persistent - increasing share of exporters

Table 1: Descriptive statistics of Hungarian firms between 2000-2008

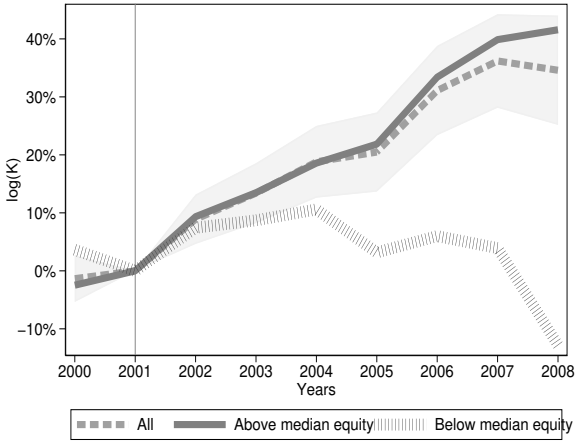
	Full Sample	Incumbents	Exits	Entrants	Exporting	Always exporting	Export entrants	Export exit	Foreign owned	Always foreign owned
Firms	68132	28706	14123	31575	19568	3382	13780	11342	6350	4048
Share of total:	100	42	21	46	29	5	20	17	9	6
Share of exporters:	-	-	-	-	100	17	70	58	-	-
Observations	408596	258354	41462	122070	144495	30438	98971	83481	44246	26371
Value added	146.18	199.56	106.92	33.75	323.01	925.56	156.06	156.37	786.1	1082.94
Capital	243.63	338.38	169.31	47.93	534.24	1500.98	273.73	271.52	1270.42	1678.96
Equity	333.3	477.01	176.05	53.15	740.51	2163.66	336.2	345.3	2061.65	2939.32

Effects of capital inflows on incumbent firms

$log(K) = \beta_0 + \beta_1 \times t + \beta_2 D_{\emptyset \text{F. owned}} + \beta_3 \times t \times D_{\emptyset \text{F. owned}} + \beta_4 \text{Controls} + \epsilon$, with $\times t$



Effects of capital inflows on always exporting firms - equity matters



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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: $P_{t-1}k_t \leq \frac{a_t}{1-\theta}$
  - Intermediate goods – imperfect competition & constant markup
  - Final goods

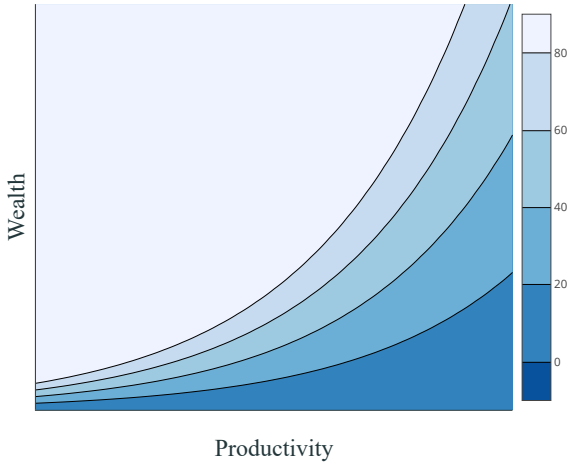
Equilibrium: capital market integration

- $NFA_t = -\sum_e \int_{a,z} \left[P_{t-1} k_t - a_t \right] dG_t$
- closed capital markets: $NFA_t = 0$
- integrated capital markets: $NFA_t + NFA_t^* = 0$
- This is a financial integration allowing for the indirect claim on capital across borders

Misallocation for exporters

- Intensive margin — Suboptimal capital choice for more productive exporters
- Extensive margin — Exit choice of incumbent exporters depend on assets

Exporter's capital choice: $k(a,z)/k^*(z)$



Misallocation for exporters

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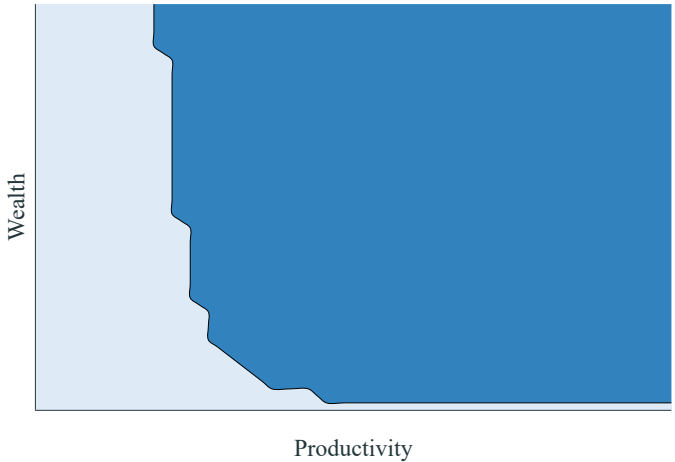
Exit (pale) decision of incumbent exporters



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  - **Calibration**
  - Capital inflows
  - Trade liberalization
  - Transition dynamics
  - Welfare

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 constraints
- Trade is governed by variable trade costs
- Firm value-added: idiosyncratic shock process and entry cost to exporting
- 1991: No integration, 2001: Trade, 2008: Trade & Capital market integration

Non-targeted moments

Description	Data	Model	Source & Year
Production			
Standard deviation of ARPK	1.36	0.5	Firm level, Hungary
Standard deviation of log capital growth	0.61	0.66	Firm level, Hungary
Exporters			
Fraction of firms that export	29	40	Table 1
Mean leverage, all firms	46	52	Table 1
Mean leverage, exporters	51	50	Table 1
Fraction of total debt credited to exporters	57	66	Firm level, Hungary
Fraction of total capital used by exporters	64	67	Firm level, Hungary
Fraction of total employment used by exporters	55	62	Firm level, Hungary
Inequality			
GDP per capita, Hungary vs. Germany	34	28	WB, 2008
Top 10% wealth share	53	57	HSO 2014
Top 10% income share	34	28	WID 2008
Top 1% income share	11	6	WID 2008
Top 10% income share	24	25	WID 1991
Top 1% income share	6	5	WID 1991

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Capital inflows — steady state changes

Capital Market	Closed	Integrated
Productivity		
TFP	100	95
Standard deviation of ARPK	0.34	0.5
Aggregates		
GDP	100	109
GDP*	100	104
Consumption	100	101
Capital	100	135
Welfare and Inequality		
Consumption equivalent welfare	0	5.6
Top 10% wealth share	44	57

Capital inflows — effect on firms

Capital Market	Closed	Integrated
Extensive margin		
Non-exporting firms	100	126
Exporting firms	100	102
Intensive margin		
% of capital used by exporters	63	67
% of labor used by exporters	64	62
Avg. duration (years) of export status	2.5	4.1
Average capital size of non-exporters	100	95
Average capital size of exporters	100	142
Average capital size	100	117
Mean leverage, all firms	53	52

What drives changes in misallocation?

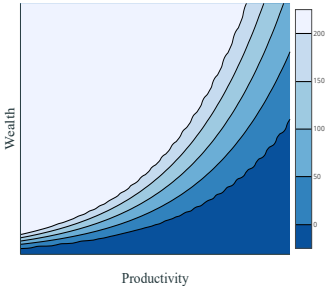
- Decreasing the cost of capital (or trade) directly increases Π^{ex}
- Decompose changes in Π^{ex} with $\Delta = \text{new} - \text{old}$:

$$\Delta\Pi^{ex} = \frac{\partial \Pi^{ex}}{\partial l}\Delta l + \frac{\partial \Pi^{ex}}{\partial k}\Delta k + \text{Direct effect}$$

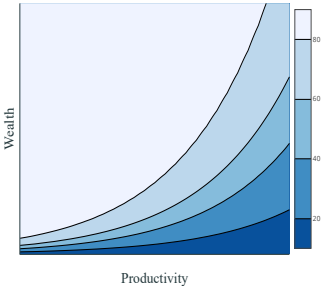
- But the indirect effect rewards unproductive firms

Exporters decision change with capital market integration

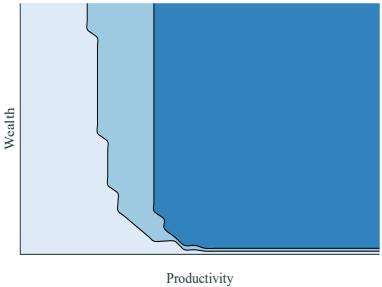
Unproductive exporters expand capital by 200 %, profits by 80 % vs 0% and 20 %



(c) % change in capital



(d) % change in profits



(e) Exit decision

Extensive margin affecting the distribution of exporters

- ”Wealthy” and ”productive” relative to: the median wealth and average productivity
- Large increase in wealthy but unproductive firms
- Fraction of above median exporters from the initial 77% to 92% (data: 87% to 95%).

Capital Market	Closed	Integrated
Low wealth and low productivity	6	2
Low wealth and high productivity	17	5
High wealth and low productivity	7	25
High wealth and high productivity	70	67

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Trade liberalization under closed and integrated capital markets: steady states

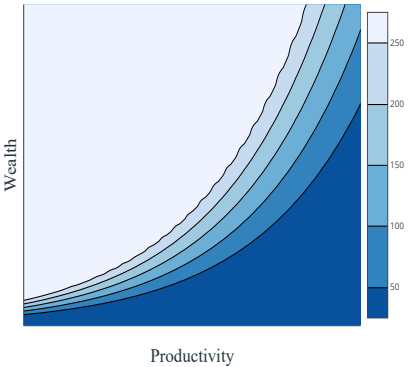
Integration	None	Trade	Trade and capital
Productivity			
TFP	100	110	105
Standard deviation of ARPK	0.33	0.34	0.5
Aggregates			
Output	100	116	127
Income	100	107	107
Consumption	100	104	104.4
Capital	100	98	132
Welfare and Inequality			
Consumption equivalent welfare	0	4.6	11.6*
Top 10% wealth share	47	44	57

Trade liberalization under closed and integrated capital markets: effect on firms

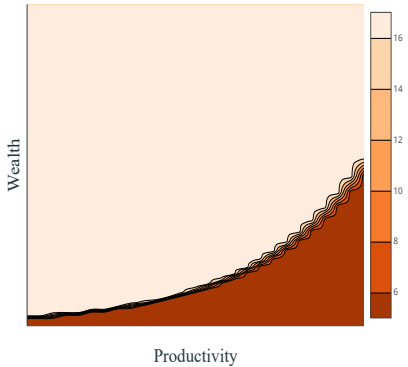
Integration	None	Trade	Trade and capital
Extensive margin			
Non-exporting firms	100	75	95
Exporting firms	100	134	136
Intensive margin			
% of capital used by exporters	48	63	67
% of labor used by exporters	48	64	62
Avg. duration (years) of export status	2.3	2.5	4.1
Average capital size of non-exporters	100	93	89
Average capital size of exporters	100	96	136
Average capital size	100	104	122

Intensive margin: $\Delta k^{ex}/k^{ex}_{\text{old}}$

Unproductive, high net worth exporters increase their capital by 250% (a) vs. 16% (b)



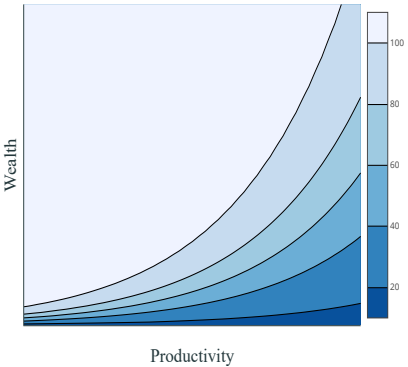
(f) Open Capital Markets



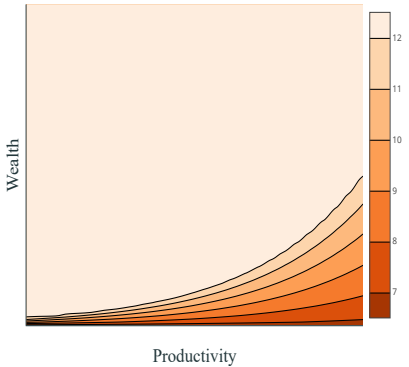
(g) Closed Capital Markets

Intensive margin: $\Delta\Pi^{ex}/\Pi^{ex}_{\text{old}}$

Indirect effect changes the profits of unproductive exporters by 100% (a) vs 12% (b)



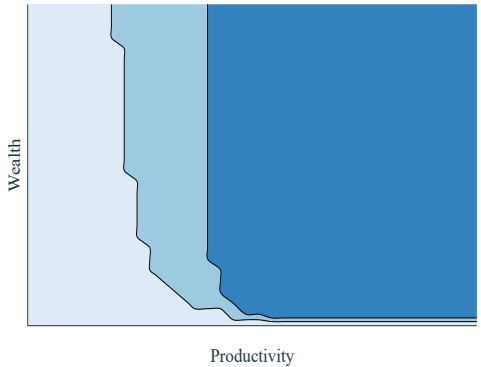
(h) Open Capital Markets



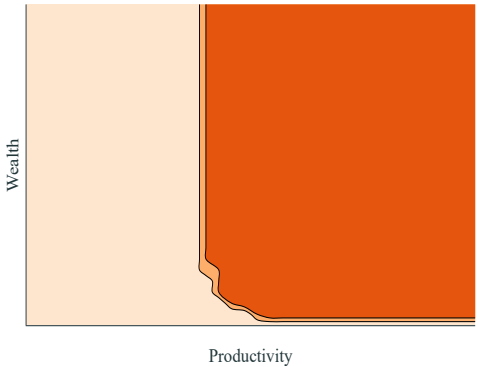
(i) Closed Capital Markets

Shift in the exit decision from initial (light azure) to final (pale azure)

Changes in profits result in unproductive, high net worth firms exiting later



(j) Open Capital Markets



(k) Closed Capital Markets

Extensive margin affecting the distribution of exporters

- Thresholds: the median wealth of firms and average productivity
- Trade liberalization also increases wealthy & unproductive exporters
- But relatively fewer exporters are wealthy or productive

Integration	None	Trade	Trade and capital
Low wealth and low productivity	3	6	2
Low wealth and high productivity	11	17	5
High wealth and low productivity	6	7	25
High wealth and high productivity	80	70	67

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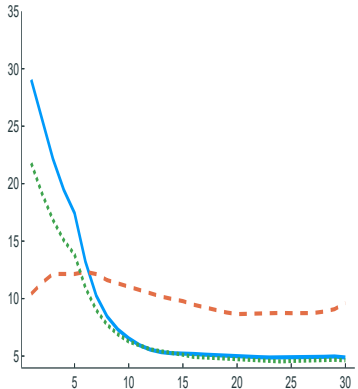
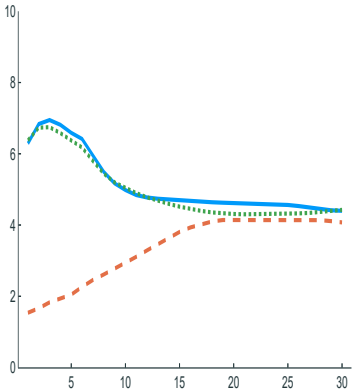
Transition dynamics after a trade shock

- 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 the 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

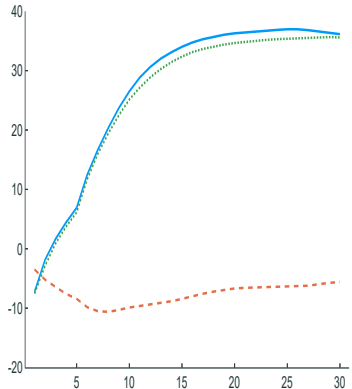
Short-term gains: Path 1 (red dashed) vs 2 (blue) vs historical (green dotted)



(a) Productivity

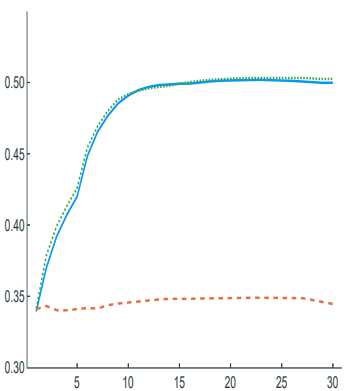


(b) Total consumption

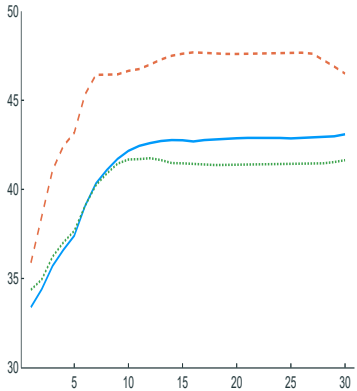


(c) Capital per exporters

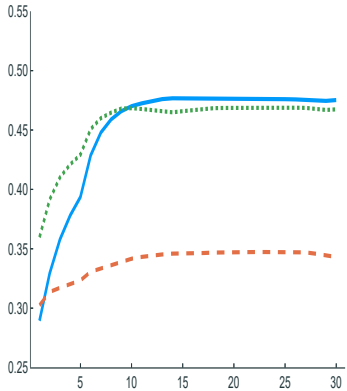
Long-term losses: Path 1 (red dashed) vs 2 (blue) vs historical (green dotted)



(d) Standard deviation of ARPK



(e) Share of exporter firms



(f) Exporter ARPK dispersion

Welfare

- Everyone prefers liberalized trade
- Inequality still increases under closed capital markets
- Owners of export firms benefit
- 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

Role of Foreign economy - the reason for the historical path

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

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 unproductive exporters
  - But is outweighed by the general benefit of having cheap capital available for all
- Few additional results:
  - Without trade liberalization, capital market integration is less useful
  - More developed economies are *weakly less* affected by both reforms

Contribution to the Literature

Back to Introduction

- Misallocation and Trade:
  - Edmond et al.(2015) Berthou et al.(2018), Bai et al. (2019),
  - **Source of misallocation and firm dynamics matter for trade liberalization**
- Trade liberalization and financial frictions:
  - Brooks & Dovis (2018), Kohn et al.(2020), Ebrahimian & Firooz (2022)
  - **Capital market openness determines how financial development matters for gains of trade**
- Capital Market Integration:
  - Obstfeld and Rogoff (2000), Mendoza et al. (2009), Gopinath et. al (2017), Li and Su (2022),
  - **Even if misallocation increases, CMI is still good for welfare**