Trade, Import Competition and Productivity Growth In the Food Industry

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Dipartimento di Economia, Management e Metodi Quantitativi

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Università degli Studi di Milano

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Objective

- Basing on the firm-heterogeneity model by Melitz and Ottaviano (2008), we test the pro-competitive effect of trade liberalization
  - Effect of import penetration growth on productivity growth within the EU food industry
  - Does this effect changes if we consider import penetration from different origins (EU15, New Member States, OECD non-EU, BRICs)?
  - Is the effect stronger for intermediate or final goods?

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Main Results

- Growth in import penetration leads to significant productivity growth in EU food sector
  - This positive relation is almost exclusively due to import competition coming from
    - Developed (especially EU) countries
    - Final products
  - The effect is robust to several controls and to endogeneity issues

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Outline

- **Motivation and research questions**
- Theoretical considerations
- Empirical specification
- Data
- Main results
- Conclusions and implications

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Motivation and research questions

- In the last decades, the EU food market has been experiencing
  - Strong growth in Import Penetration ratio: from 16% (1995) to 42% (2008)
  - Slow down in total factor productivity growth
    - 7 out of 27 EU members have been affected by a negative TFP growth in the food sector
- Is trade liberalization responsible for this slowdown in productivity?
- The EU public opinion tends to have a negative perception of globalization

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Motivation and research questions

- Evidence from the literature for a positive relation between trade liberalization and productivity growth, at
  - Theoretical level (e.g. Krugman, 1980; Melitz, 2003; Melitz and Ottaviano, 2008, and many others)
  - Empirical level
    - Industry level (e.g. Trefler, 2004; Chen et al. 2009 ...)
    - Firm level (e.g. Pavcnik, 2002; Aghion et al., 2006 ...)
- Until now, little evidence on the food industry (Gopinath and Ruan, 2008)
- However, this sector represents an ideal case study
  - Despite its recent liberalization, it still remains the most protected manufacturing sector
  - Thus potentially interesting policy implications

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Theoretical Considerations

- Melitz and Ottaviano (2008) model

  Two main Channels

  – **Trade liberalization effect (competition)**

    - Competition leads less productive firms to exit generating an increase in **industry** productivity growth (and a reduction in price and firms' markup)

  - **Market size effect** (similar to Krugman and Helpman, 1985)

    - In larger markets, prices and markup tend to be lower and productivity higher, as an effect of tougher competition

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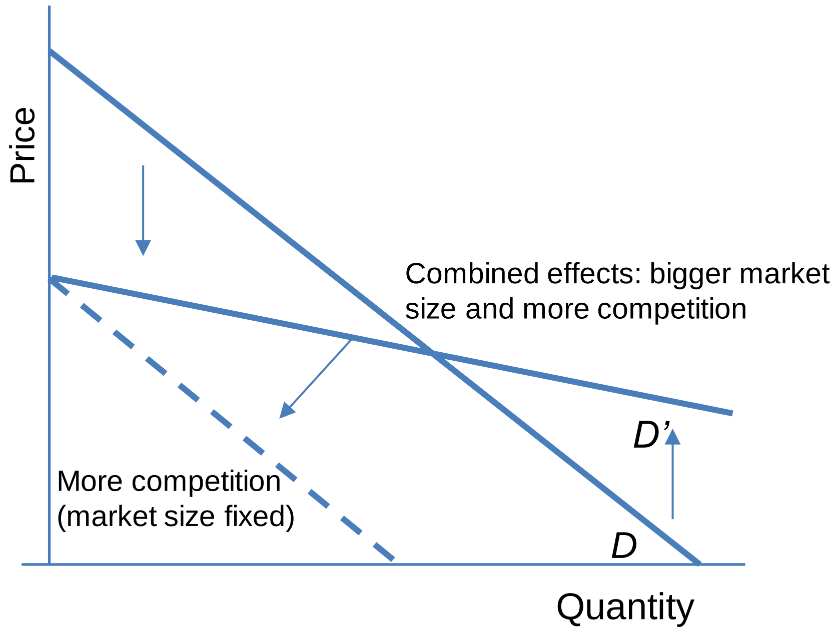
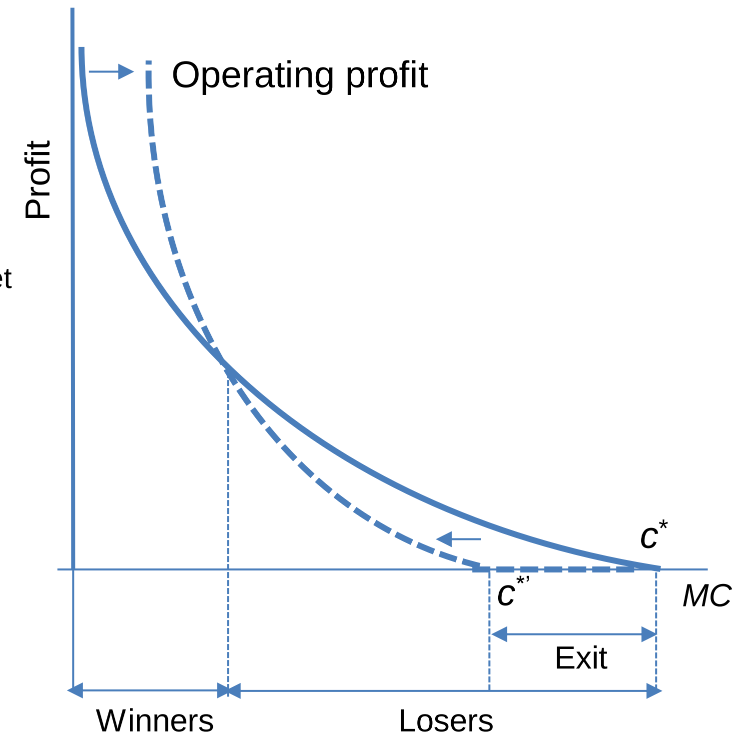
Theoretical Considerations

Winners and Losers from Market Integration





- *Small firms: the effect of competition dominates*

Each firm's market share shrinks

- *Large firms: the effect of larger market size prevails (flatter demand curve)*

- *Firms with marginal cost above the cutoff c^* drop out of the market (negative operating profit)*

- *Firms with $c_i > c^*$ are forced to exit the market*
- *Firms with $c_i < c^*$ can lower their markup and gain > market share*

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Theoretical Considerations

- Baseline growth model specification

$$\Delta y_{cit} = \beta_0 + \beta_1 lny_{cit-1} + \beta_2 \Delta IP_{cit-1} + \gamma X_{cit-1} + \varepsilon_{cit}$$

Δy_{cit} = Productivity growth

$lny_{cit\text{-}1}$ = Convergence term

$\Delta IP_{cit\text{-}1}$ = import penetration growth

$X_{cit\text{-}1}$ = other controls

- Average firm size
- GDP (real)
- Business conditions

$$\varepsilon_{cit} = \mu_c + \theta_{it} + \omega_{cit}$$

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Empirical Specification

- Identification issues:
  - **Measurement error in the dependent variable**

    Due to the lack of specific deflators for value added and capital
  - **Endogeneity of Import Penetration**

    i.e. less productive firms may lobby for protectionism
- How do we address these issues?
  - Use of industry-year fixed effects (Rodrik, 2013)
  - Instrumenting *IP* through SYS-GMM estimator (Blundell and Bond, 1998), that also accounts for the dynamic panel bias

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Data

- Panel of more than 1600 observations
  (25 EU countries, 9 food industries at NACE 3-digit)
- **Dependent variables**
  - Labour Productivity
    - Data from Eurostat SBS
  - Total Factor Productivity
    - Estimated from a Cobb-Douglas production function
- **Import Penetration**
  - Import value weighted by apparent consumption
    - Data from Eurostat SBS (production) and Eurostat COMEXT(import and export)

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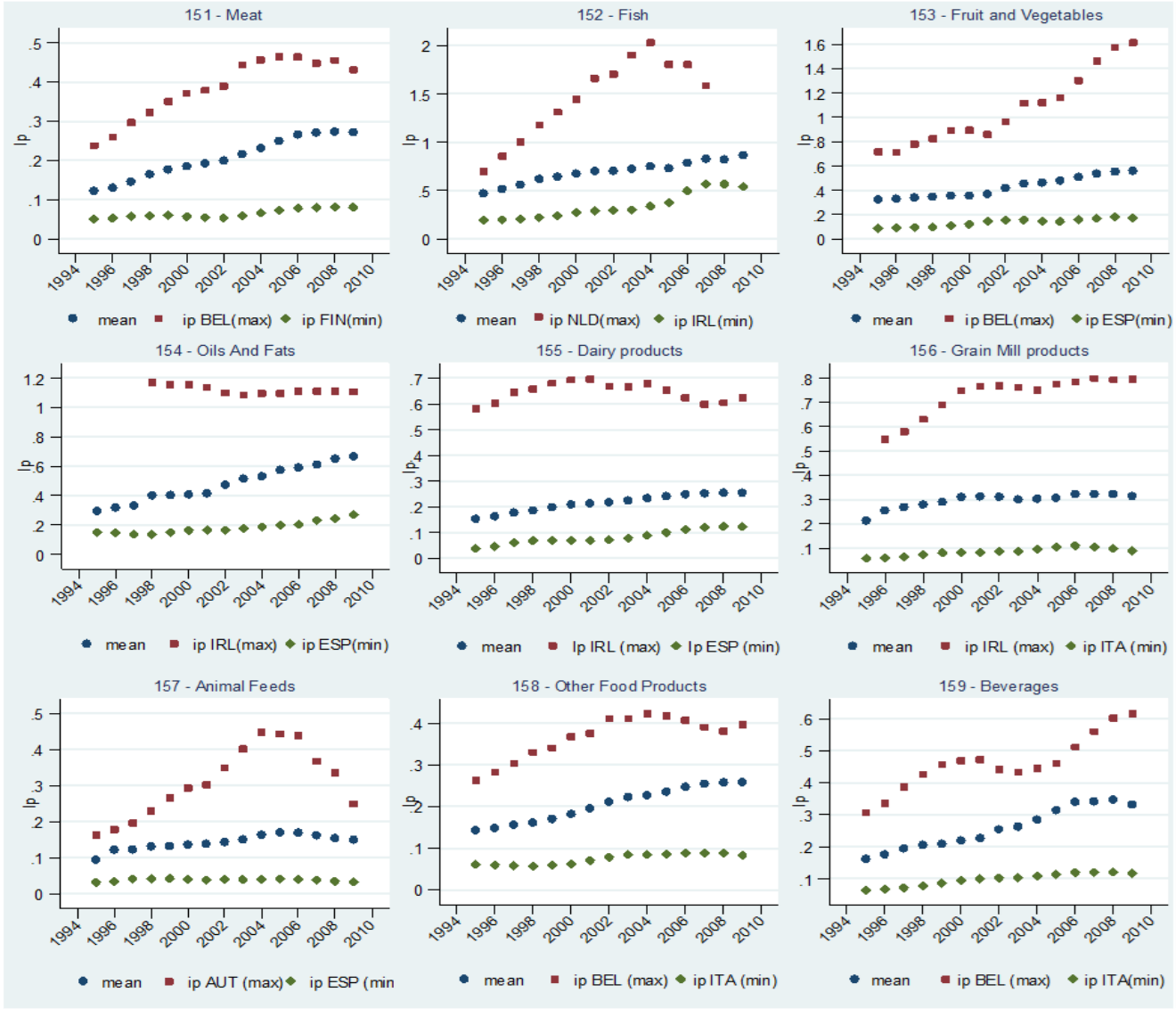
Data

Import Penetration across food sectors and time



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Data

- Other covariates
  - **Average firm size** (turnover/No. of firms)
    - Data from Eurostat SBS
  - **Real GDP**
    - Data from Eurostat National Accounts
  - **Business Conditions (Trefler, 2004)**
    - Generated by estimating the (country) industry-specific predictions of the effect of GDP and Real Exchange Rate growth on productivity.
    - Data on GDP and RER from Eurostat, National Accounts
- Deflators
  - **Price indices** from Eurostat, National Accounts

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Results - 1

Import competition and productivity growth: basic regressions

	(1) ΔLP	(2) ΔTFP	(3) ΔLP	(4) ΔTFP	(5) ΔLP	(6) ΔTFP
Lagged LP (TFP)	-0.040***	-0.056***	-0.046***	-0.061***	-0.323***	-0.361***
	(0.009)	(0.012)	(0.010)	(0.013)	(0.070)	(0.071)
Δ World import penetration			0.108***	0.097**	0.110***	0.101***
			(0.030)	(0.030)	(0.028)	(0.028)
Lagged avg. firm size					0.030**	0.030**
					(0.012)	(0.011)
Lagged real GDP					0.149	0.206**
					(0.085)	(0.082)
Lagged Business conditions					0.097	0.072
					(0.085)	(0.091)
Country F.E.	No	No	No	No	Yes	Yes
Industry-year F.E.	No	No	No	No	Yes	Yes
# Obs.	2334	2110	1770	1638	1598	1587
R-square	0.039	0.057	0.059	0.078	0.291	0.314

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Results - 2

Regressions according to the trade partners and to BEC Classification (intermediate vs. final products)

		Dependent variable	
		ΔLP	ΔTFP
I	Δ EU15 import penetration (t-1)	0.115***	0.112***
		(0.029)	(0.029)
II	Δ OECD (noEU) import penetration (t-1)	0.010	0.011
		(0.007)	(0.007)
III	Δ NMS import penetration (t-1)	0.000	-0.001
		(0.004)	(0.003)
IV	Δ BRIC import penetration (t-1)	-0.003	-0.003
		(0.003)	(0.003)
V	Δ Import penetration intermediate (t-1)	0.028	0.023
		(0.019)	(0.018)
VI	Δ Import penetration final goods (t-1)	0.093*	0.087*
		(0.046)	(0.045)

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Results - 3 Robustness checks

SYS-GMM regressions treating IP as endogenous

	(1) ΔLP	(2) ΔTFP	(3) ΔLP	(4) ΔTFP	(5) ΔLP	(6) ΔTFP	(7) ΔLP	(8) ΔTFP
Lagged LP (TFP)	-0.106***	-0.218***	-0.101***	-0.218***	-0.104***	-0.238***	-0.101***	-0.225***
	(0.026)	(0.041)	(0.023)	(0.040)	(0.028)	(0.048)	(0.026)	(0.044)
Δ World import penetration (t-1)	0.115***	0.098**						
	(0.044)	(0.038)						
Δ OECD (noEU) import penetration (t-1)			0.013*	0.014**				
			(0.007)	(0.006)				
Δ Import penetration intermediate (t-1)					0.026	0.026		
					(0.021)	(0.020)		
Δ Import penetration final goods (t-1)							0.136***	0.105**
							(0.043)	(0.042)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
AR1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR2	0.136	0.216	0.095	0.160	0.112	0.189	0.155	0.254
Hansen	0.276	0.183	0.286	0.245	0.256	0.198	0.366	0.330
No. Of Obs.	1598	1587	1592	1581	1597	1586	1598	1587
No. Of groups	206	206	206	206	206	206	206	206
No. Of instruments	193	193	193	193	193	193	193	193

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Conclusions and implications

- Strong support for the pro-competitive effects of import penetration (Melitz and Ottaviano, 2008)
  - 1% increase in IP ratio would result in a 0.09-0.14% increase in productivity growth
  - The effect of import penetration accounts for more than 20% of the TFP growth in the observed period

- This relation is mainly due to final food products coming from EU countries

Conclusions

- Main possible implications
  - A further trade liberalization can be beneficial for the EU food industry productivity (at least in the short run)
  - Moreover the EU should not worry too much about competition coming from developing countries
    - This is because, until now, their quality competition appears still weak in many sectors
- What next
  - Employments effects ??
  - Firm-level productivity effects ??

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Thank you!