

MARKUP AND PRICE DYNAMICS: LINKING MICRO TO MACRO

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*Understanding inflation dynamics:
the role of costs, mark-ups and expectations*

- Recent attention micro-based aggregate markups in US, and other regions – e.g. De Loecker and Eeckhout (2017, 2018).
- Debate at various high-level policy circles (ECB Sintra, Jackson Hole, etc.) about the rise (or not) of markups and therefore market power.
- Potentially large implications for studying aggregates:
 - Labor market outcomes: wages, labor share and income inequality.
 - Inflation or lack thereof: rising markups and no inflation?
 - Productivity growth measurement.

THIS PAPER

- This project: Belgium 1978-2016
- Small-open economy contrast - long panel 1978 onward.
- Puts us in a unexplored territory:
 - Potential technological change (beyond Hicks-neutral): rise fixed cost?
 - Globalization:
 1. competitive pressure, market size → **substantive**,
 2. global firms (MNEs) balance sheet declaration → **technical**.

MEASUREMENT OF MARKUPS

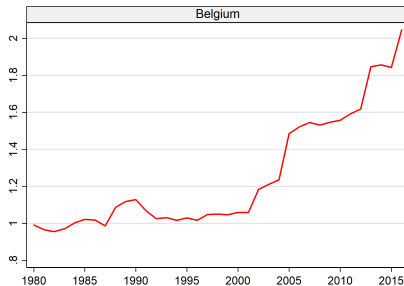
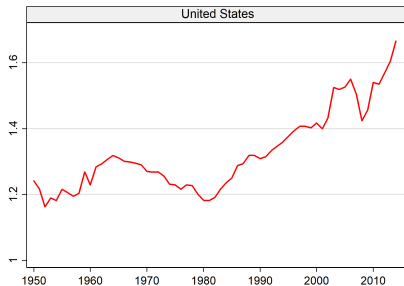
- We follow De Loecker and Warzynski (2011) and De Loecker and Eeckhout (2017) and apply the production-approach.
- With data on firms (i) over time (t) on sales (S_{it}), and a variable (V) input's expenditure (E_{it}^V), and an estimate of the corresponding output elasticity:

$$\mu_{it} = \theta_{it}^V \frac{S_{it}}{E_{it}^V}$$

- Aggregation:

$$M_t = \sum_i s_{it} \mu_{it}$$

WHAT DO WE KNOW?



- Recent evidence on the US: rising markups and profits.
- Listed Belgian firms (Worldscope): similar pattern.

SAMPLE CONSTRUCTION

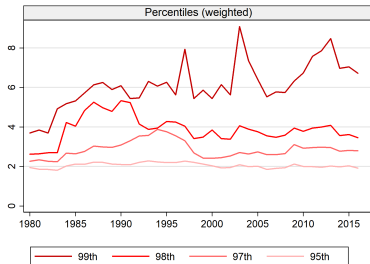
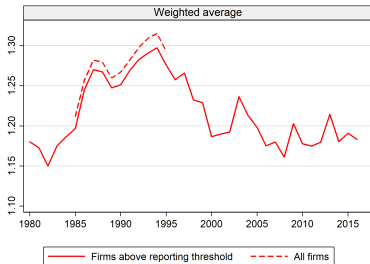
- Objective: construct long time-series of aggregate markup (and underlying determinants: shares and firm-level markups).
- Challenge: data sources annual accounts (NBB AA): 78-84 and 85-16
- Non-trivial construction of sample capturing large share of Belgian private economic activity.

IMPLEMENTATION

- Crucial input to the method is the choice of a variable input of production:
 - Intermediate inputs: disqualifies capital and also labor (case of Belgium)
 - Cost of goods sold (not observed as such?), materials.
- The latter greatly impacts pattern and interpretation: variables vs fixed cost (similar to role of SG&A in DLE and state of confusion).

NORMALIZED AGGREGATE MARKUPS:

ALL INTERMEDIATES

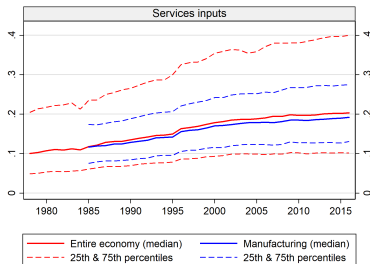
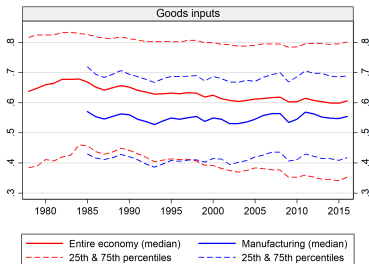


BREAK DOWN INTERMEDIATE INPUTS

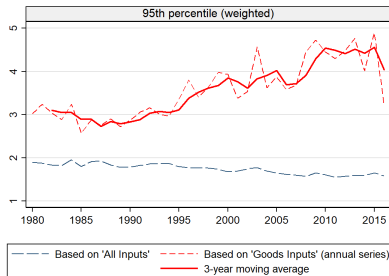
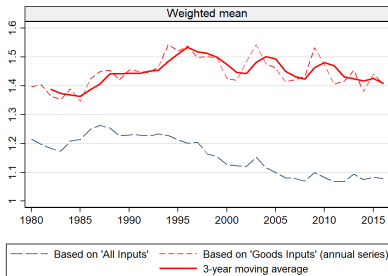
- Goods Intermediates (**variable**): raw materials used in production
- Service intermediates (**quasi-fixed**):
 1. Insurances
 2. Transportation/Travel/Catering
 3. Deliveries to the firm
 4. Availability fees
 5. Rent
 6. Maintenances and repairs
 7. Temporary and external work
 8. Wages, bonuses, pensions of CEO, partners and active owners.

TECHNOLOGY AND FIRM ORGANIZATION

$$y_{it} = \underbrace{\beta_{st}^g m_{it}^g + \beta_{st}^s m_{it}^s}_{\text{Intermediates}} + \beta_{st}^L l_{it} + \beta_{st}^K k_{it} + \epsilon_{it}$$

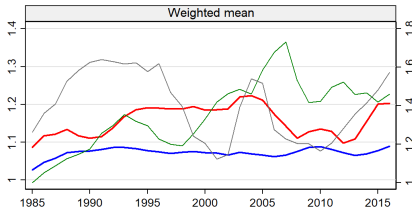


VARIABLE VS FIXED INPUTS

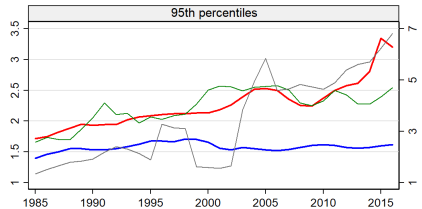


- First important observation: pattern of goods-intermediates and services-intermediates radically different.

SECTORAL ANALYSIS



— Manufacturing (41% -> 32%)
— Trade (38% -> 43%)
— Agriculture (0.2%)
— Utilities (right axis, 7% -> 5.5%)



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MARKUP GROWTH AND REALLOCATION

- Decompose ΔM_t into *within* and *reallocation*.
- Consider two distinct decompositions:

1. Actual: $\bar{a}_{it} = \frac{a_{it} + a_{it-1}}{2}$:

$$\sum_{i \in \mathcal{I}} \bar{a}_{it} \Delta \mu_{it} + \sum_{i \in \mathcal{I}} \tilde{\mu}_{it-1} \Delta \bar{a}_{it} + \sum_{i \in \text{En}} \tilde{\mu}_{it} a_{it} - \sum_{i \in \text{Ex}} \tilde{\mu}_{it-1} a_{it-1}$$

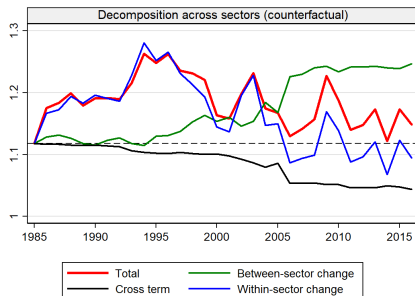
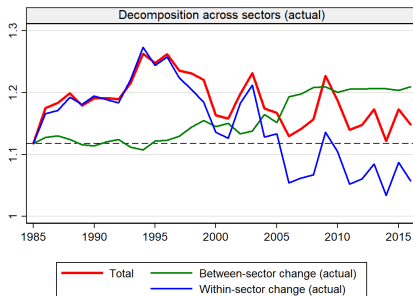
2. Counterfactual: $a_{it} = a_{it-1}$:

$$\sum_{i \in \mathcal{I}} a_{it-1} \Delta \mu_{it} + \sum_{i \in \mathcal{I}} \tilde{\mu}_{it-1} \Delta a_{it} + \sum_{i \in \mathcal{I}} \Delta \mu_{it} \Delta a_{it} + \sum_{i \in \text{En}} \tilde{\mu}_{it} a_{it} - \sum_{i \in \text{Ex}} \tilde{\mu}_{it-1} a_{it-1}$$

APPROACH: TOP-TO-BOTTOM

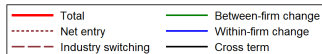
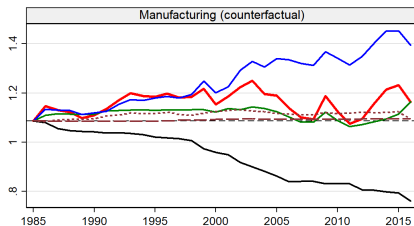
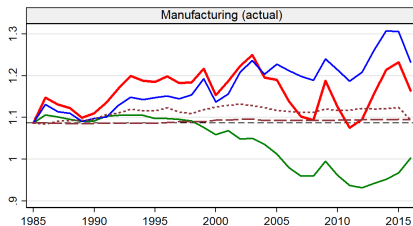
1. Across/within *sectors* – aggregated across firms,
 - No entry and exit
 - Declining manufacturing sector (41 to 32 %)
2. Across/within *firms* –within a sector.

DECOMPOSITIONS: ACROSS SECTORS



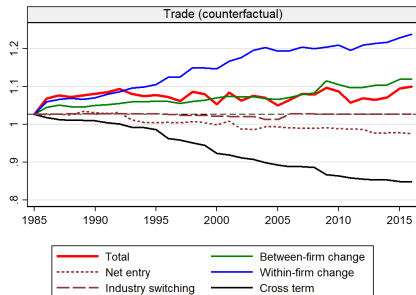
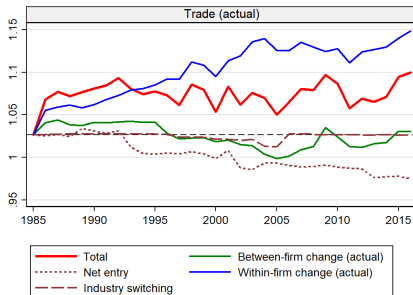
- Period of markup growth due to markup growth within sectors,
- Period of fluctuating markup: $\text{corr}(\Delta \text{ shares}, \Delta \text{ markups}) < 0$.

DECOMPOSITIONS: MANUFACTURING



- Period of markup growth due to markup growth within firms,
- Subsequent period growing firms lower margins (discuss US).

DECOMPOSITIONS: TRADE

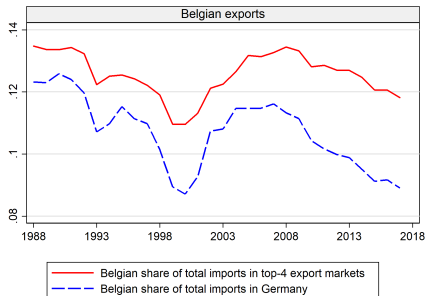
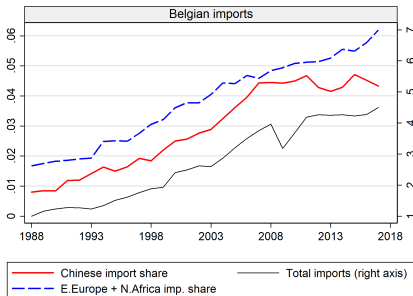


- Period of markup growth due to markup growth within firms,
- Trading firms exit had relatively high markups,
- Subsequent period growing firms lower margins (discuss US).

DECOMPOSITIONS: TAKE-AWAYS

- Period of aggregate markup growth: within-firm markup growth.
- Stagnating markup period: negative correlation between market share changes and markup growth.
- Hypothetical decomposition suggests a potentially much more pronounced markup increase in absence of negative correlation.
- The latter suggests factors explaining difference with evidence from US (market size, growth potential, etc.)
- Value of contrasting both decompositions: identify potential drivers of hampers of markup growth (implications for productivity analysis).

BELGIAN COMPETITIVENESS?



MAJOR FINDINGS (1): Technology and markups

- Fundamental change in production and sales process: rise fixed factors.
- Increasing markups 1985-1995, in the overall economy, but a continuing rise up to 2005 in manufacturing. Remaining years stable.
- Results are uniquely driven by the dynamics in the sales-to-expenditure ratio, and not so much in the changing technology parameters.

MAJOR FINDINGS (2): Drivers

- Aggregate pattern masks dynamics at sector and firm level.
- When markup rises, entirely due to the within markup growth.
- When markup cycles around a stable average: strong process of reallocation (at the sectoral or firm level)
→ increasing *negative correlation*(Δ market share, Δ markup).
- Declining competitiveness (rising imports, weaker export market shares) during flattening of aggregate (sectoral) markup.