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Industry concentration, firm-level markups and business dynamics from Austrian micro-data

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Overview

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Why monitoring competition?

- **Economic effects**
  - Allocative efficiency
  - Productive efficiency (Leibenstein 1966)
  - Market coordination (Hayek 1945)
  - Innovation & structural change (Schumpeter 1911, Arrow 1962, Baumol 1982)
- **Growing concerns** about declining business dynamics and competition, e.g.
  - **USA**: Decker et al (2014, 2016), Gutiérrez - Philippon (2017), De Loecker et al (2020), Konczal - Lusiani (2022)
  - **Europe**: Ganglmair et al (2020), Bajgar et al (2019, 2021), Carr - Davies (2022), Koltay et al (2022), Calligaris et al (2024)

=> Lack of systematic monitoring in **Austria**

- Böheim (2008), BWB: Erharter (2015), Rainer-Bellak (2023), Harsdorf-Borsch - Felbermayr (2023)

Data

- **OECD Multiprod 2.0**
  - Harmonised methodology (Berlingieri et al, 2017)
  - Stata scripts
  - Critical inputs (deflators, capital-labour ratios)
- **Austrian Microdata Center** (AMDC)
  - Structural Business Statistics (SBS), ca. 35 K firms from ÖNACE B to N, S95 2008-2020
  - Business Register, 2013-2020
- Many **caveats**
  - No firms below (variable) SBS size thresholds (e.g, 10-20 employees)
  - No book values (PIM plus workaround for initial capital stocks; intangibles not included)
  - Cells blinded for most concentrated industries ($<$ 4 firms)
  - No information on group ownership

$=>$ **Focus** on manufacturing and non-financial market services

Industry concentration: indicators

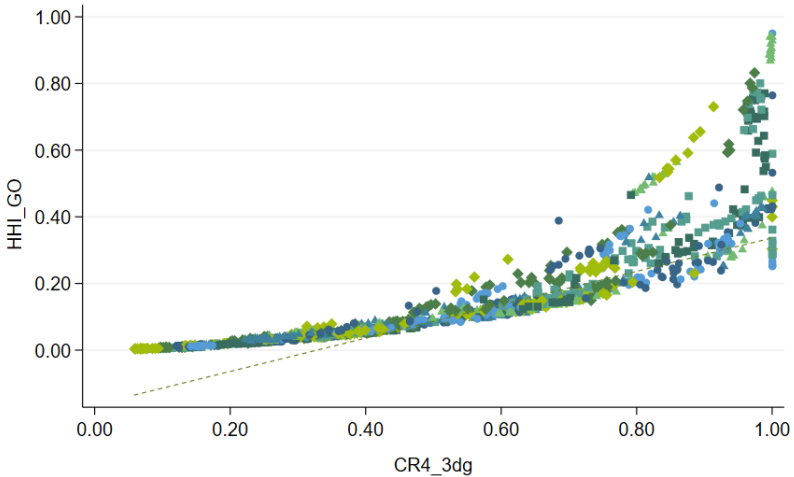
Herfindahl-Hirschmann Index (HHI) is the sum of the squared output shares $s_{ij} \equiv \frac{Q_i}{Q_j}$ of all firms N_j in the industry:

$$HHI_{jt} = \sum_{i=1}^{N_{jt}} s_{ijt}^2 \tag{1}$$

Concentration ratio CRX_j measures the sum of shares of the X largest firms in an industry's total output (X = 4, 8, 20):

$$CRX_{jt} = \sum_{i=1}^{X} s_{ijt} \tag{2}$$

Correlation HHI and CR4, 3-digit industries, 2010-2020



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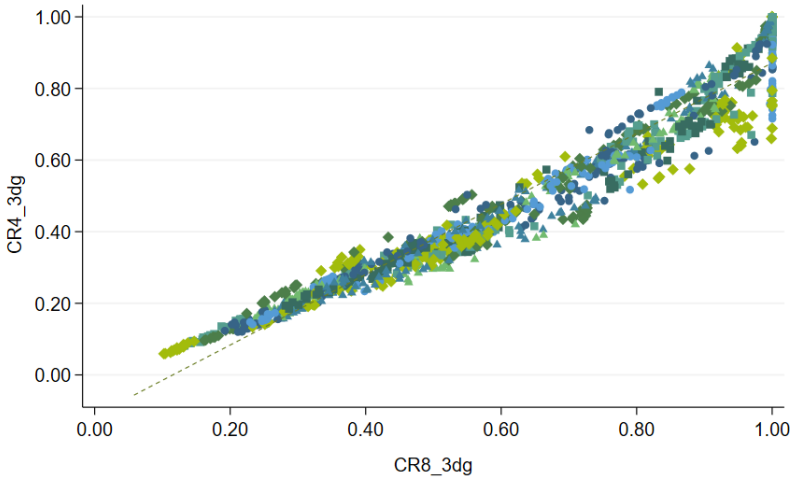
Correlation CR4 and CR8, 3-digit industries, 2010-2020



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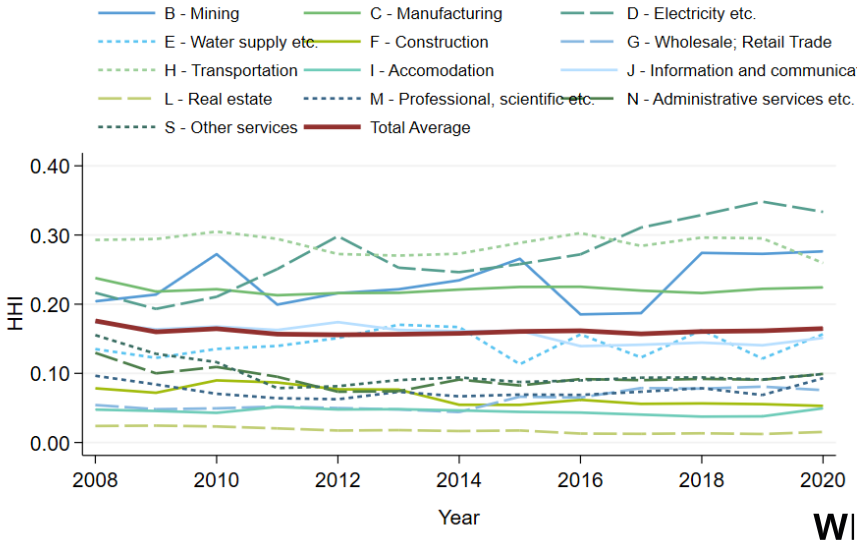
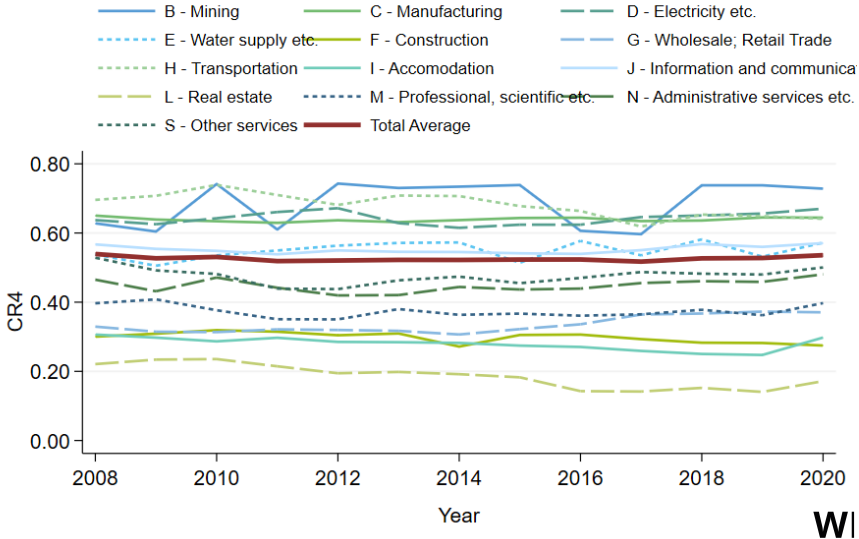
Development HHI, average 3-digit industries



Development CR4, average 3-digit industries



Industry concentration: main results

- **No** trend towards **increasing concentration** at the level of 191 3-digit NACE industries
- In 2020, the **average output shares** of the four, eight and twenty largest enterprises were 52.9%, 65.3% and 79.0% with an average HHI of 0.16.
- HHI remained virtually unchanged: rising in 98 sectors, while it fell in the remaining 93 sectors.
- $CR4$ rose in 96, the $CR8$ in 90 and the $CR20$ in 79 industries.

1. Dynamic Olley-Pakes decomposition (DOPD) of productivity growth in industry j by Melitz and Polanec (2015):

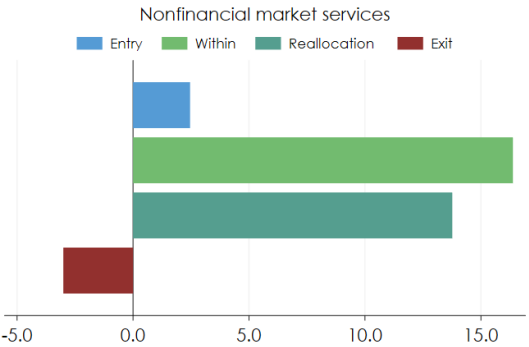
$$\overbrace{\Delta A_j}^{\text{Total}} = \overbrace{\Delta \bar{a}_{Rj}}^{\text{Within}} + \overbrace{\Delta cov(s_{Rj}, a_{Rj})}^{\text{Reallocation}} + \overbrace{s_{Ej2}(A_{Ej2} - A_{Rj2})}^{\text{Entry}} + \overbrace{s_{Xj1}(A_{Rj1} - A_{Xj1})}^{\text{Exit}} \quad (3)$$

Four effects:

- General *within* growth without reallocation
- *Reallocation* among active companies in both periods
- Productivity effect of firm *entry*
- Productivity effect of firm *exit*

2. Labour reallocation: average change in the number of employees per firm for different deciles of the productivity distribution (t = 1, 3 and 5 years)

DOPD of average change in MFP after 1 year, log differences 2014-2019



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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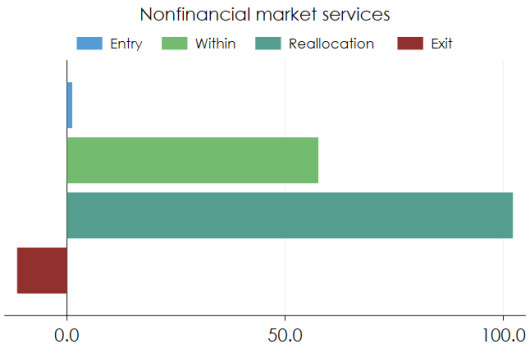
DOPD of average change in MFP after 5 years, log differences 2014-2019



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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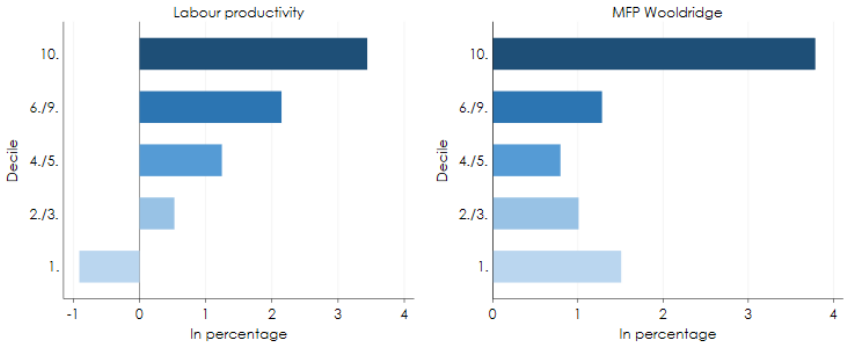
Average employment change by productivity: after 1 year, 2013-2019



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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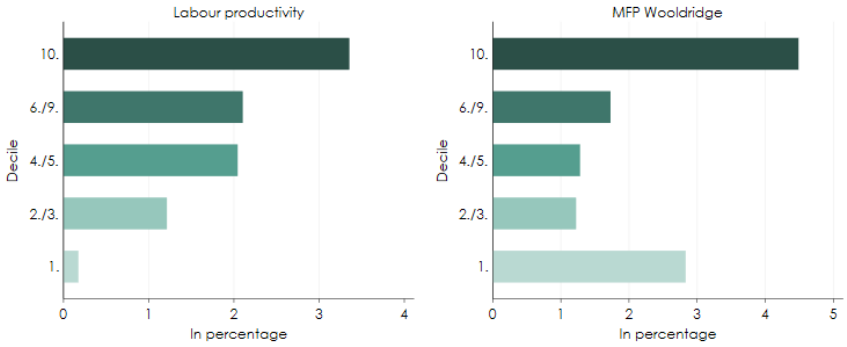
Average employment change by productivity: after 5 years, 2013-2019



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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Reallocation: main results

- For the broad sector of non-financial market services, the analysis confirms that competition effectively contributes to the **reallocation of production** towards the more productive firms.
- Companies with higher productivity also **create more jobs**. From 2013 to 2020 employment growth was by far the highest in the top ten percent of all companies in terms of both labour productivity and MFP.

Markups: Indicator (De Loecker and Warzynski, 2012)

Firm-level *markups* μ of output prices p over marginal cost c:

$$\mu_i \equiv \frac{p_i}{c_i} \tag{4}$$

ACF-production function with output $Q_{i,t}$, productivity $A_{i,t}$, capital stock $K_{i,t}$, labour $L_{i,t}$, variable intermediate inputs $V_{i,t}$, predictable shocks ψ_{it} and unpredictable shocks ϵ_{it}:

$$Q_{i,t} = Q_{i,t}(A_{i,t}, K_{i,t}, L_{i,t}, V_{i,t}, \psi_{it}, \epsilon_{it}) \tag{5}$$

The markup corresponds to the output elasticity of the variable input ...

$$\theta^V_{i,t} \equiv \frac{\delta Q(.)}{\delta V_{it}} \frac{V_{it}}{Q_{it}} = \frac{1}{\lambda_{it}} \frac{p^V_{it} V_{it}}{Q_{it}} \tag{6}$$

...divided by its share in total expenditures:

$$\mu_{it} = \theta^V_{i,t} \frac{p_{it} Q_{it}}{p^V_{it} V_{it}} \tag{7}$$

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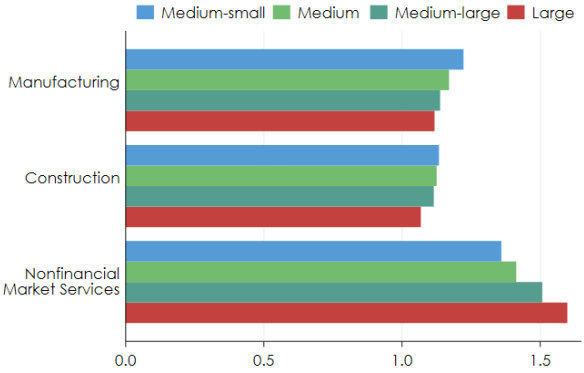
Average markups by sector and size class: 2008-2020



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

NB: Medium-small: 20-49, medium 50-99, medium-large: 100-249, large: 250 or more employees.

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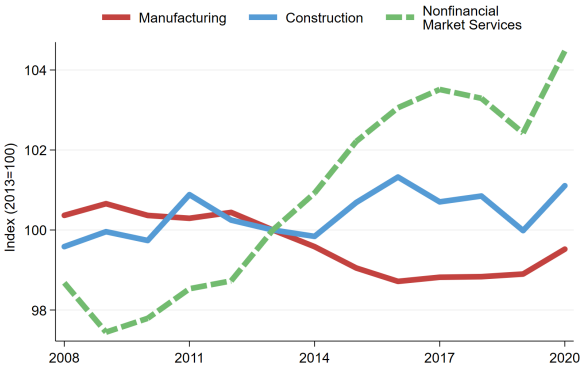
Average markups: sector groups, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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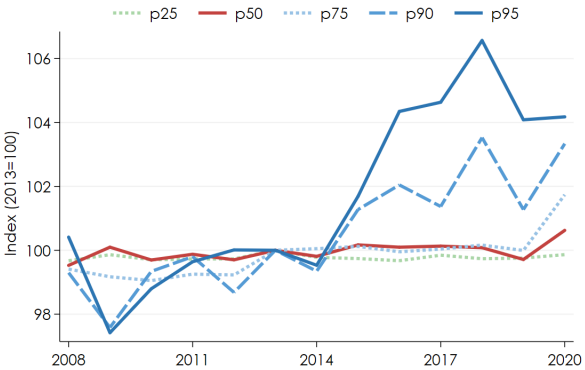
Average markups: distribution, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

NB: Since Multiprod sets negative markups to 1, the lowest percentiles (p5, p10) may not be included.

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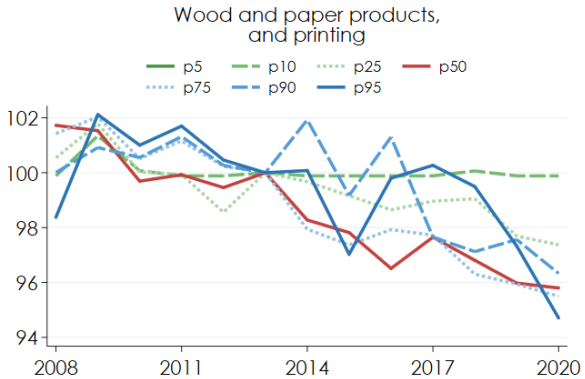
Average markups: Wood & paper products, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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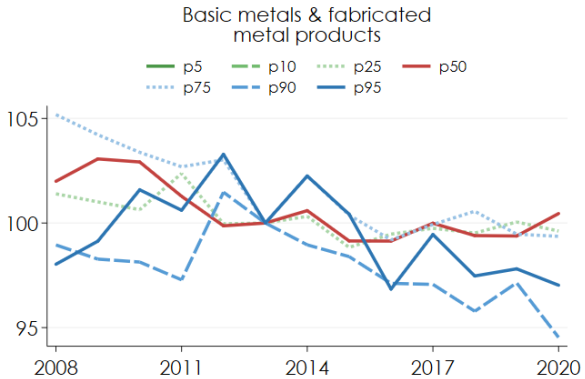
Average markups: Metals and products, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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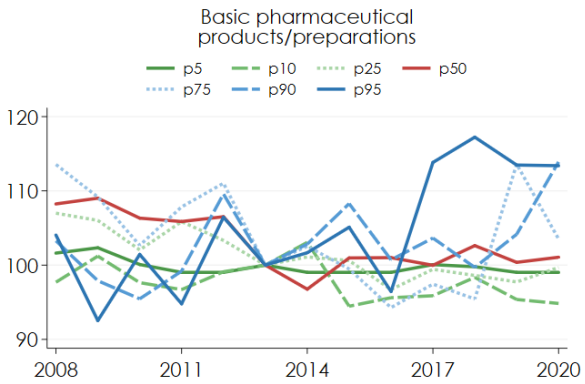
Average markups: Basic pharmaceutical products, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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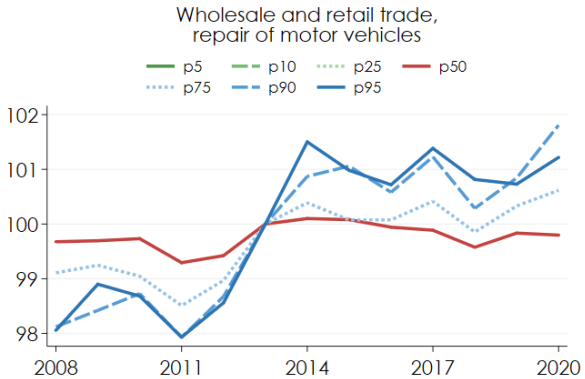
Average markups: Wholesale & retail trade, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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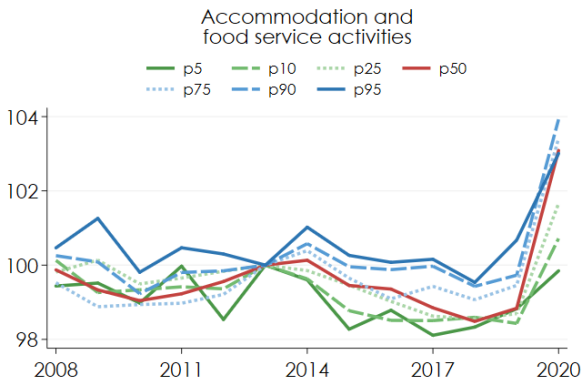
Average markups: Accomodation & food services, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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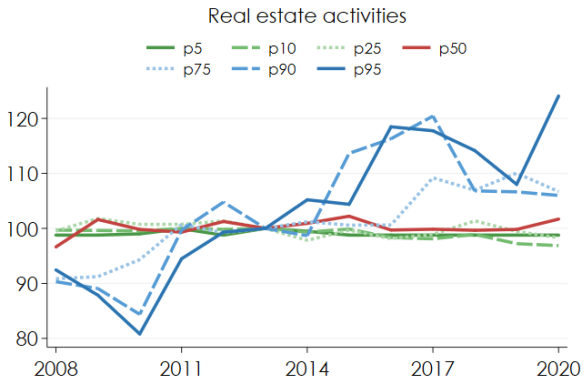
Average markups: Real estate, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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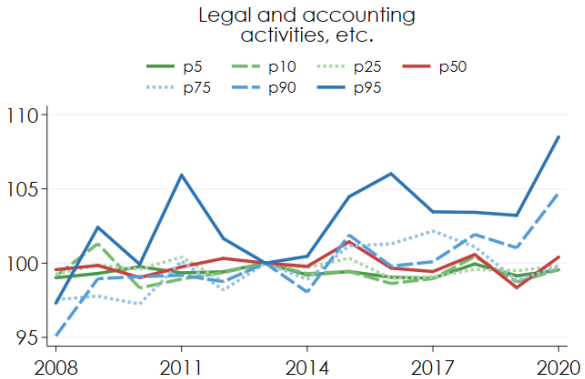
Average markups: Legal and accounting services, index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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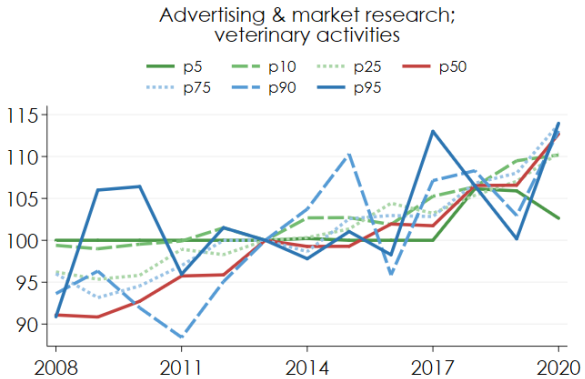
Average markups: Advertising & market research etc., index 2013-100



Source: Multiprod 2.0 - OECD, STAT, WIFO calculations.

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Markups: Main results

- In 2020, the **average firm-level markups** across 26 broad STAN sectors amounted to 33.05%, an increase of 1.47 PP since 2008.
- They were **highest** in the non-financial market services (39.6%), followed by manufacturing (18.7%) and construction (13.0%).
- From **2008 to 2020**, they increased in the non-financial services and construction sectors, while the manufacturing sector recorded a slight decline.
- The **strongest increase** of markups occurred in *real estate* and business services, such as *legal and accounting services* and *advertising and market research*.
- In many sectors, the micro-data reveal a self-reinforcing **'winners-take-more'** dynamic, where companies in the higher percentiles of the initial distribution increase their markups more than those in the lower percentiles.

Conclusions I

- **Competition** is pivot to competitiveness & quality of business locations => should become integral part of a **regular monitoring** of the overall economy.
- **Prove of concept**: (with all due caveats) AMDC allows for a meaningful monitoring of general trends and structural changes with respect to the average intensity of competition in Austria.
- It **cannot** (and should never intend to) **substitute** for in depth structural models and investigation of specific markets.

Conclusions II

Empirical evidence is mixed, but **worrying overall**:

- Industry **concentration** does not show a general trend, if anything tending slightly upwards. More disaggregated analysis is warranted, but confidentiality rules will lead to more missing observations precisely in the cells with highest concentration.
- Data confirm that competition is generally effective in stimulating the **reallocation** of economic activity and productivity growth. Longer time series are needed to assess also the change in business dynamics over time.
- Firm-level **markups** provide the clearest indication of a general weakening of competition. In many of the non-tradable sectors these have moved upwards on average, but unevenly in favour of firms with initially higher markups.

Discussion I (potential causes)

- **Anti-competitive behaviour** of individual firms => specific market investigations by the AFCA.
- **Sector regulations** (e.g., occupational entry requirements in professional services) may facilitate uneven markup dynamics => regulatory reforms.
- General **structural factors** may shift the balance against effective competition:
  - **Technological change**: growing fixed investments for innovation, digitalization and AI, often also lowering marginal costs.
  - **Corporate strategy**: firms may deliberately increase sunk investments to prevent entry and protect market power.
  - **Business intelligence**: big data, new analytical tools and highly skilled professionals make companies smarter in exploiting profit opportunities (e.g. personalized marketing/pricing; algorithmic cooperation).
  - Slowdown of **technology diffusion** because of high complementary investments (skills, organization, new business models, etc.) could explain asymmetric markup dynamics.

Discussion II (potential remedies)

What scope does that leave for **policy intervention?**

A **comprehensive but targeted** approach will be needed, e.g.

- In some cases, this may involve removing barriers to entry, such as enabling **data portability** when switching between different service providers.
- In other situations, attempts can be made to limit the build-up of a dominant position, e.g. by narrowing the scope of **intellectual property rights** (IPRs).
- If the widespread adoption of innovations is a major obstacle, it may be appropriate to use tools aimed at **technology diffusion**.

=> In any case, the rise of average markups and the *winners-take-more* dynamic warrant increased **alertness** (and regular monitoring).

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