

# Price Markups, Innovation, and Productivity: Evidence from Germany

**Bernhard Ganglmair, Nadine Hahn, Michael Hellwig  
Alexander Kann, Bettina Peters, Ilona Tsanko**

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**Does competition foster productivity? Why?**

## In a Nutshell

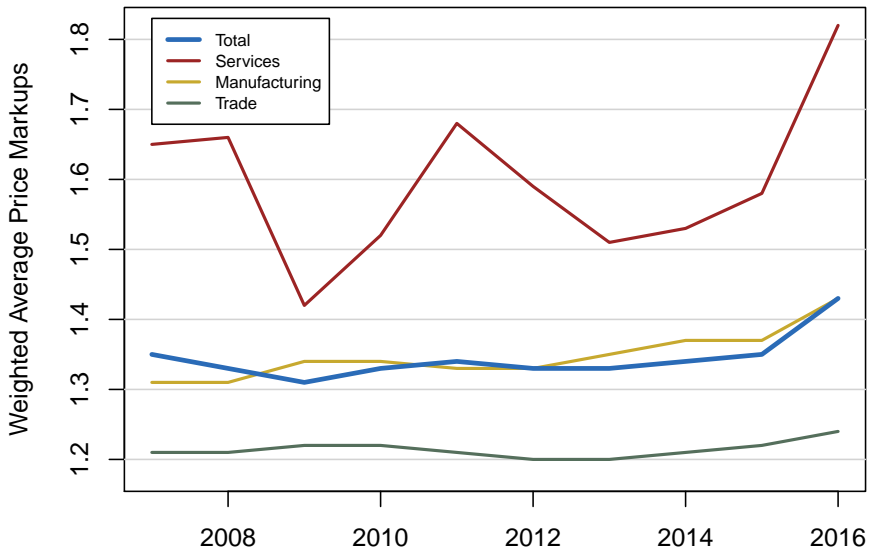
1. How have markups (as proxy for competition) developed over the last decade?
  - Slight increase of markups in Germany
  - Effects of financial crisis (lower markups) in services
2. Does less competition (i.e., higher markup) result in lower productivity?
  - Competition fosters productivity in manufacturing and trade
  - Opposite effects in services
3. What are the mechanisms?
  - Direct effects: such as management practices (e.g., *quiet-life hypothesis*)
  - Indirect effects: competition → innovation → productivity

Direct effect is relatively strong and outweighs indirect effect (in manufacturing and trade).

## Price Markups in Germany

- Estimation of price markups for Germany for 2007 – 2016
- Markups as proxy for competition
- Balance sheet and P&L statement data for ~12,000 companies in three sectors:
  - Manufacturing (*NACE Section C*)
  - Trade, both retail and wholesale (*NACE Section G*)
  - Services (*NACE Sections H, I, J, L, M, and N*)
- Data sources:
  - Orbis database
  - Mannheim Innovation Panel

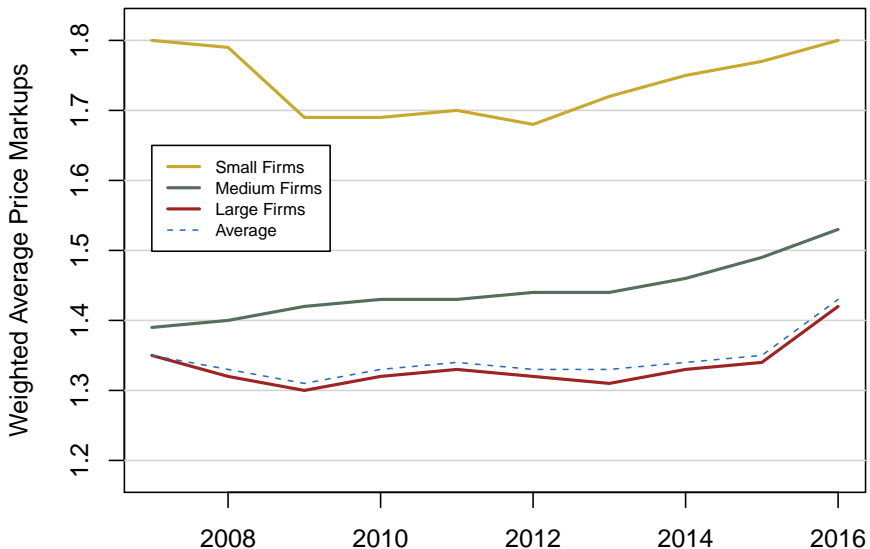
## Fairly Constant Markups ... with Some Variation



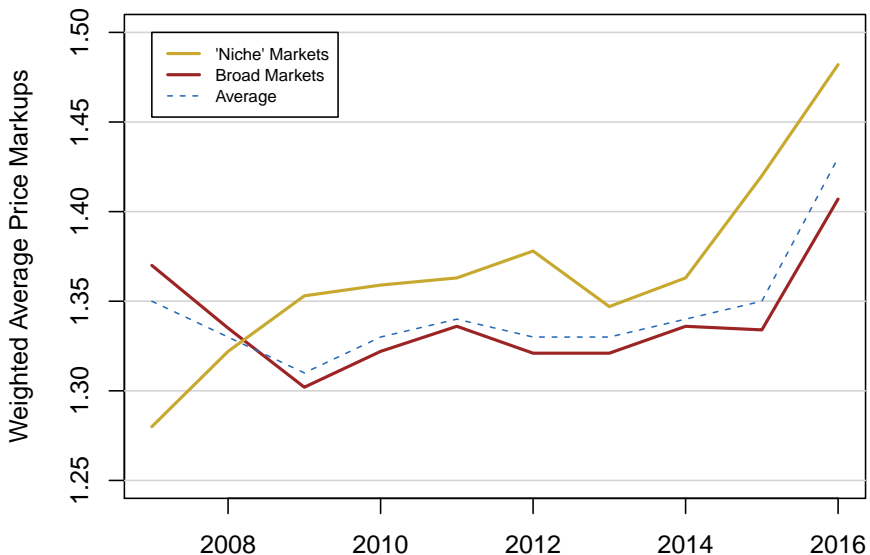
## Competition and Price Markups in Germany

- Average markups (30–45%) below those estimated for the U.S., but in line with other estimates for Germany/Europe
- Weak positive trend in markups (decrease in competition)
- Large differences across sectors
  - low markups in trade
  - high (but more volatile) markups in services
- Effect of financial crisis on markups driven by services sector

## Are Higher Markups for SMEs ...



## ... a Consequence of Firm Size or Niche Markets?





## Are SMEs More Crisis Resilient?

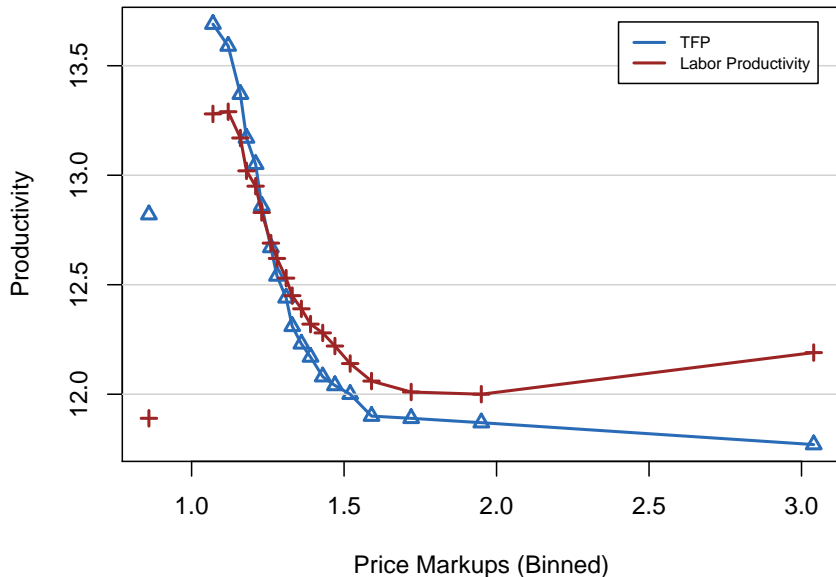
- SMEs exhibit higher markups
- One possible explanation:
  - SMEs are more likely active in niche markets in which we see higher markups
- In crisis mode?
  - Small companies hit by the financial crisis (→ lower markups), with recovery only at the end of our time window
  - Medium-sized companies (with lower markups) not affected by financial crisis

## Markups and Productivity

- Does competition drive productivity? Do higher markups imply lower productivity?
- If yes, why?
- Economics literature:
  - Quiet-Life Hypothesis (*Hicks, 1935*) or “X-Inefficiency” (*Leibenstein, 1966*)
  - Selection (“Darwinian mechanism”)
  - Rent-sharing (*Neven und Röller, 1996*)

We find a negative relationship between price markups and productivity!

# Less Competition $\rightarrow$ ? Lower Productivity



## Markups Dampen Productivity

Dependent variable: $\ln(\text{Productivity}_{it})$		Labor Productivity	TFP
Total Economy			
$\ln(\text{Markup}_{i,t-1})$		-0.463*** (0.095)	-0.680*** (0.093)
Manufacturing			
$\ln(\text{Markup}_{i,t-1})$		-1.910*** (0.175)	-1.940*** (0.175)
Trade			
$\ln(\text{Markup}_{i,t-1})$		-3.589*** (0.374)	-3.552*** (0.440)
Services			
$\ln(\text{Markup}_{i,t-1})$		0.357*** (0.081)	0.057 (0.103)

## Competition is Good News for Productivity

- 1% increase of price markups lowers productivity by 0.5% (0.7%)
  - Manufacturing (ca. 2%) and trade (ca. 3.5%)
  - Opposite effect in services: *More competition* → *lower productivity*
  - Evidence of superstars?
- Similar-sized effects for twice-lagged markups
- Stronger competition results in stronger productivity!
  - Combined effect
  - What are the mechanisms? Let's look at *innovation*

# Competition Fosters Innovation

	Total	Manufacturing	Trade	Services
	(a)	(b)	(c)	(d)
Innovation Expenditure				
$\ln(\text{Markup}_{i,t-1})$	-1.706*** (0.629)	-3.723** (1.261)	-1.010 (2.360)	-1.935*** (0.749)
R&D Expenditure				
$\ln(\text{Markup}_{i,t-1})$	-1.596*** (0.561)	-4.140*** (1.394)	0.343 (2.175)	-1.694*** (0.613)

## Competition and Productivity: Channels

- **Direct effect** (via, e.g., management practices)

Competition → Productivity

- **Indirect effect** (via innovation)

Competition → Innovation → Productivity

- Estimation of a two-equation system:
  - *Equation 1*: Innovation as a function of competition
  - *Equation 2*: Productivity as a function of competition and innovation

## Two-Equation System: Results

	Total	Manufacturing	Trade	Services
Equation 1: Innovation Expenditure ( $t - 1$ )				
$\ln(\text{Markup}_{i,t-2})$	-1.512*** (0.497)	-2.699*** (0.788)	-1.812 (2.244)	-1.594** (0.698)
Equation 2: TFP ( $t$ )				
$\ln(\text{Markup}_{i,t-1})$	-0.789*** (0.072)	-2.088*** (0.104)	-3.080*** (0.486)	0.271** (0.121)
$\ln(\text{InnoExp}_{i,t-1})$	0.052*** (0.007)	0.052*** (0.006)	0.120 (0.098)	0.109*** (0.019)



## Direct and Indirect Effects

	Total	Manufacturing	Trade	Services
Combined effect	-0.680*** (0.093)	-1.940*** (0.175)	-3.552*** (0.440)	0.057 (0.103)
Direct effect	-0.789*** (0.072)	-2.088*** (0.104)	-3.080*** (0.486)	0.271** (0.121)
Indirect effect ( <i>Approximation</i> )	<b>-0.079</b>	<b>-0.140</b>	-0.217	<b>-0.174</b>

- Negative indirect effect (in the “right” direction)
- Direct effect dominates
- Services: positive direct effect, offset by negative indirect effect

## Takeaways and Outlook

- Does competition foster productivity? **Yes!**
- How?
  - **Direct effect** overtowers an **indirect effect** (via innovation)
  - Services playing their own game!
- Quo vadis?
  - Higher markups (concentration!) dampen productivity
  - Keep an eye on the markets in the aftermath of Covid-19!
  - Crucial role for both competition and innovation policy (interdependence?)

**Thank you!**

ganglmair@zew.de

Download the full study **here**.