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Product Market Competition and Employer Provided Training in Germany

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Introduction

- ▶ Workplace training creates important human capital that immediately fits the needs of firms.
- ▶ Workplace training increases wages and profitability, reduces production costs and generates positive externalities.
- ▶ In 2013, employers in Germany invested about 33.5 billion Euro in further training (Seyda and Werner 2014).
- ▶ Recent research on product market competition as a determinant of employer provided training remains in its infancy.

Previous research

- ▶ Both, the theoretical predictions and the empirical evidence remain inconclusive.
 - ▶ Negative association (Muehleemann and Wolter 2007, Li 2009).
 - ▶ Positive association (Bassanini and Brunello 2011, Xu and Lin 2011, Lai and Ng 2014, Bilankos et al. 2017).
 - ▶ No association (Görlitz and Stiebale 2011, Picchio and van Ours 2011).

Theoretical Background Discussion

Hypothesis 1: The influence of product market competition on training could be nonlinear.

- ▶ Aghion et al. (2005) argue that an inverted U-shaped relationship between product market competition and innovation exists.
- ▶ We use a new self-reported measure of competitive pressure. This measure allows us to distinguish between the exact circumstances of high competitive pressure.

Theoretical Background Discussion

Hypothesis 2: The influence of product market competition could differ by sectors.

- ▶ Worker's human capital is of particular importance for the competitiveness of firms in the service sector (Batt 2002, 2008, Hipp and Grupp 2005).
- ▶ The provision of a service usually relies to a large extent on humans. Employees who come into direct contact with customers are 'part of the product' (Batt 2008).

Theoretical Background Discussion

Hypothesis 2 (continued): The influence of product market competition could differ by sectors.

- ▶ In the manufacturing sector employees remain part of the production process, not part of the product.
- ▶ Firms may invest in technologies, machines and equipment to reduce labor input or to improve quality.
- ▶ Focusing on manufacturing firms in Germany / in the Netherlands, Görlitz and Stiebale (2011) / Piccio and van Ours (2011) find no relationship between product market competition and the extent of training.

Data & Variables

▶ IAB Establishment Panel

- ▶ Empirical analysis is based on privately owned commercial establishments with at least five employees in 2009 to 2015.

▶ Employer Provided Further Training

- ▶ Number of employees who received employer provided further training during the first half of the respective year divided by the overall number of employees in the establishment.

<i>Employer Provided Further Training</i>	<i>Mean</i>
Training intensity	0.28

N= 51,676.

Data & Variables

▶ Product Market Competition

Unique firm-specific measure of competition

- ▶ Managers are asked to identify the extent of competitive pressure that the establishment has to deal with.
- ▶ If establishments face high competitive pressure, managers are asked if the major competition is associated with a risk of liquidation.

<i>Product Market Competition</i>	<i>Mean</i>
Minor competitive pressure	0.12
Medium competitive pressure	0.40
High competitive pressure without threat of liquidation	0.29
High competitive pressure with threat of liquidation	0.15

N= 51,676. The category „No competitive pressure at all“ is the reference group.

Data & Variables

- ▶ Self-reported competition measures have been used by Blanchflower and Machin (1996), Bloom et al. (2010) and Lai and Ng (2014).
- ▶ Self-reported firm-specific measures have advantages over traditional industry-level measures (e.g. Herfindahl index, import penetration ratio):
 - ▶ Self-reported measures take into account that firms within the same industry may face different degrees of competitive pressure.
 - ▶ Self-reported measures allow interviewees to include relevant competitors even when they are outside the standard industry or geographic boundaries of the official index.
 - ▶ Self-reported measures are available for all private sector industries.

Data & Variables

▶ Inclusion of a large set of control variables

- Multi-establishment firm, foreign ownership, dispersed ownership.
- Establishment age, establishment size, establishment size squared.
- Investment per capita, investment in information technology, investment in machines, vintage of technology.
- Collective bargaining, works council, alternative forms of worker representation.
- Temporary agency worker, share of skilled employees, share of university graduates, share of part-timers, share of women, share of apprentices.
- Vacancies for skilled and high-skilled workers, vacancies of unskilled workers, difficulties in filling vacancies.
- Industry dummies, region dummies, time dummies.

Results

Pooled Estimations

<i>Variable</i>	<i>OLS</i>	<i>OLS</i>	<i>Tobit</i>	<i>Fractional Probit</i>
High competitive pressure with threat of liquidation	---	-0.008 (0.0071)	-0.004 [-0.002] (0.0117)	-0.025 [-0.008] (0.0243)
High competitive pressure without threat of liquidation	---	0.018 (0.0067)**	0.047 [0.027] (0.0109)***	0.061 [0.019] (0.0226)**
High competitive pressure (either type)	0.009 (0.0065)	---	---	---
Medium competitive pressure	0.007 (0.0065)	0.007 (0.0065)	0.024 [0.014] (0.0107)**	0.027 [0.008] (0.0220)
Minor competitive pressure	0.001 (0.0072)	0.001 (0.0072)	0.011 [0.006] (0.0118)	0.005 [0.002] (0.0243)
Number of observations	51,676	51,676	51,676	51,676
Number of establishments	17,115	17,115	17,115	17,115

The table shows the estimated coefficients. Standard errors are in parentheses. Average marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. *Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Results

Panel Estimations

<i>Variable</i>	<i>Random Effects</i>	<i>Fixed Effects</i>	<i>Random Effects Tobit</i>	<i>Fixed Effects Tobit</i>
High competitive pressure with threat of liquidation	-0.003 (0.0070)	0.005 (0.0087)	0.001 [0.001] (0.0116)	-0.008 (0.0168)
High competitive pressure without threat of liquidation	0.018 (0.0066)**	0.019 (0.0082)**	0.041 [0.024] (0.0108)***	0.031 (0.0157)**
Medium competitive pressure	0.008 (0.0063)	0.011 (0.0077)	0.023 [0.013] (0.0104)**	0.020 (0.0150)
Minor competitive pressure	0.005 (0.0067)	0.010 (0.0079)	0.015 [0.009] (0.0111)	0.015 (0.0150)
Breusch Pagan test (χ^2)	18653.77***	---	---	---
Hausman test (χ^2)	---	826.11***	---	---
Rho	---	---	0.4950 (0.0055)***	---
Log likelihood	---	---	-30123.393	---
Number of observations	51,676	51,676	51,676	51,676
Number of establishments	17,115	17,115	17,115	17,115

The table shows the estimated coefficients. Standard errors are in parentheses. Average marginal effects are in square brackets. Marginal effects of dummy variables are evaluated for a discrete change from 0 to 1. *Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Results

Separate Random and Fixed Effects Estimations by Industry

Variable	Service Sector		Manufacturing Sector		Other Sectors	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects	Random Effects	Fixed Effects
High competitive pressure with threat of liquidation	-0.008 (0.0092)	0.003 (0.0116)	-0.002 (0.0142)	0.010 (0.0172)	0.017 (0.0197)	0.007 (0.0241)
High competitive pressure without threat of liquidation	0.020 (0.0084)**	0.021 (0.0106)**	0.013 (0.0138)	0.020 (0.0165)	0.035 (0.0187)*	0.021 (0.0226)
Medium competitive pressure	0.011 (0.0080)	0.011 (0.0099)	0.001 (0.0134)	0.010 (0.0160)	0.022 (0.0180)	0.022 (0.0216)
Minor competitive pressure	0.006 (0.0085)	0.010 (0.0101)	-0.003 (0.0140)	0.009 (0.0162)	0.017 (0.0192)	0.016 (0.0220)
Breusch Pagan test (χ^2)	10129.71***	---	4753.57***	---	1818.51***	---
Hausman test (χ^2)	---	566.11***	---	168.98***	---	93.05***
Number of observations	28,349	28,349	16,819	16,819	6,508	6,508
Number of establishment	9,947	9,947	5,196	5,196	1,972	1,972

The table shows the estimated coefficients. Standard errors are in parentheses. *Statistically significant at the 10% level; ** at the 5% level; *** at the 1% level.

Conclusions

- ▶ Competition spurs training investments only when that competition is not a threat to firm solvency.
- ▶ Competition increases training in those industries in which workers' human capital plays an important role in the competitiveness of firms.