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Temporary Agency Work as a Substitute?

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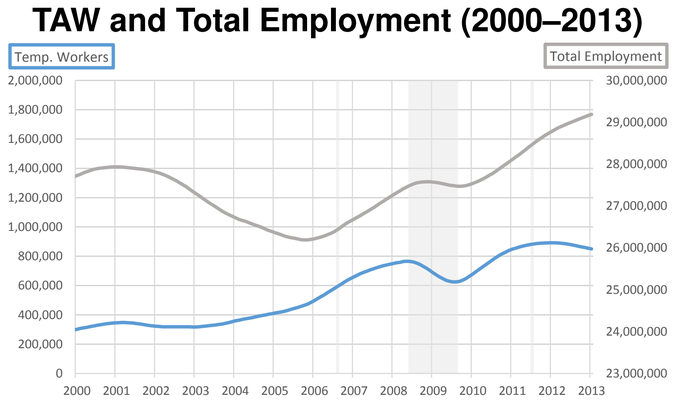
Abstract

In 2008-2009, Germany was hit by a significant negative demand shock, but the level of employment remained constant and increased thereafter. To smooth employment, the German government extended short-time work, a subsidy for social security contributions of qualifying workers. In parallel, German temporary agency work decreased in 2008 and 2009. This project is the first to show evidence for the effective adjustment of labor inputs differentiated into regular employment (RE) and temporary agency work (TAW) in German industry from 2007 to 2011.

TAW and Total Employment (2000–2013)



Note: Moving averages of socially insured temporary agency workers, and moving averages of socially insured employment.
Source: Federal Employment Agency Germany, author's calculation.

Motivation

TAW is a substitute for RE if both types of labor do the same job,

or a complement if two types of labor do different jobs, e.g. one is low-qualified and the other one is high-qualified.

Preliminary Findings

- Expenditures for TAW dropped by 32 percent from 2008 to 2009 and recovered thereafter.
- Expenditures for RE decreased by 6 percent from 2008 to 2009.
- German industry spent on average 5 percent of the labor expenditures on TAW during 2007 and 2011.
- Manufacture of transport equipment accounted for 13 percent of labor expenditures on TAW.
- Manufacture of chemicals and chemical products accounted for 3 percent of labor expenditure on TAW.

A Synthetic Panel

Challenge: No data source contains information about expenditures and people employed in TAW and RE on the firm level.

Idea: Apply several data sources

- Administrative Cost Structure Census in the German Industry, 20072011
- German IAB-Establishment Panel

Unit of Observation:

- Groups of Firms: 3 Employment Level, 11 Industry Branches
- Years: 2007 and 2011
- Cost structure census: more than 30 observations per group
- Establishment panel: more than 15 observations per group

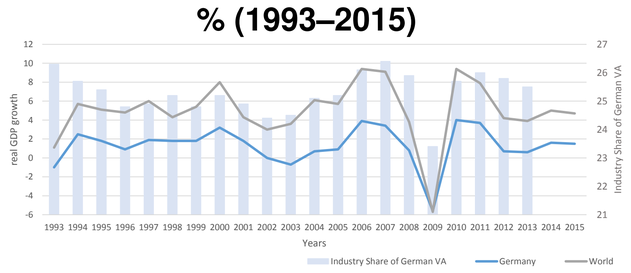
Samples:

- Mean of firms' revenue and expenditure for RE, TAW, materials, and capital
- Mean number of TAW and RE, and information about short-time work

Why focus on German Industry?

- German industry is highly dependent on global product demand and used short-time work during the Great Recession.
- In 2016, it contributed 22 percent to gross value added and employed 21 percent of RE.
- One quarter of Germanys TAW was placed only in the metal and electrical industry in 2016.
- In comparison to an average German worker, a TA worker is more likely to be male, young, and less skilled. Every second TA worker does helper tasks.

Annual Growth in Real GDP (World, Germany) and Industry Share of German Value Added in % (1993–2015)



Source: IMF, and Eurostat, author's calculation.

Obstacle: firms and establishments

Idea: For the average establishment, the mean of cost per hired TAW lies between a lower and an upper bound

- Denominator: mean of hired TAW in establishments
  lower bound $\leq \frac{\text{mean of cost for TAW}}{\text{mean of hired TAW}} \geq$ upper bound
- Lower bound by all single-establishment firms (in numerator)
- Upper bound by all firms (in numerator)

Bernd/Wood 1975, Greene 1993

Trans-log Cost Function with Multiple Input Factors: Derive Elasticities of Substitution between Input Factors based on Parameters of SUR

$$
\begin{aligned}
c &= \alpha + \alpha_K p_K + \alpha_L p_L + \alpha_T p_T + \alpha_M p_M \\
&+ \beta_{KK}\frac{1}{2}(p_K)^2 + \beta_{LL}\frac{1}{2}(p_L)^2 + \beta_{TT}\frac{1}{2}(p_T)^2 + \beta_{MM}\frac{1}{2}(p_M)^2 \\
&+ \beta_{KL}(p_K p_L) + \beta_{KT}(p_K p_T) + \beta_{LT}(p_L p_T) \\
&+ \beta_{KM}(p_K p_M) + \beta_{LM}(p_L p_M) + \beta_{TM}(p_T p_M), \\
S_K &= \alpha_K + \beta_{KK} p_K + \beta_{KL} p_L + \beta_{KT} p_T, \\
S_L &= \alpha_L + \beta_{LL} p_L + \beta_{KL} p_K + \beta_{LT} p_T, \\
S_T &= \alpha_T + \beta_{TT} p_T + \beta_{KT} p_K + \beta_{LT} p_L.
\end{aligned}
$$

Allen's partial elasticities of substitution, Uzawa 1962:

$$\sigma_{ij} = \frac{C\frac{\partial^2 C}{\partial p_i \partial p_j}}{\frac{\partial C}{\partial p_i}\frac{\partial C}{\partial p_j}},$$

With a trans-log cost function for TAW and RE:

$$\sigma_{LT} = \frac{\beta_{LT} + S_L S_T}{S_L S_T},$$

Assumptions: CRTS, homogeneity of degree one, exogenous output and factor prices

Related Studies

- Temporary Work as a Stepping Stone (Buch/Niebuhr 2013, Kvasnicka 2009)
- Pay Gaps between TAW and RE (Jahn/Pozolli 2011, Jahn 2010, Antoni/Jahn 2009)
- Effects of TAW use on Competitiveness (Nielen/Schiersch 2014, Hirsch/Mueller 2012)
- Domestic Outsourcing and the Wage Structure (Goldschmidt/Schmieder 2015)
- Employment Adjustment during the Crisis (Burda/Hunt 2011)
- Substitution Effect of TAW with a SVAR (Jahn/Weber 2016)

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