

Does the Sector Experience Affect the Wage Gap for Temporary Agency Workers

VERY PRELIMINARY RESULTS

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Introduction

- Over the past two decades, **temporary agency** employment has become a **significant** employment form in most OECD countries.
- As temp jobs are often regarded as "bad jobs", the expansion of agency work raises concerns about **labor market segmentation** and **dualism**.
- The **empirical evidence** for **European countries** indicates that the average wage of temps **lags** those of permanent workers by between 2% in Portugal (Böheim and Cardoso, 2009) and 15 percent, in Germany (Jahn, 2010). This is also **confirmed** for the US (Segal and Sullivan, 1998; Addison et al., 2009) and the UK (Booth et al., 2002; Forde and Slater, 2005).

Introduction (2)

- As a consequence of the low wages in this sector not only most European governments but also the European commission feels the **need to intervene** (see, for example, the 2008 European Parliament Directive). [▶ Germany](#)
- On the other hand, agency employment may also have **beneficial effects** for the workers in this sector (acquisition of human capital, development of productive job search networks, flexibility) (Autor, 2001).
- Critics of this view claim that temp work is unlikely to be conducive to on **the job-training or networks**, given its short job duration and low-skilled content (Segal and Sullivan, 1997). A temp experience may also **stigmatize** workers (Blanchard and Diamond, 1994).

[▶ To Literature](#)

Temporary agency employment is a hot topic in Germany

Zeitarbeit Schluss mit billig!

Trendwende nach 25 Jahren: Erstmals soll Zeitarbeit wieder stärker reguliert werden.



Gewerkschaftsmitglieder mit Protest-Tassen, auf denen Slogans zum fairen Gestalten der Leiharbeit auffordern

Previous literature

- Until today, the empirical evidence has been **rather mixed** in terms of these competing hypothesis.
- Some studies find that having work as temp **improves** the subsequent employment outcomes and wages (Ichino et al., 2008; Lane et al., 2003; Jahn and Rosholm, 2010).
- Other find **no strong evidence** for the stepping stone function of temporary agency work (Amuedo-Dorantes et al., 2008; Autor and Houseman, 2011; García-Pérez and Muñoz-Bullón, 2005; Kvasnicka, 2009; Malo and Muñoz-Bullón, 2008; Hamersma and Heinrich, 2008).
- However the existing studies so far **has failed** to treat **the temporary agency employment** as a rather **heterogeneous** phenomenon.

Aim

- To shed more light on these **competing hypothesis**, this article gathers new evidence for Germany, by estimating not only the wage differentials between temps and non temp workers but also the effects on wages of the **intensity** of agency employment.
- Conceiving temp employment as **a multi-value treatment**, allows us to directly test whether workers experiencing **higher exposures** to temp employment can indeed acquire more skills or establish more networks.
- The intensity measure is either based on the **cumulative number or the duration** of past agency jobs.

Contribution

- As workers self-select into different levels of treatment, we apply a **two-stage selection-corrected** method in a dynamic panel data framework. To best of our knowledge, this is the first time a dose-response function approach is **applied in dynamic panel data** setting.
- Combined with a **suitable exclusion restriction**, our results provide new evidence about **the causal impact** of temp employment intensity on wages.
- To investigate the dose effect on wages further, we calculate the **predicted wage path** associated with each treatment level for workers who move to regular employment.
- As a robustness check, we calculate the same effects implementing a **matching estimator**, which allows for continuous treatment effect evaluation (Hirano and Imbens, 2004).

Data sources

- A 5 percent random sample of the **Integrated Employment Biography** (IEB): non agricultural employees btw 18-60 for the period 1995-2008 (quarterly panel data);
- **Advantages:** administrative longitudinal information about socio-economic and job characteristics at the individual level.
- **Minor drawbacks:** i) employment spells in temporary help agencies are identified by an **industry classification** code; ii) gross daily wages are **top-coded** (Büttner and Rässler, 2008, imputation approach); iii) hours worked **not observed** (part-time employees excluded); iv) education is **missing** for 19% employees (Fitzenberger et al., 2005, imputation approach).

Treatment and control variables

- Both **binary** and **multi-value** treatment, the latter measured as either: i) the cumulative number of weeks in temp employment over the past 5 years or in the current job spell; ii) the number of temp jobs during the past 5 years;
- **Socio-demographic controls**: age, citizenship and education.
- **Employment history over the past 5 years**: the previous labor force status, unemployment benefits, the employment experience, the number of regular and temp jobs and the uninterrupted previous employment duration.
- **Current employment controls**: six occupational groups, whether employed in a metropolitan, urban or rural area, East Germany dummy.
- **Firm characteristics**: age, size, the share of female workers and of employees with a university degree.
- **Other controls**: the real quarterly growth rate of GDP, the regional unemployment rate (413 districts).

Empirical strategy: binary treatment

- Our point of departure is the following **two equation model**:

$$\begin{cases} w_{it}^0 = \alpha_0^0 + X_{it}'\alpha_1^0 + \tau_t + \mu_i^0 + e_{it}^0 & \text{for } t_i^0 \text{ s.t. } D_{it} = 0 \\ w_{it}^1 = \alpha_0^1 + X_{it}'\alpha_1^1 + \tau_t + \mu_i^1 + e_{it}^1 & \text{for } t_i^1 \text{ s.t. } D_{it} = 1 \end{cases} \quad (1)$$

- The **switching regime** is driven by the model for D , which is given by

$$D_{it}^* = \beta_0 + Z_{it}'\beta_2 + v_{it}$$

where the vector Z includes, among other controls, all available lags and leads of **shares of temporary agency workers at district level**.

- A quarter by quarter **probit model** is adopted to estimate the treatment choice equation (Jiménez-Martin, 2006).

Empirical strategy (2): binary treatment

- Adding consistent estimates of the inverse Mill's ratios, $\hat{\lambda}_i^0$ and $\hat{\lambda}_i^1$ to equation (1), we obtain:

$$\begin{cases} w_{it}^0 = \alpha_0^0 + X_{it}'\alpha_1^0 + \tau_t + \sigma_0\hat{\lambda}_i^0 + \mu_i^0 + e_{it}^0 & \text{for } D_{it} = 0 \\ w_{it}^1 = \alpha_0^1 + X_{it}'\alpha_1^1 + \tau_t + \sigma_1\hat{\lambda}_i^1 + \mu_i^1 + e_{it}^1 & \text{for } D_{it} = 1 \end{cases}$$

- We consistently estimate the previous equation using the **fixed effect** estimator.
- Obviously, the variance and covariance matrix of the two-step estimator needs to be adjusted by **bootstrapping the sequential two-step estimator**.

Empirical strategy: multi-value treatment

- We then **extend** the previous model by considering a **multi-value treatment** setting:

$$w_{it}^j = \alpha_0^j + X'_{it}\alpha_1^j + \tau_t + \mu_i^j + e_{it}^j \text{ for } t_i^j \text{ s.t. } D_{ijt} = 1; j = 0, 1, 2, 3, 4 \quad (2)$$

- The **dose-response function** of the optimal level of treatment can be expressed as:

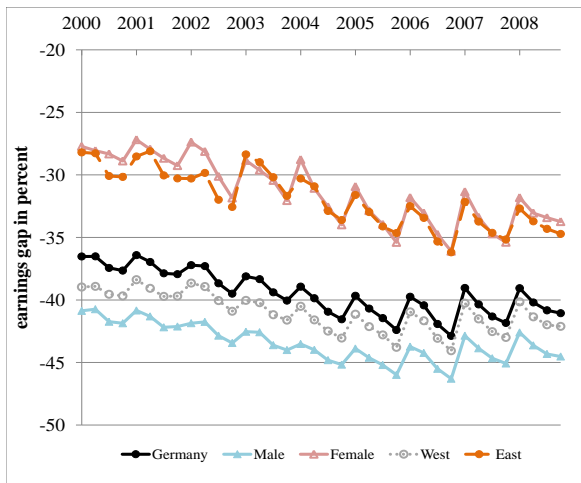
$$DR_{ijt}^* = \gamma_0^j + Z'_{it}\gamma_1^j + u_{ijt}$$

- The treatment levels in terms of **the total temp experience** in weeks are: 0; <8; 8-26; 26-52; > 52. The doses in terms of **the total number of temp jobs** are: 0; 1; 2; 3; > 3.
- a quarter by quarter **ordered probit model** is adopted to estimate the treatment choice equation.

Descriptive statistics of selected variables by type of employment

	Temp		Non-temp	
	mean	sd	mean	sd
Average real gross wage	53	29	90	46
Personal Characteristics				
Age	36	11	39	10
Male	0.751	0.432	0.663	0.473
Foreign	0.216	0.411	0.120	0.325
East	0.203	0.402	0.191	0.393
Education				
Secondary degree no vt	0.170	0.376	0.089	0.285
Secondary degree with vt	0.688	0.463	0.702	0.458
High school degree no vt	0.008	0.091	0.007	0.086
High school degree with vt	0.071	0.257	0.081	0.273
Politechnics	0.029	0.168	0.046	0.209
University	0.033	0.178	0.075	0.263
Previous labor force status				
Unemployed	0.536	0.499	0.183	0.386
Long-term unemployed	0.084	0.278	0.025	0.156
Not in the labor force	0.113	0.317	0.124	0.330
Temporary employed	0.142	0.349	0.069	0.253
Regular employed	0.210	0.407	0.624	0.484
Previous benefits				
Unemployment benefits	0.254	0.435	0.111	0.314
Unemployment assistance	0.156	0.363	0.036	0.185
Prev. empl. characteristics				
Current uninterrupted job tenure	82.900	85.800	184.000	95.200
No temp jobs (5 years)	1.930	1.460	0.221	0.673
No all jobs (5 years)	3.930	2.540	2.490	2.080
Weeks in temp jobs (5 years)	85.900	79.800	6.830	24.100
Weeks in non-temp jobs (5 years)	82.700	74.300	219.000	64.100
Observations	659,082		4,416,529	

Raw temp earnings gap (2000-2008)



Binary and multi-value treatments

	Binary treatment		
	All	Men	Women
FE	-0.196*** (0.000)	-0.198*** (0.000)	-0.185*** (0.001)
Control function approach	-0.188*** (0.001)	-0.193*** (0.001)	-0.165*** (0.002)
	Multi value treatment		
	All	Men	Women
Current temp job in weeks			
< 8	-0.204*** (0.001)	-0.206*** (0.001)	-0.185*** (0.002)
8-26	-0.180*** (0.001)	-0.183*** (0.001)	-0.159*** (0.002)
26-52	-0.158*** (0.001)	-0.165*** (0.001)	-0.129*** (0.002)
> 52	-0.119*** (0.001)	-0.135*** (0.001)	-0.071*** (0.002)
Total temp experience in weeks			
< 8	-0.214*** (0.001)	-0.212*** (0.001)	-0.210*** (0.002)
8-26	-0.194*** (0.001)	-0.193*** (0.001)	-0.190*** (0.002)
26-52	-0.176*** (0.001)	-0.179*** (0.001)	-0.162*** (0.002)
> 52	-0.136*** (0.001)	-0.150*** (0.001)	-0.094*** (0.002)
No of temporary agency jobs			
1	-0.179*** (0.001)	-0.184*** (0.001)	-0.159*** (0.001)
2	-0.179*** (0.001)	-0.187*** (0.001)	-0.144*** (0.002)
3	-0.170*** (0.001)	-0.180*** (0.001)	-0.125*** (0.003)
> 3	-0.169*** (0.001)	-0.184*** (0.001)	-0.099*** (0.003)

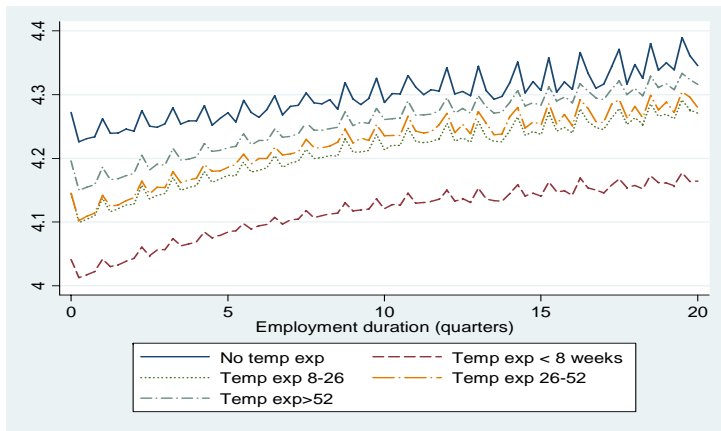
Binary and multi-value treatments

	Binary treatment		
	All	Men	Women
Control function approach	-0.286*** (0.001)	-0.328*** (0.001)	-0.207*** (0.000)
	Multi value treatment		
	All	Men	Women
Current temp job in weeks			
< 8	-0.403*** (0.001)	-0.442*** (0.001)	-0.369*** (0.001)
8-26	-0.352*** (0.001)	-0.390*** (0.001)	-0.273*** (0.001)
26-52	-0.299*** (0.001)	-0.322*** (0.001)	-0.230*** (0.001)
> 52	-0.209*** (0.001)	-0.256*** (0.001)	-0.134*** (0.001)
Total temp experience in weeks			
< 8	-0.354*** (0.001)	-0.446*** (0.001)	-0.427*** (0.002)
8-26	-0.332*** (0.001)	-0.385*** (0.001)	-0.259*** (0.001)
26-52	-0.324*** (0.001)	-0.377*** (0.001)	-0.228*** (0.001)
> 52	-0.254*** (0.001)	-0.296*** (0.001)	-0.170*** (0.001)
No of temporary agency jobs			
1	-0.252*** (0.001)	-0.291*** (0.001)	-0.194*** (0.001)
2	-0.320*** (0.001)	-0.357*** (0.001)	-0.186*** (0.001)
3	-0.328*** (0.001)	-0.389*** (0.001)	-0.269*** (0.001)
> 3	-0.392*** (0.001)	-0.435*** (0.001)	-0.355*** (0.001)

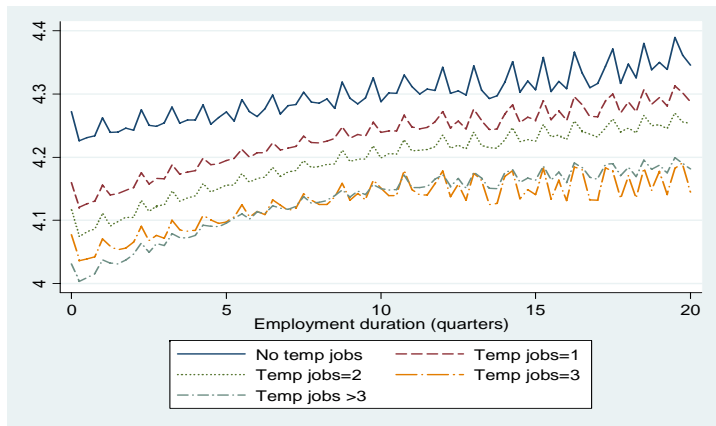
Post-temp earnings gaps

	Multi value treatment		
	All	Men	Women
Total temp experience in weeks			
< 8	-0.228*** (0.001)	-0.298*** (0.001)	-0.102*** (0.001)
8-26	-0.116*** (0.001)	-0.206*** (0.001)	0.043*** (0.001)
26-52	-0.094*** (0.001)	-0.162*** (0.001)	0.033*** (0.001)
> 52	-0.074*** (0.001)	-0.146*** (0.001)	0.024*** (0.001)
No of temporary agency jobs			
1	-0.093*** (0.001)	-0.165*** (0.001)	0.023*** (0.002)
2	-0.139*** (0.001)	-0.225*** (0.001)	-0.010*** (0.001)
3	-0.187*** (0.001)	-0.227*** (0.001)	-0.010*** (0.001)
> 3	-0.196*** (0.001)	-0.268*** (0.001)	-0.183*** (0.001)

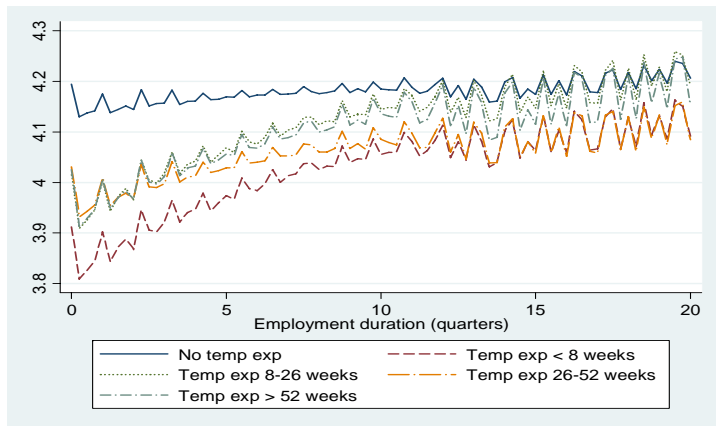
Wage predictions of temps moving to regular employment with different treatment levels, all sample



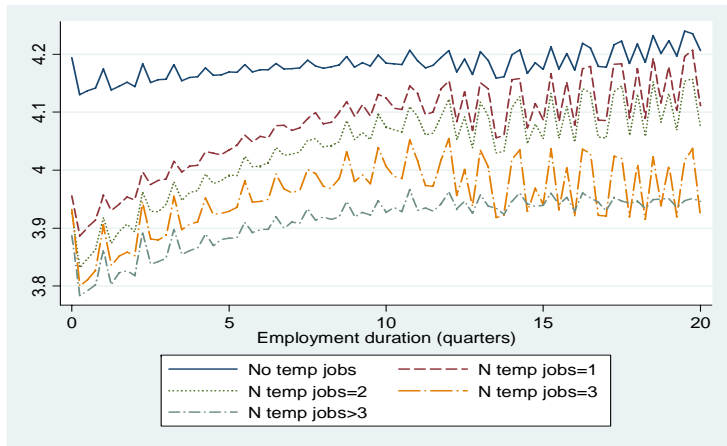
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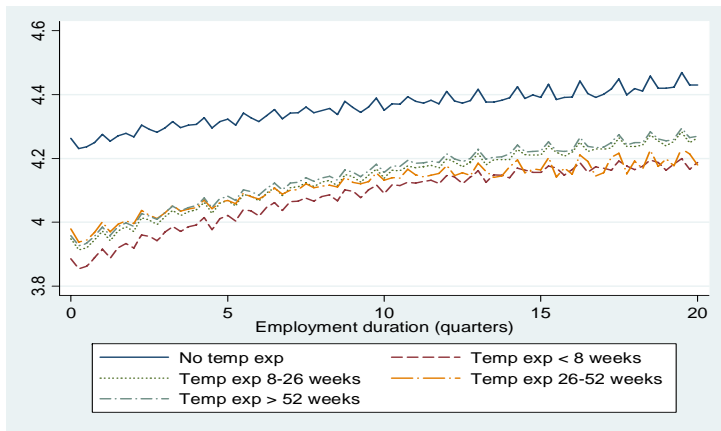
Wage predictions of temps moving to regular employment with different treatment levels, women



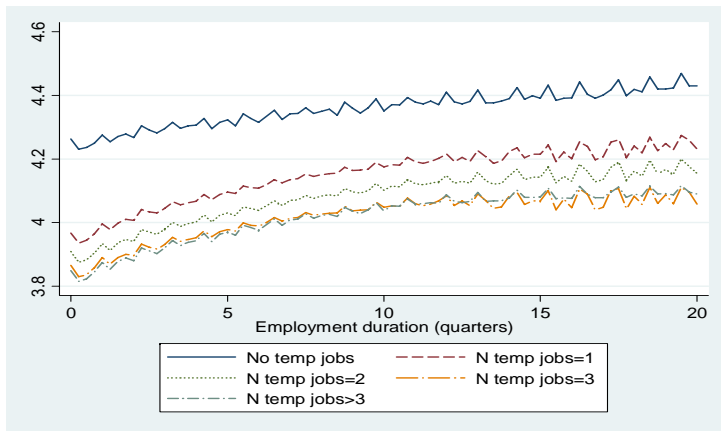
Wage predictions of temps moving to regular employment with different treatment levels, women



Wage predictions of temps moving to regular employment with different treatment levels, men



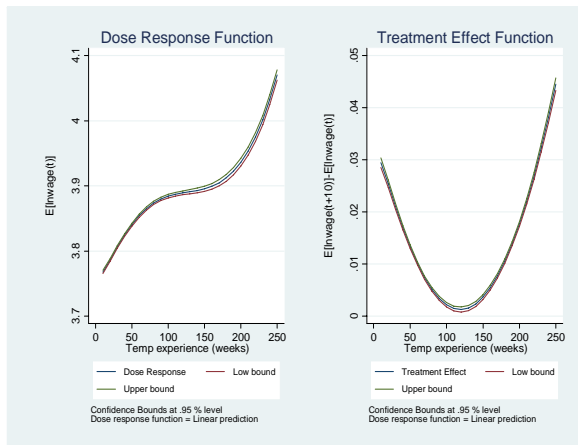
Wage predictions of temps moving to regular employment with different treatment levels, men



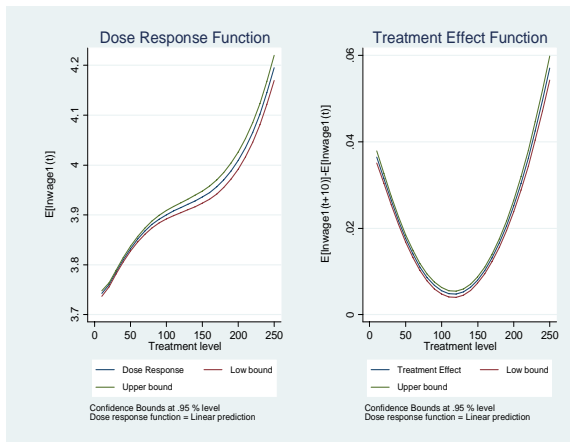
LbH effects: semi-parametric approach

- In order to investigate further the potential **causal effect** of the intensity of temp employment on wages, a matching analysis has been conducted.
- Instead of binary treatment (Rosenbaum and Rubin 1983) and multi-valued treatment (Imbens 2000 and Lechner 2001) we have a **continuous** treatment.
- **Dose response function:** $\mu(d) = E[w_d(d)]$
- **Generalized Propensity Score (GPS):** $R = r(D, X)$
- **Unconfoundness** assumption (Hirano and Imbens 2004): $Y(d) \perp D | R$

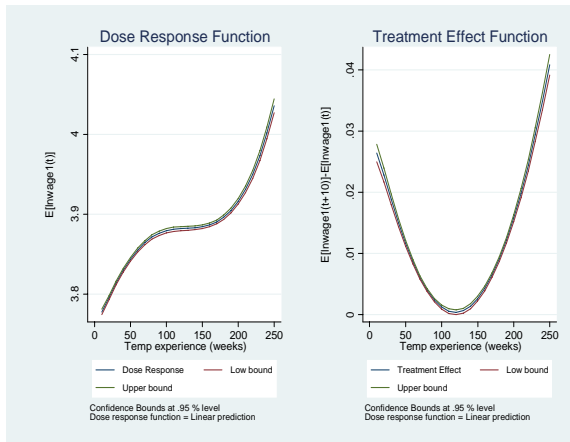
The effects of temp experience on wages, matching approach



The effects of temp experience on wages for women, matching approach



The effects of temp experience on wages for men, matching approach



Preliminary conclusions

- This article **gathers** new evidence for Germany, by estimating not only the **wage differentials** between temps and non-temp workers but also the effects on wages of the "**intensity**" or "**dose**" of temporary employment:

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 - 2 The estimated earning gaps are **decreasing** with the **treatment intensity**, if measured in terms of the number of weeks spent in temporary agency employment \implies human capital hypothesis.
 - 3 On the other hand, the wage gaps **increase** with the number of distinct temp jobs \implies stigma effects.
 - 4 This study **confirms** the popular perception that temporary agency jobs are generally **not desirable** when compared to permanent employment, at least in term of remuneration.