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# Unemployment Benefits and Wages: Evidence from the German Hartz-Reform

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**JEL:** J08, J31, J65

Hartz-Reforms, unemployment benefits, wages

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**Summary.** Using the introduction of fixed long-term unemployment benefits in Germany in 2005 as a unique experiment we find strong evidence that lower unemployment benefit has an adverse effect on wages. We use panel data to identify and estimate the effect of this structural break. In western Germany the effect is higher for men and increases with the skill level. In eastern Germany there is no systematic difference between men and women but the negative impact on wages is confirmed.

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## 1 Introduction

In this paper we examine the effect of lower unemployment benefits (UB) on wages. Economic theory predicts that lower UB leads to lower wages. This effect arises from a lower outside option in a wage bargaining context and is prominently modeled in the literature on search models [see Rogerson et al. (2005)]. Empirical findings support this prediction. There are two ways to examine the effect of lower UB on wages. The first way is to measure the impact of UB on reservation wages using survey data [see Feldstein and Poterba (1984) or Addison et al. (2009)]. The second is to measure the impact of UB directly on wages [see Topel (1984) or McCall and Chi (2008)]. To measure the effect of lower UB on wages, we follow the second approach by using the exogenous variation of the long-term UB given in the quasi-natural experiment of the most extensive reform of the German labor market: the Hartz-Reforms. The Hartz-Reforms, came into effect from 2003 to 2006.

The main components of this reform are the following: increasing in the flexibility of the labor market and the substantial decrease in long-term UB [see Jacobi and Kluve (2007)]. Before 2005 the long-term UB was a fraction of the individual's earnings. Since 2005, however, the long-term UB is means tested and non-income-related. We use panel data from the German federal employment agency [BA-Employment Panel (2008)] to show the negative effect of this reduction of the long-term UB on wages.

The remainder of this paper is organized as follows: Section 2 gives an overview of the German Hartz-Reforms. Section 3 describes our data. In section 4 we explain our method and estimation strategy. In Section 5 we show empirical evidence for a decreasing wage effect. Section 6 concludes this study.

## 2 The German Hartz-Reform

The Hartz-Reforms constitute the most comprehensive labor market reform in the last decade in Germany. A good overview of the German labor market legislation reforms since 1990 is provided by Ebbinghaus and Eichhorst (2006). The Hartz-Reforms consist of four parts. Hartz I and Hartz II increase the flexibility of the German labor market and were introduced at the beginning of 2003. The main components were to ease temporary work, the introduction of a new start-up grant scheme and the liberalization of the Mini-Jobs legislation.<sup>1</sup> Hartz III rules the reorganization of the German Federal Employment Agency. For our quasi-natural experiment the Hartz-IV-Reform is the most important one. Hartz IV consists of two main components.<sup>2</sup>

The first and most important aspect is the introduction of fixed and means tested long-term UB (ALG II) on the 1<sup>st</sup> of January 2005. Before this date the long-term UB was 53% or 57% (with a child) of the former net wage. In 2005 the long-term UB become means tested and non-income related at a fixed level of 345 EUR + means tested housing costs.<sup>3</sup> For most workers the reform meant a decrease in their long-term UB. The income loss through the Hartz-IV-Reform increases with a higher wage. This is because of two reasons. First the low monthly support is independent from the former income. Second UB are now means tested. With financial assets or a sufficiently high income of the partner the UB could decrease to zero.

The second component of Hartz IV was the shortening of the maximum short-term UB entitlement length (ALG I) to 18 months on the 1<sup>st</sup> of February 2006.<sup>4</sup> The entitlement length depends on the length of the former employment and the age of the individual. The minimum

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<sup>1</sup>For Mini Jobs (earnings up to 400 Euro) the contribution rate to the social insurance is lower than for regular employment subjected to social insurance contribution.

<sup>2</sup>In addition top-up benefits has been introduced to ease the re-employment of long-term unemployed via a wage subsidy.

<sup>3</sup>The ALG II replaced the two previous, parallel systems of unemployment assistance and social assistance.

<sup>4</sup>The legislation was later changed so that now the maximum period is 24 months for old employees.

requirement is a 12 months employment subject to social insurance contribution within the last 2 years to receive a short-term UB (ALG I) for 6 months. The ALG I is 60 % or 67 % (with a child) of the previous net wage, it is not means-tested and has a maximum level.<sup>5</sup>

Both components of Hartz IV reduce the expected value of UB. Because the entitlement length of ALG I was also limited before the reform, one can suppose that the effect of the introduction of ALG II on the expected value of UB is higher.

### **3 Data**

We use the BA-Employment Panel (2008), which consists of 2 percent of all employees entitled to social security in Germany. This dataset contains quarterly individual and firm-specific information between the first quarter of 1998 and the last quarter of 2007. We restrict our analysis to a balanced panel from the first quarter of 2000 to the fourth quarter of 2007. This restriction is necessary because of missing unemployment information. We are unable to track Individuals through spells of unemployment before 2000. We build a balanced panel because we are interested in the socially insured labor force: the socially insured full-time employees and the unemployed.

Our sample contains the following data on individuals: sex, age, wage, employment status, job tenure, education, type of employment and unemployment. All information is collected at the end of each quarter. The wage is given as the nominal gross salary per month. To avoid a time trend of the dependent variable, we calculate the real gross salary per month by using the German Harmonized Index of Consumer Prices [Federal Statistical Office Germany (2011a)]. The real wages between 2000 and 2007 were stationary.<sup>6</sup> The employment status is reported

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<sup>5</sup>The upper limit of ALG I depends on the (social security) contribution assessment ceiling.

<sup>6</sup>Since we observe a fixed number of time periods, we applied the Harris-Tzavalis test for stationarity [Harris and Tzavalis (1999)]. The non-stationarity hypothesis is only not discarded for low- and high-skilled women in

by the employer and classified into four groups: unskilled blue collar worker, skilled blue collar worker, foreman and white collar worker (reference group). The job tenure is measured as the duration in quarters of employment of the individual in a certain firm. Education level is classified into three groups: low, medium and high skilled. Workers without vocational training are classified as low skilled, a completed vocational training indicates a medium skilled classification and a higher academic degree is necessary for high skilled employees.

For the empirical estimation we use the following firm-specific information: firm size, the industry and the age structure of the employees. The firm size is classified into three groups. A small firm has less than 50 employees and a large firm more than 200 employees. We use the medium size firms with 50 to 200 employees as a reference group. We distinguish the following industries: Construction Industry, Manufacturing Industry, Wholesale and Retail Trade, Real Estate, Renting and Business Activities, Transport, Storage and Communication and Financial intermediation.<sup>7</sup> The age structure is described by the share of old (>55 years) and young (<20 years) employees. To account for the influence of business cycles, we include a variable on the industry-specific gross value added (real annual value, base year: 2000) [Federal Statistical Office Germany (2010)].

Because of structural differences in the labor markets, we divide the dataset into eastern and western Germany [see Kronthaler (2003) or Smolny (2009)]. The segmentation is based on the job location. Very low and very high wages may distort the analysis for “regular” wages. Wages above the maximum level up to which contributions to the social insurance have to be paid, are reported voluntarily. If the wage is not reported voluntarily, the maximum level up to which contributions to the social insurance have to be paid is reported as the individual wage. To avoid a bias of our analysis because of missing wage information we truncate the

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eastern and western Germany in the Construction Industry. These two groups are too small to allow reliable test results. The use of alternative inflation data [BIP Deflator] does not change the results.

<sup>7</sup> The industries follow the European national accounting system [Federal Statistical Office Germany (2007)].

top and bottom 5-percentile. After these restriction our sample still contains 136 949 men and 49 240 women in western Germany and 25 995 men and 17 419 women in eastern Germany.

#### 4 Methodology

The level of UB has a positive impact on wages. This positive impact can be shown using a wage bargaining model. The higher the UB the higher the outside option of the employees is, thus higher UB result in higher wages. In search models with rational workers and profit maximizing firms such a wage bargaining is applied to derive an equilibrium wage [see Rogerson et al. (2005)]. Thus the wage is a positive function of the UB. Therefore decreasing the UB should decrease the wage. The introduction of the means tested non-income related UB in 2005 is a quasi-natural experiment in which the UB decrease. Our estimation strategy is consistent with the idea of a structural break in the German labor market in 2005. We indentify this structural break using a Chow- Test.<sup>8</sup> We do not detect a structural break for the shortening of the entitlement length of the short term UB in 2006.<sup>9</sup>

We estimate the impact of the introduction of the means tested non-income related UB on the real wage in 2005. We use the following empirical model:

$$w_{it} = \beta_0 + \beta_1 \text{lower UB}_t + \text{controls} + a_i + u_{it}.$$

The real wage  $w$  of each individual  $i$  in period  $t$  is estimated with a constant  $\beta_0$ , a time dummy variable to measure the effect the lower long-term UB (*lower UB*), several control

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<sup>8</sup> To find additional support for the results of the Chow- test we split our sample into two sub-samples: before (year 2003) and after the introduction (year 2007) of the means tested long-term UB. We exclude the period from 2004 to 2006 to avoid transition effects. The pooled regressions for both sub-samples show for all but eastern German men a significantly lower constant after the reform. The remaining coefficients are quite similar [see Appendix A]

<sup>9</sup> We also estimate our model with a dummy variable for this period. The coefficients of this dummy variable are insignificant. This finding should be checked when more data after 2006 becomes available. Maybe we do not find a structural break because the sample period is still too short.

variables, a personal fixed effect  $a_i$  and an error term  $u_{it}$ . The variable *lower UB* is unity from 2005 on.

Because the lower long-term UB affects all socially insured employees it is not possible to identify a treatment and a control group to isolate the pure effect of the lower long-term UB. Nevertheless we are confident that the parameter  $\beta_1$  reveals the impact of the lower long-term UB on wages. We are confident about this because we are able to isolate the effect of the *Lower UB* dummy variable by using a wide set of control variables. These are age, age square, professional status, firm-size, firm's age structure, industrial-specific gross value added per worker, individual job tenure and quarter dummies.<sup>10</sup>

Since we are interested in the time variation in the wages we run individual fixed effect (FE) regressions.<sup>11</sup> First we estimate our empirical model separately for men and women in eastern and western Germany. This estimation gives a first impression of the effect of lower UB on wages. In a second step we study skill and industry-specific effects. Because of the time invariant information on skill, sex and industries we estimate the model for men and women and the three skill levels for six different industries according to the European national accounts system [see Federal Statistical Office Germany (2007)]. To draw a detailed picture while preserving the quality of the data, only industries with a share of more than 4 percent of all employees are considered.<sup>12</sup> To identify industry-specific effects and differences we estimate our model separately for every industry in eastern and western Germany.<sup>13</sup> To show approximately the percentage wage effect of the lower UB we also estimate our model with logarithmic wages.

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<sup>10</sup> With dummy variables for each quarter but the first we cover possible seasonal effects.

<sup>11</sup> The Hausman-test also suggests fixed effect estimations.

<sup>12</sup> Overall the chosen six industries contain more than 96% of the working population in the private sector between 2000 and 2007 [Federal Statistical Office Germany (2011b)].

<sup>13</sup> An aggregate estimation with dummy variable for each industry would be biased. By using fixed effect estimation with dummy variables for the different industries, the coefficients of these dummy variables would be driven by the minority of inter-industrial mobile workers. Theory and empirics [Neal (1995)] show that inter-industrial mobility is small.



## **5 Results**

In this section we show evidence that the introduction of the lower (means-tested long run) UB in 2005 lead to a decreasing effect on wages. As mentioned in the previous section, we first present in Table 1 the empirical evidence for men and women in eastern and western Germany irrespectively of industry and skill level.

**Table 1: FE estimation results for men and women in eastern and western Germany**

Dependent variable: wage in euro	Western Germany		Eastern Germany	
	Men	Women	Men	Women
Constant	524.71*** (78.40)	69.58*** (6.70)	898.07*** (72.12)	365.22*** (22.94)
<b>Lower UB</b>	-74.18*** (-173.34)	-63.39*** (-90.60)	-40.81*** (-50.77)	-56.43*** (59.12)
Age	103.66*** (394.61)	104.19*** (26.73)	54.84*** (110.17)	67.35*** (106.99)
Age <sup>2</sup>	-1.02*** (-350.28)	-1.00*** (-229.17)	-0.60*** (-110.31)	-0.63*** (-93.05)
Unskilled blue collar worker	-204.96*** (-146.11)	-117.65*** (-37.85)	-171.29*** (-67.49)	-110.46*** (-26.91)
Skilled blue collar worker	-166.21*** (-129.57)	-86.08*** (25.23)	-148.39*** (-65.94)	-107.03*** (-29.80)
Foreman	15.65*** (6.96)	0.17 (0.02)	-1.25 (-0.31)	52.83*** (4.87)
Small firm	-61.28*** (-94.33)	-51.27*** (-45.90)	-37.24*** (-34.89)	-34.00*** (-22.69)
Large firm	57.91*** (87.66)	48.82*** (44.59)	47.88*** (36.96)	22.13*** (14.72)
Firm's share of young employees	-21.55*** (-5.77)	-66.53*** (-11.93)	34.36*** (5.58)	46.45*** (6.10)
Firm's share of old employees	-61.69*** (-26.47)	-80.16*** (-22.03)	-47.99*** (-13.03)	-35.11*** (-8.00)
Industrial-specific gross value added	1.21*** (53.05)	0.41*** (10.13)	1.02*** (41.46)	1.19*** (32.35)
Job Tenure	3.31*** (123.98)	0.94*** (20.39)	3.09*** (64.94)	1.42*** (23.45)
2 <sup>nd</sup> Quarter	-13.94*** (-44.21)	-10.33*** (-20.06)	-9.57*** (-16.19)	-8.58*** (-12.21)
3 <sup>rd</sup> Quarter	-28.20*** (-88.99)	-20.35*** (-39.30)	-20.26*** (-34.11)	-17.45*** (-24.69)
4 <sup>th</sup> Quarter	-33.58*** (-104.85)	-23.47*** (-44.87)	-20.20*** (-33.62)	-17.43*** (-24.45)
R <sup>2</sup>	0.26	0.07	0.31	0.11
Individuals	136 949	49 240	25 995	17 419

The industry-specific gross value added is given annually. The result of this specification is equivalent to use of year dummy variables.

Source: authors' calculation. Significance-level: 0.01(\*\*\*), 0.05(\*\*) and 0.1(\*). t-values are reported in parentheses below the coefficients.

For men and women in eastern and western Germany we find a highly significant negative impact of the lower UB. The effect is higher in western Germany, probably because of the higher wage level. In contrast to western Germany the effect is higher for women in the eastern Germany. All coefficients show the marginal effect of each variable on the wage. Thus the lowering of the UB in 2005 leads c.p. to a 74.18 EUR lower gross monthly wage of men in western Germany. The negative coefficient of lower UB does not imply overall that all wages decreased after 2005. The wage would only have decreased if all other variables would have remained constant. However this was not the case.

To allow a more detailed analysis we now present the results for the skill- and industry-specific estimations. In total we have 72 regressions. We estimate fixed effect regressions to identify the effect of the Lower UB for men and women, six industries and three skill levels in eastern and western Germany. Tables 2 and 3 present the coefficients of the Lower UB dummy variable for the level estimation as well as for the logarithmic estimation. The values in the tables are the industry, gender and skill specific coefficients of the variable Lower UB. In the first line for every skill level the marginal effect of the Lower UB variable of the level estimation is given. In the second line (*italic*) we show the marginal effect of the Lower UB variable in the logarithmic estimation. In the third line the within  $R^2$  for both models is given. The *italic* number represents the within  $R^2$  of the logarithmic model. In the fourth line the number of individuals is given.

**Table 2: Marginal and percentage effect of lower UB on wages with respect to industry, gender and skill level for western Germany**

	Construction industry	Manufacturing industry	Wholesale and retail trade	Real estate, renting and business activities	Transport, storage and communication	Financial intermediation
Men						
<b>Low</b>	-47.09***	-40.20***	-44.83***	-75.16***	-52.28***	-85.10***
<i>Log</i>	<i>-0.019***</i>	<i>-0.016***</i>	<i>-0.020***</i>	<i>-0.029***</i>	<i>-0.022***</i>	<i>-0.024***</i>
Within R <sup>2</sup>	0.09/0.10	0.04/0.04	0.05/0.05	0.03/0.03	0.07/0.08	0.19/0.18
Individuals	1329	7983	1803	1035	1384	157
<b>Medium</b>	-57.86***	-52.93***	-80.30***	-86.46***	-53.26***	-111.47***
<i>Log</i>	<i>-0.019***</i>	<i>-0.017***</i>	<i>-0.027***</i>	<i>-0.027***</i>	<i>-0.020***</i>	<i>-0.028***</i>
Within R <sup>2</sup>	0.08/0.10	0.10/0.10	0.06/0.07	0.10/0.08	0.05/0.06	0.30/0.29
Individuals	12771	46413	20707	11470	9472	4342
<b>High</b>	-96.47***	-119.18***	-254.11***	-172.81***	-116.51***	-177.24***
<i>Log</i>	<i>-0.020***</i>	<i>-0.028***</i>	<i>-0.060***</i>	<i>-0.043***</i>	<i>-0.028***</i>	<i>-0.041***</i>
Within R <sup>2</sup>	0.19/0.15	0.37/0.33	0.27/0.22	0.25/0.21	0.23/0.20	0.49/0.44
Individuals	708	7956	2174	5317	573	1123
Women						
<b>Low</b>	-26.04	-34.38***	-57.72***	-65.60***	-43.73***	-36.66***
<i>Log</i>	<i>-0.017</i>	<i>-0.017***</i>	<i>-0.028***</i>	<i>-0.031***</i>	<i>-0.013***</i>	<i>-0.013***</i>
Within R <sup>2</sup>	0.11/0.14	0.04/0.04	0.04/0.05	0.10/0.11	0.07/0.09	0.03/0.11
Individuals	57	3001	840	391	201	219
<b>Medium</b>	-20.25***	-37.38***	-67.22***	-65.93***	-43.12***	-71.66***
<i>Log</i>	<i>-0.010***</i>	<i>-0.015***</i>	<i>-0.030***</i>	<i>-0.028***</i>	<i>-0.019***</i>	<i>-0.025***</i>
Within R <sup>2</sup>	0.04/0.04	0.10/0.10	0.05/0.06	0.07/0.06	0.08/0.08	0.12/0.18
Individuals	1019	8370	9106	5678	2138	3123
<b>High</b>	61.64	-85.28***	-163.14***	-149.40***	-43.41**	-155.87***
<i>Log</i>	<i>-0.028*</i>	<i>-0.022***</i>	<i>-0.045***</i>	<i>-0.044***</i>	<i>-0.011</i>	<i>-0.041***</i>
Within R <sup>2</sup>	0.07/0.08	0.15/0.10	0.08/0.06	0.10/0.07	0.13/0.14	0.11/0.12
Individuals	95	959	613	1169	176	345

Dependent variable: wage in euro, logarithmic values are given in italics.

Controls: age, age<sup>2</sup>, professional status, firm-size, firm's age structure, industry-specific gross value added per worker, job tenure, quarter dummies

Source: authors' calculation. Significance-level: 0.01(\*\*\*), 0.05(\*\*) and 0.1(\*).

In every industry for nearly all skill levels and for both genders, we confirm the highly significant negative coefficients of the general estimations for western Germany [see table 2]. For the largest subsample of medium skilled men in the manufacturing industry the lowering of the UB in 2005 leads c.p. to a 52.93 EUR lower gross monthly wage in western Germany. In the logarithmic estimation the lower UB causes the wages to decrease c.p. by 1.7%. For the majority of cases the effect is higher for men compared to women. For all industries and for men and women we find in most cases a larger effect with a larger skill level. The higher the skill level the stronger the absolute and relative negative effect of the lower UB. This may result from the higher wages of the high skilled workers. The long-term UB of the highly skilled decreased much more than the long term UB of low skilled.

The differences between the industries are not systematic. For the construction and manufacturing industry as well as for transport, storage and Communications the effect is smaller than in the aggregate estimation. In contrast, the effect seems to be larger in wholesale and retail trade, real estate, renting and business activities and financial intermediation.

In eastern Germany the significant negative impact of the lower UB holds true, but the effect is smaller than in western Germany. For medium skilled men in the manufacturing industry the lowering of the UB in 2005 leads c.p. to a 25.09 EUR lower gross monthly wage in. In the logarithmic estimation the lower UB decreases the wages c.p. 1.2%. In contrast to western Germany there is no clear pattern to the lower UB effect with respect to gender, skill and industry. There is no systematic difference between men and women. Furthermore the level of the effect is detached from the skill level. It is also impossible to identify an industry specific pattern [see Table 3].

**Table 3: Marginal and percentage effect of lower UB on wages with respect to industry, gender and skill level for eastern Germany**

	Construction industry	Manufacturing industry	Wholesale and retail trade	Real estate, renting and business activities	Transport, storage and communication	Financial intermediation
Men						
<b>Low</b>	1.55	-32.87***	3.41	-19.65	-56.17***	-77.52*
<i>Log</i>	<i>-0.007</i>	<i>-0.012***</i>	<i>-0.003</i>	<i>-0.014*</i>	<i>-0.024***</i>	<i>-0.016</i>
Within R <sup>2</sup>	0.11/0.12	0.07/0.06	0.12/0.12	0.09/0.09	0.15/0.15	0.47/0.49
Individuals	104	269	117	85	134	9
<b>Medium</b>	-23.38***	-25.09***	-20.91***	-40.82***	-47.41***	-61.81***
<i>Log</i>	<i>-0.014***</i>	<i>-0.012***</i>	<i>-0.013***</i>	<i>-0.020***</i>	<i>-0.023***</i>	<i>-0.023***</i>
Within R <sup>2</sup>	0.04/0.05	0.10/0.10	0.05/0.06	0.04/0.05	0.05/0.05	0.36/0.36
Individuals	4945	6307	3651	2494	2860	317
<b>High</b>	-88.40***	-30.17***	-31.28**	-38.34***	-45.84***	-33.88**
<i>Log</i>	<i>-0.033***</i>	<i>-0.010***</i>	<i>-0.013***</i>	<i>-0.014***</i>	<i>-0.013***</i>	<i>-0.012**</i>
Within R <sup>2</sup>	0.11/0.12	0.27/0.22	0.13/0.10	0.13/0.10	0.27/0.22	0.27/0.23
Individuals	256	908	277	780	147	115
Women						
<b>Low</b>	3.09	-27.25**	-21.49	-50.14***	-93.26***	-38.64
<i>Log</i>	<i>-0.025</i>	<i>-0.015***</i>	<i>-0.018***</i>	<i>-0.027***</i>	<i>-0.045***</i>	<i>-0.016</i>
Within R <sup>2</sup>	0.34/0.31	0.07/0.06	0.11/0.10	0.09/0.10	0.17/0.16	0.21/0.21
Individuals	12	161	69	66	34	14
<b>Medium</b>	-10.87	-20.29***	-21.28***	-39.59***	-49.44***	-29.59***
<i>Log</i>	<i>-0.008</i>	<i>-0.014***</i>	<i>-0.013***</i>	<i>-0.022***</i>	<i>-0.023***</i>	<i>-0.012***</i>
Within R <sup>2</sup>	0.05/0.05	0.06/0.05	0.04/0.05	0.03/0.03	0.13/0.11	0.13/0.12
Individuals	435	1922	2226	1631	933	641
<b>High</b>	-11.82***	-43.04***	-35.48**	-19.69*	-130.92***	-31.09**
<i>Log</i>	<i>-0.050***</i>	<i>-0.014***</i>	<i>-0.014**</i>	<i>-0.007***</i>	<i>-0.051***</i>	<i>-0.012**</i>
Within R <sup>2</sup>	0.05/0.05	0.20/0.16	0.07/0.08	0.03/0.02	0.12/0.12	0.22/0.17
Individuals	85	308	183	427	75	104

Dependent variable: wage in euro, logarithmic values are given in italics.

Controls: age, age<sup>2</sup>, professional status, firm-size, firm's age structure, industry-specific gross value added per worker, job tenure, quarter dummies

Source: authors' calculation. Significance-level: 0.01(\*\*\*), 0.05(\*\*) and 0.1(\*).

## 6 Conclusions

Theory predicts, the lower the UB the lower the wage. Using a 2% sample of all German socially insured fulltime employees we find strong evidence that a lowering of the UB lowers the wages in Germany. We examine the structural break in the German labor market in 2005 due to the Hartz-IV-Reform. This reform of the labor market legislation decreases the long-term UB and is therefore a unique natural experiment. Before 2005 the long-term UB was a fraction of the former wage, from 2005 on the long-term UB becomes a fixed means tested payment. Thus the long-term UB decreases. The higher the income is the greater the lowering of the long-term UB. Our findings show that the decrease in the long-term UB has a negative effect on the wages, *ceteris paribus*. Furthermore in western Germany the effect is higher the higher the skill level, this is true for both men and women. For every skill level the effect is higher for men. A possible explanation for these findings is the larger impact on higher wages. In eastern Germany we do not find a systematic difference between men and women but the negative impact of lower UB on wages is confirmed.

Our paper contributes to the literature on the effects of the Hartz-Reform on the German labor market. Specifically we amend previous findings which show a wage restraint effect of the – IV-Reform [e.g. Rebien and Kettner (2011)]. While discussing the effects of the Hartz-Reform and therefore the lowering of the UB it is important to take into account that the labor market reform also had a significant positive effect on job creation in Germany. Current studies show that the reform has increased the matching efficiency [Klinger and Rothe (2012)], reduced unemployment and its duration [Krause and Uhlig (2012)]. In general the Hartz-Reform has improved the labor market for the better [Möller (2010)]. Thus Sinn et al. (2009) find descriptive evidence that the reform reduces the core of unemployment in Germany. This success and the creation of new jobs can also be attributed mainly to the 2005 labor market reform. Moreover current research [Koller (2011)] suggest that the effect of an

increasing low-wage labor market, often criticized in the public debate, is small (western Germany) or nonexistent (eastern Germany).



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## **Data**

BA-Employment Panel (2008), Research Data Centre (FDZ) of the German Federal  
Employment Agency (BA) at the Institute for Employment Research (IAB), Nuremberg.

## Appendix A

**Table A1: Pooled estimations before and after the reform in western Germany**

	<b>Men (before)</b>	<b>Men (after)</b>	<b>Woman (before)</b>	<b>Women (after)</b>
<b>Constant</b>	<b>1692.24***</b>	<b>797.67***</b>	<b>2021.77***</b>	<b>474.83***</b>
	<b>(55.74)</b>	<b>(30.15)</b>	<b>(45.20)</b>	<b>(10.88)</b>
Age	81.37***	68.93***	95.70***	79.92***
	(85.49)	(63.47)	(65.40)	(44.95)
Age <sup>2</sup>	-0.79***	-0.68***	-1.02***	-0.82***
	(-69.97)	(-56.99)	(-56.98)	(-41.12)
Low skilled	-135.85***	-120.64***	-79.94***	-58.16***
	(-40.96)	(-35.44)	(-13.85)	(-9.26)
High skilled	736.86***	695.15***	842.51***	819.86***
	(238.19)	(219.76)	(141.43)	(125.94)
Unskilled blue collar worker	-993.20***	-1037.59***	-767.86***	-767.27***
	(-362.79)	(-371.74)	(-143.11)	(-129.35)
Skilled blue collar worker	-734.07***	-756.67***	-486.68***	-511.41***
	(-309.01)	(-307.80)	(-58.80)	(56.92)
Foreman	70.25***	24.60***	-45.43	30.47
	(12.51)	(4.24)	(-1.39)	(0.85)
Small firm	-197.48***	-183.81***	-251.85***	-249.05
	(-77.50)	(-69.82)	(-59.44)	(-53.84)
Large firm	306.42***	-294.76***	278.98***	280.95***
	(131.96)	(-28.60)	(69.60)	(64.37)
Firm's share of young employees	-1149.73***	-1347.16***	-1710.342***	-2177.04***
	(-61.33)	(-63.21)	(-59.06)	(-60.01)
Firm's share of old employees	-183.56***	-294.76***	-321.43***	-435.81***
	(-16.72)	(28.60)	(18.03)	(-25.57)
Industrial-specific gross value added	-3.00***	7.74***	-13.69***	3.79***
	(-13.35)	(85.26)	(-41.14)	(20.57)
Job tenure	8.83***	5.22***	-0.75	-0.68***
	(36.59)	(52.50)	(-1.74)	(-3.60)
2 <sup>nd</sup> Quarter	0.28	-21.25***	7.08	-18.74***
	(0.11)	(-7.95)	(1.59)	(-3.87)
3 <sup>rd</sup> Quarter	-5.94**	-30.00***	12.84***	-16.80***
	(-2.26)	(-11.22)	(2.85)	(-3.46)
4 <sup>th</sup> Quarter	-5.90**	-58.35***	23.44***	-35.33***
	(2.67)	(-21.77)	(5.13)	(-7.27)
R <sup>2</sup>	0.5198	0.5053	0.3598	0.3110
Obs.	510599	492257	177287	168908

Source: authors' calculation. Significance-level: 0.01(\*\*\*), 0.05(\*\*) and 0.1(\*). t-values are reported in parentheses below the coefficients.

**Table A2: Pooled estimations before and after the reform in eastern Germany**

	Men (before)	Men (after)	Woman (before)	Women (after)
<b>Constant</b>	<b>1018.76***</b>	<b>1189.68***</b>	<b>515.06***</b>	<b>160.04**</b>
	(22.93)	(23.01)	(8.61)	(2.24)
Age	54.07***	43.34***	75.43***	77.23***
	(29.79)	(19.46)	(30.34)	(25.10)
Age <sup>2</sup>	-0.604***	-0.47***	-0.80***	-0.78***
	(-27.85)	(-19.17)	(-26.94)	(-23.07)
Low skilled	82.94***	79.82***	12.53	34.88**
	(8.28)	(7.04)	(0.93)	(2.30)
High skilled	472.99***	603.50***	476.53***	569.16**
	(70.20)	(86.99)	(67.28)	(75.62)
Unskilled blue collar worker	-652.63***	-791.99***	-626.74***	-684.46***
	(-107.22)	(-118.62)	(-68.06)	(-67.14)
Skilled blue collar worker	-581.72***	-689.74***	-525.39***	-550.10***
	(-125.06)	(134.12)	(-69.47)	(65.11)
Foreman	-44.24***	-80.51***	-157.81***	-166.52***
	(-3.65)	(-6.03)	(-3.92)	(-3.93)
Small firm	-190.85***	-159.60***	-283.14***	-296.33***
	(-44.15)	(-33.43)	(-46.87)	(-44.95)
Large firm	310.28***	322.55***	300.16***	240.27***
	(65.53)	(62.82)	(50.87)	(37.47)
Firm's share of young employees	-926.90***	-1054.11***	-1389.40***	-1733.92***
	(-30.53)	(-26.53)	(-36.77)	(-34.57)
Firm's share of old employees	-204.85***	-201.00***	-78.89***	-32.35
	(-10.96)	(-11.06)	(-3.47)	(-1.45)
Industrial-specific gross value added	1.59***	2.27***	-0.19	2.07***
	(7.29)	(23.63)	(-0.66)	(13.36)
Job tenure	14.36***	7.69***	2.75***	0.78***
	(34.07)	(39.85)	(4.45)	(2.91)
2 <sup>nd</sup> Quarter	-8.20	-22.49***	1.62	-20.57***
	(-1.63)	(-4.06)	(0.25)	(-2.87)
3 <sup>rd</sup> Quarter	-20.26***	-30.03***	2.79	-22.47***
	(-4.00)	(-5.42)	(0.42)	(-3.13)
4 <sup>th</sup> Quarter	-20.16***	-51.04***	12.56*	-40.90***
	(-3.93)	(-9.17)	(1.89)	(-5.67)
R <sup>2</sup>	0.4245	0.4678	0.3548	0.3261
Obs.	89265	89297	61444	59867

Source: authors' calculation. Significance-level: 0.01(\*\*\*), 0.05(\*\*) and 0.1(\*). t-values are reported in parentheses below the coefficients.