German Institute
for Economic Research

DIW BERLIN

Weekly Report

Gender pay gap lower in large cities than in rural areas

For years, the difference between the gross hourly earnings of women and of men has remained constant for German white-collar employees at about 30 percent. It is obvious that regional factors play an important role in explaining this difference. In rural areas, the gender pay gap is especially pronounced (2006: 33 percent) while in metropolitan areas it is considerably lower than the average (2006: 12 percent). This more favorable ratio is mainly due to the increased employment opportunities for highly-qualified women in cities. In addition, it is evident that where there are high levels of regional unemployment at the county level, women's pay suffers more than men's. The present study was based on the data from the German Socio-Economic Panel Study (SOEP). Focusing on white-collar salaried employees (Angestellte) allows us to analyze pay determinants on the basis of largely homogenous pay structures.

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The gender pay gap[1] is seen as a considerable problem by the European Commission, which has demanded on several occasions that it should be reduced.[2] The gender pay gap in Germany is particularly high, in comparison to that in other EU countries, and has remained so for many years. Evidently, the German labor market is characterized by enduring gender-specific structures that disadvantage women.[3]

Along with factors related to human capital, the gender pay gap in Germany may partly be explained by regional factors such as regional unemployment and the type of settlement structure in different counties (Box 1). The present study investigates the extent to which these factors may contribute to explaining the gender pay gap, based on the *gross hourly earnings* of white-collar salaried employees (*Angestellte*) aged between 18 and 64.[4] The study is limited to *Angestellte* because

[1] On the gender pay gap, see, for example, Blau, F. D., Ferber, M. A. et al.: The Economics of Women, Men and Work. New Jersey 2006.

[2] COM Commission of the European Communities: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions: Tackling the pay gap between women and men. eur-lex. europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0424:FIN:EN: PDF; and COM: Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on Equality Between Women and Men - 2008. ec.europa.eu/employment_social/ gender_equality/ docs/com_2008_001 0_en.pdf.

[3] On this subject see also Holst, E., Schrooten, M.: "Führungspositionen: Frauen geringer entlohnt und nach wie vor seltener vertreten." Wochenbericht des DIW Berlin no. 25/2006; and Busch, A., Holst, E.: "Verdienstdifferenzen zwischen Frauen und Männern nur teilweise durch Strukturmerkmale zu erklären." Wochenbericht des DIW Berlin no. 15/2008.

[4] Gross hourly earnings are calculated on the basis of gross monthly earnings divided by the number of hours of paid work. The number of hours of paid work are calculated as the agreed number of hours to be worked in a week plus paid overtime. Where overtime was partially paid for and partially remunerated by means of extra time off, half of the over-

Box 1
Regional indicators

The following regional indicators were used for the calculations:

- The (logarithm of the) unemployment rate at county (*Kreis*) level, to reflect the amount of work on offer in the region.[1] We expected this to have a negative effect on earnings.

- A breakdown of regions by type, based on the settlement structure classifications developed by the Federal Office for Building and Spatial Planning.[2] This classification takes both population density and the "central place functions of regional cores" into account. It reflects the fact that the structures of rural areas e.g. in Brandenburg (for example the *Kreis* of Dahme-Spreewald) can differ significantly from those in rural areas of Schleswig-Holsten (for example the *Kreis* of Nordfriesland). The classification of counties (*Kreise*) is retained in our analysis, except that we broke the classification "core cities in highly densely populated metropolitan areas" down into "larger core cities" and "core cities". The *Kreis* classifications for rural regions were combined to form one reference category; in our descriptive analysis, they are compared with region type 1.

- Whether the place of residence is in the former West Germany or the former East Germany

1 See for example Blien, U.: "Die Lohnkurve. Auswirkungen der regionalen Arbeitslosigkeit auf das Lohnniveau." In: Mitteilungen aus der Arbeitsmarkt- und Berufsforschung, vol. 36, no. 4, 2003, 439-460.
2 Bundesamt für Bauwesen und Raumordnung (Federal Office for Building and Spatial Planning): Laufende Raumbeobachtung - Raumabgrenzungen. Siedlungsstrukturelle Gemeindetypen. www.bbr.bund.de/cln_007/nn_103086/DE/Raumbeobachtung/Werkzeuge/Raumabgrenzungen/Siedlungs-strukturelleGebietstypen/gebietstypen.html.

Definition of types of region

Type of region	Description	Examples
1	Large core cities in metropolitan areas	Berlin (city), Munich (state capital), Leipzig (city), Cologne (city)
2	Core cities in metropolitan areas	Nuremberg (city), Potsdam (city), Mannheim, Bielefeld (city)
3	Highly densely populated counties in metropolitan areas	Ludwigsburg, Gütersloh, Rhein-Sieg-Kreis, Pinneberg
4	Densely populated counties in metropolitan areas	Harburg, Main-Kinzig-Kreis, Schaumburg, Meissen
5	Rural counties in metropolitan areas	Rotenburg (Wümme), Stade, Oberhavel, Dahme-Spreewald
6	Core cities in urbanized regions	Kiel (state capital), Magdeburg, (state capital), Erfurt (city), Augsburg (city)
7	Densely populated counties in urbanized regions	Hildesheim, Weimar (city), Paderborn, Reutlingen
8	Rural counties in urbanized regions	Waldeck-Frankenberg, Hochsauerlandkreis, Spree-Neisse, Wernigerode
9 (Reference category for analysis)	Rural counties, of higher or lower population density, in rural regions	Celle, Nordfriesland, Nordvorpommern, Emsland

the pay mechanisms influencing the earnings of workers (*Arbeiter*) differ considerably from those of *Angestellte*.[5] The data basis for these analyses is the Socio-Economic Panel Study (SOEP).[6]

time worked was added to the standard working week. Weekly hours worked were then converted to a monthly figure by multiplying them by 4.35 (the average number of weeks per month). Gross monthly earnings were then divided by this figure. On this subject see also Buslei, H., Steiner, V.: Beschäftigungseffekte von Lohnsubventionen im Niedriglohnbereich. Baden-Baden 1999.

5 In German-speaking countries, a distinction is generally drawn between Angestellte ("employees", traditionally, white-collar salaried employees) and Arbeiter ("workers", traditionally blue-collar wage-earners). There are a number of structural differences between Angestellte and Arbeiter that affect earnings (for example with regard to protection against dismissal, collective pay agreements, and vacation bonuses). These make comparisons between the two groups more difficult. In addition, opportunities for career progression, and thus earnings potential, differ considerably between the two groups.

6 Wagner, G.G., Frick, J. R., Schupp, J.: "The German Socio-Economic Panel Study (SOEP) - Scope, Evolution and Enhancements." In: Schmollers Jahrbuch, vol. 127, no. 1, 2007, 139-169.

Gender pay gap lower in large cities than in rural areas

Overall, there was a considerable difference between the gross hourly earnings of male and female *Angestellte* in 2006. Women earned about 70 percent of average male earnings (Figure). The gender pay gap was thus about 30 percent.

The differences in rural areas were higher than the average. In 2006, according to the SOEP, the difference in earnings in rural areas was about 33 percent, far higher than that in large core cities in metropolitan areas (12 percent), which include Berlin.

Earlier studies had already revealed that the gender pay gap in cities was smaller.[7] This suggests that in metropolitan areas, labor market conditions for women differ from those in rural areas.[8] For example, the higher level of women's earnings and lower gender pay gap may partly be explained by the fact that the concentration of large service-industry enterprises in metropolitan areas increases the chances of, in particular, highly qualified women being employed, over those in other regions. In addition, the higher availability of education, the more frequent involvement of women in the labor force, and a greater heterogeneity of lifestyles (an "urban culture") should mean that attitudes towards equal opportunities for men and women would be more egalitarian than in rural areas. This would make these regions particularly attractive to highly-qualified women.[9]

Do high levels of regional unemployment increase the gender pay gap?

The level of unemployment in a region can affect regional earnings structures: the concept of the "wage curve" has been coined to capture this phenomenon.[10] It describes the relationship between regional unemployment and regional pay levels as (inversely) negative, i.e., the higher the level of unemployment in a particular region, the lower the pay levels there. This idea is based partly on the belief that high levels of regional unemployment reduce wage pressure on employers because it weakens workers' negotiating positions.

The existence of the wage curve was confirmed in studies involving international comparisons in the early 1990s. A coefficient for earnings, related to unemployment of -0.1 was usually identified. This value means that when unemployment rates

Figure

Regional gross hourly earnings[1] of salaried employees (Angestellte) and gender pay gap, 2006
in Euro

1 Median.
2 Region type 9: rural counties, of higher or lower population density, in rural regions
3 Region type 1: Large core cities in metropolitan areas

Sources: SOEP 2006; DIW Berlin calculations.   **DIW** Berlin 2008

double, salary levels fall by about ten percent. For the states making up the former West Germany, the value identified was -0.13.[11] Only weak empirical evidence of the wage curve could be identified for the former East German states.[12]

For western Germany, a gender-specific study of this issue was carried out on the basis of the IAB 1989 sample of employees, with aggregate data added. This established that regional unemployment had stronger negative effects on women's earnings than on men's.[13] A significant negative link between regional unemployment and regional earnings was also found for Germany as a whole using data from the year 2000 from the IAB's employer-employee database; however, in this case the effect identified was stronger for men than for women.[14] This paper

7 See Berth, F.: Der kleine Unterschied: Zumindest in modernen Groß-städten werden junge Frauen nicht mehr so benachteiligt-gerecht ist die Situation aber noch nicht. In: Süddeutsche Zeitung, no. 289 (Saturday/Sunday, December 15/16, 2007), 2; and Beveridge, A.: No Quick Riches for New York's Twentysomethings. Gotham Gazette (June 19, 2007), www.gothamgazette.com/article/ demographics/20070619/5/2208.

8 As early as 1993, it was established (for western Germany) that women in metropolitan areas were much more strongly oriented towards paid employment, and far fewer women had no vocational training, than the averages for people of working age. This was reflected in higher-than-average rates of employment and higher-than-average levels of income and qualifications. See Bender, S., Hirschenauer, F.: "Regionale Unterschiede in der Frauenerwerbstätigkeit - Eine Typisierung westdeutscher Arbeitsmarktregionen." In: Mitteilungen aus der Arbeitsmarkt-und Berufsforschung, no. 3/1993, 294-312.
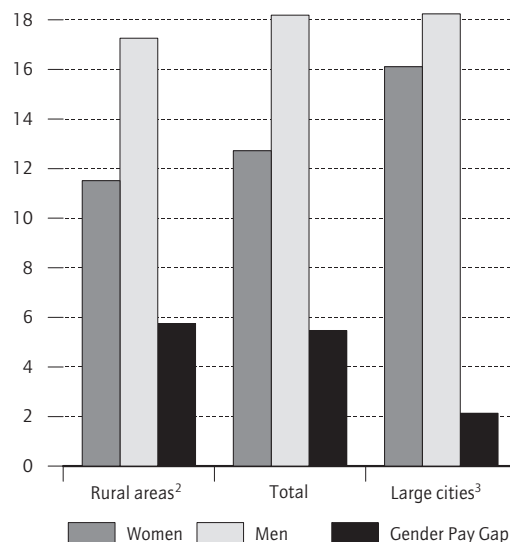
9 Sigelmann, L.,Tsai, Y.-M.: "Urbanism and Women's Labor Force Status: A cross-national Study." In: International Journal of Comparative Sociology, vol. 26, 1985, 109-118; Duch, R. M., Taylor, M. A.: "Postmaterialism and the Economic Condition." In: American Journal of Political Science, vol. 37, no. 3, 1993, 747-779; and Rodenstein, M.: "Frauen." In: Häußermann, H. [ed.]: Großstadt. Soziologische Stichworte. 2nd edition, Opladen 2000, 47-56.

10 Blanchflower, D.G., Oswald, A.J.: The Wage Curve. London/Cambridge (Mass.) 1994.

11 Blanchflower, D.G., Oswald, A.J., op. cit. For an overview of other studies on Germany and their findings, see Blien, U.: "Die Lohnkurve. Auswirkungen der regionalen Arbeitslosigkeit auf das Lohnniveau." In: Mitteilungen aus der Arbeitsmarkt- und Berufsforschung, vol. 36, no. 4, 2003, 454.

12 Buscher, H. S.: "Gibt es eine Lohnkurve in den neuen Bundesländern?" In: Mitteilungen aus der Arbeitsmarkt- und Berufsforschung, no. 4, 2004, 461-475.

13 See Blien, U., Mederer, A.: "Die Regionaldimension geschlechtsspezifischer Entlohnung." In: Jahrbuch für Regionalwissenschaft, vol. 18, no. 1, 1998, 37-54.

14 Achatz, J., Gartner, H., Glück, T.: "Bonus oder Bias? Mechanismen geschlechtsspezifischer Entlohnung." In: Kölner Zeitschrift für Soziologie und Sozialpsychologie, vol. 57, 2005, 466-493.

will use SOEP data for *Angestellte* to evaluate the present situation. The main question of interest is whether regional unemployment affects the extent of the gender pay gap.

Issues determining the gender pay gap: regional factors play a significant role

In addition to regional factors, many other variables affect earnings, such as human capital, employment in segregated (gender-typical) activities and sectors, and family situation. Below, we undertake a multivariate regression analysis to isolate the effect of regional indicators of earnings from that of these other variables.[15] The analysis was performed for 2005 data, as this was the last year for which all relevant types of regional information were available.

Even once all the different factors are taken into account, the characteristic of being a woman has a negative effect. In other words, even when all other variables (qualification, professional experience, place of residence, and others) are identical, women earn less than men do. When the analysis is broken down by gender, the results reveal that a regional wage curve exists *only* for women. For this group, the principle is valid that the higher the level of unemployment in a county *(Kreis)*, the lower their earnings (Table 1). A doubling of regional unemployment levels reduces women's earnings by 6.4 percent. By contrast, no statistically significant effect could be identified for men.

The existence of this wage curve for women may be partly explainable through women having a lower level of regional mobility, because of family commitments. If this were the case, they would be less capable of using the possibility of moving to a new employer as a threat in wage negotiations than men, and for that reason, would be forced to accept poorer conditions. In addition, structural processes resulting from gender-typical segregation probably also influence negotiation processes. For example, women are concentrated in a smaller range of occupations than men are, which means they are faced with more competition.

Men in large core cities in metropolitan areas have earnings that are, on average, 8.6 percent higher than those of men in rural counties in rural regions. This effect cannot be established with statistical significance for women. However, the difference between the coefficients for the genders is statistically significant. Evidently, men are more successful in

[15] We also tested whether a multi-level model (using the Kreise as the second level) would produce different results. But the coefficients obtained from that multi-level analysis differed only marginally from the results obtained through linear regression.

Table 1

Factors determining gross hourly earnings of salaried employees (Angestellte), men and women, of employment age in 2005[1]

	With regional factors	
	Women	Men
Regional indicators		
Place of residence: new (eastern) federal states (reference value: old (western) federal states)	-0.172***	-0.250***
Logarithm of unemployment rate at county level	-0.064**	-0.046
Settlement structural characteristic of county (Reference value: rural counties of higher and lower population density in rural regions)		
Large core cities in metropolitan areas	0.008	0.086**
Core cities in metropolitan areas	0.013	0.033
Highly densely-populated counties in metropolitan areas	0.023	0.095***
Densely populated counties in metropolitan areas	-0.076**	0.018
Rural counties in metropolitan areas	-0.018	0.048
Core cities in urbanized regions	-0.019	0.034
Densely populated counties in urbanized regions	-0.040	0.013
Rural counties in urbanized regions	-0.038	0.011
Human capital		
Duration of education, in years	0,042***	0,029***
Educational experience, in years	0.023***	0.032***
Educational experience, squared	-0.0005***	-0.001***
Share of professional experience gained through part-time work	-0.002***	-0.003***
Length of employment with current employer, in years	0.008***	0.007***
Full-time employment (35 hours per week or over)	-0.072***	0.040
Family circumstances		
Family status (reference value: single)		
Living with spouse	0.006	0.053**
Unmarried but living with partner	0.031	0.037
Number of children in household aged under 16	0.025**	0.023**
Segregation		
Managerial role (reference value: non-managerial role)	0.236***	0.273***
Economic sector (reference value: manufacturing industry)		
Trade, hotels and catering, transport	-0.197***	-0.152***
Other services	-0.081***	-0.003
Number of employees at place of employment (reference value: fewer than 20)		
20 – 199 employees	0.146***	0.162***
200 – 1999 employees	0.195***	0.225***
2000 employees or more	0.273***	0.269***
Employed in the public sector (reference value: not employed in the public sector)	0.081***	-0.024
Constant	1.908***	1.864***
Number of cases	2 889	2 063
R² adjusted	0.393	0.612
For information: R² adjusted (without regional factors)	0.355	0.462

1 OLS earnings estimate: * Level of significance < 10 percent;
** level of significance < 5 percent; *** level of significance < 1 percent.
Sources: SOEP 2005; DIW Berlin calculations.

DIW Berlin 2008

making use of the advantages of the city, such as e.g. networks. Further analysis showed that the higher earnings achieved by women in urban metropolitan areas is due mainly to the higher level of education achieved by women in employment there than by women in employment in rural areas.[16]

[16] This is shown by a separate estimate of earnings without taking

Table 2

Extent to which regional indicators explain the gender pay gap
in percent

	Without	With	Difference, in percentage points
	Regional factors		
Endowment effect („explained")	76,98	82,12	
			5,14
Remaining effect („unexplained")	23,02	17,88	

Sources: SOEP 2005; DIW Berlin calculations.　　　　　　　　　　　**DIW** Berlin 2008

As expected, both men and women in the states formerly making up West Germany have higher earnings than their counterparts in the former East Germany. The earnings differential between the former West and the former East is more marked for men than for women.

Education, professional experience, segregation, and family circumstances

The other explanatory variables included in the model show, as expected, a statistically significant positive effect on gross hourly earnings for duration of education, amount of professional experience and length of employment with the current employer, for both men and women. Education has a stronger effect on women's earnings than on men's (the gender-specific difference between the coefficients is statistically significant). On the other hand, men's professional experience is much more strongly reflected in higher earnings than that of women. One reason may be that women's careers are generally more often interrupted and characterized by discontinuities than men's. All else being equal, ten years of continuous professional experience are worth more on the labor market than, for example, the same amount of experience with an interruption of several years in the middle (during which a loss of human capital occurs). Another factor may be that women are more likely to work in occupations in which increased professional experience is less likely to lead to higher earnings. In addition, the question of whether professional experience has been gained through full-time or part-time work also affects earnings. The more the experience is based on part-time work, the greater the likelihood that the part-time experience will be penalized.

Overall, women employed full-time earn significantly less (per hour) than those employed part-time; for men, it makes no difference whether their contractual hours of work are above or below 35 hours per week. However, the earnings disadvantage experienced by women working full-time is

education into account; in this analysis, women profit (to a statistically significant degree) from residing in core towns in metropolitan areas. The findings are not described here in any further detail.

partially an effect of education. When the regression is carried out without including human capital factors, there is no significant difference between the earnings of women in full-time work and those in part-time work.

Both the total number of employees in the workplace, and working in manufacturing industry, have a positive effect on earnings for both men and women. The reduction in earnings in "other services" (banking and insurance services, real estate, legal advice and others), in comparison to those in manufacturing industry is much more marked for women than for men. However, only women profit from employment in the public sector. Overall, it can be seen that the model has a greater capacity to explain the results found when regional indicators are taken into account.

Decomposition of the gender pay gap with and without inclusion of regional factors

Using the multivariate model for women and men, the earnings differential was then broken down, using an Oaxaca-Blinder decomposition, into an "explained" component and an "unexplained" component (Box 2). This decomposition was carried out once without including the regional factors and once including them.

Where the regional factors were not taken into account, about 77 percent of the gender pay gap can be explained in terms of gender-specific differences in the variables ("endowment effect") (Table 2). When regional unemployment rates, settlement structures and place of residence (whether the former West or East) are taken into account, the percentage "explained" increases to some 82 percent. This shows that taking regional factors into account is important for explaining the gender pay gap. The "unexplained" remaining effect, of about 18 percent, involves social and cultural conditions that mean, for example, that the same regional labor market characteristics (for example unemployment) have different effects on women's earnings than on men's

Box 2
Oaxaca/Blinder decomposition of the gender pay gap

The Oaxaca-Blinder decomposition carried out by us breaks the difference in earnings between men and women into the following components (in this method, the higher-earning group, here, men, generally form the reference group).[1] It is assumed that in the event of absolute parity of treatment of the genders, women would earn the same amount as men, not the reverse:

- *Endowment effect:* The difference in the average variable values between the two groups multiplied by the coefficient calculated for the male group reveals the share of wage disparity that can be explained by gender-specific differences in the various characteristics. This value corresponds to the percentage wage loss that men would experience if they had the same qualifications, professional experience and other characteristics taken into account by the model, as women, and if these characteristics were valued for women in the same way as for men ("explained effect").

- *Price effect*: The differential between the coefficients estimated for men and for women multiplied by the average of each variable for the female group gives the portion of the gender wage gap that can be explained by the different monetary valuation placed on the characteristics. It shows how much more women would earn if their qualifications, professional experience and so on were rewarded to the same extent as men's.

- *Shift effect*: This is the portion of the wage gap that *cannot* be explained by differences in the various characteristics or how they are rewarded.

- *Remainder effect:* In technical terms, this is the sum of the price and shift effects. It is frequently interpreted as "discrimination". However, caution is required because it also covers unobserved differences between the groups. In addition, some differences in the variables recorded could be due to discrimination, for example if it is more difficult for women to access particular forms of education or employment (for example managerial positions).[2] For this reason, we describe the sum of the price and shift effect here as the "unexplained effect".

1 See Blinder, A. S.: "Wage Discrimination: Reduced Form and Structural Estimates." In: *The Journal of Human Resources*, vol. 8, no. 4, 1973, 436-455; and Oaxaca, R. L.: "Male-Female Wage Differentials in Urban Labor Markets." In: *International Economic Review*, vol. 14, no. 3, 1973, 693-709.
2 On this subject see Olsen, W., Walby, S.: "Modelling Gender Pay Gaps." EOC Working Paper Series, *www.lancs.ac.uk/fass/sociology/papers/walby-modelling-genderpaygapswp17.pdf;* and Achatz, J., Gartner, H., Glück, T.: "Bonus oder Bias? Mechanismen geschlechtsspezifischer Entlohnung." In: *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, vol. 57, 2005, 466-493.

earnings. In other words, this remainder effect also reflects discriminatory structures in the labor market.

Conclusion

The analyses show for *Angestellte* in Germany that regional unemployment (at the county (*Kreis*) level) has a negative effect on women's earnings. This increases the gender pay gap. The stronger effect for women than for men may be partly related to segregation in the labor market and to family commitments, which weaken women's bargaining power in pay negotiations.

The observation that the gender pay gap is lower in cities than in rural areas is explained mainly by the different levels of qualification held by women in the two types of region. Only men have a fundamental earnings advantage in cities over rural areas. Evidently, they are more successful in making use of the advantages of the city, such as networks. This result shows that even a reasonably egalitarian "urban culture" does not automatically lead to equal pay for both genders.