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Labor market closure and the stalling of the gender pay gap

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Labor Market Closure and the Stalling of the Gender Pay Gap

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Abstract

The gender pay gap (GPG) remains a persistent phenomenon in contemporary labor markets. Despite a vast body of research examining its causes, as of today, unequal labor market power resources between men and women have remained an underappreciated factor in the literature. Drawing on the Socio-economic Panel and the Microcensus, the association between the GPG and labor market closure – a crucial determinant of unequal power resources in labor markets – is followed from 1993-2011. Employing JMP decomposition, unionization, tertiary credentialing and part-time employment are found to exacerbate the overall wage differential by 41 percent. Part-time employment has been the only indicator that enlarged the gender pay gap (17 percent) between 1993 and 2011, while the remaining covariates contributed toward its convergence. These results advance our understanding of stalling GPGs by highlighting the so far widely neglected importance of power resources on the GPG.

Keywords gender pay gap; labor market closure; stalled gender revolution; JMP decomposition; dualism

JEL J2 J5 L1

1 Introduction

The pay gap between men and women continues to be a much-debated feature of labor markets and, despite many attempts to tackle gender income inequalities, has remained fairly constant throughout the past decade (England, 2010; German Federal Statistical Office, 2016; OECD, 2017). The stagnation is puzzling given that women have caught up in human capital attributes and even outpace men in terms of education (Grönlund & Magnusson, 2016; OECD, 2017). Although scholars have increasingly engaged in trying to solve this paradox (see, e.g., Cha & Weeden, 2014; Goldin & Katz, 2016), thus far a lot of questions remain unanswered. In this paper, we argue that part of the puzzle can be solved by accounting for asymmetric power resources of men and women at labor markets.

Based on the power resource approach, we argue that subordinate groups with low social status, i.e., women and racial minorities, possess lower political power and bargaining effectiveness, which in turn circumscribes their power to forestall pay degradation (Catanzarite, 2003). This lack in power resources can best be operationalized by means of social closure theory (Weber, 2010[1922]). In a nutshell, occupational closure (as the form of social closure that appears at labor markets) describes a process by which incumbents restrict access to occupational positions and, given this powerful position, are able to demand privileges, such as higher than average wages (see, e.g., Bol & Weeden, 2015; Weeden, 2002). Although scholars are recently more engaged in scrutinizing the impact of occupational closure on wages in general and evidence was found that occupational closure does influence bargaining power, e.g., high occupational union coverages is associated with wage premiums (Bol & Weeden, 2015), thus far we know little about gender-specific effects of occupational closure on the pay differential between men and women. This gap is surprising, given that there is evidence that women compared to men lack tools to exert closure, which, for instance, is illustrated in their lower representation in unions (Ebbinghaus & Göbel, 2014).

Furthermore, the amount of women in part-time positions and any kind of marginal employment, such as the German “Minijobs”, is striking and grew vastly over the past two decades (OECD, 2017; Weinkopf, 2009). Thus, drawing on dualization theory (Emmenegger, Häusermann, Palier, & Seeleib-Kaiser, 2011), here conventional definitions of occupational closure are broadened to labor market closure. According to dualization theory, “outsiders”, i.e., employees in nonstandard and atypical employment relationship, provide the economic flexibility the state and employees need to stabilize privileges for workers in the “core”

economy, the so called “insiders”. A secondary and cheap labor force is created by stripping outsiders of employment and wage security (Palier & Thelen, 2010). Due to women’s high prevalence of working in part-time position they are such outsiders (Hipp, Bernhardt, & Allmendinger, 2015; Palier & Thelen, 2010). This outsider status of part-time employers, of which a majority is female, is associated with wage losses (Kalleberg, 2000; Manning & Petrongolo, 2008; Weeden, Cha, & Bucca, 2016) and lower social security coverages, such as lower pension entitlements. Thus, we argue that the full extent of labor market closure on the gender pay gap (hereafter: GPG) can only be captured by additionally accounting for part-time employment as a transmitting mechanism of gendered power resources next to the conventional closure covariates (i.e. here: unionization and tertiary credentialing).

Using the power resources approach operationalized as labor market closure, we reason, despite women increasingly catching up in labor market participation and human capital attributes, gendered power asymmetries reflective in labor market closure influence gender wage inequalities. Given the continuous disadvantage of women in labor markets, understanding these gender-specific effects of labor market closure while disentangling it from supply-side human capital explanations might contribute to our understanding of the “stalled gender revolution” (England, 2010).

The article is structured as follows: First human capital theory is juxtaposed with contemporary sociological explanations for the GPG. Next, the power resource theory is introduced by explaining how this approach might be able to shed light on angles of the GPG that cannot be captured with conventional labor market theories, i.e., human capital. Simultaneously, a novel approach of defining labor market closure is proposed by including part-time employment as a critical factor of gendered labor market closure. Thereafter, the empirical chapter draws on a rich data set created by merging the German Socio-economic Panel with the Microcensus. Individual human capital attributes (e.g., work experience, tenure, education, etc.) are juxtaposed with labor market closure (unionization, tertiary credentialing and part-time employment). In doing so it is possible to scrutinize and contrast their equal or diverging importance for explaining wage differences between men and women. Juhn, Murphy, and Pierce decompositions (hereafter: JMP) are carried out across the pooled sample, to examine the overall impact of labor market closure and human capital on the wage differential, as well as changes in their impact between 1993 and 2011. Thereby, this study provides not only insights in the static mechanisms of these indicators but also assesses their changing impact on

the GPG over time. Finally, the significance of the power resource approach for explaining the GPG is highlighted.

2 The importance of power for the gender pay gap

Two of the most frequently discussed theories in explaining wage differences between men and women are differences in human capital investments (Becker, 1985) and the devaluation of women in the labor market, sometimes referred to as cultural devaluation (England, 1992; Levanon, England, & Allison, 2009). Although human capital theory is still a crucial determinant in explaining women's wage gap relative to men's, its encompassing fit is increasingly disputable, given a rising quantity of women participating in paid labor and catching up in labor-market-relevant attributes such as education (Boll, Rossen, & Wolf, 2017; Minkus & Busch-Heizmann, 2018). To address the shortcoming of human capital theory in sufficiently explaining women's wage disadvantages, the theory of cultural devaluation has received particular attention in sociological explanations and brought about a vast amount of evidence documenting the downgrading of women's status at labor markets (Busch, 2013; Levanon et al., 2009; Mandel, 2013; Minkus & Busch-Heizmann, 2018).

However, even though these theories explain parts of the wage differential and this study builds on the evidence brought forth by these lines of argument, we argue that the crucial factor of gendered power resources has received too little attention so far (Catanzarite, 2003; Murphy & Oesch, 2015). The concept of power resources goes beyond the human capital approach and is only partially present in the cultural devaluation approach. Employing a power resource approach, we argue that women are prone to occupy positions in the labor market that lack the power and thus opportunities to exert closure strategies and thereby actually reinforce wage inequalities between men and women. We will test these claims by juxtaposing covariates of labor market closure with the widely deployed theory of human capital, in order to scrutinize their value and their changing impact on explaining the GPG in Germany. In what follows there will be a short overview on human capital and cultural devaluation theory. Thereafter the power resource approach will be introduced.

Human capital

Undeniably human capital theory still plays an important role in explaining wage inequalities between men and women. Women still lack men's endowments in work experience and have

higher rates in employment interruptions (Boll, 2011). However, accounting for human capital variables, such as education, tenure and work experience, a considerable wage differential between women and men remains (Blau & Kahn, 2006). This is true even though women are increasingly catching up in human capital attributes and even outperform men in educational attainment in most OECD countries (OECD, 2012, p. 117 ff.). Additionally, there are increasing incentives for women to engage in paid work put forth by public policy in industrial countries, which in turn translates to higher female labor market participation (ibid., p. 150). This evidence suggests a decreasing significance in human capital theory for explaining the GPG in contemporary labor markets (Boll et al., 2017; Grönlund & Magnusson, 2016).

However, Germany might be a crucial case here, as the traditional male breadwinner system has persisted for a very long time and it was only in the mid-2000s that it shifted towards promoting female labor market participation (for this paradigm shift, see Fleckenstein, 2011). This late engagement of German policy makers to promote female employment reflects the comparatively high impact of individual human capital attributes on the German GPG (Grönlund & Magnusson, 2016) and a large part-time corrected labor market participation gap between men and women (Schreiber, 2015).

Cultural devaluation

As an answer to the shortcoming of human capital theory to comprehensively explain the GPG, scholars have stressed the importance of the downgrading of women's status at labor markets in general (Ridgeway, 1997) as well as the devaluation of female-connoted work content in specific (England, 1992). Mechanisms that have been suggested to manifest this downgrading are, for instance the monetary devaluation of female-connoted work content, which is work that has formerly been carried out for free in the household context and is now commodified. This theoretical approach is often subsumed under the term of cultural devaluation and has received considerable attention. Calanca et al. (2019) found that jobs which are advertised using soft skills associated with stereotypes about women (e.g. being, warm, polite, caring) come with wage penalties. Levanon et al. (2009) found evidence for the US labor market that an increase in women's share in occupations drives wages down (for Germany see: Hausmann, Kleinert, & Leuze, 2015). More recently Mandel (2013) has shown that men suffer a wage penalty once their field opens up to women and that this tendency is exacerbated in high-paying occupations. Recent studies found further evidence that, controlling for unobserved heterogeneity, moving from a male to a female occupation incurs considerable wage losses (Magnusson, 2013; Murphy & Oesch, 2015).

The power resource approach

The outlined research provides plenty of evidence that there is a devaluation of women at labor markets. The argument of this paper is somewhat related but also goes beyond the premise of cultural devaluation, by employing the power resource approach. This approach implies that women's disadvantageous labor market position is directly linked to their lack of power resources, which is transmitted through their subordinate status (Catanzarite, 2003; see also Murphy & Oesch, 2015). This approach is similar to the theory of cultural devaluation, but while the latter traditionally operationalizes the downgrading of women by employing the percentage share of women in an occupation, the power resources approach enables one to scrutinize the exact mechanism at work, by emphasizing women's lower political and bargaining resources at labor markets (Murphy & Oesch, 2015, p. 1227). Here, mechanisms that manifests women's lower power resources at labor markets are tied to labor market closure and operationalized as unionization, tertiary credentialing and part-time employment. In what follows these labor market closure covariates and their significance for gender asymmetries in power resources, as well as the particular importance of part-time employment as a gender-specific component of closure in dualizing labor markets, is outlined.

Labor market closure

Social closure was first introduced by Weber (2010[1922]), who stressed that social groups seek to contain their positions by restricting necessary resources to a small group of people or by excluding people on the basis of ascribed characteristics. Parkin (1979), states that these closure strategies should not only be seen as strategies of the dominate group but also of the excluded group, who are defending their lower status against a "status of outsiders" (ibid., p. 45). Closure can be defined as a strategy of mobilizing power that is targeted at the exclusion of subordinate groups and therefore "necessarily entails the creation of a group, class or stratum of legally defined inferiors" (ibid., p. 45). He extends the strategy of exclusion with usurpation and thereby acknowledges that predominant groups can also be threatened in their hegemonic status. Occupational or labor market closure can thus be described as a special mechanism of social closure, by which access to positions in occupations is restricted, which in turn enables incumbents of these occupations to demand privileges such as high wages.

In a recent study comparing Germany and the UK, evidence was found that occupational closure, operationalized as educational credentialing, licensure, unionization, and apprenticeships, perpetuates income inequalities in both countries. While in Germany unionization and vocational credentialing come along with wage premiums, in the UK, tertiary

credentialing and licensure are rewarded (Bol & Weeden, 2015). A study focusing solely on Germany found evidence that licensure provides wage advantages in the lower income strata rather than in the high ones (Haupt & Witte, 2016).

In this study, we go beyond the commonly used indicators of occupational closure. The term of occupational closure is broadened to labor market closure and the gender-specific component of part-time employment is added as a closure mechanism. Thereby, the special position of women as outsiders working mainly in low-wage, low-security part-time positions is acknowledged.

Labor market closure and gender

As far as the association of the gendered power resources and the unequal remuneration between men and women is concerned, evidence is quite sparse. Murphy and Oesch (2015), test the power resource approach using unionization as an indicator of occupational closure. They find no significant effect of unionization on women's or men's wages in Germany. However, they rightly acknowledge that accounting only for the representation of unions is a rather limited measure for testing the power resources approach. Haupt (2012) uses an index measuring social closure of occupations within the German labor market and finds evidence that women gain higher wage premiums by occupational closure than men.

Furthermore, a few qualitative studies examine the influence of occupational closure on gender arrangements within single occupations (Wetterer, 1992; Witz, 1992). Employing a historical perspective on the UK labor market, Witz (1992) identifies closure strategies targeted toward women in medicine. She found exclusion strategies carried out by the dominant male group, as well as usurpation and exclusion strategies, so called dual strategies (Parkin, 1979), carried out by women (the subordinate group). By outlining how the medical profession has developed from a predominantly female to a male dominated profession, where men take over the prestigious position of doctors and women are nurses and midwives, she calls into question whether and to what extent labor market segregation is something that appears naturally and stresses the role of power struggles over the distribution of positions in professions (Witz, 1992).

Part-time employment

In Germany, the legacy of the male breadwinner still shapes labor market patterns and the wage structure. Legislation like Germany's tax-splitting system, from which couples with high earning gaps profit the most manifest this legacy. However, recent research suggests that there

has been a shift in Germany from the traditional male breadwinner model to a modified breadwinner model. This implies that the quantitative increase in female labor market participation can be traced back to more women working as a secondary earner in part-time employment (Trappe, Pollmann-Schult, & Schmitt, 2015). This change cannot only be observed in western Germany, where women traditionally have been the secondary earner (if they were not homemakers), but also in eastern Germany, where since the 2000s, endowments in full-time work experiences among eastern German women declined (Minkus & Busch-Heizmann, 2018). Thus, women's increasing participation in paid work still mainly serves as an addition to the living wage of the male breadwinner (Trappe et al., 2015).

The legacy of the male breadwinner is intertwined and further reinforced, by Germany being a Bismarckian welfare state. In line with findings on labor market dualization it has been argued that in the Bismarckian welfare state that provides comparatively large employment protection, especially female-dominated social services are hit by the enforcement of a secondary labor markets, as they are comprised of many part-time positions and a general precariousness (Kroos & Gottschall, 2012; Palier & Thelen, 2010). Furthermore, actors of the state and unions in Bismarckian welfare state protect their traditionally structured labor market, which is comprised of a core worker who is usually the male-breadwinner and enjoys high employment security as well as stable wages. In contrast, the secondary labor market consists mostly of women and meets the demand for cheap labor in the low-productivity social services. Demand for these social service positions, especially in (child-)care, has dramatically increased since a change in public policy in mid 2000s was implemented to promote an increase in female labor market participation (Fleckenstein, 2011; Trappe et al., 2015). Germany serves as a crucial case, as many nonprofit organizations, rather than the state, provide social services, which results in an undermining of the standard employment relationships (Kroos & Gottschall, 2012). Therefore, positions in social services come along with low wages (Schäfer & Gottschall, 2015), a lack of employment security (Eichorst & Marx, 2012), and involuntary part-time positions (Kroos & Gottschall, 2012).

In line with these theoretical underpinnings, recent empirical analysis confirms the marginal position of women in the German labor market. In the past 20 years Germany has experienced a 20 % growth in female employment (OECD, 2012) and today women represent almost half of the labor force in Germany (Wanger, 2015). For the most part, this increase in female labor force participation has taken place in part-time employment. In 2014, nearly 60 % of women worked part-time as compared to 20 % men (ibid.). Among the part-time workforce almost two-

8

thirds of all women were in marginal employment. Additionally, more than 60 % of low-wage earners in Germany are women (Weinkopf, 2009).

More than 20 % of all part-time work in Germany is involuntary, meaning due to workers not finding a full-time position and almost 30 % of part-time work is due to care obligations (Schreiber 2015). Moreover, it has been found that part-time work usually comprises wage penalties compared to full-time employment (Kalleberg, 2000; Manning & Petrongolo, 2008; Weeden et al., 2016).

Given the outlined evidence, a novel approach of operationalizing part-time employment as a special case of gender-specific labor market closure is proposed. This proposition is justified for two main reasons. First, there is a sharp increase in female part-time employment, which is in large parts involuntary or due to care obligations. Institutional male-breadwinner arrangements that promote an unequal distribution of paid-work between couples, such as the German tax-splitting system, encourage women to stay clear of positions in standard normal employment. Additionally, the failure of the German government to provide an environment in which women can reconcile care and paid work further fuels women's likelihood of working part-time. Second, is the aforementioned need of a secondary labor market in a Bismarckian welfare state. The majority of workers in part-time employment, and, thus, the outsiders in a dualizing labor market are women. Women are the ones providing the welfare state with the cheap labor force, which comes about with low wages and low employment security, while the core, and mostly male, workforce remains to enjoy high job security and breadwinner wages (Palier & Thelen, 2010).

Broadening labor market closure by this gender-specific mechanism hence implies that one can account not only for individual preferences of women for part-time work (Becker, 1985), but also for a demand-side strategy of the state and employers, which restrict well-paid, high-security positions in the core labor market for the male-breadwinner, at the costs of a flexible, low-paid and mostly female workforce (Palier & Thelen, 2010). An approach that is, to the best of my knowledge, novel when it comes to examining factors influencing the gender gap in pay.

Unionization

Unionization in general acts as a labor market closure mechanism, as the collective power of unions helps to negotiate wages that are above the "natural wage". By threatening employers with organized strikes, unions have the power to negotiate higher wages for their members (Weeden, 2002). Unions are of particular importance for gendered individual closure as they not only set a natural minimum wage by collective bargaining, but also have mitigating effects

on the GPG (Blau & Kahn, 2006; Elvira & Saporta, 2001). However, although in the last decades women have increasingly joined unions, members in German unions are still mostly male (Ebbinghaus & Göbel, 2014). What's more and in consideration of the declining power of unions, their mitigating effects on income inequalities between men and women might be declining as well (ibid.). However, the hypothesized ambiguous influence of unions on the gender wage gap remains an open question.

Tertiary credentialing

Educational credentials signal job-relevant traits of the potential employee, if access to these credentials is restricted, as in Germany with the *numerus clausus* at universities, holders of educational degrees can demand higher wages (Bol & Weeden, 2015). Especially the share of tertiary degrees might be a critical factor for shaping the GPG, as women have made considerable gains in tertiary education over the past decades. The rent-seeking effect of educational credentialing on the GPG might be obscured by the lower returns to credentials in typically female sectors. Recent evidence suggests that wage returns in the health and social services are significantly lower compared to the finance and manufacturing sector (Schäfer & Gottschall, 2015). These tendencies have intensified rather than declined during the last 15 years (Bispinck, 2013). Additionally, a devaluation of tertiary credentials might have taken place in the last decades, as more people earn a tertiary degree. Scrutinizing whether the rent-seeking effect of tertiary credentialing is affected by women's growing endowments in education, will provide an interesting case to explore the dynamics of labor closure once women do embody the rent-seeking attributes.

Hypothesis

Given the evidence on the connectedness of gender and labor market closure, we expect to find distinct effects of closure on the GPG. While the mitigating impact of unionization on the GPG, in light of the diminishing significance of unions at the German labor market might be dismissive over the examined time-span, the lower representation of women in unions in general might still exacerbate the wage differential. As for tertiary credentialing, we also expect that the increasing share of women with tertiary degrees might have comparatively advanced their position in the labor market. Nevertheless, overall men might still have wage advantages due to time-lagging effects of women catching up in educational attainment. Part-time employment is expected to further perpetuate the gender wage gap, especially the sharp increase

of female shares in the part-time workforce might be replacing old indicators of income inequality between men and women such as the unequal distribution of human capital.

To sum up, we expect labor market closure to have ambiguous effects on the GPG, ranging from a convergence due to women's higher educational achievements in recent years, to a widening of the gap given the increase of women in low wage part-time employment.

3 Data, Variables

Drawing on a rich data set created by merging the German Socio-economic Panel SOEP (Goebel et al., 2019) with the Microcensus, the association between individual hourly wages, individual human capital attributes, and occupational level closure covariates were assessed using the waves 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009 and 2011. Both data sets combined provide a powerful source to juxtapose individual human capital and labor market closure, while the SOEP provides a detailed assessment of individual wages and individual human capital endowments, the big sample sizes of the Microcensus are an excellent source for aggregating labor market closure covariates at the occupational level.

Following conventional practice, the **explained variable**, *logarithmic gross hourly wage*, is calculated using the gross monthly wage divided by actual working hours. Wages are adjusted for inflation using the consumer price index expressed in 2010/€ provided by the German Federal statistical office. Workers earning below 1 €/h or above 150 €/h (expressed in 2010/€) are excluded. Missing values are accounted for by using the imputed wages provided by the SOEP (see Grabka & Frick, 2003). The sample is comprised of men and women of working age (blue-collar, white-collar employees and civil servants aged between 18 and 64).

Human capital is accounted for, by adding up *full- and part-time work experience* (weighting part-time experience by a factor of 0.5). Additionally, years of *tenure* and *education* using the CASMIN-categories are included. To account for varying confounding factors, additional **control variables** were introduced. Dummies for white-collar or blue-collar employees, (low-, middle-, or high-level) civil servants, or executive positions account for heterogeneous *workplace characteristics*. Additionally, *yearly dummies* are introduced so as to control for timely confounders. Furthermore, regional *east/west* indicators, a dummy signaling whether *children* below the age of 16 live in the household, a *migration background* dummy, *age* categories and a *wage imputation flag* dummy are included. Human capital and control variables are individual level covariates and retrieved from the SOEP.

Labor market closure is measured (a) via the impact of *unionization* on wages, i.e., the occupational percentage of people organized in a union. For testing gender specific closure effects of tertiary credentialing, (b) the share of *tertiary degrees* in an occupation was calculated. Furthermore, (c) *part-time employment* was operationalized by calculating part-time shares at the occupational level. Part-time includes different types of marginal employment. Unfortunately, these different kinds cannot be differentiated in a clear-cut manner across the years in the Microcensus. Indicators of part-time work and tertiary credentialing are retrieved from the German Microcensus, while the share of unionization was calculated based on the SOEP. These occupational covariates were calculated by collapsing the variables at the three-digit occupational level using the job classifications of the German Federal Statistical Office, 1992 version (German Federal Statistical Office, 1992). Based on these three-digit occupational codes these occupation-level variables were merged to the individual level data provided by the SOEP. See Table 1 for an overview.

Table 1: Descriptive statistics of explained and explanatory variables

Explained Variable	Men (N = 50877)			Women (N = 44281)		
	Mean		Std dev	Mean		Std dev
Real hourly wages (ln)	2.74	(2.72)	0.54	2.48	(2.47)	0.54
Explanatory Variables						
Occupational covariates						
Nonstandard employment (%)	12.25	(12.11)	13.21	32.0	(32.1)	19.0
Unionization (%)	20.3	(21.0)	13.9	15.0	(15.3)	10.6
Tertiary education (%)	22.0	(20.03)	29.9	20.4	(18.1)	27.3
Human capital						
Low level of education	0.36	(0.40)	0.48	0.28	(0.33)	0.45
Intermediate education	0.39	(0.38)	0.49	0.48	(0.47)	0.50
Higher education	0.25	(0.22)	0.43	0.24	(0.20)	0.42
Work experience (full-time + 0.5*part-time)	19.7	(19.61)	11.0	14.6	(14.6)	9.55
Work experience ((full-time + 0.5*part-time) ²)	508.8	(511.4)	470.0	305.6	(308.3)	354.5
Job Tenure (years)	11.7	(11.7)	10.3	9.44	(9.18)	9.04
Controls						
Hierarchical job position						
Blue-collar employees	0.40	(0.41)	0.49	0.20	(0.22)	0.40
White-collar employees	0.20	(0.22)	0.40	0.56	(0.57)	0.50
Clerks	0.061	(0.064)	0.24	0.048	(0.041)	0.21
Executive position	0.23	(0.21)	0.42	0.12	(0.11)	0.33
Self-employed	0.11	(0.10)	0.31	0.070	(0.06)	0.25
Children below 16 in household (=1)	0.44	(0.38)	0.50	0.40	(0.34)	0.49
East Germany (=1)	0.23	(0.17)	0.42	0.25	(0.18)	0.43
Migration Background (=1)	0.20	(0.18)	0.40	0.18	(0.19)	0.39
Imputed income (=1)	0.094	(0.11)	0.29	0.094	(0.12)	0.29
Age categories						
Age (< 29 years)	0.13	(0.14)	0.34	0.15	(0.17)	0.36
Age (30 - 44 years)	0.44	(0.44)	0.50	0.43	(0.42)	0.50
Age (45 -59 years)	0.37	(0.37)	0.48	0.38	(0.37)	0.49
Age (60-64 years)	0.052	(0.049)	0.22	0.034	(0.036)	0.18

Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own calculations not weighted. Weighted arithmetic means in parentheses.

Notes: Sample includes persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64).

4 Methods

In order to decompose the GPG, Juhn, Murphy, and Pierce decompositions (hereafter: JMP) are applied. Employing JMP decomposition allows one to distinguish the extent to which gender-specific differences in endowments influence the wage differentials, as opposed to

effects of the wage structure in general. Additionally, by decomposing the residual, the effect of unobserved prices and endowments between men and women can be scrutinized as well (Blau & Kahn, 1996; Juhn, Murphy, & Pierce, 1991, 1993). The JMP decomposition starts out with a simple wage equation for men:¹

$$Y_i = \mathbf{X}_i \boldsymbol{\beta} + \varepsilon_i, \quad (1)$$

where \mathbf{X} is a vector of covariates and $\boldsymbol{\beta}$ is a vector of regression coefficients. Using simple OLS regressions the residual ε_i by definition can be rewritten as:

$$\varepsilon_i = \theta_i \sigma \quad (2)$$

Using this framework, the impact of individual characteristics, prices of observable skills as well as unobservable prices and skills can be calculated, by holding any subset of the components fixed.

Varying characteristics, fixed prices and residuals:

$$Y_{MF}(1) = \mathbf{X}_{MF} \boldsymbol{\beta}_M + \theta_{MF} \sigma_M \quad (3)$$

Varying characteristics and prices, fixed residuals:

$$Y_{MF}(2) = \mathbf{X}_{MF} \boldsymbol{\beta}_{MF} + \theta_{MF} \sigma_M \quad (4)$$

Varying characteristics, prices and residuals:

$$Y_{MF}(3) = \mathbf{X}_{MF} \boldsymbol{\beta}_{MF} + \theta_{MF} \sigma_{MF} \quad (5)^2$$

According to (2) the residual is comprised of two components: a standardized wage residual θ_i (with a mean of zero and a standard deviation of one) and the within-group standard deviation σ of male wages. Accordingly, the residual term in (3) and (4) are computed by assigning percentile rankings to women depending on their position in the male residual function. The term $\theta_F \sigma_M$ is calculated by assigning each women her corresponding male residual given her percentile ranking in the male wage residual distribution (while the term $\theta_M \sigma_M = \varepsilon_M$ and thus always remains zero).³ Using the wage regressions in equations (3) to (5) the total wage difference can be decomposed as follows:

$$\Delta Y_{MF} = [\Delta Y_{MF}(1)] + [\Delta Y_{MF}(2) - \Delta Y_{MF}(1)] + [\Delta Y_{MF}(3) - \Delta Y_{MF}(2)]$$

¹ In our case the reference for the decomposition is the male wage function. Alternatively, a pooled or female wage function can be applied.

² This equation calculated separately for men and women is obviously nothing else than the regular OLS male and female wage equations.

³ The notation implies that normality is imposed on the residual. This is not the case, as we do not use the mean to calculate σ but rather the entire wage distribution. The notation is merely for expositional purposes following the one used by Juhn et al. (1991) and Blau and Kahn (1996).

$$= T = Q + P + U, \quad (6)$$

where Δ denotes the male-female differential (MF), Q stand for the quantity effect, measuring the portion of the wage gap, which is due to differences in characteristics between men and women, P denotes the price effect, estimating how the wage structure contributes to differences in pay, and U accounts for the part of the wage differential which can be attributed to unobserved quantities and prices.

For longitudinal data the equation:

$$Y_{it} = \mathbf{X}_{it} \boldsymbol{\beta}_t + \theta_{it} \sigma_t, \quad (7)$$

can be further decomposed in order to measure changes in wage differentials over time (second-order JMP decomposition).

The specification for changes in the wage differential looks as follows:

$$\begin{aligned} D_{t'} - D_t = & (\Delta X_{t'} - \Delta X_t) \beta_{Mt} + \Delta X_{t'} (\beta_{Mt'} - \beta_{Mt}) + (\Delta \theta_{t'} - \Delta \theta_t) \sigma_{tM} \\ & + \Delta \theta_{t'} (\sigma_{Mt'} - \sigma_{Mt}), \end{aligned} \quad (8)$$

where t denotes the first time period and t' denotes the second time period and Δ denotes the difference between men and women analyzed separately for t and t' in the decomposition. These terms can be decomposed into changes of individual characteristics, changes in prices of observable skills, changes in unobservable prices and changes in unobservable individual attributes over time.

The first part of the equation on the right-hand side $(\Delta X_{t'} - \Delta X_t) \beta_{Mt}$, the so-called quantity effect, estimates the part of the wage differential that is due to changes of differences in observable characteristics between men and women. This is weighted by a pooled coefficient for men. The second term $\Delta X_{t'} (\beta_{Mt'} - \beta_{Mt})$, the wage effect, denotes change of differences in prices for the estimated covariates, measured at the men's coefficients. The third term $(\Delta \theta_{t'} - \Delta \theta_t) \sigma_{Mt}$, referred to as the unobserved quantity effect, denotes changes in the wage differential due to differences in unobservable quantities between the two groups, again weighted by the male standard deviation of wages. Thus, this term measures the contribution of women's varying positions in the male residual distribution, given that residual male wage inequality is constant. The fourth term $\Delta \theta_{t'} (\sigma_{Mt'} - \sigma_{Mt})$, the unobserved price effect, measures changes in men's residual wage distribution, assuming that percentile rankings in women's wage distribution stays the same. Residuals are again obtained by following a non-parametric approach and using the entire residual distribution and the inverse cumulative

distribution function (for the slightly more complex estimation of the residual gap in a second-order JMP decomposition see: Blau & Kahn, 1996; Juhn et al., 1991).⁴

In order to account for (a) sample attrition in the SOEP and (b) the fact that the JMP decomposition uses summary statistics, e.g., for calculating quantity effects; regressions and bivariate statistics are weighted by year-specific cross-sectional probability weights provided by the SOEP (Kroh, 2010). Covariates retrieved from the German Microcensus (part-time employment, and tertiary credentialing) were collapsed at the occupational level using corresponding weights provided by the Microcensus. Furthermore, when pooled regressions were carried out, robust standard errors were clustered by individuals in order to account for the panel structure of the SOEP.

5 Findings

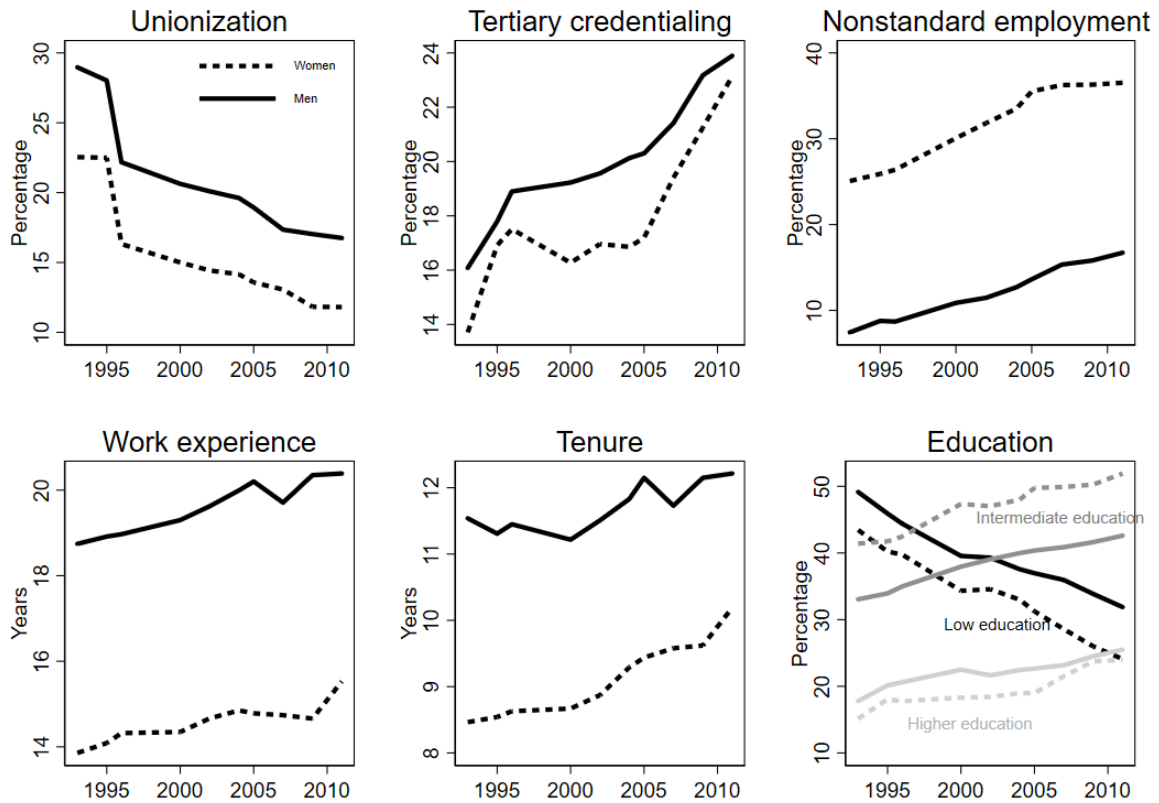
Descriptive findings

Figure 1 describes the sample regarding the main covariates of interest, plotting yearly means for men and women. Women tend to be in occupations that have lower rates of unionization and higher shares of part-time employment. Additionally, men's endowments regarding work experience are higher compared to women. However, the figure also illustrates that women have caught up in terms of tenure and education. Although in 2011 men in the German labor market still superseded women in tertiary education ("high education") women are increasingly catching up. Additionally, women have higher shares of secondary education ("intermediate education") and less often only elementary level of education ("low education") during the examined time span.

To further explore how these different characteristics of working men and women impact the GPG, we first scrutinize their returns on wages by employing pooled OLS regressions and in a later step disentangle the effects of different endowments between men and women from price effects on the GPG using JMP decomposition.

⁴ All estimations are calculated using the ado packages JMPierce and JMPierce2 provided by Ben Jann.

Figure 1: Descriptive characteristics of working men and women in Germany. Own, weighted calculations.



Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own, weighted calculations.

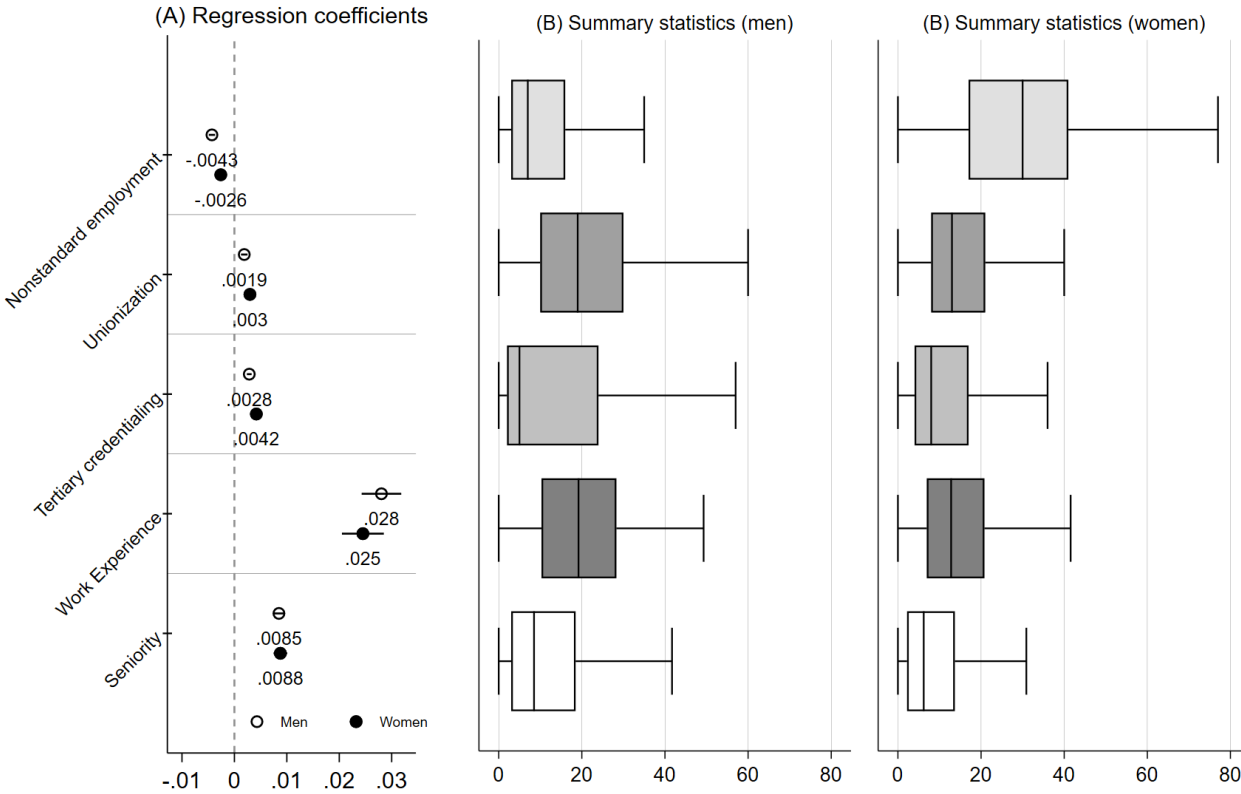
OLS wage regressions

To assess general differences of returns to labor market closure covariates between men and women, pooled OLS regression separate for men and women with individual robust clustered standard errors were calculated.

Figure 2(A) graphically illustrates the influence of the main covariates of interest on hourly wages, estimated separately for men and women. Respective regression tables including all covariates and controls can be found in the appendix (Table A.1). An increase of 1 % in the unionization rate of an occupation is accompanied by a wage premium of 0.3 % for women ($\exp[0.003]=1.003$) and 0.19 % for men ($\exp[0.0019]=1.0019$). This also means that workers in a hypothetical occupation with 100 % unionization earn wage premiums of about 35 % for women ($\exp[0.003*100]=1.35$) and 21 % for men ($\exp[0.0019*100]=1.209$), compared to workers in a hypothetical occupation with 0 % unionization. Tertiary credentialing also comes about with high wage premiums. Working in an occupation where anyone holds tertiary degrees is associated with a wage premium of 32 % ($\exp[0.0028*100]$) for men and 52 %

($\exp[0.0042 \times 100]$) for women, as opposed to a hypothetical occupation where no one holds a tertiary degree. Quite the opposite is the case for the share of part-time employment in an occupation. A hypothetical occupation with only part-time employment comprises wage penalties of about 23 % for women and 35 % for men. The coefficients for human capital and tenure are depicted in Figure 2(A) as well. Wage returns on work experience (approximately 3 %) and tenure (approximately 1 %) are quite similar for men and women.

Figure 2: Coefficient plot (based on weighted wage regression for men and women (based on Table A.1 in the appendix) and weighted summary statistics.



Note: x-axis depicts regressions coefficients from Table A.1 in the appendix.

To examine whether point estimates between men and women are significantly different from each other, interaction effects between sex and the entire set of covariates were estimated (results not shown). Women’s wage penalties for part-time employment are significantly lower than men’s (see also: Boll et al., 2017). The higher wage penalty for men is puzzling; we might assume that men lose a higher percentage of wages because being in part-time employment is a violation of the male-breadwinner norm. However, testing the exact mechanisms behind this

phenomenon is not within the scope of the paper. Additionally, wage premiums for unionization and tertiary credentialing are significantly higher for women and the human capital variables of tenure and work experiences do not differ significantly between men and women.

These findings are consistent with previous studies and confirm a positive association between tertiary credentialing and unionization on wages in Germany (Bol & Weeden, 2015). Additionally, the results provide important insights into the association between labor market closure and gender, seeing how not only labor market closure brings about wage premiums but also that its impact is significantly different for men and women. These findings are in line with a study by Haupt (2012), who found that German women profit more from occupational closure than men.

Figure 2(B) illustrates the sample statistics to the corresponding point estimates in 2(A). The summary statistics illustrate that men have higher shares in unionization and tertiary credentialing, which are the covariates that are accompanied by wage premiums, while women have higher shares in part-time employment, which is the structural factor that incurs wage losses. Furthermore, although Figure 2(A) suggests similar wage returns to human capital covariates for men and women, 2(B) illustrates the higher endowments of men in work experience and seniority, as compared to women. Thus, overall men might as well profit more from the increasing linear additive trend of wage premiums for tenure and work experience, as they are simply better endowed in terms of human capital.

To further disentangle how the different endowments (as seen in Figure 2[B]), as opposed to the wage structure and unobserved characteristics impact the GPG, a pooled JMP decomposition is carried out.

Pooled JMP Decomposition

Regressions that served as the basis for the decomposition are the very same pooled clustered robust OLS regressions as in the previous section and can be found in the appendix (Table A.1 and A.2).⁵ Blocks of variables were pooled and added up in their value if they represented the same theoretical construct (e.g., blue-collar, white-collar, clerks, and executive position pooled into hierarchical job positions).

⁵ Clustered, robust standard errors do only affect the standard error and respective significance test in the OLS regression. The residual component of the JMP decomposition is not affected.

Table 2: Pooled JMP Decomposition of the gender pay gap, 1993 to 2011. (M1 based on Table A.1 and M2 based on Table A.2 in appendix)

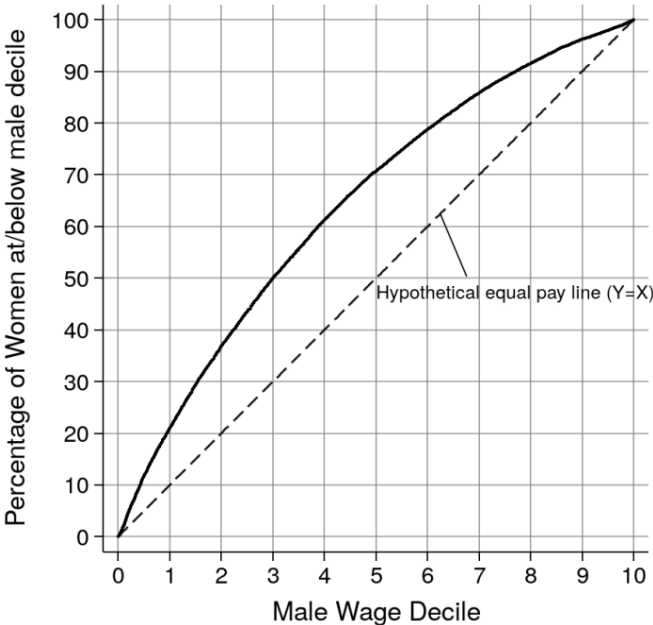
		M1		M2 (occupation adjusted)		Calculation
		Coefficients	Contribution	Coefficients	Contribution	
Wage differential	(T)	0.249		0.249		
Observed quantities	(Q)	0.144	58 %	0.115	46 %	(Q/T)
Coefficients for quantity effect	(C)					
Occupational covariates						
Nonstandard employment (%)		0.086	35 %	0.061	25 %	
Unionization (%)		0.011	4 %	0.006	2 %	
Tertiary education (%)		0.005	2 %	0.006	2 %	
Human capital						
Education		-0.004	2 %	-0.002	1 %	
Work experience		0.033	13 %	0.035	14 %	
Tenure		0.021	8 %	0.021	8 %	
Controls						
Hierarchical job position (blue-, white-collar, clerk and executive position)		-0.014	6 %	0.000	0 %	(C/T)
Region		0.003	1 %	0.003	1 %	
Migrant		0.000	0 %	0.000	0 %	
Children below 16 in HH (=1)		0.002	1 %	0.002	1 %	
Controls (yearly dummies and imputation flag)		0.001	0 %	0.000	0 %	
Age categories		-0.001	0 %	-0.001	0 %	
Occupations (two-digit dummies)		X	X	-0.018	7 %	
Unobserved prices and quantities	(U)	0.000	0 %	0.000	0 %	(U/T)
Observed prices	(P)	0.105	42 %	0.134	54 %	(P/T)
Observations		95158				

Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own, weighted calculations based on OLS regressions with robust, individual clustered standard errors.

Notes: Reference is a male wage regression model. Sample includes persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64).

An hourly wage difference in geometric means of 28 % ($\exp[0.249]$) between men and women is found in Table 2. While differences in endowments (quantity effect) between men and women explain 58 % of the GPG, the impact of the wage structure (price effect) explains 42 %. Unobserved price and quantity effects are completely negligible (0 %). More specifically the biggest single factor of the quantity effect influencing wage differentials between men and women is the share of part-time employment in an occupation. If women’s jobs had the same amount of part-time employment positions as men’s, the pay gap would close by 35 %. This is a remarkably large amount given that human capital variables (work experience, education and tenure) added up can only explain 19 % of the wage differential. What’s more regarding human capital, the wage differential widens due to women’s lack in tenure and work experience, while they overtake men in education. The GPG would be 2 % larger if women had the same educational endowments as men. Furthermore, judging from the JMP decomposition, it becomes obvious that different compositions of occupational rates of unionization as well as tertiary credentialing are of importance for the GPG as well.

Figure 3: Cumulative distribution function of female wages relative to the male wage distribution. Workers in Germany. Own, weighted calculations.

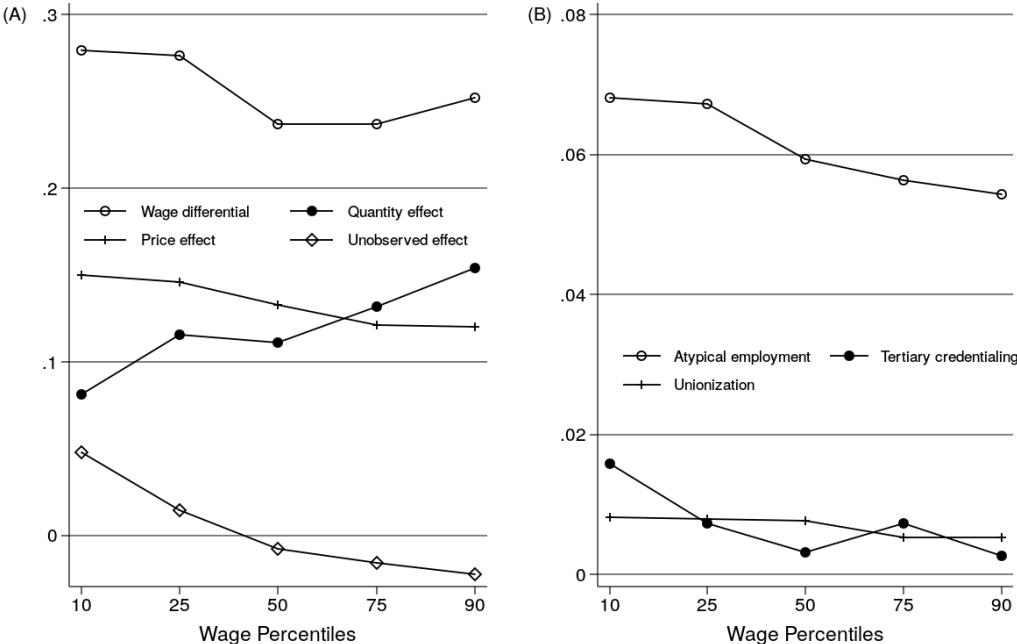


Together they account for 6 % of the wage difference. Although M1 to a certain extent already controls for occupational characteristic by accounting for hierarchical job positions, M2 further controls for heterogeneity in occupations by including two-digit occupation dummies in the regressions.

In M2 the influence of part-time employment diminishes a bit in its strength, but remains to be the single most influential factor of the quantity effect.⁶ Furthermore the effect of unionization weakens as well and – adjusted for two-digit occupations – explains only 2 % of the GPG.

Figure 3 illustrates the unequal distribution of wages between men and women by plotting the cumulative percentage of women at or below the male wage decile for the pooled sample. As can be seen in Figure 3, 20 % of women are at or below the first male wage decile, while 25 % of women already rank only at or below the 1.22 percentile. Wages of 50 % of all women in the sample are at or below the 3rd decile of the male wage distribution. 75 % are at the 55th percentile while 90 % of women are approximately at the 7.7 male wage decile of the male wage distribution. The figure suggests that gender wage inequalities are quite heterogeneous depending on women’s position in the corresponding male wage distribution.

Figure 4: Coefficient plot of decomposition analysis on wage percentiles (based on wage regression for men and women, Table A.2 in appendix).



To explore how the effects of human capital and labor market closure on the pay gap vary across the wage structure, we use the ability of the non-parametric JMP decomposition to go beyond

⁶ We expect the true estimate of the occupational covariates to lie somewhere between M1 and M2. While they might be biased in M1, the coefficients in M2 might be too conservative, because the model accounts for the occupations as such. Furthermore, one should be cautious with respect to comparing the individual and occupational point estimates regarding their strength, as occupational heterogeneity is accounted for (using occupational dummies), but individual heterogeneity is not. Thus, the individual covariates in M2 might be slightly biased compared to the occupational covariates.

the mean and estimate the influence of covariates at different wage percentiles. Figure 4 graphically depicts the decomposition of the gender pay gap, as well as the magnitude of the labor market closure covariates across wage percentiles (for respective occupation-adjusted OLS regressions, see Table A.2 in appendix).

Figure 4(A) illustrates the decline of the GPG along the wage distribution, being the lowest at the 50th and 75th percentile. Furthermore, the price and the unobserved effect lose explanatory power along the wage distribution, while the quantity effect gains importance for explaining the wage differential. Regarding the variables of interest, Figure 4(B) illustrates their diminishing explanatory power for wage differentials in the higher income brackets. Especially the explanatory impact of part-time employment declines moving up the wage distribution. Furthermore, the closure effect of tertiary credentialing appears to be the lowest at the 50th wage percentile and again increases in importance higher up the wage distribution.

These results are thus similar to a study on labor market closure in Germany, which found that licensure, as a particular form of occupational closure, has nuanced implications for wage premiums across the wage distribution and rather serves as a safety net to the bottom of the wage structure (Haupt & Witte, 2016). We also find nuanced effects of labor market closure on the GPG across the wage structure. While part-time employment and unionization exacerbate the GPG disproportionately in the low-income strata, tertiary credentialing penalizes women's wages in the low and the high-income brackets and has nearly no effect at the median of the wage distribution.

Second-order JMP decomposition 1993 vs. 2011

To examine the development of the wage differential between 1993 and 2011, an extension of the JMP decomposition for changes over time is carried out. Between 1993 and 2011 the GPG declined by about 3 %. To examine further why the GPG only fell so little in about two decades, we now turn to the detailed impact of the covariates included in the decomposition as illustrated in Table 2 (for the corresponding OLS regressions, see Table A.3 in the appendix).

Table 3: Pooled JMP Decomposition of changes in the gender pay gap, 1993 and 2011.

		Occ. adjusted	
		Coeff.	Contr.
Changes in wage differential	(D)	-0.035	
Changes in observed quantities	(Q)	-0.022	63 %
Occupational covariates			
Nonstandard employment (%)		0.006	17 %
Unionization (%)		-0.003	9 %
Tertiary education (%)		-0.004	11 %
Human capital			
Work experience		-0.002	6 %
Education		-0.002	6 %
Tenure		-0.005	14 %
Controls			
Hierarchical job position (blue-, white-collar, clerk and executive position)		0.001	3 %
Age categories		0.001	3 %
Region		-0.008	23 %
Migrant		-0.000	0 %
Children below 16 in HH (=1)		-0.001	3 %
Controls (yearly dummies and imputation flag)		-0.001	3 %
Occupations (two-digit dummies)		-0.004	11 %
Changes in observed prices	(P)	0.032	91 %
Occupational covariates			
Nonstandard employment (%)		0.010	29 %
Unionization (%)		-0.010	29 %
Tertiary education (%)		0.000	0 %
Human capital			
Work experience		0.034	97 %
Education		-0.002	6 %
Tenure		0.010	29 %
Controls			
Hierarchical job position (blue-, white-collar, clerk and executive position)		-0.007	20 %
Age categories		-0.003	9 %
Region		-0.000	0 %
Migrant		0.000	0 %
Children below 16 in HH (=1)		0.001	3 %
Controls (yearly dummies and imputation flag)		-0.000	0 %
Occupations (two-digit dummies)		-0.002	6 %
Changes in unexplained differential	(U)	-0.043	123 %
Unobserved quantities	(QU)	-0.068	194 %
Unobserved prices	(PU)	0.024	96 %
Observations		21009	

Source: SOEP.V31, German Microcensus, 1993 and 2011, own, weighted calculations based on OLS regressions with robust, individual clustered standard errors.

Notes: Reference is a male wage regression model. Sample includes persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64).

The most striking finding shown in Table 3 is the very strong impact of part-time employment on widening the wage differential from 1993 to 2011. Part-time employment, besides the marginal contribution of hierarchical job positions and age composition, is the only quantity effect that contributed to widening the GPG by as much as 17 %. Put differently, if it wasn't for the relative increase of women's share in atypical employment compared to men between 1993 and 2011, the GPG in 2011 would be attenuated by 17 %. During the time span examined, women caught up with men in terms of human capital endowments. If women's relative difference to men's work experience, tenure and educational characteristics would be as high as in 1993, the GPG in 2011 would approximately be 26 % larger. Overall, these results indicate that the GPG in Germany has persisted because the number of women working in occupations with high shares of part-time employment has grown vastly since 1993. As for unionization and tertiary credentialing, the other labor market closure covariates of interest, the figures suggest that women's share in unions and their participation in occupations that require tertiary degrees has increased. The higher unionization rate accounts for a narrowing of 9 %⁷ of the wage difference between men and women, while the increasing share of tertiary degrees in women's occupations has closed the gap by 11 %.

Moving on now to consider the effect of the wage structure on the GPG between 1993 and 2011, we find a high impact of the human capital variables on exacerbating wage inequalities between men and women. Especially the returns to work experience (and to some extent to tenure) have risen sharply since 1993s. This is particularly beneficial to men, as the pooled JMP decomposition (Table 3) demonstrated that women still lack men's human capital endowments, despite their catching up between 1993 and 2011 (see also Figure 1). Additionally, a rising wage penalty to part-time employment has exacerbated the GPG by 29 %. Returns to tertiary credentialing have had no impact on the wage structure and thereby on the GPG during the examined time frame. Additionally, the large effect of various unobserved quantities to close the GPG is quite striking. Apparently, women caught up a lot, not only in observable quantities but also in terms of their position in the male wage distribution. Furthermore, as the unobserved prices effect reveals, increasing wage inequality between 1993 and 2011 contributed a fair share towards widening the GPG.

⁷ As standard errors for the JMP decomposition are usually not reported, indication of significant results is typically inferred to by the corresponding OLS point estimates. As can be seen in the appendix (Table A.3), unionization is not significant in the male and female regression. Thus, one should be cautious in the interpretation of the impact of unionization on the gender pay gap. Interestingly, this non-significant result probably explains why Murphy and Oesch (2015) could not find evidence for the power resource approach, as unionization (their only indicator of occupational closure) yields a non-significant point estimate in our results.

Robustness and competing explanations

Robustness is inspected by adding a dummy variable of individual part-time employment to the estimated models. Doing so, we pursue two objectives: (a) ensure that the association between part-time employment and a widening GPG is not spurious – meaning that the part-time labor market closure covariate on the occupational level does not pick up effects of individual part-time status, and (b) to check for a competing explanation, namely the compensating differentials argument, which, as a supply-side argument, states that workers accept lower wages if they are compensated with desirable working conditions (Rosen, 1986). This theory is often applied to mothers' expected preferences for part-time position, arguing that by working in part-time employment, they can reconcile family and work more easily (see Glauber, 2012; Waldfogel, 1997). Our robustness check (estimates not shown, available upon request), does not alter the occupational part-time coefficient. Thus, we can conclude that: (a) our occupational estimate of shares in part-time employment is not a spurious effect of individual part-time employment status, and (b) individual preferences and, thus, individual supply-side theories such as human capital and compensating differentials, are not sufficient for explaining the wage penalty of part-time employment. Regardless, effects of part-time shares operationalized as occupational labor market closure are of significance for the stalled GPG.

However, an additional indicator of part-time employment status is of course highly correlated with part-time work experience and with the occupational share of part-time employment. Furthermore, the inclusion of a part-time work dummy might additionally lead to an endogeneity bias (hourly wages are calculated using individuals working hours). Thus, we refrain from including the dummy in the main models presented in the paper.

6 Summary and Discussion

This study has scrutinized the importance of labor market closure for the GPG utilizing the power resources approach that argues that part of the wage difference between men and women is transmitted via power asymmetries in the labor market. We highlight four key findings, their implications, limitations, and contributions to the current sociological debate on gendered income inequalities.

First, the overall GPG widens due to lower unionization and lower rates in tertiary credentialing in women's occupations by an estimate of 41 %, which is mostly due to women working in occupations with higher shares of part-time employment (35 %).

Second, and over time however, evidence was found that unionization and tertiary credentialing, have contributed towards closing the wage differential between men and women. Thus, labor market closure – if operating in favor of women – can contribute a fair share towards attenuating the wage differences between men and women. These gains, however, are offset by the wage losses experienced due to women increasingly working in occupations with high shares of part-time employment. If it were not for women working in occupations with high shares of part-time employment, the GPG would have decreased by 17 % between 1993 and 2011. The results hold, even if a dummy variable indicating individual part-time status is included in the model. Therefore, the evidence suggests that part-time employment exacerbates the GPG irrespective of individual preferences and supply-side mechanisms. Thus, this lends support to dualization theory, by illustrating that wage penalties are posed on occupations with high shares in part-time employment, net of individual human capital characteristics. Indeed, there seems to be a structural component to part-time employment, by which workers are deprived of their just wages.

Third, on an individual level we found that gains women have made in terms of increasing endowments in human capital variables such as education, tenure and work experience are offset by rising prices to human capital. This is disadvantageous for women, as the pooled decomposition suggests that, despite women's gains, overall they still fall short of men's work experience and tenure.

Forth, using a non-parametric decomposition technique evidence is found that the impact of these structural factors is distinct within the wage structure. While unionization, tertiary credentialing and part-time employment are of importance for the GPG in lower income strata, their influence diminishes moving up the wage ladder.

The presented results are not without limitations. It would certainly be worthwhile to further disentangle the part-time effect from marginal employment, i.e., while regular part-time employment in Germany is partially covered by social security schemes, most of marginal employment relationships are not. These types of precarious working arrangements might pose additional wage penalties on incumbents once disentangled from regular part-time work. Unfortunately, this was not possible with the data at hand.

Nevertheless, my evidence suggests that gendered power resources operationalized as labor market closure do have an impact on the GPG. This impact however, is ambiguous, while labor market closure can work in favor of women, as illustrated by the mitigating impact of unionization and tertiary credentialing on the GPG between 1993 and 2011, increasing part-

time employment prevents women from earning the wages they are entitled to and has exacerbated the GPG in the examined time-frame. The power resource approach provides a fruitful theoretical basis for exploring these structural factors, by leading us to discover that it is not individual supply-side factors that have perpetuated wage inequalities between men and women, but rather the disproportionate wage penalty for growing shares in occupational part-time employment and the rising prices to a full-time commitment to the labor market. Only if we acknowledge women's vulnerable position in labor markets by implementing policies that cease to sanction women for not being able to commit as much time to paid work as men, will we finish the gender revolution.

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Appendix

Table A.1: Pooled Wage regressions for men and women with robust, clustered standard errors, 1993 to 2011.

	Men		Women	
Occupational Covariates				
Nonstandard employment (%)	-0.004***	(0.000)	-0.003***	(0.000)
Unionization (%)	0.002***	(0.000)	0.003***	(0.000)
Tertiary education (%)	0.003***	(0.000)	0.004***	(0.000)
Human capital				
Education (ref.: little education)				
Intermediate education	0.096***	(0.011)	0.095***	(0.012)
Higher education	0.211***	(0.018)	0.202***	(0.021)
Work experience (full-time + 0.5*part-time)	0.028***	(0.002)	0.025***	(0.002)
Work experience squared (full-time + 0.5*part-time)	-0.001***	(0.000)	-0.000***	(0.000)
Job Tenure (years)	0.008***	(0.001)	0.009***	(0.001)
Controls				
Hierarchical job position (ref.: blue-collar workers)				
White-collar employees	0.130***	(0.011)	0.179***	(0.013)
Clerks	-0.031*	(0.015)	0.077***	(0.023)
Executive position	0.293***	(0.016)	0.304***	(0.020)
Self-employed	0.092***	(0.025)	0.025	(0.031)
Children below 16 in household (=1)	0.053***	(0.009)	0.014	(0.010)
East Germany (=1)	-0.400***	(0.012)	-0.322***	(0.012)
Migration Background (=1)	-0.030**	(0.012)	0.012	(0.013)
Imputed income (=1)	-0.050**	(0.015)	0.025	(0.020)
Age categories (ref.: < 29 years)				
Age (30 - 44 years)	-0.009	(0.015)	0.004	(0.016)
Age (45 -59 years)	-0.041	(0.021)	-0.081***	(0.020)
Age (60 -64 years)	-0.043	(0.030)	-0.168***	(0.029)
Constant	2.174***	(0.019)	1.952***	(0.026)
Year dummies	✓		✓	
Observations	50877		44281	
R^2	0.37		0.30	

Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own, weighted calculations.

Notes: Sample includes persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64). Standard errors in parentheses (* p<.05 ** p<.01 *** p<.001).

Table A.2: Occupation adjusted pooled Wage regressions for men and women with individual robust, clustered standard errors, 1993 to 2011.

	Men		Women	
Occupational covariates				
Nonstandard employment (%)	-0.003***	(0.000)	-0.003***	(0.001)
Unionization (%)	0.001*	(0.000)	0.004***	(0.001)
Tertiary education (%)	0.003***	(0.000)	0.004***	(0.001)
Human capital				
Education (ref.: little education)				
Intermediate education	0.068***	(0.011)	0.067***	(0.013)
Higher education	0.185***	(0.017)	0.184***	(0.021)
Work experience (full-time + 0.5*part-time)	0.028***	(0.002)	0.023***	(0.002)
Work experience squared (full-time + 0.5*part-time)	-0.001***	(0.000)	-0.000***	(0.000)
Job Tenure (years)	0.008***	(0.000)	0.008***	(0.001)
Controls				
Hierarchical job position (ref.: blue-collar workers)				
White-collar employees	0.068***	(0.014)	0.081***	(0.016)
Clerks	-0.034	(0.020)	0.022	(0.025)
Executive position	0.230***	(0.018)	0.227***	(0.021)
Self-employed	0.060*	(0.026)	-0.016	(0.032)
Children below 16 in household (=1)	0.055***	(0.008)	0.009	(0.010)
East Germany (=1)	-0.374***	(0.011)	-0.310***	(0.012)
Migration Background (=1)	-0.023	(0.012)	0.013	(0.013)
Imputed income (=1)	-0.045**	(0.015)	0.033	(0.020)
Age categories (ref.: < 29 years)				
Age (30 - 44 years)	-0.017	(0.014)	0.009	(0.015)
Age (45 -59 years)	-0.047*	(0.021)	-0.077***	(0.019)
Age (60 -64 years)	-0.041	(0.029)	-0.158***	(0.029)
Constant	1.903***	(0.171)	1.649***	(0.055)
Year dummies	✓		✓	
Two-digit occupation dummies	✓		✓	
Observations	50877		44281	
R ²	0.40		0.32	

Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own, weighted calculations.

Notes: Sample includes persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64). Standard errors in parentheses (* p<.05 ** p<.01 *** p<.001).

Table A.3: Wage regressions for men and women, 1993 and 2011.

	1993		2011	
	Men	Women	Men	Women
Occupational Covariates				
Nonstandard employment (%)	-0.003 (0.002)	-0.004* (0.002)	-0.003*** (0.001)	-0.003*** (0.001)
Unionization (%)	0.002 (0.001)	0.002 (0.002)	-0.000 (0.001)	0.003 (0.002)
Tertiary education (%)	0.003* (0.001)	0.003 (0.002)	0.003*** (0.001)	0.004*** (0.001)
Human capital				
Education (ref.: little education)				
Intermediate education	0.072*** (0.022)	0.134*** (0.030)	0.111*** (0.023)	0.048 (0.025)
Higher education	0.157*** (0.035)	0.257*** (0.059)	0.251*** (0.034)	0.172*** (0.031)
Work experience (FT + 0.5*PT)	0.019*** (0.005)	0.016** (0.005)	0.031*** (0.004)	0.023*** (0.004)
Work experience squared (FT + 0.5*PT)	-0.000*** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
Job Tenure (years)	0.005*** (0.001)	0.004 (0.002)	0.010*** (0.001)	0.010*** (0.001)
Controls				
Hierarchical position (ref.: blue-collar workers)				
White-collar employees	0.039 (0.029)	0.093* (0.042)	0.107*** (0.028)	0.065 (0.040)
Clerks	-0.041 (0.040)	0.037 (0.071)	0.030 (0.042)	0.039 (0.053)
Executive position	0.186*** (0.038)	0.211*** (0.061)	0.301*** (0.038)	0.275*** (0.047)
Self-employed	0.049 (0.049)	0.043 (0.110)	0.106* (0.049)	0.017 (0.058)
Children below 16 in household (=1)	0.019 (0.017)	0.034 (0.028)	0.074*** (0.017)	-0.014 (0.020)
East Germany (=1)	-0.550*** (0.020)	-0.483*** (0.026)	-0.339*** (0.023)	-0.261*** (0.020)
Migration Background (=1)	0.009 (0.024)	-0.006 (0.033)	-0.003 (0.021)	0.042* (0.020)
Imputed income (=1)	-0.094* (0.041)	0.174** (0.067)	-0.089* (0.036)	0.025 (0.036)
Age categories (ref.: < 29 years)				
Age (30 - 44 years)	0.016 (0.039)	0.035 (0.036)	0.021 (0.039)	0.006 (0.039)
Age (45 -59 years)	0.019 (0.049)	-0.030 (0.042)	-0.068 (0.051)	-0.063 (0.046)
Age (60 -64 years)	0.065 (0.073)	-0.285** (0.089)	-0.141* (0.071)	-0.095 (0.060)
Constant	2.145*** (0.097)	1.800*** (0.071)	2.201*** (0.111)	2.173*** (0.271)
Two-digit occupation dummies	✓	✓	✓	✓
Observations	3671	2760	7277	7301
R ²	0.51	0.37	0.46	0.38

Source: SOEP.V31, German Microcensus, 1993, 1995, 1996, 2000, 2002, 2004, 2005, 2007, 2009, 2011, own, weighted calculations.

Notes: Sample includes employed persons of working age (blue-collar and white-collar employees and civil servants aged between 18 and 64). Standard errors in parentheses (* p<.05 ** p<.01 *** p<.001).