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Why do some occupations offer more part-time work than others? Reciprocal dynamics in occupational gender segregation and occupational part-time work in West Germany, 1976–2010

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ABSTRACT

This paper analyzes the reciprocal relationship between occupational gender segregation and occupational part-time work in West Germany over time. Based on a unique occupational panel dataset covering 254 occupations between 1976 and 2010, we apply static, dynamic, and Arellano-Bond panel models to account for reverse causality and endogeneity. Results indicate that trends in occupational part-time rates and gender ratios mutually reinforce each other but not in the same manner. Part-time work in occupations increases once more women start working in these occupations. Occupational part-time ratios are mainly driven by married women and mothers; women's education level only plays a minor role. Vice versa, the gender composition of occupations is likewise affected by changing working-time arrangements, at least in the short run, but it is mainly driven by previous levels of occupational gender segregation.

1. Introduction

Over the last few decades, there has been considerable growth in women's labor force participation and employment, and the employment gap between women and men has narrowed in virtually all OECD countries (OECD, 2018, p. 15). In Germany, too, women's employment rates have risen considerably, mostly due to growth in part-time employment (Wanger, 2015). Even today, Germany has one of the highest shares of women in part-time work in the OECD (OECD, 2018, p. 33). In general, part-time work is a means of balancing gainful employment and unpaid family/household work and leisure time, which might be attractive for both women and men (Gatrell and Dermott, 2018). Since women still bear greater familial obligations, particularly in the conservative

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welfare state of West Germany, it is an important way for women to cope with work-family conflicts (Klenner and Schmidt, 2011).[1] Nonetheless, part-time work negatively affects subsequent employment careers, since it is associated with severe disadvantages in terms of wage growth (Boll, 2010), progression to management positions (Hipp and Stuth, 2013), and pensions (Frommert and Strauß, 2013). Thus, from a gender-equality perspective, women's part-time employment remains a mixed blessing.

So far, most explanations of women's involvement in part-time work have involved factors at the individual, household, or social policy level (for an overview, see Olivetti and Petrongolo, 2017; Steiber and Haas, 2012). Only a few studies—mainly focusing on the United States—acknowledged that women's part-time employment might also depend on characteristics of occupational environments, particularly the occupational gender composition (Cassirer, 2004; Cha, 2013; Sparreboom, 2014). In Germany, weekly working hours are much higher in male-dominated (43.4 h) than in female-dominated occupations (32.7 h) (Busch-Heizmann, 2015a, p. 577). However, the relationship between the share of women in an occupation and occupational part-time work has hardly been studied.

The few existing studies have suggested two possible directions of influence. The first pertains to how occupational gender segregation affects men's and women's working time arrangements. In this regard, some studies indicated that flexible working conditions are more common in female-dominated occupations (Cassirer, 2004; Lowen and Sicilian, 2009), while other studies did not find such an association, either for the United States (Glass and Camarigg, 1992; Glass and Fujimoto, 1995; Glauber, 2011) or for Germany (Althaber and Leuze, 2020; Damelang and Ebensperger, 2020). The second possible direction of influence is that occupational working time arrangements could affect the occupational gender composition. In this regard, studies for the United States have shown that young women avoid occupations with high working time demands (Frome et al., 2006) and that women leave occupations with overwork once becoming mothers (Cha, 2013). A recent German study found that only substantial part-time work affects the gender composition of occupations (Damelang and Ebensperger, 2020). In sum, based on this mixed evidence, we know little about the reciprocal relationship between the occupational gender composition and occupational part-time ratios over time.

Therefore, we ask in this article: Does part-time work in an occupation increase once more women start to work in an occupation? Or do occupations that offer more part-time work attract more women? Unlike most previous studies on this issue, we do not study individual actors' decisions but instead directly model processes on the meso level of occupations. There are two reasons for this analytical choice: First, we perceive occupations as historically distinct forms of organizing work that both transmit cultural meaning and provide opportunities and constraints to individuals working in them (Krüger, 1995a, p. 196). Consequently, working-hour norms are embedded in occupational contexts (Weeden and Grusky, 2005; Williams et al., 2013) that likely affect whether or not employers offer part-time work and whether or not employees make use of it. By focusing on the occupational level, we thus seek to investigate the normative contexts surrounding part-time work.

The second reason for this analytical choice relates to causal processes on the occupational level—these are the result of many decisions made by single actors but their combined consequences at the occupational level cannot be simply deduced from these decisions. Scrutinizing the relationship between part-time work and gender at the occupational level allows us to assess the causal direction of influence directly, which is impossible when modeling part-time work at the individual level (for a similar design, see Damelang and Ebensperger, 2020). Accordingly, our analyses complement previous literature on the relationship between occupational gender segregation and wage levels (e.g. England et al., 2007; Hausmann et al., 2015a; Levanon et al., 2009) but our analyses examine working times rather than monetary remunerations. However, our decision to focus on the meso level of occupations comes at a cost, since it requires us to make bridge assumptions at the microlevel that cannot be tested directly. We partly seek to address this problem by differentiating between subgroups of women who are more or less likely to work part time, such as women with different skill levels, with or without children or being married or not.

We analyze the reciprocal relationship between occupational gender segregation and part-time work in West Germany, where both women's part-time employment rates and levels of occupational gender segregation are rather high (Charles and Grusky, 2004; OECD, 2018). Empirically, this study benefits from an occupational panel dataset that comprises yearly information on 254 occupational groups for the years 1976–2010, combining data from the German Microcensus and the Sample of Integrated Labour Market Biographies (SIAB); it thus gives a comprehensive picture of the West German occupational structure for up to 35 years. We apply three different types of econometric models to address problems of reverse causality and endogeneity: static and dynamic fixed-effects panel models and models with Arellano-Bond instrumental variable estimators. To avoid misspecifications and examine the stability of the effects over time, we present results for covariates with different time lags.

2. State of research: explaining women's part-time work

There is a substantial body of research that analyzes how individual, household, and social policy factors are associated with reductions in women's working hours. At the individual level, women are more likely to work part time if they are married and/or have children, both in Germany (Althaber and Leuze, 2020; Klenner and Schmidt, 2011; Trappe et al., 2015; Wanger, 2015) and in other OECD countries (e.g. Gash, 2008; Salladarré and Hlaimi, 2014; Steiber and Haas, 2012). Moreover, self-selection processes have been

[1] Other forms of flexibility often mentioned in this context are telework (Lott, 2020b) and flexible working time (e.g., flexible beginning and ending times, weekly time accounts) (Lott, 2020a). Until the COVID-19 pandemic, telework was very rare among employees in Germany, with only 3 percent using it most of the time and 6 percent sometimes (Destatis, 2021). Flexible working times are more often available for both men and women, but they offer limited flexibility for combining wage work and care work, mainly in combination with part-time work (Lott, 2020a). Moreover, there were no reliable data available on the usage and regulation of flexible working times and telework for the time span under investigation. For these reasons, we focus solely on part-time work.

shown to affect women's employment in general and specifically their involvement in part-time work; educational levels are decisive here (Steiber and Haas, 2012). Accordingly, highly educated women are more likely to continue to work full time after having a child than less highly educated mothers (e.g. Konietzka and Kreyenfeld, 2010; Olivetti and Petrongolo, 2017; Salladarré and Hlaimi, 2014; Steiber et al., 2016).

The household context likewise influences women's working time, in particular partners' resource constellations—the partner with the higher income potential works longer hours (Hipp and Leuze, 2015). However, empirical evidence in this regard remains rather mixed, since women reduce their working hours more after childbirth than their male partners irrespective of the resource constellation (Kühhirt, 2012; Schober, 2013). Such patterns are often explained with gender role attitudes and the (re-)production of gender identities in everyday social interactions among couples (Brines, 1994; Thébaud, 2010). According to this perspective, men are culturally deemed responsible for providing the household income; they therefore have to work full time irrespective of their individual resources. In contrast, women only work full time until they marry and/or have children due to their cultural responsibility for care work (Bühlmann et al., 2010). These cultural prescriptions regarding men's and women's working times are reproduced at the societal level by welfare state regulations, such as public childcare availability (e.g. Gash, 2008; Jaumotte, 2003; Olivetti and Petrongolo, 2017). In the conservative-corporatist welfare state of (West)Germany, the modified breadwinner model with a full-time-working man and a part-time-working women and mother is still the predominant paradigm for couples seeking to balance work and family obligations (Trappe et al., 2015).

In addition to these common explanations for women's part-time work, the literature hints that the gender composition of occupations might matter. However, the few studies on this topic have provided inconclusive results. While some studies have shown that flexible working conditions are more common in female-dominated occupations (Cassirer, 2004; Eichhorst et al., 2015; Lowen and Sicilian, 2009), others have indicated that integrated occupations offer the highest flexibility (Glauber, 2011). Still other studies have found no correlation between the share of women in an occupation and working time arrangements (Althaber and Leuze, 2020; Glass and Fujimoto, 1995), and some have even reported a negative correlation (Glass and Camarigg, 1992).

Thus, it is far from clear whether the occupational gender composition has a causal effect on occupational part-time work, especially in the German context. Rather, it might be the case that, conversely, occupational working times may affect the gender composition of occupations. The first study to address this reciprocal relationship was by Damelang and Ebensperger (2020), who analyzed how five occupational working time characteristics influenced the gender composition of occupations and vice versa for Germany for the years 1996–2012. They found that a higher share of substantial part-time work and telework in an occupation and a lower share of weekend work increased the proportion of women working in that occupation—marginal part-time work had no measurable effect. They did not find evidence for the reverse direction of influence, i.e., that the gender composition of occupations affected their working time arrangements.

Even though Damelang and Ebensperger (2020) provided the first important results on the relationship of occupational gender segregation and working time, their theoretical considerations remained rather general and were not tailored to the heterogeneous working time characteristics they analyzed, which makes it difficult to interpret their results. Moreover, their models predicting the various working time characteristics did not include control variables and thus might suffer from omitted variable bias. In contrast, their model on the effect of five working time characteristics on the share of women in an occupation might have been biased by multicollinearity, since working conditions—especially substantive and marginal part-time work—should be highly correlated within occupations. Finally, their observation period of 14 years (with lags of 3 years) might have been too short to observe stable patterns of a reciprocal influence.

In this paper, we seek to address these shortcomings by providing additional and more robust evidence on the reciprocal relationship between the share of women in an occupation and occupational part-time work. Our exclusive focus on part-time employment allows us to develop a theoretical framework that is tailored to this highly gendered type of working time arrangement. Moreover, since the prevalence of part-time work varies greatly between different groups of women—between those with different educational attainment, between married and nonmarried women, and between mothers and childless women, we additionally differentiate between these subgroups to explore possible relationships in more detail. Methodologically, our analyses cover a time span of up to 35 years and include a large range of control variables to obtain more robust results on the causal link between occupational gender segregation and working time. Finally, we expand the statistical approach used by Damelang and Ebensperger (2020) by combining static and dynamic fixed-effects models with Arellano-Bond panel models; we thus provide results for different time lags to address possible problems of reverse causality and statistical bias.

3. Theoretical framework: the reciprocal relationship between occupational gender composition and occupational part-time work in Germany

3.1. The German case

We analyze the reciprocal relationship between occupational sex composition and occupational part-time work in Germany, where

both the rate of women working part time and levels of occupational sex segregation are rather high (Charles and Grusky, 2004; OECD, 2018). Over the past few decades, the share of German women in part-time employment has risen, from 35 percent in 1991 to 58 percent in 2014 (Wanger, 2015, p. 2). Since part-time work is much more common in West Germany than in East Germany due to the different policies that governed women's labor force integration in the past (Trappe et al., 2015), we focus our theoretical considerations and empirical analysis on West Germany.[2]

Unlike in other OECD countries, where part-time employment is often precarious (e.g. Cassirer, 2004 for the U.S.), part-time employment in Germany is not necessarily linked to low job quality. In 2014, for example, the majority of women working part time held regular employment contracts with full social security entitlements (Wanger, 2015, p. 2).[3] Since 2001, all employees have been legally entitled to reduce their working hours (according to the so-called Part-time and Fixed-term Employment Law, *Teilzeit-und Befristungsgesetz*), if they work in firms with more than 15 workers. Moreover, since 1992, parental leave regulations in Germany have guaranteed that parents can return to work for their former employer in an equal position within three years after giving birth. Since women still bear greater familial obligations in Germany, it is mothers who are increasingly making use of this option, although they typically reduce their working hours upon returning to work (Aisenbrey et al., 2009; Bächmann and Gatermann, 2017; Ziefle and Gangl, 2014).

Just as the use of part-time work is particularly evident in Germany, so is occupational gender segregation, which is rather pronounced by international standards (Charles and Grusky, 2004). Moreover, it has only declined slowly in recent decades (Hausmann and Kleinert, 2014), even though women's employment participation has steadily increased. One reason why occupational gender segregation is so persistent in Germany is that young people's initial occupational choices have long-lasting career consequences. Vocational and academic qualifications endow participants with specialized skills that enable them to enter specific occupations (Gangl, 2001; Leuze, 2010), thereby limiting access to a wider range of occupations and the associated resources, such as prestige and income. As a result, occupational mobility is low in Germany by international standards at labor market entry (Gangl, 2001), during further career development (Solga and Konietzka, 1999), and after family-related employment breaks (Aisenbrey et al., 2009).

According to Krüger (1995a), the gender composition of occupations and their working time arrangements developed jointly in Germany. Her historical account of the German labor market indicates that administrative and service sector occupations that developed in the first half of the 20th century were primarily filled by young, unmarried women. These women worked there until they got married and had children, which is why these occupations tended to offer more part-time opportunities without good wages or prospects for upward mobility (Krüger, 1995a). The result was a gender-segregated labor market in which traditional gender roles differentiating between a male breadwinner and female homemaker became incorporated in the occupational structure.

Due to institutional inertia, these occupational configurations persist (Krüger, 2001). Consequently, the organizational principles and cultural prescriptions regarding occupational working time arrangements still depend on the occupational gender composition (Krüger, 1995b). Even today, occupations dominated by women have characteristics that cater to female caregivers' life courses—they enable employment discontinuities in the form of family-related employment interruptions or reduced working hours (Bächmann and Gatermann, 2017). Thus, female-dominated occupations are still oriented towards female-stereotypical gender roles and employment trajectories, which makes it much easier to offer and use part-time work in these occupations than in male-dominated ones, where normative expectations of full-time work and continuous employment over the life course prevail (Krüger, 1995a). At the same time, however, gender role attitudes have become less traditional (Ebner et al., 2020), women's qualification levels and employment participation have increased considerably (Wanger, 2015), and sectoral and technological changes have resulted in a transformation of occupational patterns (Black and Spitz-Oener, 2010).

This complex pattern of inertia and change at the occupational level begs a question regarding their consequences over time: What drives occupational change in this regard? Is it the gender composition of occupations or their working time arrangements? In the following, we further develop this perspective by discussing whether (1) an inflow of women into particular occupations leads to an increase in occupational part-time work, and/or (2) whether occupations that increasingly offer part-time employment attract more women.

3.2. How the occupational gender composition might affect occupational part-time ratios

Turning to the first direction of influence, we must discuss why part-time work might grow in a particular occupation after increasing numbers of women have started to work in this occupation. According to Krüger (1995a), occupations transmit cultural meanings and provide opportunities and constraints to individuals working in them. Thus, norms about typical working hours are reproduced at the occupational level through employer behavior and individuals working in these occupations.

In response to an increasing female workforce, employers may adopt family-friendly policies, such as flexible scheduling and part-time work, to reduce absenteeism and staff turnover (Davis and Kalleberg, 2006). In doing so, employers may react to the cultural

[2] In West Germany, rising employment levels among women and especially among mothers since the 1970s have been accounted for by an increase in part-time employment, while women's full-time employment even decreased. In East Germany, in contrast, full-time employment was the norm for women with and without children until re-unification. Part-time employment has risen since the 1990s but is still much lower than in West Germany (Trappe et al., 2015).

[3] This is in contrast to marginal part-time work, which is defined as work with a monthly wage of up to 450 euros (as of 2013, previously 400 euros) that does not offer any social security entitlements and therefore entails much higher employment risks (Klenner and Schmidt, 2011; Wanger, 2015).

expectations that women devote more time to childrearing and household chores and offer part-time employment particularly for female employees, irrespective of whether these employees already have children or will have them in future. However, since the female workforce is most likely to only increase in particular occupations rather than throughout whole firms, any increase in part-time work will likely be linked to working-time norms prevalent in these occupations. Moreover, the introduction of part-time work in particular occupations within firms is reinforced by occupational associations and trade unions, which might attempt to support the provision of family-friendly benefits in female-dominated occupations (Krüger, 2001, p. 415). Finally, the female workforce might have better chances of asserting its interests in part-time work if other groups of workers, such as men or immigrants, cannot replace them easily (Weeden and Grusky, 2005, p. 153)—this should be easier in female-dominated occupations. Overall, this line of reasoning indicates that a rising share of women working in an occupation should lead to an increase in occupational part-time ratios (H1).

However, even though a higher share of women working in an occupation might increase normative pressures for employers to offer part-time work, this option may only be exercised by certain subgroups of women. Accordingly, part-time employment in an occupation might vary between different groups of women. There are several potential reasons for this. First, women's human capital investments have been shown to influence their employment behavior and as such their preferences for part-time work (Salladarré and Hlaimi, 2014; Steiber et al., 2016). Consequently, the demand for part-time work should be lower in occupations with a larger share of highly educated women, irrespective of women's parental status. Rising shares of highly qualified women in an occupation should therefore increase occupational part-time ratios to a lower extent than rising shares of low- or medium-qualified women (H1a).

Second, rising part-time ratios might result from the temporal dynamics of women's life courses, which are strongly patterned by work-family policies. Since public childcare provision, particularly for children under three years, was rather low in West Germany until recently (Cooke, 2007; Trappe et al., 2015), mothers in general have fewer opportunities to stay in employment and to work longer hours. Most mothers make use of the right to return to their previous job within three years after giving birth, albeit they often reduce their working hours (Aisenbrey et al., 2009; Ziefle and Gangl, 2014). Consequently, a rising share of mothers in an occupation should increase occupational part-time ratios more strongly than a rising share of childless women (H1b). In addition, Germany's joint filing system of taxes for married couples effectively reduces the net incomes of second earners. Since married women often earn less than their husbands, the taxation system provides incentives for married women to reduce their working hours (Hipp and Leuze, 2015; Jaumotte, 2003). This indicates that an increasing share of married women in an occupation might result in a stronger increase in the share of part-time workers than an increasing share of nonmarried women (H1c).

3.3. How occupational part-time ratios might affect the occupational gender composition

Turning to the second direction of influence, namely the idea that an increase in occupational part-time work will positively affect the share of women working in that occupation, we have to consider why women (self-)select into occupations with (exogenously given) family-friendly working-time arrangements. Cultural explanations point to the importance of socially shared stereotypes about male and female gender roles (Busch-Heizmann, 2015b; Charles and Bradley, 2009), which are reproduced by internalization during childhood (Okamoto and England, 1999) and cause biased self-evaluations when choosing gender-atypical occupations (Correll, 2004). According to neoclassical economic theory, rational women anticipate a discontinuous work biography due to family formation and are therefore less likely to invest in human capital (Becker, 1985). When choosing an occupation, they are assumed to prefer occupations with high starting wages, low status losses in case of employment interruptions, and greater workplace flexibility (Polachek, 1981).[4]

Both cultural and rational choice arguments predict that young women should consider gender role prescriptions and working time norms when making their occupational choices. However, hardly any empirical study on occupational preference formation has explicitly addressed occupational working times as a possible point of reference. For the United States, Frome, Alfeld, Eccles, and Barber (2006) show that young women who originally intended to enter male-dominated occupations often switched to avoid high working-time demands. For Germany, Ochsenfeld (2016) found that students with a stronger preference for "pleasant working hours" eschewed fields of study that would impose higher time demands on their future lives. Both studies indicate that occupations' perceived working time norms seem to be relevant for young women making their initial occupational choices.

Moreover, rising occupational part-time ratios might be important for women when planning a family or during their transition to motherhood. If women work in occupations with a strong prevalence of overwork before childbirth, they may be inclined to change to occupations with more family-friendly working-time arrangements (Cha, 2013). Because women still bear more family responsibilities, especially in the conservative welfare state of West Germany, there are numerous further events in women's lives that make it attractive to change to an occupational field with better part-time conditions, for example, if children's institutional care arrangements change or if elderly relatives require care.

In addition to these supply side occupational choice processes, discriminatory behavior by employers leads to the reproduction of male and female stereotypes when hiring and promoting (future) employees (Reskin and Ross, 1990). Rational employers might discriminate against women on a statistical basis (Phelps, 1972), in particular if women try to enter male domains (Quadlin, 2018) or intend to return to full-time employment after having a child (Cassirer, 2004; Correll et al., 2007). Consequently, self-selection may not be the only reason why women work in occupations with more part-time employment; norms about typical working hours may prompt

[4] Many of these assumptions, however, were empirically disproved, both for the United States (e.g. Okamoto and England, 1999) and Germany (e.g. Ochsenfeld, 2016).

employers to discriminate against women and hinder them from entering occupations with strong full-time and overwork norms. Overall, our theoretical considerations concerning occupational (self-)selection indicate that rising occupational part-time levels should increase the inflow of women into these occupations (H2), either by cohort exchange or by intra-cohort occupational changes.[5]

Finally, it is important to point out that our two basic hypotheses on the interrelationship between occupational gender composition and occupational part-time ratio (H1 and H2) are not necessarily mutually exclusive. The interplay between occupational trends in female representation and part-time ratios might either be shaped by employers' reactions to women's need to reconcile work and family and corresponding interest assertions by employees—e.g., by mothers and married women (hypothesis 1) or by women's (self-) selection into occupations with family-friendly working time (hypothesis 2)—or by both processes, which would then reinforce each other over time. At the same time, both perspectives indicate that the interrelation between occupational gender compositions and occupational part-time ratios is not merely driven by employers' or employees' individual decisions, but rather by cultural prescriptions concerning traditional gender roles and corresponding working time norms, both of which are incorporated in the occupational structure.

4. Data and measures

To examine the relationship between the share of women in occupations and part-time ratios empirically, we generated an occupational panel dataset containing yearly information on 254 occupational groups in West Germany from 1976 to 2010. For this purpose, we combined information from two data sources: (1) The *Microcensus* of the German Statistical Office, a 1% sample of German private households that was conducted every two years until 1995 and every year since then (Federal Statistical Office and GESIS, 2012). We used the scientific use files, which cover 70% of the total sample population in every year. (2) We also used the *Sample of Integrated Labour Market Biographies (SIAB)*[6], a 2% sample of the population included in *Integrated Employment Biographies (IEB)*. This administrative dataset draws on obligatory yearly employer notifications on the employment status, wages, and firms of all employees in regular dependent employment (Vom Berge et al., 2013). Both datasets are well suited to analyzing occupational groups, because they contain reliable information on large samples and are not affected by nonresponse. To match both datasets, we recoded the three-digit occupational groups of the German classification of occupations (KldB) 1975 and 1992 used in the German Microcensus into the slightly different version of the German classification of occupations 1988 (KldB 1988) used in the SIAB (Faas et al., 2019).

To generate a yearly occupational panel dataset, we aggregated information for persons in West Germany aged 15 to 64 in regular dependent employment[7] based on the three-digit occupational groups of the KldB 1988 for the years from 1976 to 2010 (Hausmann et al., 2015b; Faas et al., 2019). Since male-dominated occupations in industry were subjected to more fine-grained categorization than female-dominated occupations in services in this classification, we collapsed male-dominated occupational categories requiring similar tasks (Hausmann et al., 2015b; Matthes et al., 2008). Moreover, the aggregation of information was based on occupational categories with at least 30 persons per year to avoid random fluctuations of occupational characteristics. Missing information for one year were imputed by using the mean of the previous and the following year (Faas et al., 2019). The final dataset contained aggregated characteristics for 254 occupational groups over 35 years, which resulted in 8890 observations.

In line with our hypotheses, we used two different dependent variables, which served as the main covariate of interest in the corresponding model: (1) the share of employees working part time up to 20 h per week[8] per occupation and year, and (2) the share of women among all employees per occupation and year (for their distributions over time, see Table A1 in the Appendix). Both variables take values between 0 and 1, where 0 means that no workers worked part time or no woman worked in this occupation in the given year, and 1 means that an occupation was staffed completely by part-time employees or women. Due to their deviations from normality, both variables were log-odds transformed in a modified form (see Busch-Heizmann, 2015b; Damelang and Ebensperger, 2020), which accounts for the size of occupational groups (Maddala, 1983, p. 30):

$$y_{it}^{*} = ln\left(\frac{y_{it} + (2n_{it})^{-1}}{1 - y_{it} + (2n_{it})^{-1}}\right)$$

$i = 1, \ldots, N =$ index of occupations (N = 254).
$t = 1, \ldots, T =$ index of time (N = 35 years).

[5] We chose not to specify additional hypotheses for particular subgroups of women because the use of part-time work may arise due to many life situations faced by women. Therefore, these groups cannot easily be transformed into clearly defined empirical indicators.

[6] The SIAB data is available through the Research Data Centre (FDZ) of the Federal Employment Agency in the Institute for Employment Research. For more information on the data and on data access, see http://fdz.iab.de/.

[7] Due to the focus on regular dependent employees, we did not include civil servants and self-employed people as part of the analyses. We do not consider this problematic, since both groups face very different employment conditions (e.g., regarding employment security) compared to dependent employees. Therefore, the underlying processes that might lead to increasing part-time rates or changes in the share of women might also differ systematically. Moreover, our analyses cover the majority of persons in the German labor market, as 70–75% of all employed persons in West Germany were in regular dependent employment in recent decades (Bundeszentrale für politische Bildung, 2020).

[8] We chose this conservative indicator of part-time work because it reflects the options for flexibility in a certain occupation better than substantial part-time work with more hours. Moreover, in the period under investigation, mothers in West Germany were often constrained to part-time work with relatively few hours, since childcare and schooling was organized on a half-day basis. For robustness checks, we also estimated models with substantial part-time work (up to 34 h), but the results were mostly the same (see Appendix Tables A5a-5d).

y_{it} = share of female/part-time employees in occupation i in year t.
n_{it} = number of employed persons in occupation i in year t.

To analyze the first direction of influence (hypothesis 1), we scrutinized how the share of women in general (H1) and of particular subgroups affect occupational part-time ratios. These included the share of high-skilled (ISCED 1997 levels 5, 6), medium-skilled (ISCED 1997 levels 3, 4), and low-skilled (ISCED 1997 levels 0, 1, 2) women (H1a), the share of mothers (with children up to 15 years living in the household) and childless women (H1b), and the share of married and nonmarried women (H1c) per occupation and year. Due to very high correlations between the shares of women, mothers, and married women in occupations, we could not test the effects of these variables jointly. To compare effect sizes across different models, we therefore z-standardized all relevant predictor and outcome variables. When investigating the second direction of influence (hypothesis 2), we investigated how the share of part-time employment per occupational group affected the gender composition of this occupation.

Since both dependent variables might be influenced by variables other than our covariates of interest, such as further worker characteristics, establishment and sector characteristics or general labor market conditions, we used two specific sets of control variables. We present the indicators, their measurement and data sources, and the rationales for including them in the two models in Table 1. A descriptive overview of the variables in the two models, including their characteristics within occupations over time, is presented in Table A1 in the Appendix.

5. Modeling strategy

To test the reciprocal link between changes in shares of women and part-time ratios within occupations, we used linear regression models with fixed occupation effects and lagged covariates. Fixed-effects models only consider the variance of relevant characteristics within occupations over time and hold differences between occupations constant. Accordingly, this estimator is not biased by time-constant unobserved heterogeneity at the occupational level (Allison, 2009; Halaby, 2004).[12] A key assumption of static fixed-effects models is that all covariates have to be strictly exogenous in order to obtain unbiased estimators, which rules out any correlation between predictors and idiosyncratic errors, either contemporaneously or between past and future values (Wooldridge, 2010).[13] In practice, this assumption means that the possibility of reverse causality must be excluded.

To overcome this problem and to determine the direction of the relationships, we estimated two further types of models as proposed in the econometric literature. First, we estimated dynamic panel models (Baltagi, 2008), according to which an endogenous covariate is added to the fixed-effects estimator, namely the dependent variable in the previous (or an earlier) year. If the coefficient of this endogenous variable is unequal 0, this model reflects true state dependence, since the outcome in an earlier time helps predicting the current outcome (Wooldridge, 2010, p. 371). In this framework, the variable of interest is assumed to be a predetermined or sequentially exogenous covariate,[14] while the control variables are strictly exogenous. However, combining fixed-effects regressions with cross-lagged panel models may lead to estimation problems due to error terms that are necessarily correlated with predictors, the so-called incidental parameters problem, as well as problems because of uncertainties about the treatment of initial conditions (Baltagi, 2008; Hsiao, 2003; Williams et al., 2018). Yet for longer time series, as in our case, these problems seem to be less detrimental, since estimators are no longer biased as soon as time approaches infinity (Hsiao, 2003).[15]

Second, we applied the generalized method of moments (GMM, Arellano and Bond, 1991), which uses the idea that further lags of the dependent variable, of predetermined variables, and of other endogenous variables may be used to instrument the lagged dependent variable in a dynamic panel data model. We then combined these lags with the first differences of the strictly exogenous variables into a matrix of instruments, which serves as the basis for a one-step GMM estimator and a robust VCE estimator (for details, see Arellano and Bond, 1991). Research has shown that this approach provides consistent but not fully efficient estimators, yet possible bias decreases as the sample size and panel observation grow (Leszczensky and Wolbring, 2019; Williams et al., 2018), as in our case.

In sum, all three estimation strategies offer certain advantages, but they also have particular problems, whose extent we do not

[9] We excluded this variable in the model that tested hypothesis 1a to avoid multicollinearity.
[10] We included control variables with a strongly skewed distribution as natural logarithms in the models.
[11] Since nonlinear effects were evident in the time trends in both models, we included year dummies to capture time trends as precisely as possible. To check whether relevant policy changes, such as changes in parental leave regulations (1992) and changes in part-time legislation (2001), affected our results, we additionally estimated models with interactions between our dependent variables and three periods (1: 1976–1991, 2: 1992–2000, 3: 2001–2010). Results hardly differ between those periods, which indicates that the main effects are not driven by particular time periods (see Fig. 4a/b and 5a/b in the Appendix).
[12] Due to the long observation period, the variables of interest in our data had sufficient variance to estimate fixed-effects models efficiently (see Appendix Table A1). Since our data was affected by heteroscedasticity and autocorrelation, our estimations used panel robust standard errors. With variance-inflation factors of 2.05 or lower, we were able to rule out the problem of multicollinearity. We also excluded spurious correlation bias due to joint stochastic trends of the share of women and the share of part-time work.
[13] Strict exogeneity of covariates also means that no time-varying unobserved heterogeneity should be present. We address this problem by introducing a rich set of controls in order to cover the theoretically relevant characteristics.
[14] Predetermined covariates are not strictly exogenous—they are only sequentially exogenous, i.e., they allow for correlation between errors measured earlier in time than the predictors (Wooldridge, 2010).
[15] Alternative estimation methods have been proposed for short time series—for example, the lagged first-difference model (Allison, 2009) or structural equation modeling (Leszczensky and Wolbring, 2019; Williams et al., 2018). As regards structural equation models, our data shows convergence problems, which seem to be common, particularly for longer panel series (Williams et al., 2018).

Table 1
Control variables for the two models: indicators, data sources and expected influences.

DV: % part-time work in occupation		DV: % women in occupation	
Indicator (per occupation and year)	Expected influence	Indicator (per occupation and year)	Expected influence
Workers' characteristics			
Share of low-skilled workers (ISCED 1997 levels 0, 1, 2) Source: Microcensus	Employers are more likely to offer part-time employment in occupations with routine work tasks (Cassirer, 2004)[9].	Share of high-skilled workers (ISCED 1997 levels 5, 6) Source: Microcensus	Since women surpassed men in terms of educational qualifications, they might increasingly work in occupations with high educational demands.
Share of self-employed people Share of workers who have worked overtime in the last week Source: Microcensus	In occupations with more self-employed people and more overtime, the availability of part-time work should be lower (Cha, 2013; Goldin and Katz, 2016).	Share of workers reporting that they worked overtime in the last week Source: Microcensus	Women are likely to avoid occupations with strong ideal worker norms and time demands (Cha, 2013; Frome et al., 2006).
		Share of employees aged 50 years and older Source: Microcensus	Occupations with an old workforce need to exchange their workers for younger ones, which might include more women due to increased female employment.
Establishment and sector characteristics			
Average establishment size (ln[10] number of employees per establishment) Source: SIAB	Serves as a proxy for firms with internal career ladders, which are more likely to offer family-friendly employment (Davis and Kalleberg, 2006).	Average establishment size (ln[11] number of employees per establishment) Source: SIAB	Serves as a proxy for firms with internal career ladders, which are often used by men for career advancement.
Share of workers in four service sectors (trade, business services, public administration, personal services) Source: SIAB	The development of the service sector contributed to the growth in part-time employment by giving employers greater flexibility in responding to variable demand levels (Charles and Grusky, 2004; Salladarré and Hlaimi, 2014).	Share of workers in eight sectors (farming/mining, manufacturing, construction, trade, business services (ref.), public administration, personal services, without sector information) Source: SIAB	Sectoral composition of occupations accounts for women's crowding in specific industries.
General labor market conditions			
Occupation-specific trend in employment (ln number of employees)[11] Source: SIAB	Employers who are facing difficulties in recruiting and retaining skilled workers might be more willing to offer family-friendly work practices (Davis and Kalleberg, 2006).	Occupation-specific trend in employment (ln number of employees)[11] Source: SIAB	Men leave shrinking occupations as soon as employment conditions deteriorate—these are then filled with women (Reskin and Ross, 1990).
Yearly occupation-specific unemployment rate (KldB 1988, 2-digit-level) Source: official data from the Federal Employment Agency	Unemployment is a signal of a potential oversupply of labor in a specific occupation, which might lower opportunities for (full-time) employment.		
Year dummies	Control for the general time trends affecting part-time work and for changes in part-time legislation[11].	Year dummies	Control for the general time trends affecting the share of women in occupations and employment.[10]

know. Therefore, to answer our research questions and to test the reciprocal direction between the share of women and the share of part-time work in an occupation, we estimated and directly compared the coefficients of static (stat FE) and dynamic (dyn FE) fixed-effects panel models and of Arellano-Bond models (A-B) with similar specifications. The coefficients of independent variables in the static fixed-effects models (stat FE) can be interpreted as *mean effects* across the whole observation period (30–35 years, depending on the lag structure). The dynamic fixed-effects (dyn FE) and Arellano-Bond (A-B) models also contained an endogenous variable, which was lagged one year further and indicates the true state dependence of the dependent variables, i.e., whether they were systematically influenced by earlier levels of part-time work or the gender composition in an occupation. Additionally, the Arellano-Bond models used lags of the endogenous and predetermined variables as instruments. In both types of dynamic models, the coefficients of the independent variables can be interpreted as *direct effects* net of state dependence.

Since a change in the share of women may not immediately lead to a change in the availability of part-time work (and vice versa), we estimated models with different temporal lag structures: no time lag, a time lag of 1 year, a time lag of 3 years, and a time lag of 5 years. Models with no lags and 1-year lags indicate more *short-term effects* of covariates, while 3-year and 5-year lags reveal more *long-term effects* of the covariates. This strategy allows to detect strongly biased coefficients that have the opposite sign to the true values—a problem that may arise when temporal lags are incorrectly specified in fixed-effects models (Leszczensky and Wolbring, 2019)—by comparing the effects of models with various lags. The various lag structures mean that sample sizes ranged from 8890 observations (stat FE, no lags) to 7366 observations (dyn FE and A-B with 5-year lags).

6. Results

Do part-time ratios in occupations increase once more women work in these occupations? Or do occupations that offer more part-time work attract more women? In the following, we provide answers to both questions by estimating static and dynamic panel models as well as Arellano-Bond instrument variables models. Due to the log-odds transformation of both dependent variables, we can only interpret the direction and level of significance of effects. Therefore, we additionally z-standardized our dependent and predictor variables to compare their effect sizes across the various model specifications. The resulting coefficients indicate the increase/decrease in standard deviations of the log-odds transformed dependent variables if the predictors increased one standard deviation.

Turning to the first direction of influence (hypothesis 1), we investigated how the gender composition of occupations affected occupational part-time ratios. Fig. 1 presents margins plots of the predicted occupational part-time rate for the different time lags of 0, 1, 3, and 5 years. The plots contain 95% confidence intervals and are based on a model with further controls (see Appendix Table A2b). With the exception of one model specification (A-B lag 1), a higher inflow of women in occupations led to a significant increase in occupational part-time rates, both in the short and the long run. This effect was highly robust to a delay of up to five years and after controlling for earlier part-time shares (dyn FE und A-B). It also showed up in models without occupational control variables (see Appendix Table A2a). Short-term effects (lags of 0 and 1 years) were larger than long term effects (lags 3 and 5 years), indicating that an increasing share of women in an occupation immediately results in increasing shares of employees working part time.

Thus, our results strongly support hypothesis 1. They indicate that, even today, the organizational principles and cultural prescriptions of occupational working time arrangements depend on the gender composition of occupations (Krüger, 1995b). Our results are in line with previous findings for the United States, according to which organizations and occupations with higher shares of women are more likely to offer flexible scheduling and family-friendly benefits (Cassirer, 2004; Davis and Kalleberg, 2006; Lowen and Sicilian, 2009). Yet, they do not support the results of Damelang and Ebensperger (2020) for Germany, who found no effect of the gender composition on part-time work with stat-FE models. Therefore, we replicated their models by using the same time period (1996–2010) and lag structure (lag 3) with measures for short (<20 h/week) and long (<34 h/week) part-time work (see Appendix Table A6a). Our results show that the share of women merely affects the level of short part-time work in an occupation, albeit with lower effect and levels of significance than in our longer time series. This indicates that to estimate robust effects we need longer observation windows (Hsiao, 2003).

Interestingly, the part-time ratio in an occupation and year was influenced by previous levels of part-time work only in the short run. After controlling for further occupational characteristics, we only observed the positive autocorrelative effect of the part-time ratio of previous years (dyn-FE and A-B) merely for lag 0 and lag 1; after 5 years, it even turned negative, though it was not statistically significant (see Appendix Table A2b). Accordingly, the development of part-time ratios in occupations seems to be impacted by short-term adaptations to changing occupational demands but does not necessarily depend on previous part-time rates from longer time intervals.

But do part-time rates increase when there is an inflow of women into an occupation in general, or are specific subgroups of women driving this effect? Fig. 2a and b shows coefficient plots with 95% confidence intervals for three further groups of models, which we

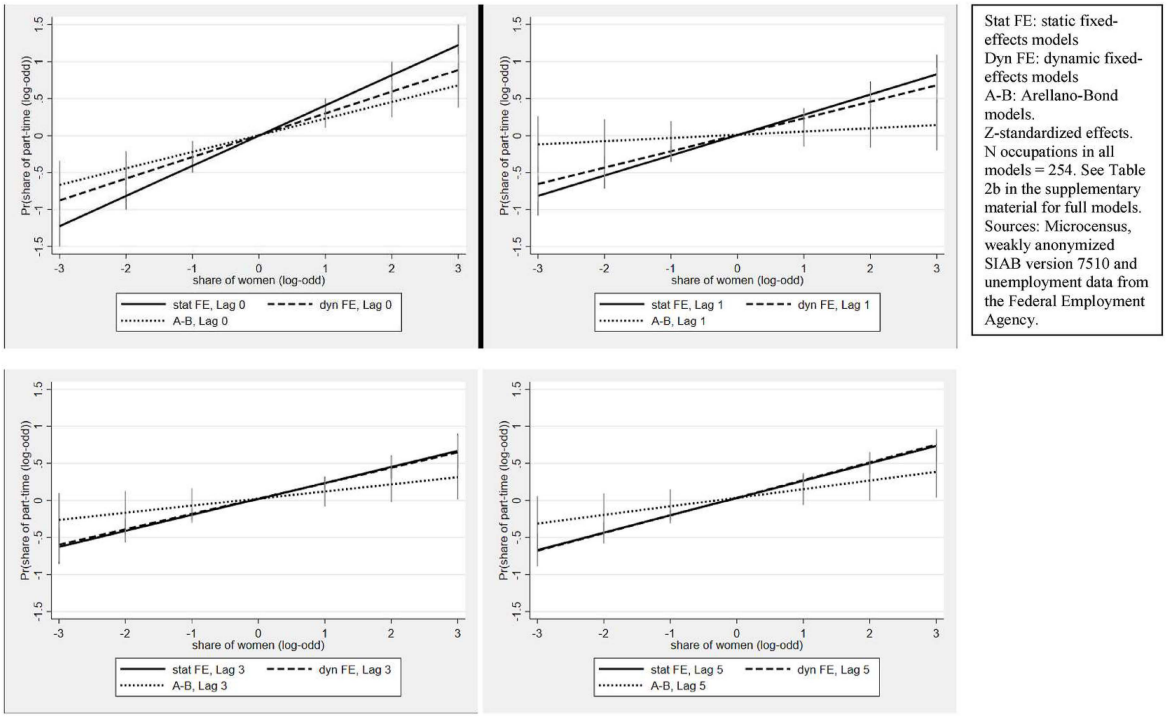
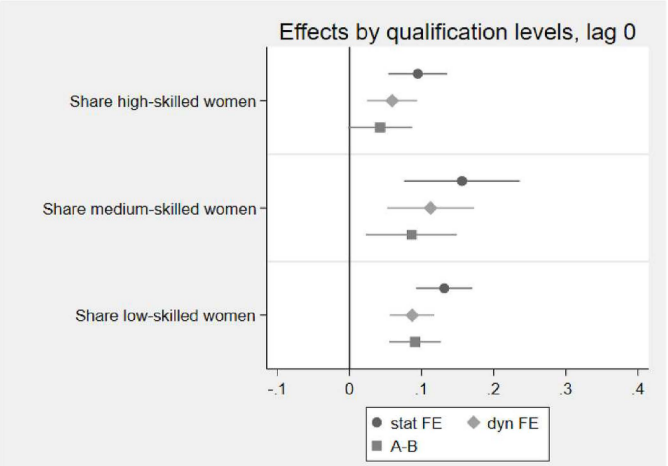
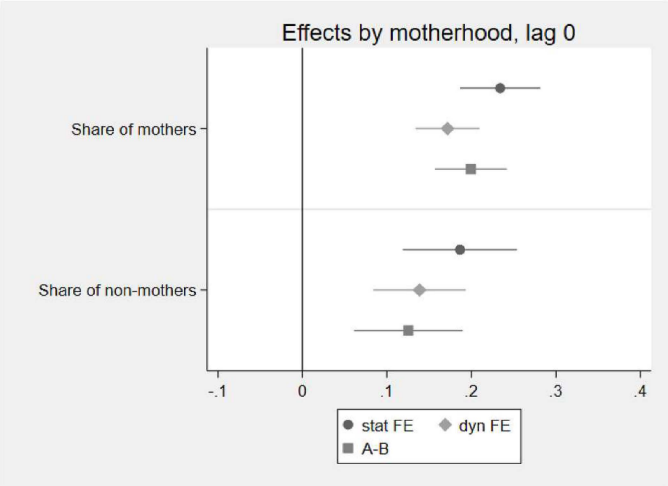


Fig. 1. *Effect of share of women on changes in part-time ratios in occupations, lag 0–lag 5.*



Stat FE: static fixed-effects models
Dyn FE: dynamic fixed-effects models
A-B: Arellano-Bond models.
Z-standardized effects.
N occupations in all models = 254. See Table 3a in the appendix for full models.
Sources: Microcensus, weakly anonymized SIAB version 7510 and unemployment data from the Federal Employment Agency.



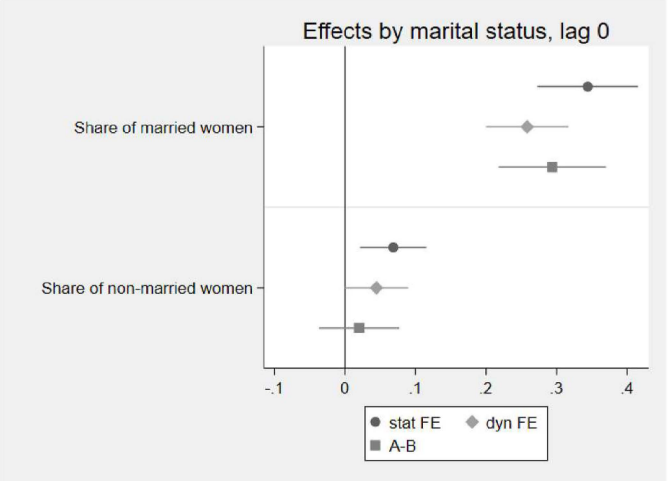
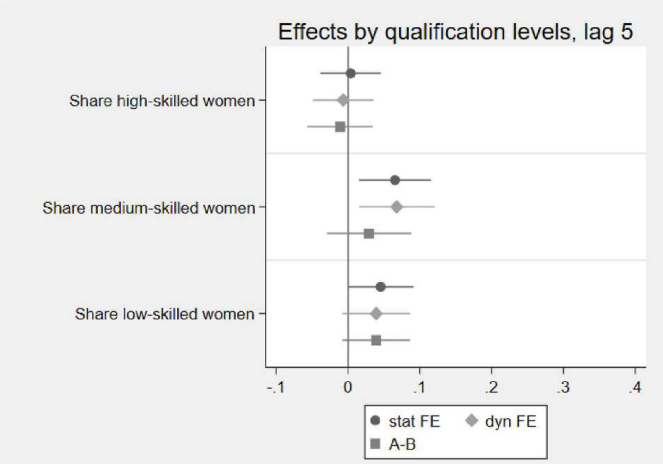


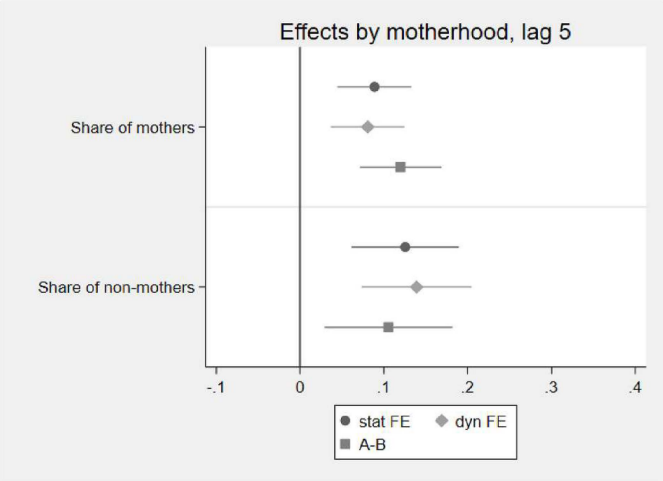
Fig. 2a. Effects of the subgroups of women on part-time ratios in occupations (lag 0)

used to test our hypotheses on subgroups of women (hypotheses 1a–c). Only two selected time structures are shown: the immediate effects of the covariates (lag 0, Fig. 2a) and the long-term effects after 5 years (Fig. 2b, see Appendix Tables A3a and A3b for full models). To test whether effects for the subgroups of women differ significantly from each other, we estimated Wald tests on the equality of coefficients (see Appendix Table 3c).

In hypothesis 1a, we expected that increasing shares of high-skilled women in an occupation would affect subsequent shares of part-time employees less strongly than increasing shares of medium- or low-skilled women (effects by qualification levels). There is only limited evidence supporting this assumption in our data: in the short run (lag 0, Fig. 2a, effects by qualification level), an increase in high-skilled women drove part-time work less strongly than did increases in the other educational groups, as we expected in hypothesis



Stat FE: static fixed-effects models
Dyn FE: dynamic fixed-effects models
A-B: Arellano-Bond models.
Z-standardized effects.
N occupations in all models = 254. See Table 3b in the appendix for full models.
Sources: Microcensus, weakly anonymized SIAB version 7510 and unemployment data from the Federal Employment Agency.



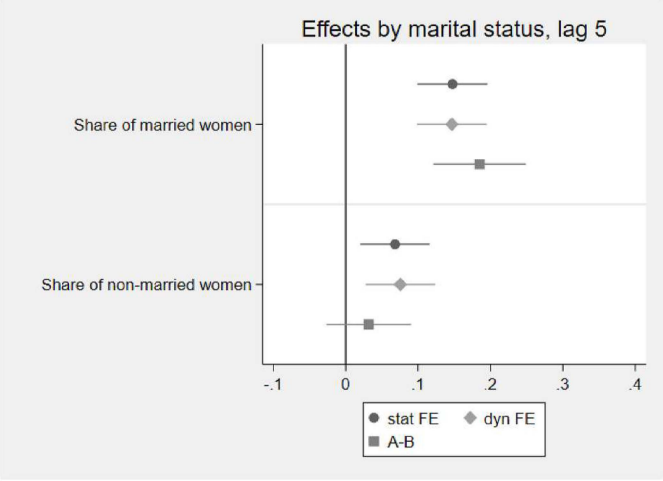


Fig. 2b. Effects of the subgroups of women on part-time ratios in occupations (lag 5).

1a. This effect was clearest in the A-B model, where the effect for the share of high-skilled women does not differ significantly from the reference group of the share of men. However, across all model specifications, coefficients were very close to each other and rather small compared to the main effect of the overall share of women in an occupation (see Appendix Tables A2b, lag 0, and Table A3a). Moreover, a Wald test on the equality of the subgroup coefficients indicates that they did not differ significantly from each other (see Appendix Table 3c). In the long run (lag 5, Fig. 2b, effects by qualification level), the effect of women with different skill levels per occupation was close to zero and not significant in most model specifications. Moreover, they did not differ significantly from each other with the exception of high vs. medium-skilled women in the dynamic model specification ($p < 0.05$) (see Appendix Table 3c). Thus, our findings do not support hypothesis 1a, namely that low-skilled women increase the part-time share in occupations more

strongly than high-skilled women do.

In hypothesis 1 b and 1c, we expected that a rising share of mothers (effects by motherhood) and married women (effects by marital status) would have stronger positive effects on the subsequent share of part-time workers than rising shares of nonmothers and nonmarried women. Our empirical results, however, only support the expected marriage effect. Even though in the short run, a rising share of mothers led to strong increases in occupational part-time rates in all three types of model specifications (Fig. 2a, effects by motherhood), this effect did not differ significantly from the effect of nonmothers (see Appendix Tables A3a and 3c). Moreover, we did not find a significant effect difference between mothers and nonmothers five years later (Fig. 2b, effects by motherhood, and Appendix Tables A3a and 3c). Thus, our results do not support hypothesis 1 b according to which mothers should make use of their right to work part time more often than nonmothers. Since, however, we were not able to differentiate mothers by the age of their children, this assumption might still hold for mothers with young children, but not for the group of mothers in general.

In contrast, increasing shares of married women raised part-time work in occupations significantly more strongly than the share of nonmarried women in the short and long run (Fig. 2a and b, effects by marital status). This effect difference is also supported by the Wald tests for all model specifications (see Appendix Table 3c). This result supports hypothesis 1c and is in line with previous research, according to which Germany's joint taxation system sets incentives for married women to reduce their working hours (Hipp and Leuze, 2015). This provides some evidence for the argument of a highly standardized temporal structuration of women's life courses in the conservative welfare state of West Germany (Aisenbrey et al., 2009; Konietzka and Kreyenfeld, 2010; Trappe et al., 2015): Women usually work full time for some years before marrying and getting children, which prompts them to work part time more often. However, the data at hand could not tell us whether the effect of marriage was confounded with the effect of motherhood, especially for mothers with young children.

Overall, the coefficients for all subgroups of women were smaller than the coefficients for the overall share of women (cf. Tables A2b, lags 0 and 5, and Tables A3a and A3b). This indicates that the interplay between occupational trends in female representation and in part-time ratios is shaped by employers' and employees' shared cultural expectations, according to which women devote more time to childrearing and household chores. This increases part-time work for all groups of women in an occupation, irrespective of whether they are high-skilled or low-skilled, already have children or will do so in future, or are married.

Turning to the second direction of influence (hypothesis 2), we investigated how the share of part-time employment per occupational group affected the gender composition of this occupation. Fig. 3 presents the predicted share of women per occupation and year (log-odds transformed, z-standardized), with 95% confidence intervals for the time lags of 0, 1, 3 and 5 years, based on models with full controls (see Appendix Table A4b). Comparing Fig. 3 with Fig. 1, we see that the effects are much smaller than those for the opposite direction of influence in all model specifications. This indicates that occupational part-time ratios drive the occupational gender composition to a much lower extent than vice versa. Moreover, the effect of part-time ratios on the share of women is significant in all three model specifications only in the short run (no lag and 1-year lag). In the long run (lag 5), models with endogenously lagged variables for the share of women (dyn-FE and A-B) show nonsignificant effects close to zero. For a lag of three years, we also find positive effects of the part-time ratios in the stat-FE and dyn-FE models, which is in line with findings from Damelang and Ebensperger (2020). However, the A-B specification indicates a nonsignificant effect close to zero, which points towards a less robust influence of part-time work with longer time lags.[16] In sum, these results only partly support hypothesis 2: rising part-time ratios in occupations resulted in an increasing inflow of women, at least in the short run.

In contrast, the share of women per occupation and year was strongly influenced by the occupational sex composition of the previous year. Thus, the share of women within an occupation had a considerable autocorrelative effect, which decreased over time but was still measurable after six years (see Appendix Tables A4a and A4b, dyn FE and A-B with lag 5). Occupations with an above-average inflow of women in previous years tended to continue to experience this in later years. When we considered this effect, we found a strong increase in explained within variation of the fixed-effects models (see R^2 within). The strong autocorrelative effect implies that (young) women's and men's occupational choices were strongly influenced by the occupational gender composition in previous years, which supports arguments based on gendered socialization processes (Busch-Heizmann, 2015b; Ochsenfeld, 2016).

7. Summary and conclusions

In international comparison, the extent of occupational gender segregation in Germany is relatively high and has only slightly declined since the mid-1970s. Even though there has been considerable expansion of women's labor force participation and employment over recent decades, women are increasingly concentrated in part-time jobs. Consequently, changing patterns of occupational gender segregation might be structurally linked to changes in occupational working-time arrangements. Yet there is limited evidence on the nature of their causal interrelations, which is mostly inconclusive and restricted to other countries.

In this article, we therefore examined whether more part-time opportunities in an occupation attract more women to work in this occupation or whether an increasing female work force in an occupation results in rising occupational part-time work. Since there are theoretical arguments for both causal directions, we assumed the relationship between occupational gender segregation and occupational part-time ratios to be reciprocal. Unlike most previous studies on this issue, we did not study individual actors' decisions but instead directly modelled processes on the meso level of occupations. This focus allowed us to investigate the normative and structural contexts surrounding part-time work and at the same time to assess the causal direction of influence directly. We tested the reciprocal

[16] Our replication with the same time interval used by Damelang and Ebensperger (2020) did not yield any significant results, neither for the short nor the long measure of part-time work (see Appendix Table A6b).

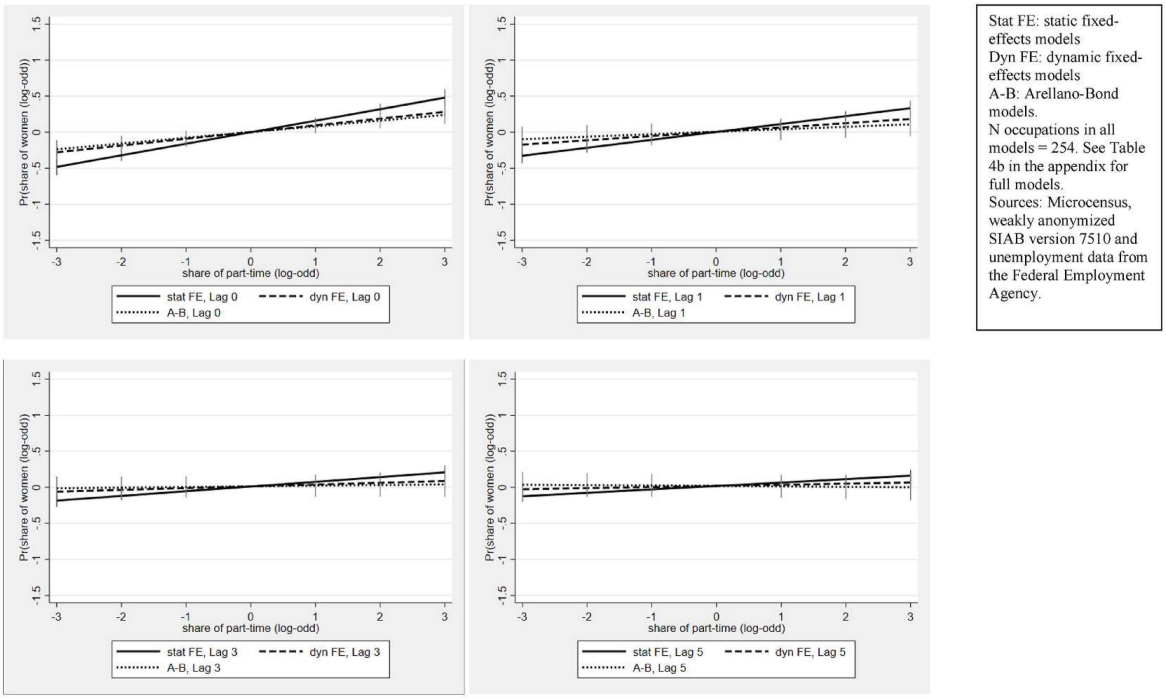


Fig. 3. *Explaining changes in the share of women in occupations (static and dynamic FE models, Arellano-Bond models), Lag 0–Lag 5.*

relationship between occupational part-time work and gender segregation by generating an occupational panel dataset for West Germany, which covered the development of 254 occupational groups between 1976 and 2010, and by applying static and dynamic panel models as well as Arellano-Bond models to account for problems associated with reverse causality, state dependence, serial correlation, and the effects of specific lag structures.

In sum, the models show a pattern of consistent results. Most importantly, changes in part-time ratios and shares of women within occupations indeed seem to be mutually dependent over time. An earlier increase in part-time employees gives rise to a later inflow of women into this occupation and vice versa. However, the strength and time structure of the mutual influences differ. The share of women affects the trend in part-time ratios more strongly in the short and long run than the reverse effect of part-time employment on occupational gender composition, with the latter effect being much smaller and significant only in the short run. We therefore conclude that occupations increasingly dominated by women are oriented towards female-stereotypical gender roles and employment trajectories, which makes it much easier to offer and use part-time work in these occupations. In contrast, occupational working time arrangements seem to matter less when (young) women make initial occupational choices or switch occupations in the course of their careers.

Contrary to our expectations, however, occupational working-time arrangements do not depend on women's qualifications and motherhood. Rather, a higher share of married women increases part-time work within occupations. Overall, the work-family policies prevalent in West Germany combined with the cultural prescriptions regarding women's responsibility for housework and care work, particularly if they are married, seem to set incentives for women to reduce their working hours, for employers to offer part-time work, and for women and men to react in opposite ways to increased part-time options.

Theoretically, our results indicate that in order to better understand women's involvement in part-time work it is necessary to consider not only explanations at the individual, household, or social policy level (Olivetti and Petrongolo, 2017; Steiber and Haas, 2012), but also the occupational environment. Since occupations are historically distinct forms of organizing work that both transmit cultural meaning and provide opportunities and constraints to individuals working in them (Krüger, 1995a, p. 196), working-hour norms are embedded in occupational contexts (Weeden and Grusky, 2005; Williams et al., 2013). In Germany, the organizational principles and cultural prescriptions of occupational working time arrangements still depend on the gender composition of occupations (Krüger, 1995b) that affect whether or not employers offer part-time work and whether or not employees make use of it. In sum, our analyses at the occupational level demonstrate that trends in occupational part-time shares and gender segregation mutually reinforce each other. Even today, occupations dominated by women have workplace characteristics that cater for women's life courses by enabling the reconciliation of wage work, care work, and housework against the background of traditional gender stereotypes.

Finally, there is evidence of true state dependence of trends in both the part-time ratios and the share of women in occupations, but their temporal patterns differ. Gender-stereotypical occupational choices do not vary much over time and lead to a very persistent structure of occupational gender segregation. When choosing an occupation, young women (and men) are strongly influenced by the gender composition, which makes gender-typical occupational choices much more likely than atypical choices (Helbig and Leuze, 2012). In contrast, occupational working time arrangements seem to matter less for early occupational choices. Moreover, part-time ratios within occupations fluctuate more over time, possibly due to quick adaptations in the demand for workers.

Our findings are only partially in line with prior research on Germany: While our models hint at mutually reinforcing patterns,

Damelang and Ebensperger (2020) only reported an effect of occupational working time arrangements (*inter alia* extensive part time) on the share of women but not vice versa. Even though both studies pursued a similar research interest, it is important to note central differences in the design: While the present study focused on West Germany over a period of 35 years, Damelang and Ebensperger (2020) focused on Germany as a whole for the years of 1996–2012. Robustness checks with similar specifications indicate that a shorter observation period might indeed obscure underlying processes, at least for our measure of short part-time work. Yet, we cannot rule out the possibility that also differences in the sample drove the results. Systematic differences between East Germany and West Germany might have covered up processes that we identified by concentrating on West Germany. In West Germany, it is very plausible that a rising share of women—and, as shown in our subgroup analyses, a rising share of married women and mothers—has led to increasing part-time ratios as these women make use of their right to part-time work and as employers offer more part-time jobs for these groups to cater to their needs regarding better work-family reconciliation. In East Germany, where women enjoy better childcare coverage and married women and mothers traditionally worked full time to a larger extent than those in West Germany, these processes may not apply.

In line with this consideration, our findings raise two questions: First, it might be interesting to see whether a similar relationship also exists in countries with different gender ideologies and work-family policies, for example, the Scandinavian countries. Even though these countries exhibit high levels of occupational gender segregation, there might be no longitudinal relationship between occupational working-time arrangements and gender composition. This might also be the case in countries where part-time work has become highly prevalent for both genders, such as the Netherlands. In that country, previous inflows of women might be unrelated to increases in occupational part-time shares, since men are increasingly choosing this working time arrangement as well. Second, researchers might ask how the observed reciprocal pattern of causal dynamics will develop further in Germany. As soon as men increasingly start to use part-time work, it might change radically. Yet, their occupational behavior, and that of future generations of women, will only change if it is supported by consistent work-family policies that are less guided by stereotypical gender roles and cater more to the needs of different groups of workers, such as parents or people who need to reduce their working times temporarily for other reasons. Looking to other countries could be very instructive in this respect.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssresearch.2021.102685.

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