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Andrea Buschner, Ursula Adam & Florian Schulz

Relative education, parenthood, and couples' division of paid work¹

Evidence from German census data

Relative Bildung, Elternschaft und Aufteilung der Erwerbsarbeit – Belege aus dem deutschen Mikrozensus

Abstract:

Educational expansion, the massive increase of women's labor force participation, and assortative mating have reduced asymmetries in educational achievements and in career resources between women and men in virtually every Western society. This paper provides an analysis of the association between partners' education, parenthood, and spouses' relative labor supply in East and West Germany. Education is considered from two angles: as an indicator for resources on the labor market or as an indicator for gender attitudes. We apply cross-sectional data from the 2011 German Microcensus, comprising 57,366 couple households. For our estimations, we use General Linear Models. Because of high case numbers, we are able to estimate several interaction effects in statistical powerful detail. We find that (1) a woman's share of paid work is higher, the higher she is educated; (2) women with higher education than their male partners realize higher shares of relative employment (in comparison to other women); (3) women rarely realize a share of 50% or

Zusammenfassung:

Entwicklungen wie die Bildungsexpansion, die zunehmende Arbeitsmarktbeteiligung von Frauen sowie die Homophilie in der Partnerwahl haben bestehende Bildungsasymmetrien zwischen Männern und Frauen in westlichen Gesellschaften deutlich reduziert. Der vorliegende Beitrag liefert für Ost- und West-Deutschland eine Analyse des Zusammenhangs zwischen der Bildung der Partner, deren Elternschaft sowie deren Erwerbsanteilen im Paar. Relative Bildung kann hierbei sowohl als Indikator für Arbeitsmarktressourcen als auch für Geschlechtsrolleneinstellungen interpretiert werden. Die Analysen basieren auf den Daten des deutschen Mikrozensus 2011 mit insgesamt 57.366 Paarhaushalten. Für die Schätzung der weiblichen Erwerbsanteile werden Allgemeine Lineare Modelle herangezogen. Aufgrund der hohen Fallzahl ist die Berücksichtigung von Interaktionseffekten möglich. Die Befunde zeigen, dass (1) der Erwerbsanteil von Frauen umso höher ist, je höher ihr eigenes Bildungsniveaus ist; (2) Frauen, die einen höheren Bildungsabschluss als ihr Mann aufwei-

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higher on average in any educational composition; (4) especially young children have a huge impact on women's labor supply; and (5) women's comparative educational advantages are more important for their share of paid work in West than in East Germany. Neither interpretation of relative education can explain the overall picture of couples' division of paid work alone. Depending on parenthood, the age of the youngest child in the household, and the regional context, either normative, or economic exchanges between partners seem to drive the association between relative education, and relative labor supply of women. We demonstrate the usefulness of two theoretical approaches of framing education as an explanatory concept.

Key words: relative education, division of paid work, relative labor supply, parenthood, labor market resources, normative context, East Germany, West Germany

sen, zeigen im Vergleich zu anderen Frauen die höchsten Erwerbsanteile; (3) Unabhängig von der relativen Bildung im Paar erreichen Frauen im Durchschnitt in aller Regel keinen Erwerbsanteil von 50%; (4) Vor allem junge Kinder zeigen einen großen Einfluss auf den Zusammenhang zwischen relativer Bildung und relativer Erwerbsbeteiligung; (5) Bildungsvorsprünge von Frauen gegenüber ihren Partnern sind für ihre Erwerbsanteile in West-Deutschland von höherer Bedeutung als in Ost-deutschland. Keine der beiden Interpretationen von Bildung erklärt allein die Aufteilung der Erwerbsarbeit im Paar. Je nach Präsenz und Alter des jüngsten Kindes sowie dem regionalen Kontext trägt die ökonomische oder wertorientierte Perspektive mehr oder weniger stark zur Erklärung des Arbeitsarrangements bei. Dabei konnten wir auf die Nützlichkeit der zwei theoretischen Rahmen von Bildung als erklärendes Modell hinweisen.

Schlagwörter: relative Bildung, Aufteilung der Erwerbsarbeit, relatives Arbeitsangebot, Elternschaft, Arbeitsmarktressourcen, normativer Kontext, Ost-Deutschland, West-Deutschland

1. Introduction

Educational expansion, the massive increase of women's labor force participation, and assortative mating are three of the last decades' most important socio-demographic trends. Developments such as these have reduced asymmetries in education and thus in career resources between women and men in virtually every Western society (Blossfeld/Drobnič 2001). Further, gender role attitudes have become much more liberal in these countries in recent decades (Brooks/Bolzendahl 2004; Lee et al. 2007; Scheuer/Dittmann 2007). At the same time, research has shown persisting inequalities regarding the division of labor within heterosexual couples (Blossfeld/Drobnič 2001; Kühhirt 2012; Hipp/Leuze 2015; Steiber et al. 2016). This has been particularly true for Germany with its still pervasive – albeit regionally varying between West and East Germany – societal notion of a traditional family model (Pfau-Effinger 2004; Budig et al. 2012; Eicher et al. 2016). We draw on the supposed 'dissonance' between reduced asymmetries in resources and persisting gender gaps in labor market participation, and provide an analysis of the association between partners' relative education, parenthood, and spouses' relative labor supply in West and East Germany.

There is certain agreement in the literature that labor market outcomes depend on both partners' resources, especially on education which has been shown to be strongly predictive for men's and women's labor market participation (Blossfeld/Drobnič 2001; Konietzka/Kreyenfeld 2010). Most research on labor market participation has focused on

the association between individual educational achievement of one or both partners, and the labor supply – i.e., weekly hours in paid labor – of one or both partners (Steiber/Haas 2009; Konietzka/ Kreyenfeld 2010; van der Lippe et al. 2011; England et al. 2012). Other studies have explicitly considered the impact of relative education on individual working hours (Sanchez/Thomson 1997), or the association between the woman's educational level, and her relative labor supply (Hipp/Leuze 2015). Apart from the studies of Eeckhaut et al. (2014), Steiber et al. (2016), Berghammer (2014) and Brynin/Schupp (2000), there is a clear lack of knowledge about the association between relative education and relative labor supply in couples. Further, research has documented the pervasive relevance of parenthood (Drobníč et al. 1999; Fouarge et al. 2010; Kühhirt 2012) and regional context (Budig et al. 2012; Kelle et al. 2017) for couples' working arrangements. However, an integrated analysis is not yet available.

Our study seeks to fill this gap, by contributing to the literature on couple inequality in four ways. First, we use recent German census data to estimate the relevance of women's and men's education for women's and men's working hours as well as couples' relative education on women's relative working hours. We use large-scale cross-sectional data from the 2011 German Microcensus, comprising 57,366 couple households. This representative data for the German population is ideally suited to disentangle, separately for West and East Germany, the relevance of educational levels and relative education on couples' shared working hours, with and without the presence of children in the households. Census data in particular, offers statistical powerful case numbers to estimate interaction effects of educational constellations with parental status and regional context.

Second, we offer a deeper insight into the association between relative education and the division of paid work by manipulating the context by the age of the youngest child in the couple households. The moderating influence of children on the association between relative education and couples working arrangements is clearly under-researched thus far (for an exception see Steiber et al. 2016). We argue that relative education has a different impact on the division of paid work depending on whether couples have no children, very young children, or older children in the households. In line with Steiber et al. (2016), we consent that it is indispensable to investigate educational effects on work arrangements by controlling for the presence or the age of the youngest child.

Third, we use data from East and West Germany to examine the moderating effect of Germany's two regional contexts on the association between relative education and relative working hours among couples. More than 25 years after German reunification, there are still crucial differences between West and East Germany in terms of institutional and normative conditions for the division of labor.

Fourth, in theoretical terms, we complement standard exchange models by offering an additional theoretical argument regarding the relevance of relative education for the division of paid work. We assume that education can be seen as a proxy for attitudes and values regarding the division of labor (van Berkel/de Graaf 1999; Bonke/Esping-Andersen 2011; Steiber et al. 2016). In doing so, we offer an alternative explanation of the relevance of educational homogamy and heterogamy for couples' working arrangements.

2. Background

To frame our analysis of the association between relative education and couples' division of paid work, we consider two theoretical approaches to education: an economic, and a value perspective. First, from an economic perspective, education is *the* pivotal resource on the labor market, since it determines one's labor market opportunities and earnings potential. Following the basic economic assumption, individuals seek returns from educational investments by means of income. The higher the educational level, the higher are the chances to be employed and the higher are the possible wages (Mincer 1958; Becker 1991). Therefore, the higher should be the individual labor supply. In line with this argument, we expect individuals to decide on their labor supply independently. However, previous research based on economic exchange theories has shown that decisions of household members usually depend on each other (Becker 1991). Allocation of paid and unpaid work emerges from a specialization process within the couple (New Home Economics; Becker 1981) or results from a bargaining process. Following the bargaining approach (Blood/Wolfe 1960; Lundberg/Pollak 1996), women and men in couples negotiate their individual labor supply based on their relative resources, mostly their earnings potential (*ceteris paribus*). As women and men are embedded in households, they face a certain amount of necessary unpaid labor that each partner tries to avoid (Brines 1993) because of opportunity costs of missed income. Thus, we expect the partner with higher income chances, and thereby a better bargaining position, be it woman or man, to realize higher labor supply, and vice versa. In cases of equal resources, that is: educational homogamy, ideally transforming into equal bargaining power, we expect both partners to be equally active on the labor market and in the household. In sum, we expect rather equal working hours in homogamous couples, and higher inequality within households according to the educational gradient between the female and the male partner.

Second, from a value perspective, education is a proxy for values or orientations in general and attitudes regarding the division of labor and gender roles in particular. In previous studies, the 'displaying gender' perspective (West/Zimmerman 1987) has been applied fruitfully to account for the gender specific division of labor. In conservative welfare states such as Germany with its traditional family model, activities such as household or childcare tasks (unpaid work) are interpreted as typical 'female' work, while the engagement in the labor market (paid work) is seen as a typical 'male' behavior (Brines 1994). According to the gender display approach, paid and unpaid labor are appropriate means for individuals to 'display' their gender (Berk 1985; Coltrane 2000). Research has shown that higher education systematically corresponds with democratic values, concepts of equality, and positive consent to the idea of gender egalitarianism (Bolzendahl/Myers 2004; Davis/Greenstein 2009; Boehnke 2011). Following this perspective, we expect the propensity of equally sharing working hours to be highest in couples in which both partners are highly educated, and lowest in couples in which both partners are lowly educated. There is evidence for this pattern for the spheres of housework (van Berkel/ de Graaf 1999), childcare (Bonke/Esping-Andersen 2011), and paid work (Steiber/ Haas 2009; Steiber et al. 2016). This finding contradicts the bargaining perspective, which proposes equal sharing in all cases of educational similarity, independent from the level of education.

Since there is still ample evidence of the traditional family model in Germany with its gender specific division of labor, at least in specific phases of the family life cycle (Konietzka/Kreyenfeld 2010; Grunow et al. 2012; Kühhirt 2012), we also considered the presence of children and the age of the youngest child as important moderating factors in our study. Accounting for parenthood within the bargaining perspective, we generally expect the female share of working hours in families to be lower than in childless couples. Parenthood induces an increase in necessary unpaid labor – housework and childcare – going hand in hand with new time restrictions (Sanchez/Thomson 1997; Baxter et al. 2008). Compared to the situation with no children, couples must re-bargain their arrangements of paid labor supply. If the bargaining process is indeed gender neutral, parenthood should have no different effect on the three constellations of relative education than in cases of childlessness. Homogamous couples should then still share paid labor duties equally, and educationally heterogamous couples should foster the gains of specialization in favor of the more educated spouse. If the normative frame of parenthood, however, asymmetrically affects bargaining power of men and women, women's comparative advantages in education are less valuable than men's are. In homogamous couples, women's share of paid work should also be reduced, but to a lesser extent than in couples with higher-educated men, and to a higher extent than in couples with lower-educated men.

Following the value perspective, we expect the association between the educational level and the division of paid work to be less affected by the normative context connected with parenthood among two high-educated partners, because these couples have most egalitarian ideas that may be capable of mitigating the effectiveness of traditional parental and gender norms. In contrast, the association should be most affected by children in low educated homogamous couples, since they have a higher propensity to surrender to the traditional norms.

Besides the different normative contexts associated with the presence and the age of children, Germany, with its two different regions, provides a good opportunity to investigate the effectiveness of two region-specific normative contexts. Even more than 25 years after reunification, West Germany still differs from East Germany in its institutional and normative support for a traditional breadwinner model (Zabel/Heintz-Martin 2013), despite some indication of convergence towards a modernized breadwinner model in both regions. In East Germany, institutional childcare is much better developed than in West Germany (Statistische Ämter des Bundes und der Länder 2012), especially for pre-school children. Moreover, the attitudes towards institutional childcare, employed mothers, and egalitarian work arrangements are much more liberal in the Eastern part of the country (Wenzel 2010; Boehnke 2011), even though some convergence of these attitudes over time could be overserved. Even if higher education is related to more egalitarian attitudes in Western societies (Bolzendahl/ Myers 2004; Davis et al. 2009), several scholars pointed out that in East Germany attitudes are less affected by education than in West Germany (Wenzel 2010; Boehnke 2011). Since we expect the effect of education on the work arrangement in couples with young children to be weaker in normative contexts that offer incentives for mothers' employment, we anticipate the effect to be weaker in East Germany than in West Germany.

3. Data and Method

3.1 Data

For our empirical analysis, we used the latest available scientific use file of the German Microcensus (2011). The Microcensus is part of the official statistics in Germany. Each year, the German Federal Statistical Office surveys one percent (about 370,000) of all private households in Germany. Participation in this survey is obligatory for all members of the sampled households. The survey covers a broad range of topics, and is especially detailed on the German population's demographic characteristics, education, and labor market participation.

For our analysis, we selected all households with two heterosexual partners aged between 18 and 55, to account for typical variations in the early and subsequent stages of employment over the life course. Also, we dropped those cases in which at least one partner has been retired, is still on training, or on maternity leave, but we kept couples with one partner on parental leave.² These restrictions aim at constructing a more homogenous sample of couples who, in theory, can jointly opt for a work arrangement, and thus are suitable for our research question. However, we are aware of the fact that even when applying these restrictions, not all working time arrangements may be evenly viable to all couples (Steiber et al. 2016), since for example some couples may be constrained to produce two household incomes due to low wages or have to compensate for one partner's unemployment. Our final sample comprises 57,366 couple households. As the results for weighted and unweighted data do not differ significantly, we report the results from unweighted data throughout our paper. See Table A1 in the appendix for descriptives of the final sample.

3.2 Measures

Outcome variable. Our dependent variable is the woman's share of weekly working hours, ranging between 0 and 1. After truncating the individual working hours of both partners to a maximum of 60 hours per week in order to minimize the influence of outliers, the woman's share was calculated by dividing her number of hours by the joint number of working hours within the couple. We used the 'normal' number of working hours for calculations instead of the 'actual' number of hours at the time of the survey to account for a bias due to periods of illness, holiday, and flexible working time. Previous studies have captured the relative employment by categorizing the couples' work arrangements (Brynin/Schupp 2000; Berg-hammer 2014; Steiber et al. 2016). This approach is disadvantageous, however, because it is difficult to define the different categories' thresholds. Furthermore, this procedure does not allow for differentiating between various levels of part-time employment. Since, in Germany, the rate of part-time employed mothers is very high and employed men mostly work full-time, the share of working hours is

2 The current parental allowance legislation in Germany enables parents to work a maximum of 30 hours per week to keep their status 'on parental leave'.

an appropriate measure to shed light on the association between relative education and women's relative labor supply.

Relative education. To capture the relative education between both partners, we used a measure for the educational composition with nine categories. We transformed the individual educational level of both partners into CASMIN classification with three categories, low (basic compulsory education with or without vocational training, as well as people without qualification), medium (completed secondary education with or without vocational training), and high (with tertiary education at universities or equivalent institutions with more technical oriented study programs)³. The three categories are crossed to obtain a measure of couples' relative education. Thus, our educational variable captures both the relation and the level of both partners' education. We used education as possible indicators for either labor market resources (Mincer 1958), or attitudes towards a gendered division of paid work (Bolzendahl/Myers 2004; Boehnke 2011; Braun/Scott 2011; Cloïn et al. 2011).

Parenthood and age of youngest child in the household. To account for children living in the couple household, we applied a set of dummy variables (1) no children; (2) youngest child < 1 year; (3) youngest child 1-2 years; (4) youngest child 3-5 years; (5) youngest child 6-9 years; or (6) youngest child 10+ years. To be precise: couples with no children are either childless, or have no resident children at the time of questioning (e.g., empty nest phase).

East and West Germany. To address regional differences within Germany, we ran separated models for East and West Germany in each step.

Controls. We controlled for potential confounders in labor market research: both partners' age, married vs. unmarried, and couples' joint working hours (Dribe/Stansfors 2009; Berghammer 2014).

3.3 Analytic strategy

Women's share of working hours is defined only on the standard unit interval [0, 1]. To model proportions bounded between zero and one, we used a fractional logit model, i.e. a general linear model including the logit transformation of the dependent variable (logit link function) and the binomial distribution (Papke/Wooldridge 1996; Baum 2008). If Y_i is a random variable taking values in the interval [0, 1], its conditional expectation can be written as

$$E[Y_i | X_{1,i}, \dots, X_{k,i}] = G(\beta_0 + \beta_1 X_{1,i} + \dots + \beta_k X_{k,i}),$$

with $G(x)$ as the logit link function

$$G(x) = \frac{1}{1+\exp(-x)}$$

First, we investigated the significance and strength of the association between the couple's educational composition, and the woman's share of working time including a set of

3 For CASMIN classification of German Microcensus data, see Lechert et al. (2006).

controls (see Figure 1; Table A2 in the appendix). Second, we examined if the presence of children, or the age of the youngest child moderate this association. We report predicted shares of women's working hours (see Figure 2) which are based on the regression models in Table A5 in the appendix. The predictions are adjusted by setting all other covariates to the sample means (Williams 2012). All analyses were conducted separately for East and West Germany.

3.4 Robustness analyses

To assess the robustness of our findings, we conducted several extra analyses (not shown). First, we used an alternative indicator for the individual educational level (ISCED) and cross-tabulated low (ISCED 0-2), medium (ISCED 3-4), and high education (ISCED 5-6) for both partners to achieve compound measures of the partners' relative education. Second, we accounted for additional explanatory variables, such as the individuals' status of parental leave, or the number of children in the couples' homes. Third, we estimated the more traditional procedure of ordinary least square models since, for example, Craig/Mullan (2011) have shown in their study on childcare time that results from OLS regressions yield substantively similar results for proportions compared with fractional logit models. In addition, we calculated Tobit Models to regard censored data. Fourth, we accounted for different processes that may drive women's labor market participation, and the amount of their working hours. We estimated a logit model for the probability of being employed versus not being employed and followed with a General Linear Model for the women's proportion of working time (including the logit link function) considering only women who had a share higher than zero. We further elaborated on this approach by using Zoib regression. Fifth, we discarded the truncation of individual working hours to a maximum of 60 hours a week. Sixth, we checked couples without children in their households more closely. This group of couples is quite heterogeneous, since there are still childless couples, couples who will never have children, as well as partners in the empty nest phase. In line with Steiber et al. (2016), we distinguished these couples by woman's age to approximately capture the different phases of family life cycle. Concluding on all results from these six robustness checks, none of the added predictors or alternative calculations changed the conclusions of our findings. Substantive results were identical.

4. Results

4.1 Woman's labor market participation and relative education

Table 1 shows that among women there is a huge regional difference regarding the volume of paid work whereas men's average working hours do not differ between East and West Germany. On average, women in East Germany are working 28.7 hours a week; women in West Germany are working 30% less (20.7 hours per week). Therefore, wom-

en's share of working hours in couples is significantly lower in West (30.2%) than in East Germany (40.0%).

Table 1: Weekly working hours and women's share of working time, by region

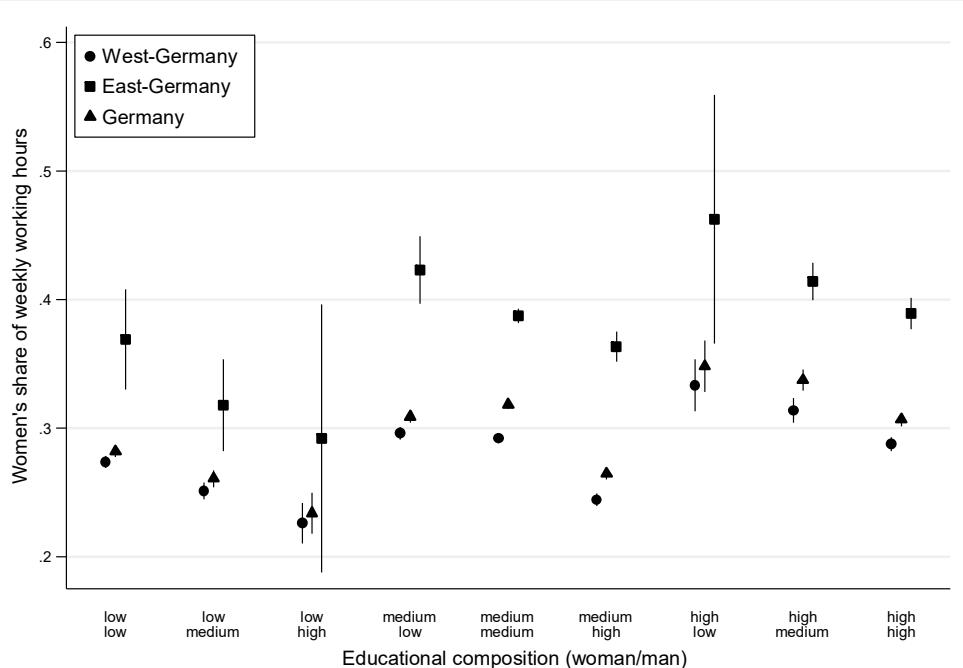
	West Germany		East Germany		Germany	
	M	SD	M	SD	M	SD
Woman's weekly working hours ^a	20.7	16.1	28.7	15.2	22.2	16.3
Man's weekly working hours ^a	40.7	10.5	39.3	11.1	40.4	10.7
Couples' joint working hours ^b	61.3	19.0	68.0	19.1	62.6	19.2
Women's proportion of working hours in couples ^c	30.2 %	22.7	40.0 %	22.1	32.1 %	22.9

Note: ^a Women's and men's working hours are truncated to a maximum of 60 hours per week in paid work. ^b Number of joint working hours is based on truncated individual working hours and ranges between 0 and 120 hours per week. ^c Woman's proportion of working hours is based on truncated data (see ^a and ^b); German Microcensus 2011, own calculations.

Figure 1 shows the adjusted predictions for women's share of weekly working hours in couples by educational composition and region. These predictions illustrate three central findings for West Germany (estimates with dots in Figure 1).

First, keeping the partner's educational level constant, the predictions indicate that the higher women's education is, the higher is their share of working time. Second, taking the couple perspective, women's proportion of time in paid work varies considerably depending on their partners' educational levels. For highly educated women, those with an educational advantage have the highest shares of working time, i.e. 33% for highly educated women with lowly educated partners or 31% for highly educated women with medium educated partners. Women's proportions are significantly lower if their partner is highly educated as well (29%). Women whose partners are higher educated have the lowest predicted proportions of working time. Low educated women with a highly or medium educated partner share approximately 23% or 25% of the joint working time, medium educated women with a highly educated spouse show a proportion of 24%. We conclude for the West German case that a woman's proportion of working hours depends on her own, as well as her partner's educational level. Highly educated women with an educational advantage hold the highest proportions of working hours. Third, women do not attain a share of 50% or higher on average in any educational composition. Consequently, there is no educational composition with an egalitarian arrangement on average. The results indicate that there are only marginal differences in the women's share of working time between homogamous medium educated and homogamous high educated couples. In both groups, women have an expected proportion of working time of about 29%. In contrast, women in couples with two low educated partners have a significantly, but slightly lower share of working time than the other homogamous groups (27%). Contrary to our expectation, homogamous high educated couples are not the most egalitarian ones with regard to the division of paid work in West Germany.

Figure 1: Adjusted predictions for women's share of weekly working hours, by relative education and region



Note: Adjusted predictions and 95% confidence intervals. The adjusted predictions are estimated from the models in Table A2 in the appendix by setting all other covariates to the sample means. German Microcensus 2011, own calculations.

While women's share of paid work in West Germany significantly depends on women's own education, as well as on their partners' education, these associations cannot be stated for East Germany to the same extent. Due to smaller case numbers in the East German sample and corresponding wide confidence intervals, we will report tendencies in the following, but state significant results explicitly.

First, in the eastern part of Germany women by trend show higher proportions of working time, the higher their own educational level is. This association is significant for women with medium-educated partners: Low educated women share 32% of working time, medium educated women 39%, and high educated women 41%. Second, although women's comparative advantages in education lead to the highest shares of working hours in East Germany as well, these shares do not differ significantly from women's proportions in other, for example, homogamous compositions (i.e. high/high). The same is true for women who live with a better-educated man. They hold the lowest shares of paid work, but their proportion is not significantly lower than, for instance, the share of women in homogamous low educated couples. Hence, results concerning comparative educational advantages of women in East Germany are less convincing than in West Germany. Third, all educational compositions in East Germany are on average on a higher level than the same groups in West Germany.

Despite low case numbers in East Germany, we assume that educational effects are weaker for women in East Germany than in West Germany. The follow up question is, whether this is true for all phases of the family life cycle. Thus, the next section will demonstrate for East and West Germany separately, how far the labor supply of women without children in their homes is affected by relative education in a different way than the one of mothers with very young or older children.

4.2 The presence of children and the age of the youngest child as moderating variables

Since women's proportion of joint working time depends on both partners' labor supply, it is additionally interesting how this proportion comes about. Not surprisingly, the range of men's mean working hours is quite small and lays within the scope of full-time employment, independent of relative education and parenthood. In contrast, women's labor supply clearly varies with the educational composition of the couple, with parenthood, and the region-specific context (see Table A3 in the appendix). Consequently, the mean variation of a woman's share of paid work is mainly governed by her own volume of working time, and less by her partner's number of working hours. Hence, the coefficient for the joint number of weekly working hours is also positive in the models (see Table A2 in the appendix). Since men mostly work about 40 hours per week, a woman's share of paid work of about 30% in West Germany means an average number of approximately 20 hours in paid work for women, and a work arrangement known as the modernized male breadwinner model or the one-and-a-half-earner model (Huinink/Reichart 2008; Lewis 2009). Our analyses support these findings, since 21% of women in our sample who live with children in their households chose a work arrangement with a full-time employed man (> 37 hours per week) and a half-time employed woman (between 15 and 25 hours per week).

Figure 2 shows how parenthood moderates the association between the relative education and the division of paid work in East and West Germany. It contains the adjusted predictions based on five instead of nine educational categories⁴ (see Table A5 in the appendix): the three homogamous compositions low/low, medium/medium, high/high, and those with an educational advantage of one partner: man's education higher than woman's, as well as woman's education higher than man's. The reduction of educational categories is for illustrative reasons only – the conclusions are not affected by this reduction (see Table A4 in the appendix).

In West Germany, as hypothesized, women's proportions of paid work show a wider range when either the presence of children or the age of the youngest child are considered. The predictions range from 4% among low educated women who live together with a child aged less than one year, to 37% among women with an educational advantage who have no child in their home. Women without children in their households have the highest shares of working time on average, and thus are closest to an egalitarian arrangement. However, even this group of women without children cannot realize a proportion of paid work of at least 50%. Instead, women's expected shares lie in a fairly narrow range be-

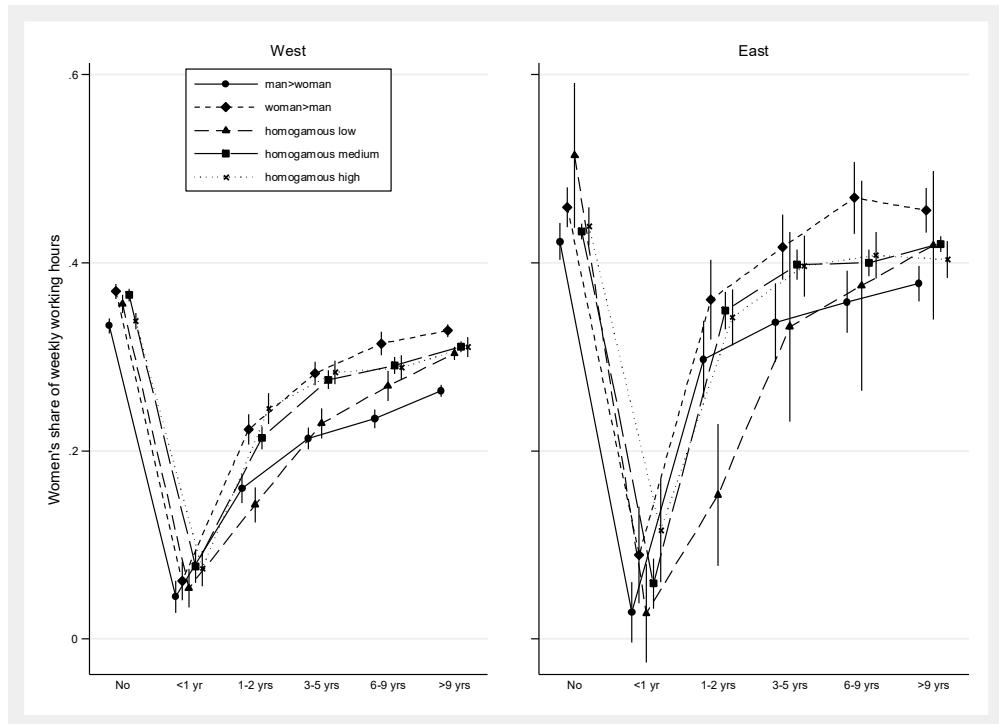
4 Results from the analyses with nine categories of educational composition are available from the corresponding author upon request.

tween 33% and 37%. Those women with an educational advantage or in a homogamous medium educated couple show the highest proportions of paid work, while women in a highly educated homogamous partnership and those with a better-educated man have the lowest shares. In couples with a youngest child being younger than one year, the women's share of working hours is expected to be very low and lies between 4% (man > woman) and 8% (homogamous medium), without significant differences between the educational compositions. Hence, the group of couples with very young children is the one farthest away from an egalitarian arrangement (i. e., 50%). In contrast, there are major differences between the educational compositions when the youngest child in the household is between one and two years old. Women in homogamous highly educated and medium educated couples, as well as those with an educational advantage, can reach a proportion of paid work of approximately 21 to 24%. Those with a higher-educated man, or especially those in a homogamous low educated couple, hold a fairly low share of 16%, or 14% , respectively. If we focus on couples with a child aged three to five years, the women's proportions are higher in all educational compositions compared to the shares of women in the group mentioned before. However, the association between the educational composition and the woman's proportion of paid work is nearly the same. Again, women's share of working hours is lowest in homogamous low educated couples, and in couples with a male educational advantage (23 and 21%). In contrast, high or medium educated women in a homogamous partnership, or women with an educational advantage, can reach a proportion of approximately 28%. A similar pattern can be seen among couples with a youngest child between six and nine years. Women's share of working hours for this group is highest if she has an educational advantage (31%), or if she lives in a homogamous medium or highly educated partnership (29% for both). The lowest proportions are again expected among women with a better-educated partner (23%), or if she is living in a homogamous partnership with a low educational level (26%). Interestingly, the pattern changes when West German couples are investigated whose youngest child is ten years or older. Educational advantages result in comparatively higher proportions of time in paid work, even though a share of 50% cannot be achieved by any educational composition. Women who are higher educated than their partner have the highest shares of working time compared to all other women (33%). Correspondingly, women with a higher-educated man hold the lowest shares of working time (26%).

In summary, we find for West Germany that a woman's proportion of paid work is higher (in comparison to other women), if she has obtained a higher level of education than her spouse. Additionally, these educational advantages are crucial when there are no children in the couples' homes. They are also more relevant, the older the youngest child in the household is. It seems that it pays off to regard the educational composition in nine categories here again to distinguish between different compositions with a higher-educated woman. Performing the same analyses as in Figure 2 with nine categories of the educational composition, the three groups of a higher-educated woman differ regarding their proportion of working time. The results indicate that, especially when there are very young children in their homes, it makes a difference on which educational level the woman with the educational advantage is; higher shares of paid work can then be realized by women who are highly educated *and* higher educated than their partner is. Medium educated women with an educational advantage hold significantly lower shares compared to

the former mentioned groups, especially when the youngest child is one two years old. If couples live together with a child aged six years or older, it does not matter on which educational level the woman's advantage is. Women who are higher educated than their spouse show a quite high proportion of more than 30%.

Figure 2: Adjusted predictions for women's proportion of weekly working hours, by relative education, presence of children/age of the youngest child and region



Note: Adjusted predictions and 95% confidence intervals. The adjusted predictions are estimated from Models 3a and 3b in Table A5 in the appendix by setting all other covariates to the sample means. German Microcensus 2011, own calculations.

When comparing the moderating effect of parenthood on the association between educational composition and female proportion of paid work in East and West Germany, we can emphasize three central differences. First, it becomes clear in Figure 2 that for all phases in the family life cycle, women in East Germany show higher shares of working hours than women in the western part of Germany do. The only exception are couples with a child under one year of age. In this phase, women in both regions reduce their labor supply considerably without significant regional differences concerning the level of female employment. Moreover, it is true for both regions that the influence of the couple's educational composition is quite weak for parents in this phase of the family life cycle.

Second, results in Figure 2 indicate that women in East Germany, who live with a child aged one to two years, have already reached a high employment level of approximately 30% among women with a better-educated man and about 36% among better-educated women. Whereas differences between the other educational groups are not significant, women in homogamous low educated couples with a youngest child aged one to two years hold a significantly lower share of 15% of total working hours.

Third, when the youngest child is ten years or older, women in East Germany show a level of employment that does not differ significantly from the level of women without children. This is the case for all educational compositions with the exception of women who live with a better-educated partner. Women with a higher education than their partner, or women in a homogamous high-educated couple, already hold a share of paid work comparable to women without children when their youngest child is aged three to five. In contrast, every educational group in West Germany with a child aged ten years or older has a lower level of women's share of paid work than their counterpart with the same educational composition, but without children.

5. Discussion

In our study, we applied a couple perspective to investigate the association between relative education and couples' division of paid labor. We based our work on two interpretations of the relevance of relative education for the division of paid work: education as a resource in economic bargaining processes or education as a proxy for attitudes regarding gender roles. Specifically, we asked (1) how couples divide paid work based on their individual and relative education, (2) how parenthood moderates the association between relative education and the division of paid work, and (3) how the association between education and labor supply is moderated by the region-specific context in East and West Germany. For our empirical analysis, we used German Microcensus data on 57,366 couples to analyze the relationship between the educational composition and the working arrangements.

Concerning our first research question, two findings stand out for West Germany. First, the higher the woman's individual education is, the higher is her share of working time. However, this share is well below 50% on average. Second, women with a high education and an educational advantage can reach the highest proportions of working hours. Hence, contrary to our assumptions, women with a higher education than their partner do not have a higher share of working time than their spouse. In contrast, men with an educational advantage showed a higher proportion of paid work than their partner does. Since men hold higher shares of working time than their partners in all educational compositions, this result is not a powerful argument for the bargaining mechanism. Hence, relative education interpreted as relative resources in the bargaining process of time allocation seems to affect women's time on paid and unpaid work in another way than men's (Schulz/Blossfeld 2006; Grunow et al. 2012). This is in line with previous research concerning the distinctive gender wage gap in Germany (Gangl/Zieffle 2008) which indicates that women's earnings potential is lower than men's, keeping their educational level constant. In addition, our data does not support the expectation of an egalitarian arrangement among homogamous couples. Women

in these couples can also achieve a maximum proportion of approximately 30% on average. Moreover, the value perspective is not applicable here either. Contrary to our expectations, highly educated homogamous couples do not share their paid labor equally. In sum, neither a value perspective nor the economic bargaining approach *alone* can explain the patterns of the couples' division of paid labor in West Germany.

In East Germany, women of all educational compositions are on a higher employment level than women in West Germany. Without taking parenthood into account, educational effects seem to be weaker for women in East Germany, since women's higher educational attainments do not consequently result in higher proportions of paid work and their comparative advantages in education do not lead to significantly higher shares.

Concerning our second research question, we showed that women's relative labor supply strongly depends on parenthood in both parts of Germany. In different groups of couples defined by the presence of children and the age of the youngest child, the division of paid work relates differently to the education of both partners. With the exception of couples with a child below the age of one, resources, as well as attitudes, seem to matter when there are younger children in their homes.

In couples with a child aged below one year, women in East and West Germany reduce their labor supply considerably. This is the only phase in which women's share of paid work in East Germany is not higher than in West Germany. Moreover, in both regions the impact of the couple's educational composition on the women's proportion of working hours is quite weak for these parents. We assume that parental leave legislation in Germany is the main explanation for the quite low proportions of paid work in this phase of the family life cycle. Though parental leave legislation, in theory, is gender-neutral⁵, mothers usually take the bulk of parental leave in Germany (Huinkink/Reichart 2008). Referring to German Census Data, about one third of fathers took parental leave in 2014, and more than three-quarters of them used the minimal option of two months (Statistisches Bundesamt 2016). Several factors are associated with fathers' low rates of parental leave, including income-based benefits that promote parental leave by the parent with the lower income, constraints of employers towards fathers to take up parental leave, and traditional ideas of gender, family, and care (Peukert 2015). In West Germany in particular, the social norm of a gendered division of labor with a male breadwinner and a female homemaker seems to be most common after transition to parenthood. Parents are exposed to even more restrictive gender norms than childless couples (Sanchez/Thomson 1997; Blossfeld/Drobnič 2001; Dribe/Stansfors 2009; Craig/Mullan 2011; Kühhirt 2012; Steiber et al. 2016), pushing women to reduce their engagement on the labor market, especially when they have very young children (Uunk 2005; Steiber/Haas 2009). The social norm of "the good mother" determines the decrease or interruption of a mothers' employment after childbirth (for West Germany: Grunow et al. 2006). This transition to a fairly traditional division of labor can be seen as the "result of parents' sensitivity to norms about good parenting and that they experience the transition to parenthood in a highly gendered way" (Dribe/Stansfors 2009: 35).

5 German parental leave legislation grants up to 14 months of paid parental leave which can be combined with part time work up to 30 hours a week, including two partner months that are assigned to the other parent and expire otherwise. This legislation was introduced in 2007, in order to strengthen fathers' participation in care work and mothers attachment to the labor market. (Peukert 2015)

While there are only few regional differences in the work arrangements among couples with children aged below one year, East and West German women differ considerably regarding their proportion of working time when their children are between one and two years old. For West German couples, highly educated women with an educational advantage are best able to transfer their advance in resources into labor supply. Additionally, high or medium educated women in a homogamous partnership hold high proportions of paid work as well. Hence, the women's individual educational level is important for the allocation of working hours. Indeed, this can be interpreted within the concept of human capital theory, which means women with a high education hold a high proportion of working time because of very high opportunity costs in the case of a reduced labor supply. However, it seems that this result can be interpreted better by taking the value perspective. High education, which is seen as an indicator for egalitarian values, provides a good counterbalance to the fairly restricting parental norms (Sanchez/Thomson 1997), especially amongst mothers with young children. Thus, we conclude for West Germany, that at least one of the following two conditions must be fulfilled to realize the highest shares of working time among mothers of young children: First, women should be highly educated, which can be interpreted as a proxy for egalitarian attitudes. Second, they must be better educated than their partners, which can be seen as an advantage in resources in a bargaining process. Our findings indicate that especially for women with very young children both conditions have to be fulfilled to realize a quite high proportion of working time. Consequently, both considerations regarding resource differences, as well as the value perspective, seem to matter in part for mothers with small children in West Germany.

Both, the resource and the value perspective are applicable to women in low educated homogamous couples as well. This can be seen in Figure 2 for both parts of Germany. Women in these couples share about 14% of paid work in West Germany and 15% in East Germany. In line with human capital theory, these women have fewer incentives for a higher labor supply. In addition, from the value perspective one would expect these women to hold lower shares due to more traditional gender norms.

If there are no children or older children in the couples' households, there are clear differences, as well as similarities between the work arrangements in East and West Germany. It is true for both parts of Germany that considerations regarding educational differences and advantages gain in importance for the division of paid work if there are older children in the couples' homes. Our results indicate that advantages in education can more easily be transferred into a higher share of working time if the youngest child is in secondary school, since restricting norms regarding the mother role are weaker. However, we suppose that for couples who are not bound by normative expectations because of very small children, a lower bargaining threshold should be considered. Our results indicate that this threshold depends on the region specific context the couples are living in, which means that bargaining processes do not occur without the influence of social norms. In West Germany, maybe not a threshold of 50%, but 30%, constitutes the bargaining level in couples. Arguing similarly to the bargaining considerations, women in homogamous couples can reach this threshold of 30%, women with a higher educational level than their partner can even pass it, while those with better-educated spouses do not reach this threshold. Moreover, this 30% threshold is indicative of typical employment patterns in West Germany. As numerous studies point out, women's – espe-

cially mothers' – labor market participation is mainly driven by part-time employment. The West German model is often described as a modernized breadwinner model or a one-and-a-half-earner model with women and especially mothers working approximately 20 hours (about a third of joint working time), while men and fathers nearly universally work 40 hours (about two-thirds of joint working time) (Huinkink/Reichart 2008; Lewis 2009). Due to institutional conditions and the more liberal normative context in East Germany, the bargaining level might be considerably higher than in West Germany and is about 40% there. Along the lines of women in West Germany, East German women with a child aged ten years or older who hold a higher educational attainment than their spouses are able to pass this threshold of 40%, while women with a higher educated partner cannot reach this level.

That means, although normative expectations towards women might be weaker if there are no children in a household or if children are older, we could not find a gender-neutral association between relative education and the share of working time. Finally, the region specific normative context prescribes the bargaining level on which economic exchange processes happen. In summary, both, the normative context of parenthood (Kühnert 2012) and the region specific context (Uunk 2005; Budig et al. 2012) in East and West Germany have emerged as crucial moderating factors in the division of paid labor.

Our study highlighted the association between relative education, parenthood, and couples' division of paid work in East and West Germany. Theoretically, we discussed two separate interpretations of education, education as an economic resource or education as an indicator for gender role attitudes. Due to high case numbers, we further analyzed the effect of parenthood on the association between relative education and relative working hours in both parts of Germany. Despite our cross-sectional design, our study yielded plausible results in the light of already existing research, and added further evidence regarding the interpretation of education. Of course, only longitudinal data would allow for in-depth testing of education and parenthood effects, making use of the specific advantages of longitudinal methods (such as accounting for unobserved heterogeneity). Further, a longitudinal design could highlight the dynamics of the association between relative education and the division of paid work over time.

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Appendix

Table A1: Descriptives of the final sample

	West Germany		East Germany		Germany	
	M	SD	M	SD	M	SD
Woman's weekly working hours ^a	20.7	16.1	28.7	15.2	22.2	16.3
Man's weekly working hours ^a	40.7	10.5	39.3	11.1	40.4	10.7
Couples' joint working hours ^b	61.3	19.0	68.0	19.1	62.6	19.2
Women's proportion of working hours ^c	30.2 %	22.7	40.0 %	22.1	32.1 %	22.9
Woman's age (years)	40.2	8.3	40.6	8.6	40.3	8.3
Man's age (years)	42.6	8.0	42.9	8.2	42.7	8.0
	%	N	%	N	%	N
Woman's education						
Low	29.4	13,700	5.3	576	24.9	14,276
Middle	54.0	25,159	76.7	8,296	58.3	33,455
High	16.5	7,697	17.9	1,938	16.8	9,635
Man's education						
Low	37.7	17,567	7.4	802	32.0	18,369
Middle	40.3	18,782	73.6	7,952	46.6	26,734
High	21.9	10,207	19.0	2,056	21.4	12,263
Couple with...						
no children	29.3	13,640	35.1	3,796	30.4	17,436
youngest child under 1 year	4.8	2,245	4.7	512	4.8	2,757
youngest child between 1 and 2 years	9.1	4,259	9.2	993	9.2	5,252
youngest child between 3 and 5 years	10.5	4,899	9.7	1,047	10.4	5,946
youngest child between 6 and 9 years	12.1	5,626	10.3	1,114	11.7	6,740
youngest child aged 10 or older	34.1	15,887	31.0	3,348	33.5	19,235
Married	84.5	39,328	73.7	7,968	82.4	47,296
N	46,556		10,810		57,366	

Note: ^a Women's and men's working hours are truncated to a maximum of 60 hours per week in paid work. ^b Number of joint working hours is based on truncated individual working hours and ranges between 0 and 120 hours per week. ^c Woman's proportion of working hours is based on truncated data (see

^a and ^b); German Microcensus 2011, own calculations.

Table A2: General Linear Models for women's share of weekly working hours (by region) – educational composition in 9 categories

	Model 1a West Germany	Model 1b East Germany	Model 1c Germany
<i>Educational composition (9 cat.)</i>			
low/low	-0.070***	-0.086	-0.083***
low/medium	-0.185***	-0.314***	-0.200***
low/high	-0.324***	-0.436	-0.335***
medium/low	0.041*	0.139*	0.041**
medium/medium	0.021	-0.009	0.006
medium/high	-0.222***	-0.110**	-0.206***
high/low	0.213***	0.301	0.220***
high/medium	0.125***	0.104**	0.116***
high/high	ref.	ref.	ref.
Joint weekly working hours	0.029***	0.012***	0.020***
<i>Presence of children/ age of the youngest child</i>			
no children	ref.	ref.	ref.
< 1 years	-2.079***	-2.338***	-2.137***
1-2 years	-0.780***	-0.434***	-0.713***
3-5 years	-0.454***	-0.191***	-0.413***
6-9 years	-0.344***	-0.137***	-0.314***
> 10 years	-0.230***	-0.077***	-0.203***
Woman's age	0.002	-0.000	0.001
Man's age	-0.002	0.002	-0.001
Married (ref.: not married)	-0.216***	-0.119***	-0.206***
East Germany (ref.: West Germany)			0.265***
Constant	-1.704***	-1.057***	-1.600***
N	46556	10810	57366

Note: * p < 0.05, ** p < 0.01, *** p < 0.001; German Microcensus 2011, own calculations.

Table A3: Descriptives of woman's share of working hours, by presence and age of the youngest child in the household and region

	West Germany		East Germany		Germany	
	N	M (SD)	N	M (SD)	N=	M (SD)
No children	13,640	42.1 (20.2)	3,796	45.1 (19.7)	17,436	42.7 (20.1)
< 1 year	2,245	4.7 (16.0)	512	5.4 (18.0)	2,757	4.8 (16.4)
1-2 years	4,259	17.4 (22.3)	993	32.0 (24.5)	5,252	20.2 (23.4)
3-5 years	4,899	24.1 (20.9)	1,047	38.7 (21.8)	5,946	26.7 (21.8)
6-9 years	5,626	26.5 (21.0)	1,114	40.2 (20.0)	6,740	28.7 (21.5)
> 9 years	15,887	30.3 (20.6)	3,348	42.3 (19.6)	19,235	32.4 (21.0)
N	46,556		10,810		57,366	

Note: ^a Women's and men's working hours are truncated to a maximum of 60 hours per week in paid work. ^b Number of joint working hours is based on truncated individual working hours and ranges between 0 and 120 hours per week. ^c Woman's proportion of working hours is based on truncated data (see ^a and ^b); German Microcensus 2011, own calculations.

Table A4: General Linear Models for women's share of weekly working hours (by region) – educational composition in 5 categories

	Model 2a West Germany	Model 2b East Germany	Model 2c Germany
<i>Educational composition (5 cat.)</i>			
man>woman	-0.213***	-0.155***	-0.209***
woman>man	0.069***	0.124***	0.071***
homogamous low	-0.068***	-0.082	-0.081***
homogamous medium	0.021	-0.008	0.006
homogamous high	ref.	ref.	ref.
Joint weekly working hours	0.021***	0.012***	0.020***
<i>Presence of children/ age of the youngest child</i>			
no children	ref.	ref.	ref.
< 1 years	-2.077***	-2.334***	-2.134***
1-2 years	-0.778***	-0.432***	-0.711***
3-5 years	-0.454***	-0.192***	-0.412***
6-9 years	-0.345***	-0.137***	-0.314***
> 10 years	-0.233***	-0.077***	-0.206***
Woman's age	0.002	-0.000	0.001
Man's age	-0.002	0.002	-0.001
Married (ref.: not married)	-0.217***	-0.120***	-0.207***
East Germany (ref.: West Germany)			0.269***
Constant	-1.705***	-1.075***	-1.606***
N	46,556	10,810	57366

Note: * p < 0.05, ** p < 0.01, *** p < 0.001; German Microcensus 2011, own calculations.

Table A5: General Linear Models for women's share of weekly working hours (by region) – including interaction terms between educational composition (5 cat.) and presence/age of the youngest child

	Model 3a West Germany	Model 3b East Germany	Model 3c Germany
<i>Educational composition (5 cat.)</i>			
man>woman	-0.023	-0.067	-0.027
woman>man	0.138***	0.081	0.132***
homogamous low	0.081**	0.302	0.086**
homogamous medium	0.122***	-0.022	0.062***
homogamous high	ref.	ref.	ref.
Joint weekly working hours	0.021***	0.012***	0.020***
<i>Presence of children/ age of the youngest child</i>			
no children	ref.	ref.	ref.
< 1 years	-1.844***	-1.793***	-1.833***
1-2 years	-0.453***	-0.410***	-0.459***
3-5 years	-0.255***	-0.175*	-0.248***
6-9 years	-0.230***	-0.128	-0.223***
> 10 years	-0.125***	-0.146**	-0.134***

	Model 3a West Germany	Model 3b East Germany	Model 3c Germany
Woman's age	0.001	0.003	0.000
Man's age	-0.002	0.000	-0.001
Married (ref.: not married)	-0.219***	-0.115***	-0.206***
East Germany (ref.: West Germany)			0.272***
man>woman # no children	ref.	ref.	ref.
man>woman # < 1 year	-0.522*	-1.432*	-0.656**
man>woman # 1-2 years	-0.512***	-0.138	-0.441***
man>woman # 3-5 years	-0.356***	-0.193	-0.345***
man>woman # 6-9 years	-0.259***	-0.143	-0.251***
man>woman # > 10 years	-0.206***	-0.041	-0.189***
woman>man # no children	ref.	ref.	ref.
woman>man # < 1 year	-0.347	-0.365	-0.361
woman>man # 1-2 years	-0.262***	0.002	-0.228***
woman>man # 3-5 years	-0.144**	0.002	-0.138**
woman>man # 6-9 years	-0.016	0.168	-0.007
woman>man # > 10 years	-0.059	0.133	-0.041
homogamous low # no children	ref.	ref.	ref.
homogamous low # < 1 year	-0.428	-1.840	-0.541*
homogamous low # 1-2 years	-0.747***	-1.357***	-0.798***
homogamous low # 3-5 years	-0.367***	-0.580*	-0.398***
homogamous low # 6-9 years	-0.179**	-0.437	-0.211***
homogamous low # > 10 years	-0.113**	-0.239	-0.120**
homogamous medium # no children	ref.	ref.	ref.
homogamous medium # < 1 year	-0.085	-0.712	-0.235
homogamous medium # 1-2 years	-0.297***	0.054	-0.168***
homogamous medium # 3-5 years	-0.162***	0.028	-0.091*
homogamous medium # 6-9 years	-0.111*	-0.011	-0.055
homogamous medium # > 10 years	-0.120***	0.091	-0.039
homogamous high # no children	ref.	ref.	ref.
homogamous high # < 1 year	ref.	ref.	ref.
homogamous high # 1-2 years	ref.	ref.	ref.
homogamous high # 3-5 years	ref.	ref.	ref.
homogamous high # 6-9 years	ref.	ref.	ref.
homogamous high # > 10 years	ref.	ref.	ref.
Constant	-1.767***	-1.071***	-1.648***
N	46,556	10,810	57,366

Note: * p < 0.05, ** p < 0.01, *** p < 0.001; German Microcensus 2011, own calculations.