Convergence or divergence? Educational discrepancies in work-care arrangements of mothers with young children in Germany

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Abstract

This study examines how educational differences in work-care patterns among mothers with young children in Germany changed between 1997 and 2013. Since the mid-2000s, Germany has undergone a paradigm shift in parental leave and childcare policies. Our comparative analysis of East and West Germany provides new evidence whether the long-standing gender regime differences interact with recent developments of social class inequalities in the changing family policy context. The analyses include pooled binary and multinomial logistic regressions based on 17,764 observations of 8,604 children below age three from the German Socio-Economic Panel Study (SOEP). The findings point to growing educational divergence in work-care arrangements in East and West Germany: Employment and day-care use increased more strongly among families with medium and highly educated mothers compared to those with low education. This has critical implications for the latter's economic security. The decline in use of informal childcare options was, however, fairly homogenous.

Keywords: childcare, early childhood, educational inequality, familialism, family policy, Germany, maternal employment, time trends

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Introduction

In Germany, as in other industrialised nations, the durations of women's employment breaks after childbirth act as important determinants of subsequent career prospects, short- and long-term returns to employment and their abilities to make provisions for old age (Aisenbrey et al., 2009; Boll, 2011; Ziefle, 2004). Higher educational attainment of mothers predicts earlier labour market returns and greater career continuity in terms of occupational prestige (Drasch, 2013; Grunow et al., 2011). Education has also been found to correlate positively with using both formal (Kreyenfeld and Krapf, 2010; Schober and Spiess, 2013) and informal childcare in Germany (Autorengruppe Bildungsberichterstattung, 2014). Social inequalities in childcare arrangements may in turn affect socioeconomic gaps in children's development, as early attendance of formal childcare has been shown to improve child outcomes and especially so for children from potentially disadvantaged families (Burger, 2010).

This study investigates whether the period between 1997 and 2013 saw an increase or decrease in educational discrepancies in terms of maternal labour market participation and formal and informal childcare arrangements among families with children below age three. Since the mid-2000s, Germany has undergone a paradigm shift in family policy by introducing parental leave and childcare reforms which promote earlier maternal labour market return and entry into formal care of children as well as greater paternal care involvement. While these policies should decrease gender inequality in labour market outcomes, the combination with some policies which support longer labour market interruptions of second earners also carries a risk of raising inequalities between women equipped with varying resources. We explore whether changes in work-care arrangements were more pronounced in West or East Germany, two contexts with persistent variations in cultural acceptance of early maternal employment and formal childcare use. This allows us to provide new evidence on how macro-level changes in family policies and work-care cultures may have influenced trends in educational discrepancies.

This research concentrates on differences in *maternal* employment, as despite recent increases in paternal leave take-up and childcare participation (Schober, 2014b), mothers on average still adjust their employment more than fathers. With respect to social inequalities, mothers' education has been shown to be a major predictor of female employment, more so than their partner's education, and in Germany this relationship has grown stronger over time (Vandecasteele and Esche, 2015). Also in terms of child development, mothers' education is positively associated with providing higher-quality home learning environments (e.g., Magnuson et al., 2009), including greater use of non-formal education activities (e.g., Schober and Spiess, 2013).

Institutional context

Different work-care cultures in East and West Germany

Profound differences in family policies between East and West Germany before reunification in 1989 have shaped cultural ideals regarding maternal employment and use of formal childcare. In the German Democratic Republic, the strong focus on integrating females in the workforce through short parental leave and extensive provision of formal care for very young children turned early maternal employment into the normative pattern (Rosenfeld et al., 2004). By contrast, the institutional setting in West Germany was characterized by joint taxation for couples, longer and low-paid parental leave entitlements and a lack of state-subsidized childcare services. As a result, the accepted norm was for the mother to take care of her child at home. Accordingly, early maternal employment and the use of formal childcare have constantly been more widely accepted and practised in East Germany than West Germany. Despite these large regional differences in formal care take-up, informal childcare use has been very similar. In recent years approximately one-third of all children under age three were in regular informal

childcare in both East and West Germany, of which by far the greatest share was provided by grandparents (Schober, 2014a).

Paradigm shift in parental leave and childcare policies

During the 1990s, following German reunification, family, tax and labour market policies kept favouring male breadwinner/female carer families. Parental leave periods used to be long but relatively low-paid. Since 1992, each parent in Germany has been entitled to take job-protected leave for the first three years of the child's life. For up to 24 months, parents could receive a means-tested childrearing benefit of up to €300 per month. Since the mid-2000s, the German government has continuously expanded the availability of state-subsidized childcare services for children below three and introduced a major parental leave reform. These reforms explicitly aimed at speeding up maternal labour market return after childbirth, increasing paternal involvement in childcare and stabilising household income across the transition to parenthood, all of which were thought to also counteract low fertility. Furthermore, the expansion of public childcare aimed at providing formal education opportunities to all children from an early age.

The parental leave reform in 2007 was characterised by a shift to an income-related reimbursement at 67 per cent of net earnings up to a maximum of €1,800 or a minimum of €300 Euros for 12 months. Furthermore, two months of individual leave entitlement were reserved for each parent and were lost if only one parent took the leave. The formal childcare expansion started with the Day-care Expansion Act (Tagesbetreuungsausbaugesetz) in 2005, according to which children under the age of three should be granted a place in childcare when both parents are in employment, education, or employment-integration programs or when the child's welfare otherwise cannot be guaranteed. The 2008 Child and Youth Welfare Act (Kinderförderungsgesetz) stipulated a legal right to a day-care place (including family day-care) for all children aged one year or over from August 1, 2013, irrespective of parental employment status, and expedited the expansion of childcare availability. From 2007 to 2013, day-care

attendance rates among children below three increased from 10 to 24 percent in West Germany and from 41 to 52 percent in East Germany, respectively (Federal Statistical Office, 2014). Thus, many more slots became available at rather low cost, as the day-care system in Germany is highly subsidised. Parental fees are frequently adjusted to household income or waived altogether for low-income families, or for all children from a certain age.

In the past, the German family policy model has frequently been classified as supported familialism (Hook, 2015; Keck and Saraceno, 2013), which is considered to suppress employment of second earners and reinforce gender inequality. In the context of the new reforms, the German family policy model may however be better described as optional familialism. It combines familialistic support in the form of joint taxation and options of long job-protected leave with defamilialist policies of some shorter but relatively well-paid leave and an entitlement to early formal childcare. In line with Hook's argument (2015), we expect that optional familialism may trigger a widening of class inequalities because families' choices between these alternatives will depend on their resources and preferences. The comparative analysis of East and West Germany provides new evidence whether the long-standing differences in gender regimes and work-care cultures interact with recent developments of social class inequalities.

Previous research

Previous studies from different countries indicate great variation in the trends in educational differences in work-care patterns. In the UK, between the 1980s and 90s the rates of return to work within one year after childbirth of women from different occupational groups and with varying qualification converged, possibly due to the greater availability of part-time jobs (Smeaton, 2006). In Austria, especially higher-educated women with children below three reduced their labour market participation between 1980 and 2009 (Berghammer, 2014). Investigating the period from 1979 to 2006 in West Germany, Drasch (2013) reports that the

positive association between mothers' levels of education and their likelihood of re-entry to the labour market became stronger in the 1990s and 2000s, suggesting further educational divergence. As opposed to this, Grunow et al. (2011) find no indication of increasing educational discrepancies in the timing of mothers' labour market re-entry following childbirth after 1991 up to 2005.

Two studies from Switzerland and West Germany which focus on mothers with dependent children in the household show some divergence in maternal employment. For Switzerland, Liechti (2014) observes increasing educational inequalities in maternal non-employment and part-time work since the 1970s, but finds that this trend has decelerated (medium vs. low education) or reversed slightly (high vs. low education) since the 1990s. Educational discrepancies in full-time employment have remained much smaller and stable, with slight increases only in the period after 2000 between high and low educated mothers. In West Germany, full-time employment of mothers declined least strongly among the highly educated between 1976 and 2004, thus pointing to growing educational differences (Konietzka and Kreyenfeld, 2010).

Turning to childcare, a study by Bainbridge et al. (2005) suggests that for three-year-olds in the US, maternal education was similarly related to enrolment in the periods 1968–1970 and 1998–2000, with inequalities in access peaking between 1978 and 1980. Blanden et al. (2015) reports the by far largest increase in formal childcare use among low-income families in the UK from 2001 to 2007. For Germany, however, Kreyenfeld & Krapf (2010) provide first evidence that between 1995 and 2008, educational discrepancies in day-care use grew for children aged four and five but not for children aged two to three years. Among the latter group, the odds of formal care use remained about three times higher for mothers with Abitur as compared to mothers with less schooling.

To-date there is no longitudinal evidence as to whether the relationship of maternal education with informal care use – or with a mixture of care types – has changed over time in Germany as well as other countries. In terms of general trends, studies from the UK show that the use of care by relatives or other informal caregivers by employed parents with a child under age five rose across the 1990s and 2000s (Bryson et al., 2012; Gray, 2005). Also in the Netherlands, grandparental childcare provision grew from 1992 to 2006 (Geurts et al., 2015).

The present study extends the literature by exploring recent trends in educational gaps in maternal employment and care arrangements for children under three years. The analysis focuses on mothers with children below three, for whom reconciling work and family life is particularly challenging, and labour market participation and external childcare use is most controversial. Also, given their strong interrelatedness this study considers employment and childcare patterns jointly. Furthermore, it examines combinations of formal and informal care options, hence mirroring parental childcare decisions more closely than when focusing on a single childcare type.

A few recent studies explore whether the effects of family policies, in particular parental leave and childcare provision, on employment of mothers may vary by their educational qualifications and therefore facilitate convergence or divergence. Based on a cross-sectional comparative study of 24 EU countries, Keck & Saraceno (2013) find that childcare coverage for children under three years correlates somewhat more strongly with employment probabilities of low educated mothers with children aged three to twelve years compared to those with high education. Unexpectedly, they discover no evidence of very short or long parental leave entitlements correlating differently with employment of mothers with varying educational resources. Berghammer (2014) suggests that parental leave extensions may have contributed to the reduction in full-time employment rates of highly educated mothers with children below three years in Austria, resulting in convergence across educational groups. By

contrast, after several extensions of low-paid parental leave in a context of worsening labour market conditions in West Germany low educated mothers slowed down their labour market re-entry and reduced their full-time employment more than highly educated mothers leading to divergence (Drasch, 2013; Konietzka and Kreyenfeld, 2010). We extend these studies by observing trends separately for East and West Germany and across the entire 2000s and part of the 2010s, a critical phase due to significant alterations in German family policy. In addition to family policy reforms, this article discusses changes in labour market opportunities, in attitudes towards the articulation of work and family life and in mating patterns and partnership status to better understand how these factors may explain the growing educational divide in work-care arrangements observed.

Macro-level developments and possible consequences for work-care choices

Frequently economic rational choice perspectives (Becker, 2009; Mincer and Polachek, 1974) are applied to predict how contextual changes in labour market conditions, family policies and mating behaviour may affect maternal employment choices. These focus on changes in financial costs and benefits of choosing different alternatives. With respect to choices of maternal work and care arrangements, a large branch of the sociological literature argues that economic explanations are insufficient and changes in how individual identities and social norms are constructed are crucial to consider. The present study therefore complements economic considerations with identity-related perspectives, which assume that as a result of past and present opportunities and institutional constraints, social groups may vary in their ideals or preferences with respect to different combination of maternal employment and care types for young children.

Family policy reforms

The expansion of highly subsidized day-care with income-dependent fees should make it easier for parents to find affordable day-care places, independent of their resources. In line with this argument, some economic policy evaluation studies found the expansion to cause fairly homogenous short-term effects on mothers' labour supply across socioeconomic subgroups (Geyer et al., 2015; Haan and Wrohlich, 2011). The parental leave reform in 2007 made employment breaks for higher-income mothers with children below one year less costly. By contrast, payments were withdrawn in the second year after birth for mothers in low-income families who had been eligible for benefits prior to the reform. Accordingly, groups with higher educational levels and higher household income reduced employment in the first year after childbirth more strongly (Kluve and Schmitz, 2014), whereas especially mothers from lower-income households increased their labour supply in the second year after childbirth (Geyer et al., 2013, 2015). The increase in employment due to the 2007 reform seems to be mainly driven by women in East Germany (Geyer et al., 2013, 2015; Kluve and Tamm, 2013). These results may point to convergence of mothers' work-care choices due to the parental leave reform, especially among mothers in East Germany.

In stark contrast, it has long been argued that higher educational attainment increases mothers' utility of returning to the labour market quickly because of higher opportunity costs of staying at home. Due to their higher human capital, they face higher foregone earnings, greater human capital depreciation, and are more severely hindered from expediting their careers by missing out on job investments at work (Mincer and Polachek, 1974). Furthermore, their less traditional identities should render early labour market returns psychologically less costly, and their jobs should entail higher psychological rewards on average (Sjöberg, 2004).

Following this argument, educational differences were previously less visible in behaviour because options for childcare for children under three were severely limited in both East and West Germany. They may have unfolded, however, as the monetary and non-monetary costs

for day-care use have decreased following the expansion. The fact that children of parents in employment, which positively correlates with education, enjoyed prioritized access to day-care further speaks for growing educational disparities over time. The extinction of now income-dependent parental leave benefits possibly made returning to work after one year appear financially more attractive for more educated, higher-earning women in order to smoothen the income stream. Furthermore, political attempts to shorten mothers' employment breaks were more compatible with higher educated women's orientations. Lastly, the finding that the 2007 reform raised longer term employment rates two to five years after childbirth (Kluve and Schmitz, 2014) mainly among more educated groups may signify diverging rather than converging trends.

Heterogeneous trends in work-care ideals

As preferences and behaviour have been shown to reinforce each other (Himmelweit and Sigala, 2004; Schober and Scott, 2012), it seems relevant to examine whether the educational gradient in internalized work-care ideals changed over time. As identities and cultural ideals are complex constructs to measure, we explored education-specific trends in attitudes towards maternal employment in East and West Germany between 1994 and 2012. Figure 1 suggests that disagreement with the statement "A pre-school child is likely to suffer if his or her mother works" increased across all educational groups, but more so among more educated respondents. Thus, the educational disparities in disagreement were significantly greater in 2012 than in 1994 in both East (low vs. high: $p<0.01$) and West (low vs. high: $p<.001$; medium vs. high: $p<.05$) (own calculations based on the International Social Survey Program (ISSP Research Group, 2014)). However, no significant changes in educational gaps became apparent concerning the statement "A working mother can establish just as warm and secure a relationship with her children as a mother who does not work". In sum, these results may point to some increase in educational disparities in attitudes towards maternal employment. Some studies suggest that

these attitudinal trends may have at least partly been triggered by recent policy reforms (Gangl and Ziefle, 2015; Schober and Zoch, 2015).

[FIGURE 1 here]

Labour market opportunities

Following German reunification, unemployment increased most drastically for the low educated, from around 15 percent in 1991 to above 25 percent in 1997 and 2005, but decreased thereafter to 20 percent in 2013; these developments were mainly driven by East Germany. In contrast, unemployment among highly educated people has remained rather stable since 1991 (Hausner et al., 2015). Thus, while educational gaps in employment probably persisted or increased throughout the 1990s, they lessened after 2005. This convergence in maternal employment, and thus day-care use, should have been greater in East than West Germany.

Mating patterns and single parenthood

Having a highly-educated partner with presumably larger financial resources lowers the incentives for mothers to participate in the labour market themselves (Konietzka and Kreyenfeld, 2010), which is why varying mating patterns could have impacted trends in maternal work-care arrangements. According to Spitzenpfeil and Andreß (2014), while levels of homogamy among West German households remained broadly constant between 1985 and 2011, the share of single households increased and the share of hypergamous households decreased. Changes in the distribution of household types were however mainly owing to the educational expansion leading to higher shares of homogamous households with highly educated partners. As opposed to this, alterations in mating preferences, e.g. the relative risk to be in a homogamous partnership, played a minor role (Spitzenpfeil and Andreß, 2014). This relative stability renders assortative mating an improbable cause of changes in work-care patterns since the 90s. Moreover, partners' educational resources have been found to matter

much less in recent years and in younger cohorts (Konietzka and Kreyenfeld, 2010; Vandecasteele and Esche, 2015). Therefore, this research does not account for fathers' educational level[i]. Rather, the substantial increase in single mothers should have raised educational disparities as single mothers of children under three who are highly educated are more often employed than partnered mothers, while those with less education have similar or lower employment rates (BMAS, 2013, p. 20). To rule out that any changes are merely due to alterations in demographic composition, all analyses control for single motherhood.

Hypotheses

While recent trends in unemployment point in the direction of convergence in maternal employment and hence formal care use, developments in education-specific gender role attitudes may speak for further divergence. As the consequences of the policy reforms in the 2000s are ambiguous, one can only derive two competing hypotheses. Hence, the period since the mid-2000s may have been characterised by convergence (Hypothesis 1a) or divergence (Hypothesis 1b) in maternal employment and formal care use across educational groups.

Given the highly salient cultural dissimilarities between East and West Germany that have persisted since reunification, we expect smaller divergence or greater convergence between education groups in employment and formal care use in East than West Germany (Hypothesis 2). This is because first, the decrease in unemployment among the low educated since the mid-2000s occurred primarily in East Germany. Second, the parental leave reform in 2007 fostered labour supply in the second year after childbirth especially among women in East Germany. One indication at odds with this hypothesis, however, is the finding of similar increases in educational gaps in attitudes regarding maternal employment in both regions.

Informal care, in particular by relatives, may be used to enable maternal labour market participation but also to promote relationships of grandparents with grandchildren.

Accordingly, the data showed weaker correlations of maternal employment with informal care (West: r=.22, East: r=.20) than with formal care use (West: r=.33, East: r=.50). Although informal care use may have been partially substituted with more widely available formal care, variations are likely to be smaller than for maternal employment and day-care use. This is especially true for West Germany, where formal care is frequently a half-day service, which may have led to increases in mixed childcare arrangements. Hence, this study predicts changes in educational disparities regarding informal care use to be less pronounced as compared to employment and day-care use (Hypothesis 3).

Data and method

Sample

The analyses were based on waves 1997 to 2013 of the German Socio-Economic Panel Study (SOEP) (Wagner et al., 2007). From 2010 onwards the sample additionally comprised households from 'Families in Germany' (FiD), a supplementary study of the SOEP that specifically oversampled families with young children and large, low-income and single-parent families (Schröder et al., 2013). The final sample included 17,764 observations of 8,604 children below three with 6,282 mothers up to age 50. In order to account for nesting of children, the standard errors were clustered at the mother level. Cross-sectional person weights were applied to account for non-response and oversampling.

Method and operationalisation of variables

To investigate trends in maternal employment, day-care use and informal care use, this study estimated logistic regression models and examined whether differences between education groups have changed across the observation period 1997 to 2013. Three of the dependent variables were binary, capturing maternal employment and children's formal and informal care

use, respectively. Maternal employment comprised full-time and part-time employment. Vocational training was classified as non-working. The variable of formal care use indicated if the child attended centre-based or family day-care ('Tagespflege'). Informal care referred to regular care by relatives, friends, neighbours, or paid caregivers in the child's home. Note that this information was only collected from 1997 onwards with gaps in 1998 and 2003. A fourth dependent variable captured all possible combinations of these two childcare types: 1) only parental care, i.e. neither formal nor informal care use; 2) only formal care; 3) only informal care; and 4) a mix of formal and informal care.

The independent variables of main interest were maternal education and period. We distinguished between i) college or university degree (high), ii) vocational training (medium) and iii) no professional education (low). To ensure large enough samples, the observation window was divided into four segments which entered the models in the form of period dummies. The first period (P1: 1997-2001) constituted the pre-reform phase and served as reference category. The second phase (P2: 2002-2006) covered the initial starting point of the day-care expansion, whose legal basis was established on January 1, 2005 with the Day-care Expansion Act. The third period (P3: 2007-2010) was characterised by the 2007 parental leave reform and further expansions of day-care availability at elevated speed. The expansion continued throughout the fourth period (P4: 2011-2013), with 2013 marking the implementation of the legal entitlement, where the demand of day-care places roughly met the supply.

The multivariate analyses included a small number of control variables to account for compositional changes in family structure over time, linear cohort trends and regional economic development. Binary indicators captured whether the child lived only with the mother in the household (single mother), and if it had a direct or indirect migration background. The number of children up to 16 years in the household and a binary variable signifying if the mother is of

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median age or older (i.e. 31 years) were included as well. Further, the models controlled for the child's age in years and month decimals including a squared term, and for the mean-centred birth year of the mother. Likewise, we included the centred annual unemployment rate at the county ("Kreis") level drawn from Federal Employment Agency statistics (Regionaldatenbank Deutschland, 2014). Finally, a binary variable indicated if the child lived in East Germany (including Berlin) as opposed to West Germany. Descriptive statistics of all variables included in the analyses are provided in Table A-1 in the appendix.

Estimation method

The multivariate analyses consisted of three parts. First, we ran pooled logistic regression models estimating children's probability of a) having a working mother, b) attending day-care and c) receiving informal care separately for East and West Germany (see Table A-2 in the appendix). In a second step, we entered interactions between maternal education and period and applied chi²-tests as to whether the educational gaps in work-care arrangement in periods 2 to 4 were significantly different from the educational gap in period 1. Part 3 contained multinomial logistic regressions of different combinations of childcare types, pooling children from East and West Germany due to lower sample sizes.

The main results are displayed as average marginal effects (AMEs) because they provide easily interpretable information on the absolute educational gaps in the expected probability on an additive scale and, unlike odds ratios, do not control for differences between groups in the baseline odds (Buis, 2010). Odds ratios and relative-risk ratios are, however, available in the appendix.

Results

Figures 2 to 4 display the predicted probabilities of employment and childcare use based on logit models with Education x Period interactions (Appendix, Table A-3). The graphs suggest

that among the low educated group labour market participation remained quite stable in the West and dipped temporarily in the East, whereas the probability of day-care use increased particularly in West Germany (P1: 2 percent; P4: 16 percent). Among children with medium and especially high educated mothers pronounced increases were observable for both regions and outcomes. For instance, comparing periods 1 and 4 the probabilities of using day-care changed from six to 21 percent among the medium educated and from 14 to 36 percent among the high educated group in West Germany. Especially from period 3, the educational gaps in employment and day-care use have grown in both regions. The educational differences in employment in East Germany, which were virtually non-existent in the first period, seemingly grew even wider than in West Germany. Given the smaller sample size, however, uncertainty is larger, as indicated by the 95% confidence intervals.

[FIGURES 2 - 3 here]

Period-specific average marginal effects of education, including chi²-tests as to whether the educational effect differed significantly in later periods compared to period 1, are shown in Tables 1 to 3. The difference in maternal employment probabilities between low and high education changed from 13 to 25 percentage points in West Germany (P1 vs. P4); this increase by 12 percentage points was statistically significant (chi²(1)= 3.92, p<.05) (Table 1). An even stronger, highly significant divergence became visible for East Germany, where the gap changed from three to well above 30 percentage points in periods 3 and 4.

[TABLES 1 - 3 here]

In Table 2 the chi²-tests revealed significant differences in the educational gradients in day-care attendance between periods 3 and 4 as opposed to period 1 for both regions. Only in West Germany the increase in educational differences narrowed slightly again in period 4 providing some indication of (re-)convergence. In sum, the results were in line with Hypothesis 1b predicting increasing divergence in maternal employment and day-care use. We found,

however, no evidence backing up Hypothesis 2, which assumed smaller divergence in East than West Germany.

Figure 4 illustrates a strikingly parallel decline of informal care use across education groups in West Germany from period 2 onwards. The probability of informal childcare use dropped from 34 to 18 (low education) and from roughly 42/43 to 27/26 (medium/high education), respectively. However, between periods 1 and 2 informal care use temporarily increased for some groups, peaking among mothers with university degree in both West and East Germany (43/47 percent) and among low educated mothers in the East (35 percent). Still, changes in the educational gaps were mostly not significant (Table 3). Overall, patterns of informal care use were more homogeneous across education groups as compared to the other two outcomes, particularly in West Germany, which provided some support for Hypothesis 3.

[FIGURE 4 here]

In addition, we investigated trends in how families combined different childcare arrangements using multinomial logit models with Education x Period interactions (Appendix, Table A-4). Figure 5 displays children's likelihood of experiencing different combinations of formal and informal childcare. Again, diverging patterns became evident in that use of exclusive parental care decreased for children with high educated mothers (P1: 53; P4: 45) but increased for children with low educated mothers in the last two periods (P1: 60; P4: 66). For children with medium educated mothers, the probability remained stable (P1: 51; P4: 53). Overall, this led to a (partly marginally) significant divergence in probabilities between the high and the low education group in periods 3 and 4, and between the high and medium education group in all subsequent periods compared to the initial phase (see Table A-5 in the appendix).

The trajectories for exclusive use of informal care and day-care, respectively, closely resembled earlier findings from the logistic regression models. The share of children experiencing a

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mixture of childcare types was generally low and increased only slightly with largely unchanged educational gaps.

[FIGURE 5 here]

Discussion

Focusing on families with children under three years of age, this study provides evidence that work-care arrangements of mothers with different levels of education diverged between 1997 and 2013, a phase spanning a major paradigm shift in family policy in Germany. Employment and day-care take-up increased most strongly among families with more educated mothers, leading to widening gaps in periods 3 and 4 (2007-2013). These results coincide and extend previous studies which documented an increase in educational disparities regarding mothers' re-entry and employment behaviour until 2006 (Drasch, 2013; Konietzka and Kreyenfeld, 2010), and regarding day-care use among children between four and five years of age (Kreyenfeld & Krapf 2010).

What is striking about the observed developments in maternal work and day-care use is the growing similarity between East and West Germany. In East Germany, educational discrepancies in attitudes, maternal employment and day-care use had initially been negligible. They only unfolded in the course of the 2000s. Rising unemployment up to 2005 probably contributed to the stable and low or partly decreasing employment rates of less educated mothers. The limited convergence since the mid-2000s, however, conflicts with economic predictions of greater convergence in short-term employment behaviour of mothers following the parental leave reform and recent improvements in labour market conditions for the low-skilled in East Germany. The constantly lower job prospects and labour market attachment before and after births may have kept low educated mothers from responding to the new policy incentives by (re-)entering the labour market and using day-care early. This may suggest that in East Germany after reunification diverging labour market opportunities have become more

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important in shaping preferred and practised work-care arrangements than previously dominant cultural norms. In West Germany the new incentives of shorter but income-related parental leave benefits in combination with wider availability of formal childcare corresponded better with labour market opportunities and work orientations held by higher-educated mothers and made returning to work about one year after childbirth normatively more acceptable. From a macro-structural point of view, the significant shift in the whole family policy package towards a model of optional familialism most likely facilitated the observed increase in educational divides in both East and West Germany despite long-standing cultural differences between the two regions. This finding provides an important contribution and extends previous longitudinal studies which focussed just on one cultural context (e.g., Berghammer, 2014; Drasch, 2013; Liechti, 2014). It remains to be seen whether in the longer term a new class division in work-care culture across the whole of Germany will become more important than the currently still persistent gender inequality in employment as well as East-West differences in the levels of day-care use.

Our and other studies' (Drasch, 2013; Konietzka and Kreyenfeld, 2010) findings on diverging educational trends in East and West Germany contrast with a study from Austria (Berghammer, 2014). To better understand why trends following parental leave extensions varied between the two countries, a promising route may be to investigate more in detail how the effects of the whole family policy packages interacted with labour market opportunities of different educational groups.

Our results show ample decline in informal childcare use, which was, however, fairly homogenous. This decline is at odds with increasing prevalence in the Netherlands and UK (Bryson et al., 2012; Geurts et al., 2015; Gray, 2005). This may be due to higher costs of formal childcare in these countries in comparison to Germany. Overall, the multinomial results indicate that informal childcare was increasingly substituted with exclusive parental care and day-care

among the low educated; mainly day-care among the medium educated; and day-care, occasionally combined with informal care, among the high educated.

As a major limitation, the sample size constrained the analyses in several ways. It did not allow us to run separate multinomial logistic regressions for East Germany, to distinguish between full- and part-time employment and varying hours of formal and informal childcare use, and to run additional analyses for women with pre-birth employment. Moreover, the analyses excluded fathers as due to the short leave periods usually taken by fathers variation in paternal employment is barely detectable in the applied framework of analysis.

Despite these limitations, the present study makes an important contribution by showing that the move from a family policy model of supported familialism towards a model of optional familialism (Hook, 2015) in Germany went hand in hand with significant increases in educational inequality in multiple domains of work and family life. It is striking that we find similar trends in East Germany with its previous defamilialist legacy and in West Germany with its strongly familialist history. In both regions, families with medium and highly educated mothers took greater advantage of the new policies than low educated mothers. This trend entails risks of further social exclusion and continued economic insecurity of this latter group. Given that some studies have shown positive effects of early attendance of formal childcare on cognitive development especially for children from potentially disadvantaged families (Burger, 2010), increasing social disparities in formal care attendance may also hold critical implications for children's social mobility.

Notes

[i] Note that the conclusions are virtually unchanged when controlling for the educational level of the partner.

References

Aisenbrey S, Evertsson M and Grunow D (2009) Is there a career penalty for mothers' time out? A comparison of Germany, Sweden and the United States. *Social Forces* 88(2): 573–606.

Autorengruppe Bildungsberichterstattung (2014) *Bildung in Deutschland 2014. Ein indikatorengestützter Bericht mit einer Analyse zur Bildung von Menschen mit Behinderungen*. Bielefeld: W. Bertelsmann Verlag.

Bainbridge J, Meyers MK, Tanaka S and Waldfogel J (2005) Who Gets an Early Education? Family Income and the Enrollment of Three- to Five-Year-Olds from 1968 to 2000. *Social Science Quarterly* 86(3): 724–745.

Becker GS (2009) *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. Chicago, IL: University of Chicago Press.

Berghammer C (2014) The return of the male breadwinner model? Educational effects on parents' work arrangements in Austria, 1980–2009. *Work, Employment & Society* 28(4): 611–632.

Blanden J, Del Bono E, McNally S and Rabe B (2015) *Universal pre-school education: The case of public funding with private provision*. CEP Discussion Paper No 1352, London.

BMAS (Bundesministerium für Arbeit und Soziales) (2013) *Alleinerziehende unterstützen – Fachkräfte gewinnen. Report 2013*. Berlin.

Boll C (2011) Mind the gap—German motherhood risks in figures and game theory issues. *International Economics and Economic Policy* 8(4): 363–382.

Bryson C, Brewer M, Sibieta L and Butt S (2012) *The role of informal childcare: a synthesis and critical review of the evidence. Full report*. London.

Buis ML (2010) Stata tip 87: Interpretation of interactions in nonlinear models. *Stata Journal* 10(2): 305–308.

Burger K (2010) How does early childhood care and education affect cognitive development? An international review of the effects of early interventions for children from different social backgrounds. *Early Childhood Research Quarterly* 25(2): 140–165.

Drasch K (2013) Educational Attainment and Family-Related Employment Interruptions in Germany: Do Changing Institutional Settings Matter? *European Sociological Review* 29(5): 981–995.

Federal Statistical Office (2014) *Statistiken der Kinder- und Jugendhilfe. Kinder und tätige Personen in Tageseinrichtungen und in öffentlich geförderter Kindertagespflege am 01.03.2014*. Available at: https://www.destatis.de/DE/Publikationen/Thematisch/Soziales/KinderJugendhilfe/Tages einrichtungenKindertagespflege5225402147004.pdf?__blob=publicationFile.

Gangl M and Ziefle A (2015) The Making of a Good Woman: Extended Parental Leave Entitlements and Mothers' Work Commitment in Germany. *American Journal of Sociology* 121(2): 511–563.

Geurts T, Van Tilburg T, Poortman A-R and Dykstra PA (2015) Child care by grandparents: changes between 1992 and 2006. *Ageing & Society* 35(6): 1318–1334.

Geyer J, Haan P, Spiess CK and Wrohlich K (2013) Das Elterngeld und seine Wirkungen auf das Haushaltseinkommen junger Familien und die Erwerbstätigkeit von Müttern. *Zeitschrift für Familienforschung* 25(2): 193–211.

Geyer J, Haan P and Wrohlich K (2015) The effects of family policy on maternal labor

supply: Combining evidence from a structural model and a quasi-experimental approach. *Labour Economics* 36: 84–98.

Gray A (2005) The Changing Availability of Grandparents as Carers and its Implications for Childcare Policy in the UK. *Journal of Social Policy* 34(4): 557–577.

Grunow D, Aisenbrey S and Evertsson M (2011) Familienpolitik, Bildung und Berufskarrieren von Müttern in Deutschland, USA und Schweden. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 63(3): 395–430.

Haan P and Wrohlich K (2011) Can child care policy encourage employment and fertility? Evidence from a structural model. *Labour Economics* 18(4): 498–512.

Hausner KH, Söhnlein D, Weber B and Weber E (2015) *Qualifikation und Arbeitsmarkt: bessere Chancen mit mehr Bildung*. Nürnberg.

Himmelweit S and Sigala M (2004) Choice and the Relationship between Identities and Behaviour for Mothers with Pre-School Children: Some Implications for Policy from a UK Study. *Journal of Social Policy* 33(3): 455–478.

Hook JL (2015) Incorporating 'class' into work–family arrangements: Insights from and for Three Worlds. *Journal of European Social Policy* 25(1): 14–31.

ISSP Research Group (2014) *International Social Survey Programme: Family and Changing Gender Roles IV - ISSP 2012*. ZA5900 Data file Version 2.0.0. Cologne.

Keck W and Saraceno C (2013) The Impact of Different Social-Policy Frameworks on Social Inequalities among Women in the European Union: The Labour-Market Participation of Mothers. *Social Politics: International Studies in Gender, State & Society* 20(3): 297–328.

Kluve J and Schmitz S (2014) *Social Norms and Mothers' Labor Market Attachment: The Medium-Run Effects of Parental Benefits*. IZA Discussion Paper No. 8115, Bonn.

Kluve J and Tamm M (2013) Parental leave regulations, mothers' labor force attachment and fathers' childcare involvement: evidence from a natural experiment. *Journal of Population Economics* 26(3): 983–1005.

Konietzka D and Kreyenfeld M (2010) The growing educational divide in mothers' employment: an investigation based on the German micro-censuses 1976-2004. *Work, Employment & Society* 24(2): 260–278.

Kreyenfeld M and Krapf S (2010) Soziale Ungleichheit und Kinderbetreuung: eine Analyse der sozialen und ökonomischen Determinanten der Nutzung von Kindertageseinrichtungen. In: Becker R and Lauterbach W (eds) *Bildung als Privileg: Erklärungen und Befunde zu den Ursachen der Bildungsungleichheit*. Wiesbaden: VS Verlag für Sozialwissenschaften, 107–128.

Liechti L (2014) Die Entwicklung bildungsspezifischer Ungleichheiten in der Arbeitsmarktpartizipation von Müttern in der Schweiz zwischen 1970 und 2010. *Zeitschrift für Soziologie* 43(5): 361–378.

Magnuson KA, Sexton HR, Davis-Kean PE and Huston AC (2009) Increases in Maternal Education and Young Children's Language Skills. *Merrill-Palmer Quarterly* 55(3): 319–350.

Mincer J and Polachek S (1974) Family Investments in Human Capital: Earnings of Women. *Journal of Political Economy* 82(2): S76–S108.

Regionaldatenbank Deutschland (2014) *Arbeitsmarktstatistik der Bundesagentur für Arbeit*. Available at: https://www.regionalstatistik.de.

Rosenfeld RA, Trappe H and Gornick JC (2004) Gender and Work in Germany: Before and

After Reunification. *Annual Review of Sociology* 30(1): 103–124.

Schober PS (2014a) Day-care trends for children under three years in Germany. In: León M (ed.) *The Transformation of Care in European Societies.* Hampshire: Palgrave MacMillan, 208–232.

Schober PS (2014b) Parental Leave and Domestic Work of Mothers and Fathers: A Longitudinal Study of Two Reforms in West Germany. *Journal of Social Policy* 43(2): 351–372.

Schober PS and Scott J (2012) Maternal employment and gender role attitudes: dissonance among British men and women in the transition to parenthood. *Work, Employment & Society* 26(3): 514–530.

Schober PS and Spiess CK (2013) Early Childhood Education Activities and Care Arrangements of Disadvantaged Children in Germany. *Child Indicators Research* 6(4): 709–735.

Schober PS and Zoch G (2015) Day-care expansion and changing attitudes of parents. *Presented at DGS Section of Family Sociology, Heidelberg, 09/2015.*

Schröder M, Siegers R and Spiess CK (2013) Familien in Deutschland. *Schmollers Jahrbuch* 133(4): 595–606.

Sjöberg O (2004) The Role of Family Policy Institutions in Explaining Gender-Role Attitudes: A Comparative Multilevel Analysis of Thirteen Industrialized Countries. *Journal of European Social Policy* 14(2): 107–123

Smeaton D (2006) Work return rates after childbirth in the UK - trends, determinants and implications: a comparison of cohorts born in 1958 and 1970. *Work, Employment & Society* 20(1): 5–25.

Spitzenpfeil M and Andreß H-J (2014) Ist der Anstieg der westdeutschen Einkommensungleichheit auf die Zunahme bildungshomogener Partnerschaften zurückführbar? *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 66(4): 575–601.

Vandecasteele L and Esche F (2015) The Changing Role of the Partner's Labour Market Resources for Female Employment Careers in Germany. *Presented at Sexualities in the Social World: 110th ASA Annual Meeting, Chicago, 23/08 2015*.

Wagner GG, Frick JR and Schupp J (2007) The German Socio-Economic Panel Study (SOEP): Scope, Evolution and Enhancements. *Schmollers Jahrbuch* 127(1): 139–169.

Ziefle A (2004) Die individuellen Kosten des Erziehungsurlaubs. Eine empirische Analyse der kurz- und längerfristigen Folgen für den Karriereverlauf von Frauen. *KZfSS Kölner Zeitschrift für Soziologie und Sozialpsychologie* 56(2): 213–231.

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Table 1. Average marginal effects (AMEs) of education on children's probability of having a working mother and chi²-tests of the difference in AMEs between period 1 and subsequent periods (Ref.: High ed.)

	West Germany			East Germany		
	AME	Period diff. in AMEs		AME	Period diff. in AMEs	
		Chi²	p-value		Chi²	p-value
Low ed.						
P1 97-01	-0.127**	Ref.		-0.027	Ref.	
	(0.044)			(0.078)		
P2 02-06	-0.105*	0.13	0.72	-0.154*	1.84	0.17
	(0.050)			(0.074)		
P3 07-10	-0.204***	1.24	0.27	-0.357***	8.58	0.00
	(0.052)			(0.079)		
P4 11-13	-0.245***	3.92	0.05	-0.324***	8.34	0.00
	(0.041)			(0.062)		
Joint (df=3)		**6.49**	**0.09**		**10.74**	**0.01**
Med ed.						
P1 97-01	-0.047	Ref.		-0.028	Ref.	
	(0.042)			(0.051)		
P2 02-06	-0.018	0.28	0.60	-0.007	0.11	0.74
	(0.043)			(0.055)		
P3 07-10	-0.066+	0.12	0.73	-0.128+	1.29	0.26
	(0.040)			(0.072)		
P4 11-13	-0.069*	0.18	0.67	-0.049	0.08	0.78
	(0.033)			(0.055)		
Joint (df=3)		**1.17**	**0.76**		**2.01**	**0.57**
N	13679			4085		

Note: Standard errors in parentheses; $^{+} p < 0.10$, $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; Further control variables: single mother, migration background, mother's age > median, mother's birth cohort, child age, age², number of children in household, county unemployment rate; Results are weighted.
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table 2. Average marginal effects (AMEs) of education on children's probability of day-care use and chi²-tests of the difference in AMEs between period 1 and subsequent periods (Ref.: High ed.)

	West Germany			East Germany		
	AME	Period diff. in AMEs		AME	Period diff. in AMEs	
		Chi²	p-value		Chi²	p-value
Low ed.						
P1 97-01	-0.115***		Ref.	-0.021		Ref.
	(0.027)			(0.069)		
P2 02-06	-0.124***	0.05	0.83	-0.032	0.02	0.89
	(0.032)			(0.064)		
P3 07-10	-0.261***	9.44	0.00	-0.206**	4.37	0.04
	(0.040)			(0.066)		
P4 11-13	-0.204***	4.40	0.04	-0.275***	9.27	0.00
	(0.034)			(0.059)		
Joint (df=3)		**12.02**	**0.01**		**13.16**	**0.00**
Med ed.						
P1 97-01	-0.083**		Ref.	-0.027		Ref.
	(0.028)			(0.047)		
P2 02-06	-0.103***	0.25	0.62	-0.033	0.01	0.91
	(0.031)			(0.045)		
P3 07-10	-0.162***	2.86	0.09	-0.121*	1.92	0.17
	(0.039)			(0.050)		
P4 11-13	-0.153***	3.26	0.07	-0.112**	1.96	0.16
	(0.028)			(0.040)		
Joint (df=3)		**4.69**	**0.20**		**3.43**	**0.33**
N	13610			4061		

Note: Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; Further control variables: single mother, migration background, mother's age > median, mother's birth cohort, child age, age², number of children in household, county unemployment rate; Results are weighted.
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table 3. Average marginal effects (AMEs) of education on children's probability of informal care use and chi²-tests of the difference in AMEs between period 1 and subsequent periods (Ref.: High ed.)

	West Germany			East Germany		
	AME	Period diff. in AMEs		AME	Period diff. in AMEs	
		Chi²	p-value		Chi²	p-value
Low ed.						
P1 97-01	0.023	Ref.		-0.199^{+}	Ref.	
	(0.062)			(0.109)		
P2 02-06	-0.093	1.98	0.16	-0.123	0.24	0.62
	(0.061)			(0.117)		
P3 07-10	-0.085	1.76	0.18	0.049	2.92	0.09
	(0.055)			(0.095)		
P4 11-13	-0.078*	2.14	0.14	-0.026	1.97	0.16
	(0.035)			(0.062)		
Joint (df=3)		**2.63**	**0.45**		**3.59**	**0.31**
Med ed.						
P1 97-01	0.090^{+}	Ref.		0.037	Ref.	
	(0.052)			(0.110)		
P2 02-06	-0.006	1.78	0.18	-0.118	1.38	0.24
	(0.052)			(0.078)		
P3 07-10	-0.000	1.76	0.18	0.074	0.08	0.78
	(0.046)			(0.075)		
P4 11-13	0.015	1.55	0.21	0.050	0.01	0.92
	(0.031)			(0.069)		
Joint (df=3)		**2.27**	**0.52**		**4.16**	**0.24**
N	11690			3621		

Note: Standard errors in parentheses; $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Further control variables: single mother, migration background, mother's age > median, mother's birth cohort, child age, age², number of children in household, county unemployment rate; Results are weighted.
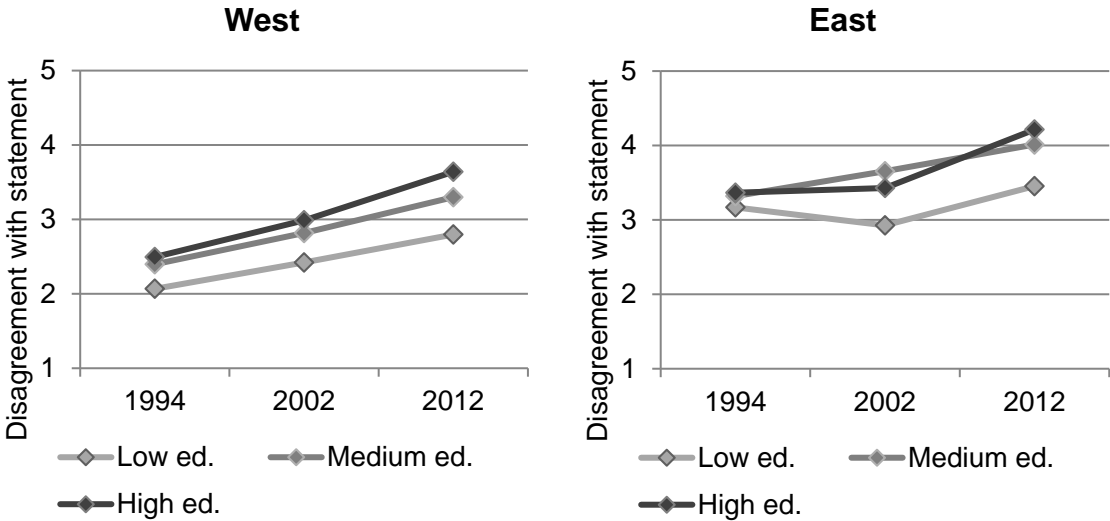Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Figure 1. Mean level of disagreement with statement "A pre-school child is likely to suffer if his or her mother works" by education, year, and region

Source: ISSP Germany (1994, 2002, 2012), authors' calculations.

Figure 2. Predicted probabilities of mothers' employment by maternal education, period, and region (see Table 1)

Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Figure 3. Predicted probabilities of day-care use by maternal education, period, and region (see Table 2)
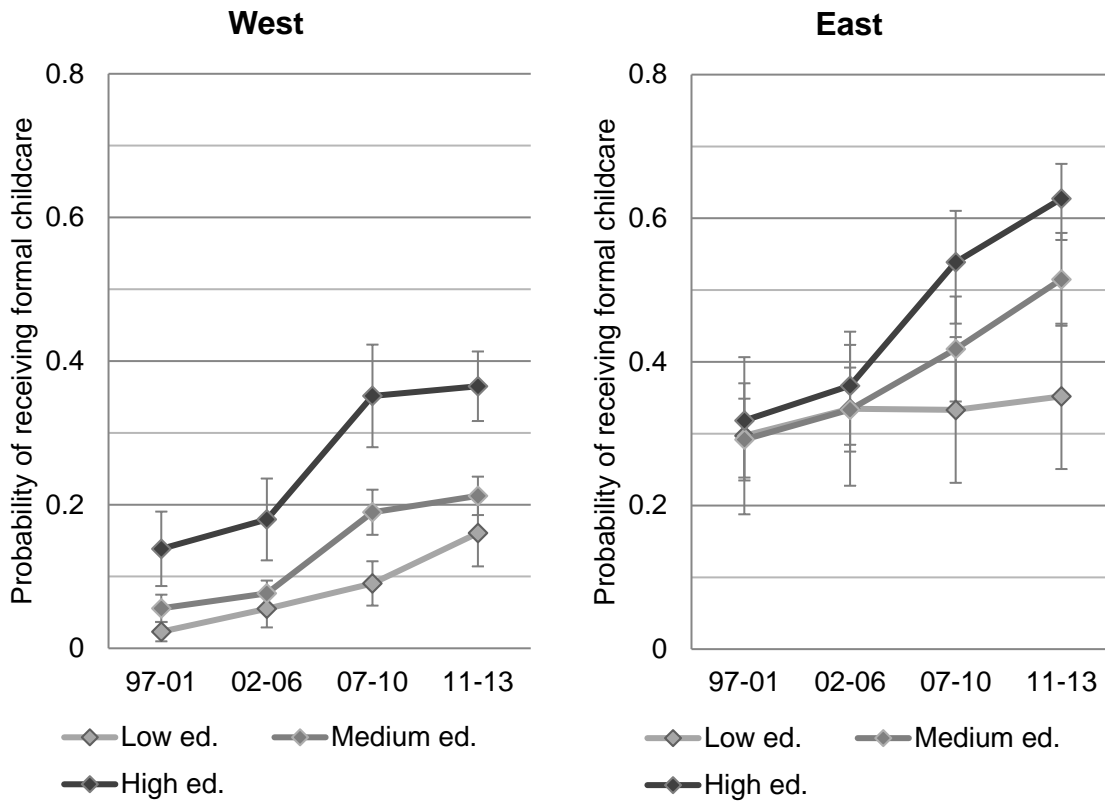
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

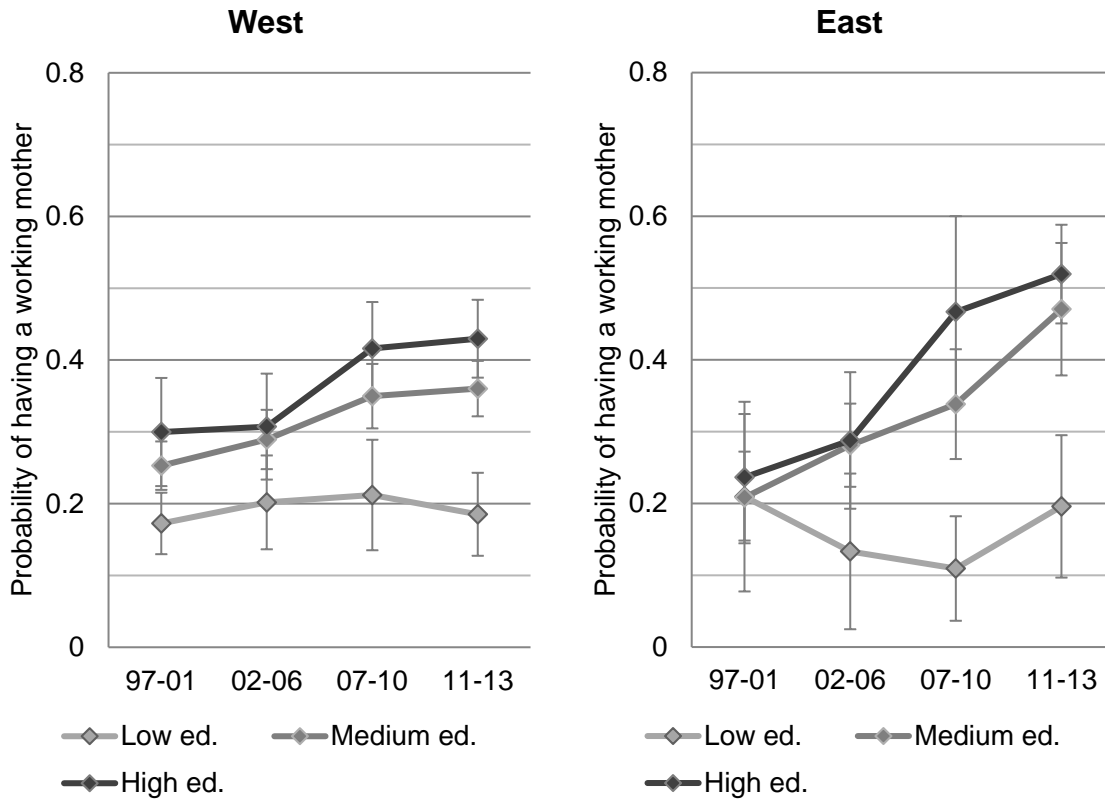**Figure 4.** Predicted probabilities of informal childcare use by maternal education, period, and region (see Table 3)
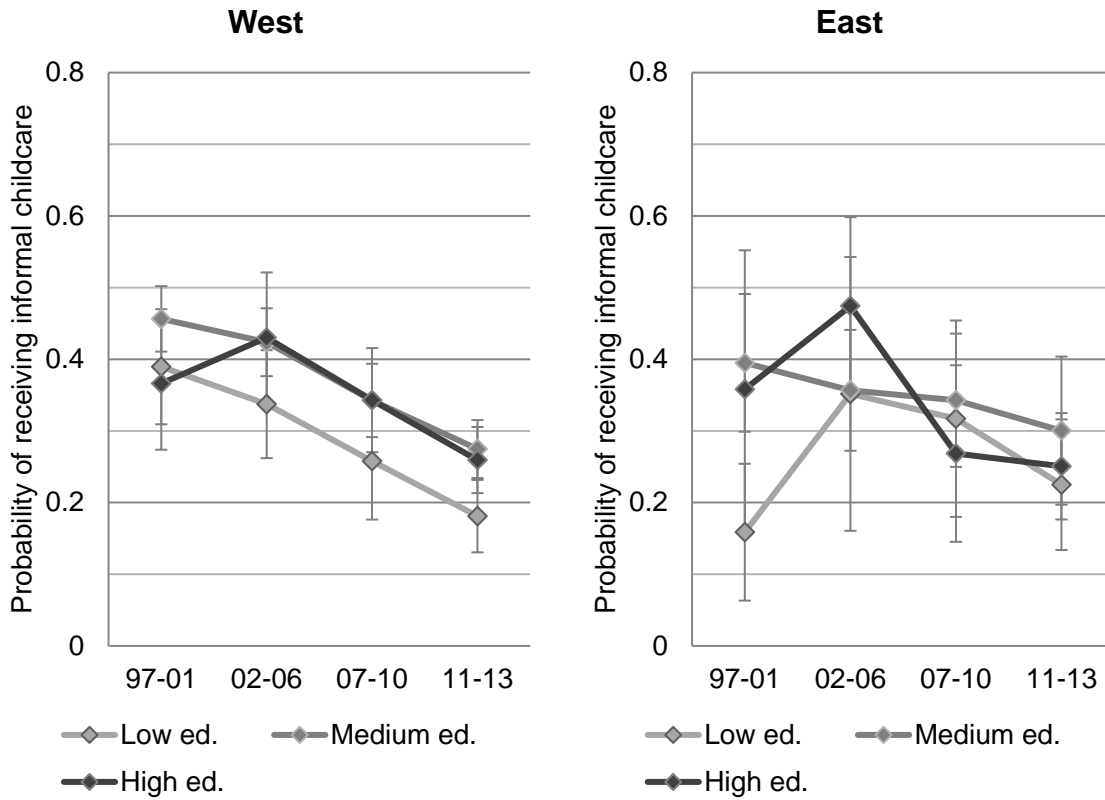
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Figure 5. Predicted probabilities of childcare type use by maternal education and period (see Table A-5)
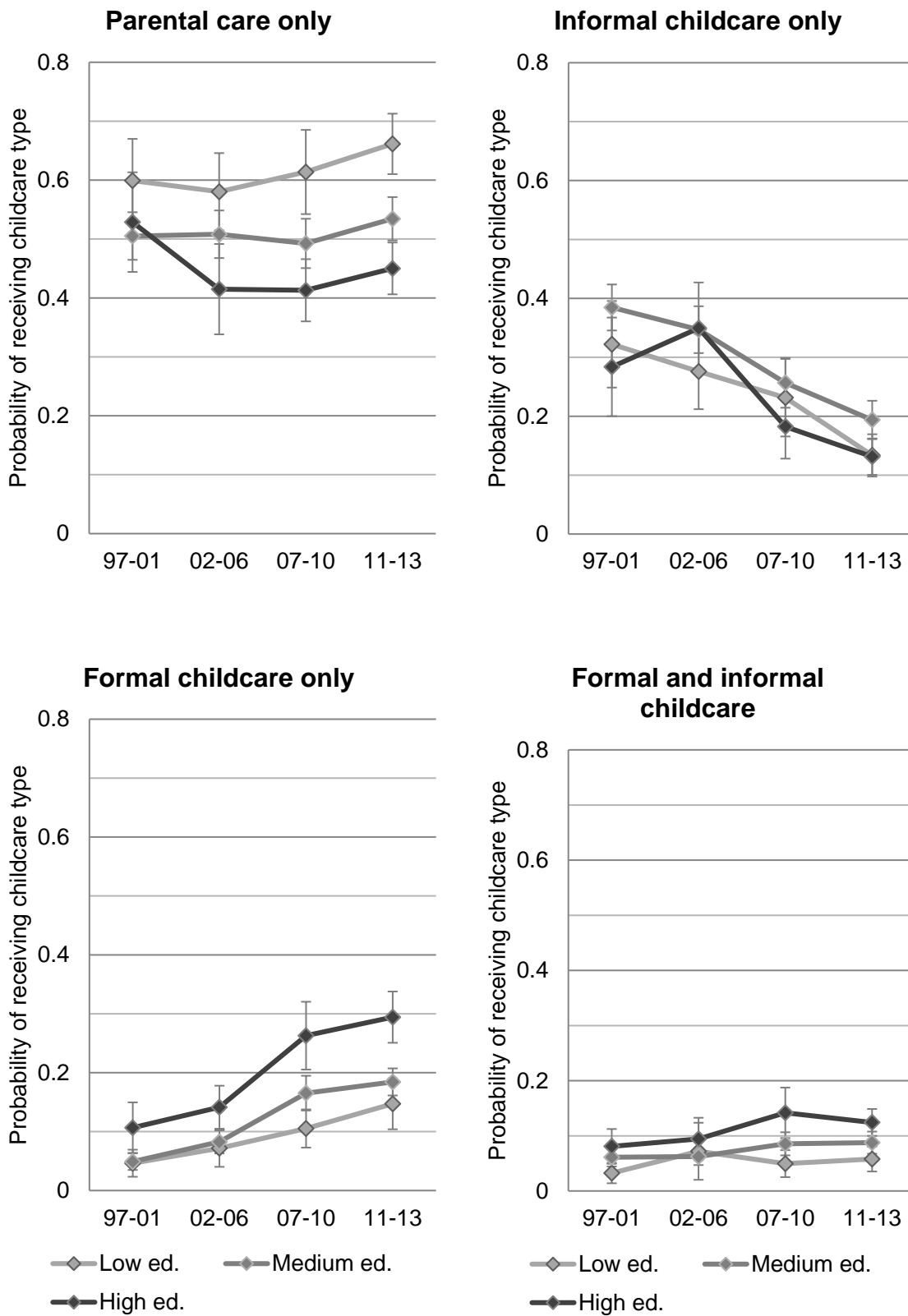
Parental care only

Informal childcare only

Formal childcare only

Formal and informal childcare

◆—Low ed.   ◆—Medium ed.

◆—High ed.

◆—Low ed.   ◆—Medium ed.

◆—High ed.

Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Appendix

Table A-1. Description of sample, West and East separately

Variable	West Germany				East Germany			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Dependent variables								
Maternal employment	0.29	0.45	0	1	0.29	0.46	0	1
Day-care use[1]	0.13	0.33	0	1	0.38	0.49	0	1
Informal care use[2]	0.37	0.48	0	1	0.33	0.47	0	1
Parental care only[3]	0.54	0.50	0	1	0.41	0.49	0	1
Informal care only[3]	0.31	0.46	0	1	0.17	0.37	0	1
Day-care only[3]	0.10	0.29	0	1	0.25	0.44	0	1
Day-care and informal care[3]	0.05	0.23	0	1	0.17	0.37	0	1
Independent variables								
P1: 1997-2001	0.35	0.48	0	1	0.30	0.46	0	1
P2: 2002-2006	0.29	0.45	0	1	0.30	0.46	0	1
P3: 2007-2010	0.21	0.41	0	1	0.23	0.42	0	1
P4: 2011-2013	0.15	0.36	0	1	0.16	0.37	0	1
Low education	0.20	0.40	0	1	0.19	0.39	0	1
Medium education	0.63	0.48	0	1	0.55	0.50	0	1
High education	0.17	0.38	0	1	0.27	0.44	0	1
Single mother	0.06	0.24	0	1	0.15	0.36	0	1
Migration background	0.32	0.47	0	1	0.13	0.34	0	1
Mother's age > median	0.57	0.50	0	1	0.41	0.49	0	1
Mother's birth cohort	1972	6.56	1952	1996	1974	6.74	1955	1995
Child age in years	1.54	0.84	0.00	2.92	1.48	0.85	0.00	2.92
No. children in household	1.81	0.89	1	11	1.79	0.96	1	9
County unemployment rate	8.62	3.18	1.4	25.2	17.06	3.75	4.9	31.4
N		13679				4085		

[1] N = 13610 / 4061; [2] N = 11690 / 3621; 3 N = 11667 / 3612. Note: Results are weighted.
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table A-2. Average marginal effects (AMEs) based on logistic regression models without interactions

	Employment		Day-care		Informal care	
	West	East	West	East	West	East
P2: 02-06	0.039$^+$	0.031	0.026*	0.027	-0.054*	-0.019
	(0.021)	(0.036)	(0.010)	(0.032)	(0.027)	(0.062)
P3: 07-10	0.116***	0.091	0.143***	0.088*	-0.147***	-0.109
	(0.027)	(0.058)	(0.017)	(0.041)	(0.033)	(0.071)
P4: 11-13	0.144***	0.170*	0.189***	0.153**	-0.225***	-0.159$^+$
Ref. P1: 97-01	(0.032)	(0.073)	(0.023)	(0.051)	(0.035)	(0.086)
Low education	-0.158***	-0.203***	-0.161***	-0.118**	-0.061$^+$	-0.063
	(0.027)	(0.044)	(0.017)	(0.043)	(0.032)	(0.060)
Medium ed.	-0.050*	-0.051	-0.114***	-0.068*	0.018	0.010
Ref. high ed.	(0.023)	(0.034)	(0.016)	(0.027)	(0.026)	(0.046)
Single mother	-0.059$^+$	-0.058	0.049*	-0.075*	0.024	0.118*
	(0.032)	(0.039)	(0.020)	(0.030)	(0.037)	(0.050)
Migration background	-0.037*	-0.057	-0.017	-0.070	-0.081***	-0.094
	(0.019)	(0.051)	(0.011)	(0.048)	(0.023)	(0.058)
Mother's age > median	0.019	0.059	0.007	-0.016	0.038	0.052
	(0.022)	(0.040)	(0.014)	(0.032)	(0.027)	(0.051)
Mother's birth cohort	-0.004$^+$	-0.000	-0.002	0.003	0.005*	0.008$^+$
	(0.002)	(0.004)	(0.001)	(0.003)	(0.003)	(0.004)
Child age in years	0.104***	0.152***	0.105***	0.251***	0.053***	0.066***
	(0.006)	(0.012)	(0.006)	(0.015)	(0.007)	(0.014)
No. children in household	-0.066***	-0.110***	-0.034***	-0.074***	-0.041***	-0.011
	(0.010)	(0.017)	(0.006)	(0.013)	(0.010)	(0.023)
County unemployment rate	-0.000	-0.003	0.000	0.001	0.001	0.003
	(0.003)	(0.004)	(0.001)	(0.004)	(0.003)	(0.006)
N	13679	4085	13610	4061	11690	3621

Note: Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; Child age² included; Results are weighted.

Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table A-3. Logistic regressions of maternal employment and childcare types including interactions (odds ratios)

	Employment		Day-care		Informal care	
	West	East	West	East	West	East
P2: 02-06	1.102	1.215	1.438	1.272	1.159	1.251
	(0.283)	(0.409)	(0.498)	(0.455)	(0.337)	(0.644)
P3: 07-10	1.997**	2.926*	4.844***	3.547**	0.740	0.420
	(0.523)	(1.444)	(1.708)	(1.508)	(0.211)	(0.247)
P4: 11-13	2.372**	3.432**	5.946***	6.213***	0.474**	0.363+
Ref. P1: 97-01	(0.629)	(1.562)	(2.041)	(2.773)	(0.131)	(0.211)
Low education	0.462**	0.834	0.128***	0.857	1.108	0.326+
	(0.119)	(0.446)	(0.052)	(0.429)	(0.303)	(0.187)
Medium ed.	0.776	0.828	0.332***	0.824	1.471+	1.178
Ref. high ed.	(0.172)	(0.280)	(0.106)	(0.284)	(0.338)	(0.581)
P2*Low ed.	1.184	0.388	1.800	0.917	0.601	1.799
	(0.420)	(0.274)	(0.894)	(0.540)	(0.217)	(1.354)
P2*Medium ed.	1.175	1.161	1.012	0.944	0.662	0.509
	(0.336)	(0.471)	(0.403)	(0.428)	(0.206)	(0.298)
P3*Low ed.	0.751	0.118**	1.020	0.267*	0.594	3.916+
	(0.295)	(0.092)	(0.501)	(0.170)	(0.228)	(2.899)
P3*Medium ed.	0.945	0.616	1.044	0.499	0.679	1.222
	(0.269)	(0.312)	(0.403)	(0.249)	(0.207)	(0.761)
P4*Low ed.	0.589	0.195*	1.970	0.160**	0.564+	2.651
	(0.204)	(0.136)	(0.907)	(0.096)	(0.191)	(1.752)
P4*Medium ed.	0.934	0.940	1.146	0.501	0.737	1.100
	(0.251)	(0.406)	(0.407)	(0.229)	(0.205)	(0.646)
Single mother	0.716+	0.696	1.661**	0.585*	1.111	1.685*
	(0.138)	(0.184)	(0.310)	(0.128)	(0.185)	(0.363)
Migration background	0.814*	0.662	0.820	0.570	0.689***	0.666
	(0.084)	(0.215)	(0.111)	(0.195)	(0.074)	(0.197)
Mother's age > median	1.113	1.481	1.079	0.904	1.197	1.265
	(0.131)	(0.359)	(0.181)	(0.209)	(0.148)	(0.296)
Mother's birth cohort	0.979+	0.998	0.981	1.020	1.027*	1.043*
	(0.012)	(0.024)	(0.015)	(0.024)	(0.012)	(0.021)
Child age in years	1.979***	2.976***	4.868***	11.953***	1.305***	1.396***
	(0.082)	(0.276)	(0.360)	(1.355)	(0.051)	(0.106)
Child age²	0.740***	0.721***	0.709***	0.357***	0.796***	0.806*
	(0.038)	(0.065)	(0.054)	(0.052)	(0.042)	(0.074)
No. children in household	0.700***	0.498***	0.674***	0.582***	0.829***	0.947
	(0.040)	(0.058)	(0.050)	(0.060)	(0.040)	(0.097)
County unemployment rate	0.999	0.988	1.003	1.010	1.006	1.012
	(0.015)	(0.026)	(0.017)	(0.028)	(0.015)	(0.028)
Constant	0.822	1.259	0.209***	1.716	1.123	0.749
	(0.188)	(0.494)	(0.060)	(0.686)	(0.263)	(0.401)
N	13679	4085	13610	4061	11690	3621

Note: Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table A-4. Multinomial logistic regression of childcare type including interactions (relative-risk ratios)

Ref.: Parental care only	Informal care only	Day-care only	Day-care and informal care
P2: 02-06	1.382	1.728	1.380
	(0.433)	(0.584)	(0.558)
P3: 07-10	0.669	4.773***	3.236**
	(0.208)	(1.743)	(1.272)
P4: 11-13	0.413**	5.831***	3.168**
Ref. P1: 97-01	(0.127)	(2.123)	(1.174)
Low education	0.979	0.293**	0.263**
	(0.284)	(0.119)	(0.113)
Medium education	1.414	0.409**	0.663
Ref. high ed.	(0.349)	(0.133)	(0.221)
P2*Low education	0.553	0.959	1.561
	(0.209)	(0.480)	(0.977)
P2*Medium education	0.557+	0.918	0.626
	(0.184)	(0.360)	(0.289)
P3*Low education	0.809	0.515	0.476
	(0.319)	(0.251)	(0.272)
P3*Medium education	0.799	0.914	0.527
	(0.263)	(0.361)	(0.229)
P4*Low education	0.655	0.703	0.700
	(0.236)	(0.330)	(0.346)
P4*Medium education	0.842	0.928	0.630
	(0.260)	(0.341)	(0.241)
Single mother	1.434*	1.081	1.096
	(0.222)	(0.214)	(0.227)
Migration background	0.673***	0.693**	0.486***
	(0.075)	(0.088)	(0.083)
Mother's age > median	1.275+	0.970	1.036
	(0.160)	(0.153)	(0.195)
Mother's birth cohort	1.033**	0.986	1.001
	(0.012)	(0.015)	(0.016)
Child age in years	1.294***	7.548***	9.293***
	(0.053)	(0.682)	(1.119)
Child age²	0.778***	0.468***	0.441***
	(0.042)	(0.039)	(0.054)
No. children in household	0.833***	0.623***	0.582***
	(0.040)	(0.043)	(0.055)
County unemployment rate	1.002	1.013	1.034+
	(0.014)	(0.017)	(0.020)
East Germany	0.655*	5.126***	4.579***
	(0.114)	(0.931)	(1.006)
Constant	1.141	0.301***	0.260***
	(0.287)	(0.093)	(0.086)

Note: N = 15279; Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.
Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.

Table A-5. Average marginal effects (AMEs) of education on children's probability of childcare type use and chi²-tests of the difference in AMEs between period 1 and subsequent periods (Ref.: High ed.)

		Parental care only			Informal care only	
	AME	Period diff. in AMEs		AME	Period diff. in AMEs	
		Chi²	p-value		Chi²	p-value
Low ed.						
97-01	0.070		Ref.	0.038		Ref.
	(0.056)			(0.057)		
02-06	0.165**	1.76	0.18	-0.074	2.31	0.13
	(0.051)			(0.051)		
07-10	0.201***	3.47	0.06	0.049	0.02	0.88
	(0.045)			(0.044)		
11-13	0.211***	4.90	0.03	0.002	0.36	0.55
	(0.034)			(0.025)		
Joint (df=3)		**5.19**	**0.16**		**4.64**	**0.20**
Med ed.						
97-01	-0.024		Ref.	0.101*		Ref.
	(0.047)			(0.047)		
02-06	0.093*	3.43	0.06	-0.003	2.61	0.11
	(0.044)			(0.045)		
07-10	0.079*	3.24	0.07	0.074*	0.21	0.65
	(0.034)			(0.035)		
11-13	0.084**	3.97	0.05	0.062**	0.55	0.46
	(0.027)			(0.023)		
Joint (df=3)		**4.65**	**0.20**		**3.09**	**0.38**

		Day-care only			Day-care and informal care	
	AME	Period diff. in AMEs		AME	Period diff. in AMEs	
		Chi²	p-value		Chi²	p-value
Low ed.						
97-01	-0.060*		Ref.	-0.048**		Ref.
	(0.025)			(0.019)		
02-06	-0.070**	0.07	0.79	-0.022	0.55	0.46
	(0.025)			(0.032)		
07-10	-0.158***	5.70	0.02	-0.092***	1.94	0.16
	(0.034)			(0.026)		
11-13	-0.147***	5.02	0.03	-0.066***	0.56	0.45
	(0.031)			(0.017)		
Joint (df=3)		**9.46**	**0.02**		**3.47**	**0.32**
Med ed.						
97-01	-0.058*		Ref.	-0.020		Ref.
	(0.023)			(0.018)		
02-06	-0.059**	0.00	0.96	-0.032	0.20	0.65
	(0.020)			(0.021)		
07-10	-0.098**	1.06	0.30	-0.056*	1.44	0.23
	(0.032)			(0.025)		
11-13	-0.110***	2.50	0.11	-0.037*	0.53	0.46
	(0.025)			(0.016)		
Joint (df=3)		**3.62**	**0.30**		**1.48**	**0.69**

Note: N = 15279; Standard errors in parentheses; $^+ p < 0.10$, $^* p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$; Further control variables: single mother, migration background, mother's age > median, mother's birth cohort, child age, age², number of children in household, county unemployment rate; Results are weighted, whole sample included.

Source: SOEP v30, FiD v4.0, Federal Employment Agency statistics (1997-2013), authors' calculations.