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Day-care expansion and parental subjective well-being: Evidence from Germany

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Day-care expansion and parental subjective well-being: Evidence from Germany

Pia S. Schober* and Christian Schmitt**

Abstract

This study investigates whether the expansion of day-care places for under-three-year-old children in East and West Germany from 2007 to 2011 has improved the subjective well-being for mothers and fathers with a youngest child in this age group. We extend existing cross-sectional country comparisons and single country policy evaluations by comparing regional variations over time in two different contexts in terms of work-care ideals, labour market, and child care policies. The empirical analysis links administrative records on day-care use at youth welfare office district level from 2007 to 2011 to regionally aggregated data from the Socio-Economic Panel (SOEP) for 2007 to 2011 and from the ‘Families in Germany’-Study (Familien in Deutschland, FID) for 2010 and 2011. We apply fixed-effects models at the county level. We find that in regions with larger day-care growth mothers and fathers expressed greater satisfaction with the available child care. In West Germany, the day-care expansion was positively associated with an increase in maternal satisfaction with family life, health, personal income, and life overall, whereas fathers’ subjective well-being was less affected. In East Germany, for mothers the associations with some domains were similarly positive but reached statistical significance only for maternal satisfaction with family life. The results suggest that the excess demand before the expansion in West and East Germany restricted maternal choice and well-being more than fathers’.

Keywords: Well-being, satisfaction; parenthood; early childhood education and care; child care

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Introduction

In recent years, the provision of state-subsidized early childhood education and care (ECEC) services has expanded in a number of European countries, including Germany, Austria, the UK, Slovenia, France, Norway, and Sweden. This was partly in response to the Barcelona targets of the European Union of providing day-care places for one third of all children aged under three years by 2010 with the aim to facilitate parents' employment and work-life balance. The target has been renewed until 2020, as only 10 member states had achieved the objective for children under three years by 2010 (European Commission, 2013).

Given these objectives, a number of recent studies have investigated whether and under what conditions expansions of day-care provision may increase maternal employment and promote parents' work-life balance. A large body of international economic and sociological literature has explored how availability and costs of early childhood education and care (ECEC) services impact on maternal employment. Results generally suggest positive, albeit sometimes small, associations of greater state-subsidized day-care provision (e.g., Steiber and Haas, 2009; Uunk et al., 2005; Pettit and Hook, 2005; Havnes and Mogstad, 2009; Del Boca and Vuri, 2007) and lower child care costs (for overviews, see Wrohlich, 2011; Anderson and Levine, 2002; Blau and Currie, 2006; Fitzpatrick, 2012) with maternal employment. Observed effects imply differing strength between countries depending on the specific early education and care policy context and by the method of analysis.

As for the question whether day-care expansions enhance parental subjective well-being, for instance by providing greater choice between different combination of paid work and child care, existing evidence has presented contradictory findings. Based on a cross-section of 28 countries, Treas et al. (2011) find that day-care provision ameliorated the disadvantage in happiness for full-time working wives compared to homemakers and part-time workers. Recently, a growing number of cross-national comparisons investigated the relationship

between state-subsidized day-care provision and perceived work-life balance or work-family conflict. Some comparisons of countries with different contexts in terms of day-care provision show only limited support for a positive effect of childcare-supply on diminishing work-family conflicts (Van der Lippe et al., 2006; Steiber, 2009; Chung, 2011), whereas others find some indications of such effects (Chung, 2012; Stier et al., 2012; Strandh and Nordenmark, 2006). Few of these studies however have had large enough country samples to actually include measures of day-care provision in addition to several other relevant institutional and cultural controls. Furthermore, they have all been based on cross-sections which limited the possibilities to consider the impact of factors which may affect both day-care provision and parental work-family conflict perceptions. Hence these studies suffer from the risk of reflecting ecological fallacies.

A few longitudinal evaluation studies of specific day-care policy reforms also provided contradictory evidence. Two evaluation studies of the introduction of universal day-care subsidies since 1997 in Quebec found adverse effects on parental life satisfaction, paternal self-reported health, maternal depression and work-family conflict, and relationship satisfaction (Brodeur and Connolly, 2012; Baker et al., 2008). However, the effects differed between income and education groups. Among low income and high educated parents, the reform had strong positive effects on parental life satisfaction, whereas the relationship was negative among middle income families (Brodeur and Connolly, 2012). A recent Australian study found that an increase in the regional availability of centre-based childcare was associated with a decrease in the perceived difficulty in obtaining a slot in a day-care centre and with finding 'good quality' childcare, as well as with an increase in mothers' satisfaction with employment and with the amount of free time available (Yamauchi, 2010). Yamauchi also found some evidence of non-linear effects with stronger improvements in regions with lower day-care coverage levels at the start of the expansion.

The study at hand adds to the existing literature by investigating how the regional variation in expanding day-care facilities for young children in West and East Germany from 2007 to 2011 was associated with parental satisfaction regarding the following areas: available day-care provision, family life, health, personal income, and with life in general. The population of analysis consists of individuals with children under three years. We develop a theoretical framework which suggests that the effects of the day-care expansion on parental well-being depend on three main factors: 1) cultural ideals of work and care arrangements among families with young children. 2) labour market conditions and economic requirements, and 3) welfare policies, which affect work-life balance such as the availability of part-time jobs. All three factors influence mothers' labour market return decisions, e.g. in terms of work hours and job characteristics, and the level of demand for day-care places. The comparison of East and West Germany may prove fruitful in this endeavour, as considerable regional differences persist in the level of day-care provision, as well as in maternal labour market behaviour and the acceptance of formal care for young children (Blohm, 2002; Cooke, 2007).

Theoretical framework

Psychological theories have suggested that gains in subjective assessments of well-being may result from actions which are in line with short-term desires or longer-term lifestyle ideals or values, whereas cognitive dissonances between ideals or values and actual behavioural choices may evoke negative emotions, such as anger and frustration (Festinger, 1957; Seligman, 2011; Diener et al., 1999). A number of studies have documented that incongruence between mothers' attitudes or desired employment status and actual employment are associated with reductions in subjective well-being or increased depressive symptoms (Berger, 2009; Klein et al., 1998; Holmes et al., 2012). More widespread availability of state subsidized day-care provision may imply more flexible options in

combining different types of work and care arrangements with potential positive consequences for parental – in particular maternal - well-being.

At a given level of quality, a greater supply of formal day-care reduces search costs for mothers who prefer this sort of care arrangement. Reduced search costs in terms of time, energy, and money may facilitate mothers' re-entry into the labour market and may increase their work hours. Psychological theories have suggested potentially counteracting effects of role enhancement and role strain when individuals assume multiple roles, such as by combining formal employment with family care (Marks, 1977; Barnett and Baruch, 1987; Goode, 1970). The combination of work and family responsibilities may increase stress due to time or strain based conflict. Alternatively, role enhancement theories imply that positive commitment to work and family roles may contribute directly and additively to well-being and may buffer each other.

An increase in maternal employment as a result of greater day-care availability may therefore enhance maternal well-being, if additional strain or time based conflict, as a result of a faster maternal labour market return and increased work hours, does not (over)compensate the benefits of role enhancement. The psychological benefits of increased employment opportunities may be greater in regions where mothers tend towards a stronger labour market attachment, but face restrictions in their ability to realise these preferences, for instance as a result of large gaps between demand and supply of ECEC services. A stronger focus of mothers' to contribute to household income may widen these gaps. At the same time, the financial necessity of mothers contributing to household income may lead them to return to work faster and work longer hours than preferred and to accept jobs with less favourable working conditions, which increase strain and time based conflict.

Recently a few cross-national comparisons have suggested that child care policies impact work-family conflict by influencing parents' employment choices in terms of job demands

and resources, such as weekly work hours, workload and working conditions (Chung, 2012; Strandh and Nordenmark, 2006). Differences in maternal employment responses to day-care expansions may also partly account for the mixed results of previous studies. In the Canadian context, where researchers found negative effects on parental well-being (Brodeur and Connolly, 2012; Baker et al., 2008), leave after childbirth is shorter and most of the increase in day-care use and maternal employment was full-time (Baker et al., 2008; Lefebvre and Merrigan, 2008). By contrast, in Australia, where Yamauchi (2010) found positive effects, employment of mothers with young children is much lower and part-time employment more widespread even after the expansion of day-care places in recent years (OECD, 2012).

Following economic theory (Becker, 1991; Ermisch, 2003), a substitution of private forms of child care even without an extension in maternal employment may increase household income, if state-subsidized day-care is cheaper than care purchased on the private market. In addition, it may allow mothers, and possibly also their partners, more spare time and therefore might reduce stress, thus positively impacting satisfaction with health, family life, and life in general. In the Australian context, the extension of day-care places seems to have been associated more strongly with reduced search costs and satisfaction with leisure time, rather than with satisfaction with employment or finances (Yamauchi, 2010).

Figure 1 depicts our theoretical model, which assumes that the availability of day-care affects parents'; in particular mothers'; time allocation to paid work, child care and leisure, depending on local work-care ideals, labour market circumstances and family policy context, such as part-time work opportunities. The latter context factors also moderate the extent to which these changes are perceived as enhancing parental satisfaction with life domains by confirming their identities or as stress and strain inducing and therefore negative for subjective well-being.

The German day-care expansion and family policy context

Historically, the level of publicly subsidized child care provision in terms of places as well as opening hours for children under the age of three has been low in West Germany, whereas a long tradition of working mothers has led to both a high demand and an extensive supply of formal ECEC services from age one onwards in the East of Germany (Klenner and Hašková, 2010). In contrast to these differences in infant care between East and West, almost 100 per cent of children across all German regions attend a day-care centre from the age of three (Statistische Ämter des Bundes und der Länder, 2011). Since 1996, each child, aged three years and over has been entitled to a place in a German day-care centre ('Kindertageseinrichtung') for at least four hours a day. Children below the age of three have not been legally entitled to a day-care slot before August 2013.

Social policy in Germany shows a long tradition of providing long parental leave periods. Those, however, have been associated with very limited benefit payments and the share of fathers taking part of the leave had been close to zero. Since 1992, parents have been entitled to take job-protected leave for the first three years of the child's life. After the eight-week mother protection period with income-related reimbursement, a means-tested flat rate benefit of about 150 Euros per month was paid for up to 24 months, with reinstatement rights lasting up to 36 months post-partum. For the past decades, the ideal of maternal care (Kremer, 2007; Hochschild, 1995) for children aged under three has been a dominant social norm in West Germany, whereas combining formal care for infants with maternal employment has been more widely accepted in the Eastern states (Cooke, 2007; Braun et al., 1994; Blohm, 2002). The female life-course in the East is still characterized by a more extensive labour market integration. Participation rates among East Germany women still exceed those of their West German counterparts, while the share of women working part-time remains much lower than in the West. East German men in turn still face precarious employment more often than West

German men, which, alongside the cultural ideal of working women, promotes the prevalence of the East German dual earner model (Schmitt and Trappe, 2010). The prominent role of a strong labour market integration of women and mothers in particular dates back to the necessity of integrating women as a means to bolster the lower productivity of the economic system of the German Democratic Republic. Over the decades this employment model has transformed into a cultural ideal, resulting in a higher normative acceptance of working mothers and has led to the establishment of institutional context that favour a parallel combination of work and motherhood over the life-course. The broad coverage of infant care institutions for under three-year olds in the East is both the most prominent and the most important of these contexts.

Recent policy development may indicate a slow movement towards greater acceptance of formal care and shared parental care for under-three-year-olds also in West Germany. In 2007, the German government introduced an income-related leave, offering a reimbursement at 67 per cent of net earnings or a minimum of €300 Euros for twelve months¹. The reform also included an individual leave entitlement of two months which was reserved for each parent to incentivize paternal leave take-up, which also aimed at encouraging paternal care (Deutscher Bundestag, 2008a). In parallel significant changes in day-care provision have been implemented. Since 2005, a federal law (“Tagesbetreuungsausbaugesetz”, Deutscher Bundestag, 2004) stipulated that at a minimum, children under the age of three be offered the chance to enrol in day-care programs if a lone parent or both parents are employed or in education or want to take up employment. A second law in 2008 (“Kinderförderungsgesetz”, Deutscher Bundestag, 2008b) provided funding for further expansions and outlined that from August 2013 all children aged one or older will be entitled to a place in a day-care centre or in family day-care. Moreover, some German states, such as Saxony, Thuringia and Rhineland-Palatine have complemented the federal legislation by entitling children already earlier to a

¹ Parental leave benefits are capped at 1,800 Euros per month.

slot in a day-care centre, from birth or from age two onwards, respectively. Aside from these changes set for 2013, there are huge regional differences in the supply of day-care slots for children under the age of three. These differences are particularly large between East and West Germany, but even within these two regions there are substantial differences between states, counties and municipalities (Statistisches Bundesamt, 2011), depending on the financial situation of these regions and the political priority given to the provision of ECEC services.

The majority of ECEC places are provided by non-profit organization, mainly churches and over one third are publicly provided (Spiess et al., 2008). Parental fees are income-dependent and below the OECD average (Immervoll and Barber, 2005). Due to the large subsidies, formal day-care institutions are considerably cheaper than private market alternatives. In order to receive subsidies, ECEC centres are required to undergo regular quality assessments through an independent private provider. The results of these assessments, however, are not published and no other support is given to parents to evaluate the level of quality and make their choices between institutions.

From 2006 to 2011, the percentage of children who attended some form of formal ECEC institution has risen by about 10 per cent in both parts of Germany, albeit from different starting points. In West Germany, the rates increased from 8 to 20 per cent, whereas the percentage of East German children who attended formal ECEC services rose from 40 to 49 per cent in 2011 (Statistische Ämter des Bundes und der Länder, 2011). Most children in formal ECEC facilities in both parts of Germany attend day-care centres; only about four per cent are cared for in registered family day-care.

Previous studies documented considerable excess demand for day-care places in East Germany and even more strongly in West Germany before the further extension of day-care expansion in 2007 (Sharma and Steiner, 2008) and demand continued to grow slightly over

time (Rauschenbach et al., 2012; Hüskens and Riedel, 2012). According to a regional survey in 2012, the rate of demand was estimated to amount to 56 and 35 per cent in East and West Germany, respectively (Rauschenbach et al., 2012; DJI, 2012). Furthermore, the majority of non-employed mothers with young children said that the lack of available day-care was the main obstacle preventing them to participate in the labour market (Sharma and Steiner, 2008). Berger (2009) found that involuntary non-employment was associated with lower life satisfaction among West German mothers. One may therefore expect greater availability of state-subsidized day-care to be positively associated with maternal labour market participation. This has also been found in an ex-ante evaluation study of the day-care expansion in Germany. Haan and Wrohlich (2009) estimated that an extension of day-care slots for under-three-year-olds, which would meet the expressed local rates of demand, would raise maternal labour market participation by approximately 1.4 and 1.7 per cent and work hours by about 2 and 3 per cent in East and West Germany, respectively.

Descriptive trends confirm that the labour force participation of mothers with children under three years has risen slightly from 31 in 2006 to 34 per cent in 2010 (BMFSFJ, 2012). In recent years, the majority of mothers in East and West Germany have re-entered the labour market faster but mainly on a part-time basis (Grunow and Müller, 2012; Schober, forthcoming 2013). The speed of return and the percentage of mothers working full-time or part-time with 30 hours or more is greater in East Germany than in West Germany. Maternal leave durations in both regions still tend to exceed one year after childbirth and are therefore longer than in liberal countries. As part-time employees have had the same rights as those working full-time since 1984 and parents have been entitled to returning to the same or a similar job part-time after childbirth since 2001, the quality of part-time work in Germany tends to be better than in some of the liberal countries, such as Australia and Canada, where day-care policy changes have been evaluated previously.

Hypothesis 1: Given the large excess demand for day-care places for under-three-year-olds and mostly part-time employment of mothers with children in this age group, we would expect that the greater availability of day-care places for under-three-year-olds has been generally positively associated with improvements in parental subjective well-being in terms of satisfaction with the available child care and other life domains.

Hypothesis 2: A relatively traditional gender division of child care and formal employment prevails in most German couples during the early years after childbirth (Schober, forthcoming 2013). The gender division of labour is slightly more egalitarian in East German couples compared to their West German counterparts (Wengler et al., 2009). However, mothers in both regions are still more likely to interrupt their employment for longer and to reduce their work hours upon labour market re-entry than fathers. As a result we expect that the day-care expansion has been more positively associated with mothers' than with fathers' subjective well-being, as the restricted availability of day-care probably constrains mothers' work-care choices and work-family balance more than fathers'.

Greater acceptance of maternal employment and use of formal day-care for young children have been reflected in a larger demand for day-care facilities in East Germany. On the one hand, one may expect more positive effects of a day-care expansion on parental well-being in such a context. On the other hand, a faster return with full-time or long part-time hours has been more common in East than West Germany. This is partly due to precarious labour market conditions for fathers making a dual earner family model with significant maternal contributions to the household income more common and necessary. Mothers' faster return, longer work hours and, for some, lower job quality may (over)compensate the positive effects based on attitudes and preferences. Furthermore, Yamauchi (2010) suggested that the effects may be non-linear with larger positive effects on maternal well-being at lower rates of day-

care coverage. We therefore formulate two competing hypotheses regarding differential effects between East and West Germany, which may partially offset each other.

Hypothesis 3a: Stronger positive associations between increased day-care provision and maternal subjective well-being measures may be expected in East Germany than in West Germany as a result of stronger maternal preferences in favour of employment and formal care use.

Hypothesis 3b: Associations between increased day-care provision and maternal subjective well-being measures may be more positive in West Germany than in East Germany due to the lower starting levels of day-care provision and greater prevalence of (short) part-time employment after longer leave durations.

Data and Method

Our empirical analysis is based on data from the German Socio-Economic Panel Study (SOEP) and the associated study 'Familien in Deutschland' (Families in Germany, FiD). The SOEP is a representative annual household panel study, which started in 1984. The most recent wave covers about 20,000 respondents from 11,000 households (for a detailed description of the data set, see Wagner et al., 2007). We use the annual SOEP waves of the years 2007 to 2011 jointly with the FiD waves 2010 and 2011. FiD is an extension study of the SOEP, where an additional survey was conducted with focus on families with young children and with special needs (low income, lone parents, and large families). The FiD data cover information from about 4,500 households with a total of about 7,800 respondents (for further information, see Schröder et al., 2013). The structure and the content of these two data sets are similar, hence they can be analysed jointly. We use only the subsamples with a representative sample design². The advantage of using these two data sets together is that they

² The excluded subsamples of these data are based on a disproportional, non-representative sampling of specific groups like lone parents and low income households.

provide a representative and large enough sample size of families with young children to aggregate regional averages for families with children under three years at county level and match them with administrative information on ECEC provision at the regional level. The latter data is based on administrative statistics on child and youth welfare ('Kinder- und Jugendhilfestatistik') which have been collected annually since 2006. These statistics provide information on the number and percentages of children of different ages attending day-care institutions in each of the 412 counties based on reports by the youth welfare offices in each county. The data is compiled and distributed by the German Youth Institute (Deutsches Jugendinstitut, DJI) in collaboration with the Technical University of Dortmund.

Method and sample selection

Our sample consists of mothers and fathers with a child under three years. County level information for these parents is based on our calculation of mean values of relevant indicators. The specific link between individual and county level data is determined by the county of residence in a given survey year. On average we observe about 15 families by county and year. Overall, across the five years there are 320 and 1022 county observations in East and West Germany, respectively.

To estimate the association between the expansion of day-care provision for under-three-year-olds and subjective well-being measures among parents with children in this age group, we apply panel regression models at the county level over a period of five years (2007 to 2011). In our empirical modelling we have to consider that unobserved characteristics at the county level may also influence the speed of day-care expansion and subjective well-being of the population. This includes preferences for certain work and care arrangements, relative municipal wealth, and attitudes towards the (re-)distribution of municipal funds. In order to address the problem of a possible influence of such unobservables, we estimate fixed-effects panel models. These account for time-invariant unobserved heterogeneity between the time-

varying dependent and independent variables (Allison, 2009). By assuming time-invariance in the unobserved characteristics of relative wealth and preferences across counties, we aim for a more accurate estimate of the impact of day-care provision on subjective well-being – measured by satisfaction with the regional child care supply, with family life, with health, with personal income, and with life in general.

As shown in equation (1), we estimated the within-county effects of day-care provision \mathbf{d}_{it} on subjective well-being of mothers \mathbf{wm}_{it} and fathers \mathbf{wf}_{it} , where \mathbf{x}_{it} is a vector of control variables. The random variation at each point in time is denoted by $\boldsymbol{\varepsilon}_{it}$, while \mathbf{u}_i captures the set of unobserved variables which can be understood as the combined effect of all time-constant unobservables on the outcome.

$$(1) \text{ } wm_{it} = \beta_{1t} + \beta_2 d_{it} + \beta_3 x_{it} + u_i + \varepsilon_{it}$$

Repeated surveys show slightly increasing demand for day-care places over the observation period, which implies that mothers have become somewhat more accepting of formal care for under three-year olds as availability of such care has risen. The fixed effects models cannot account for such changes in unobserved norms and preferences. If the slightly more favourable preferences towards day-care correlate with expanding day-care supply over time, our models may underestimate the effects of the latter on parental subjective well-being.

As fixed-effects models require repeated observations, we restricted the sample to counties with complete information on dependent and independent variables available in at least two waves between 2007 and 2011. The final sample includes 303 and 104 counties in West and East Germany, respectively. As previous studies point to major differences in attitudes towards the combination of work and family, especially regarding maternal carer norms, which remain prevalent in the West (Schmitt and Trappe, 2010), we present separate models for West and East Germany. In the panel analysis, we tested for the presence of fixed

unobserved heterogeneity by applying Hausman tests which compared the fixed-effects to random-effects models. For almost all models of maternal and paternal satisfaction, we found that only the fixed-effects models provided consistent estimates, which suggests that unobserved characteristics of counties may bias the panel analysis results unless controlled for in a fixed effects estimate.

An interesting and alternative option of empirical modelling could have been the facilitation of multilevel growth curve models with the aim of investigating changes in parental well-being over time (from birth until the child's third birthday) with families being nested in counties. However, to identify all parameters, required in such a growth curve model, we would need at least three points of observation for most individuals. Unfortunately, currently only two waves of FiD data are available, but excluding of the FiD families is not an option due to a considerable reduction in sample size. This modelling strategy would, however, represent a promising future extension once new FiD waves become available.

Measures

Dependent variables

We operationalize subjective well-being of mothers and fathers as their perceived satisfaction with aspects of life, which may relate to the increased availability of day-care services. Specifically, we investigate the associations with satisfaction with the available child care, with family life, with health, with personal income, and with life in general. By investigating satisfaction within these various domains, we aim to gain a more differentiated understanding of the mechanisms which underlie changes in subjective well-being. The relationship between maternal and paternal satisfaction and the available child care should reflect the increased provision most strongly. Satisfaction with personal income may be positively affected by increased maternal employment. The satisfaction with health and family life may be

positively associated with parents', in particular mothers', greater ability to realise their preferred time allocations in work, care or leisure. In turn, the effect may also be negatively associated with increased stress as a result of work-family incompatibility due to longer working hours, but this effect is unlikely to be prevalent in Germany, where part-time jobs tend to be of similar quality as full-time jobs and part-time employment of mothers remains the norm, in particular in West Germany. In combination changes in satisfaction with family life, health and income may also be reflected in an altered satisfaction with life in general, but the association is likely to be weaker than with the individual domains.

The set of dependent variables consists of five items, which have been recorded annually in the SOEP since 2007 and in the FiD-Study since 2010. The question wording for the domain satisfaction questions has been 'how satisfied are you today with the following areas of your life?' with four out of about ten aspects being 'health', 'personal income', 'family life' and, only for respondents with young children, 'the child care available'. Furthermore, in both FID and SOEP, respondents were asked 'how satisfied are you with your life, all things considered?'. The items for all these questions have been measured on an 11-point scale ranging from completely dissatisfied to completely satisfied. Life and domain satisfaction questions have been found to display good psychometric properties at the individual level in terms of reliability and validity and sensitivity to life events. However, as aggregated measures of subjective well-being, their relationship with policies, and the influence of changing values and standards still involve many open questions (Diener et al., 2013). It is important to note that they reflect improvements relative to desirable values, which, however, may be specific to the respective context, and should not be interpreted as universal measures of quality of life (Eckersley, 2013).

Independent variables

The availability of day-care services for children under three years is measured by the percentage of children in this age group who attended day-care centres or family day-care in the respective county in a given year based on regional youth welfare office statistics. In line with previous German studies, we therefore assume that there is no excess supply in terms of day-care slots which are not taken up by parents within a short time frame. This assumption seems reasonable given the documented excess demand across both regions in Germany for this age group (Rauschenbach et al., 2012; DJI, 2012). Figure 2 depicts the increase in the day-care attendance rates of about 10 per cent across West and East German counties between 2007 and 2011. The figures align closely with official statistics, which suggests that our sample of counties based on families in the SOEP can be assumed to be representative.

We include a number of further controls in order to account for possible background factors, which might drive the relationship between parental well-being and the availability of day-care for under-three-year-olds. The average age of the youngest child and the number of children in the household are included in all models as previous studies have found that the likelihood of day-care attendance increases with the age of the youngest child and varies with the number of older siblings (Schober and Spieß, 2013; Joesch et al., 2006). These aspects of family composition have also been shown to correlate with life satisfaction (Gash et al., 2009; Berger, 2009). Moreover, the regional rates of cohabitation and single parenthood, respectively, are controlled, as cohabitants and single parents have sometimes been found to be less satisfied with life (Berger, 2009; Luhmann et al., 2012), and young children of single parents are more likely to attend formal day-care in Germany (Schober and Spieß, 2013). Parent's average age is considered, paying heed to a growing literature on age effects on life satisfaction (Wunder et al., 2009). Furthermore, age is also found to correlate with the swiftness of returning to employment after childbirth (Grunow and Müller, 2012).

To control for changes in economic context and regional prosperity of different counties (especially during and after the 2008 economic crisis) we account for the annual unemployment rate at the county level (Regionaldatenbank Deutschland, 2012). For a more differentiated measure of economic uncertainties, requiring mothers to contribute to household income, we also tested a separate measure of the male unemployment rate, which however gave substantively the same results. Descriptive statistics for the dependent and independent variables are shown in Table 1.

Results

Table 2 shows the results of the fixed-effects models of mothers' satisfaction with the available child care, with family life, with health, with personal income and with life overall in East and West Germany. In West Germany, an increased rate of day-care use has been significantly associated with heightened maternal satisfaction in all of these areas. In East Germany, mothers express significantly greater satisfaction with family life and with the available child care after the day-care expansion (see Figures 3 and 4). A 10-per cent growth in children attending day-care services, which corresponds roughly to the increase documented by register data for both parts of Germany over this time period, is associated with an increase in maternal satisfaction with the available child care by 0.8 (on an 11-point scale) in West Germany and by 2 points in East Germany. This equals about one third of a standard deviation in West Germany and slightly less than one standard deviation in East Germany. The associations with family life satisfaction of mothers amounts to 0.7 and 0.9 in West and East Germany, respectively, which corresponds to about half of a standard deviation. The positive associations of an increase in day-care supply with the satisfaction in health and personal income in West Germany are of similar magnitude, amounting to about a half and one third of a standard deviation, respectively. The association with maternal life satisfaction is smaller in both regions, amounting to only about one quarter of a standard

deviation. Moreover, its statistical significance remains limited to West of Germany, which may be partly due to the smaller number of counties in East Germany.

Table 3 shows that fathers' satisfaction with the available child care was positively and significantly correlated with the growing rate of day-care attendance in East and West Germany. Fathers in West Germany also expressed significantly greater satisfaction with family life that corresponded to the increase in day-care supply. The effect sizes however were smaller than for mothers. According to our estimates, the 10-per cent increase in day-care use has been associated with an improvement in paternal satisfaction with the available child care by 0.6 and by 1.2 points on an 11-point scale. This equals about one third of a standard deviation in West and three quarters of a standard deviation in East Germany. The positive effect on West German fathers' family life satisfaction of 0.4 points also corresponds to about one third of a standard deviation. The greater provision of day-care facilities for under-three-year-olds, however, was not significantly associated with changes in any of the other domains or with life overall in either region.

In general, we find considerable support for Hypothesis 1, which assumed that the day-care expansion has been generally positively associated with the subjective well-being of parents. It proved statistically significant for satisfaction with the available child care for mothers and fathers in both regions and for satisfaction with family life for both genders in West Germany and for mothers in East Germany. For the other domains, we found some stronger positive associations for mothers than for fathers. This provides partial support for Hypothesis 2 which assumed weaker positive effects on fathers' than on mothers' satisfaction. For satisfaction with family life, we find convincing evidence of a close relation between local day-care attendance and maternal domain related satisfaction, while these associations among fathers appear less close. Furthermore, West Germany mothers seem to have benefited more in terms

of satisfaction with health and income than fathers. However, the strength of the association of the rate of day-care use with health and income satisfaction in East Germany and with the available child care and with life overall in both regions is relatively similar for mothers and fathers.

Joint models for the whole of Germany, including regional interactions for East and West (results can be obtained from the first author on request) showed that the difference between East and West Germany was only statistically significant for maternal satisfaction with available child care and personal income. One interesting distinction between East and West shows that among East German mothers an extension of the care-supply resulted in a stronger increase in satisfaction with available care options, while for West German women the increase in the supply translated into an increase in income satisfaction. This suggests that a limited childcare supply for under three-year old children has been a severe obstacle for West German women to focus on their labour market aspirations. Joint models of paternal satisfaction with regional interactions again show that the difference in the strength of the association between East and West Germany is not statistically significant except for paternal satisfaction with the available child care. For the latter, the effect is stronger in East Germany than in West Germany which provides partial support for Hypothesis 2a. Hypotheses 2a assumed stronger positive associations between increased day-care provision and maternal subjective well-being measures in East Germany than in West Germany as a result of stronger maternal preferences in favour of employment and formal care use, whereas Hypothesis 2b expected weaker associations as a result of the higher starting levels of day-care provision and weaker prevalence of (short-hours) part-time employment. Overall, the largely non-significant regional differences may suggest that the different mechanisms stipulated Hypotheses 2a and 2b have all been at work and therefore the regional differences largely offset each other with respect to most well-being domains. This provides some evidence of compensating effects of

attitudes towards maternal employment and child care on the one hand and maternal employment choices on the other, which might widely cancel each other.

Sensitivity tests

Categorical specifications of the day-care attendance rate in 5-per cent categories gave substantively the same results to the continuous measures. Testing for non-linear relationships, as suggested by Yamauchi (2010), we did not find any evidence for such a relation. Increases from very low starting levels of day-care provision, such as in West Germany, therefore have not been related to greater improvements in parental well-being.

To further examine potential background mechanisms, we also explored fixed effects models of changes in maternal employment and found that in both East and West Germany the day-care expansion has been accompanied by growing rates of part-time employment but not of full-time employment. As for fathers the day-care expansion may increase satisfaction with household income more strongly than with personal income, as mothers rather than fathers tend to change their labour market participation, we also tested satisfaction with household income as an additional dependent variable. We found not significant associations of the day-care expansion with mothers' or fathers' satisfaction with household income.

To check for spurious period trends driving the association between day-care attendance rates and parental subjective well-being, we reran all models for childless couples and in line with expectations found no significant associations. Moreover, we reran all models based on a sample of people within counties who did not move during the 2007 to 2011 time period to see whether the estimated effects may have been biased by people with greater subjective well-being being more likely to move to areas with greater day-care provision. The results did not vary substantively.³

³ All results of the sensitivity analyses are available on request from the first author.

Discussion

This study has investigated whether the recent expansion of ECEC services for children aged under three years in Germany between 2007 and 2011 may have improved the subjective well-being of parents with children in this age group. Facilitating the combination of employment and family care and reducing work-family conflict for parents with young children have been central aims underlying these reforms. We have explored regional associations with maternal and paternal satisfaction with various domains which may represent potential channels through which overall well-being may be affected. These include satisfaction with the available child care, with family life, with health, with personal income, and with life in general. Our findings show substantial and positive associations of regional growth rates in day-care use with maternal satisfaction in all sub-domains and with life satisfaction in West Germany. In East Germany, several of the associations were of a similar magnitude but only the improvements in maternal satisfaction with the available child care and with family life showed statistical significance, which, however, may be due to the smaller sample size of counties. In regions with larger day-care growth rates, fathers displayed greater satisfaction with the available child care and, only in West Germany, with family life. Paternal satisfaction with health, personal income and with life appears to have been largely unaffected by the ECEC reforms.

The positive associations of the day-care expansions with satisfaction with available child care among mothers and fathers in East and West Germany suggests that the reforms have had a broadly positive and alleviating impact on the target groups. This is in line with Yamauchi's (2010) results for Australia, which found that increased day-care centre availability reduced mothers' difficulties in searching for a day-care slot and increased the chance of finding one in a facility of good quality.

We did not find that the improvements were consistently greater in either West Germany or East Germany. We found consistently positive effects on maternal satisfaction with family life in both East and West. This may seem contradictory to two previous studies which documented adverse consequences of the introduction of universal day-care subsidies in Quebec for maternal perceptions of work-family conflict and relationship satisfaction (Baker et al., 2008; Brodeur and Connolly, 2012). However, a number of important differences between Germany and Quebec may explain these differences. Whereas entitlements to job-protected leave after childbirth are shorter and most of the increase in maternal labour market participation and day-care use in Quebec has been full-time (Lefebvre and Merrigan, 2008; Baker et al., 2008), German leave entitlements are still relatively long and the day-care expansion has focussed on creating day-care facilities which enable mothers to work part-time hours rather than full-time. This is also in line with our additional explorations regarding maternal labour market responses to the care-supply reforms and with general trends towards part-time labour market participation for mothers with young children in West and more recently also in East Germany (Konietzka and Kreyenfeld, 2010; Schober, forthcoming 2013). Full-time work and a fast labour market return may increase the stress and strain experienced by mothers in combining work and family, which may undermine the benefits from greater choice in terms of work and care arrangements. This may also explain why in Quebec the universal day-care subsidies have been found to increase mothers' perceived work-family conflict for middle income parents (Brodeur and Connolly, 2012).

Our results regarding positive associations with personal income in West Germany are consonant with the non-linear association found for maternal satisfaction with employment after a day-care centre expansion in Australia (Yamauchi, 2010). She found that an increase from below 5 per cent to between 5 and 15 per cent of day-care coverage was positively associated with employment satisfaction, whereas further increases were not significantly related to changes in employment satisfaction. This may explain why we did not find a

similarly strong effect on satisfaction with personal income in East Germany, where mothers have been traditionally more integrated into the labour market and the level of day-care coverage was already just under 40 per cent at the start of the reform period. Especially in a context of poor labour market conditions, the recent extensions in places or hours of available public childcare, however, may not have allowed East German mothers to increase their income and labour market engagement in terms of the jobs and hours as they would prefer. Apart from that, we did not find evidence of a non-linear relationship, as Yamauchi found for Australia {, 2010 #1141}. Increases from very low starting levels of day-care provision, such as in West Germany in 2007, mostly have not been related to greater improvements in parental well-being.

The findings showing a positive impact of childcare supply on maternal health satisfaction in West Germany contrast with Yamauchi's (2010), who reports no significant associations. The difference to the Canadian study by Baker et al. (2008), who reports negative effects on maternal health, may again be due to cross-national differences in maternal labour market responses and the relation of the Canadian case to full-time work. For maternal life satisfaction, our findings present stronger evidence for a positive impact of the day-care expansion in West Germany than on the studies for Australia and Quebec. However, for low income and highly educated subgroups, Brodeur and Connolly (2012) also found positive effects on maternal life satisfaction in Quebec.

Furthermore, we found that the increased availability of day-care services was positively associated with life satisfaction of mothers and fathers, although the effects reached significance only for West German mothers. The similar magnitude of effects on mothers and fathers conforms with the findings from Quebec, even though they pointed in a different direction (Brodeur and Connolly, 2012). By contrast the positive effects on satisfaction with family life in both regions and on satisfaction with health and personal income in West

Germany were stronger for mothers than for fathers. This may be interpreted as mothers' work-family balance being more strongly affected by the day-care provision for under-three-year-olds, which has also been found by Stier et al. (2012) in a cross-sectional comparison of 27 countries. Brodeur and Connolly (2012) also found a more pronounced, albeit negative impact on perceived work-family conflict among mothers than among fathers after the introduction of universal day-care subsidies. Overall these results suggest that the subjective well-being of mothers and fathers seems to have been positively affected by the German day-care expansion for under three year old with somewhat stronger effects on mothers than fathers.

This study enhances our understanding of how the ECEC policies, in particular the provision of affordable day-care for young children, may impact parental subjective well-being. By exploiting within-country regional variations in rates of day-care use across a four-year period from 2007 to 2011 and applying fixed-effects models to account for time-invariant unobserved heterogeneity, we provide a more rigorous analysis than previous cross-sectional comparisons of work-family conflict in a large number of diverse countries. These may vary along many contextual parameters. By considering in more detail maternal work-care ideals, labour market and family policy as moderating contextual influences on maternal employment responses and perceived satisfaction of parents, we have developed a more differentiated theoretical framework than existing policy evaluation studies from Quebec and Australia. Due to data limitations, we were unable to further test potential mechanisms, such as parental stress and strain from job demands, maternal work return choices in terms of speed and hours, as well as the alleviating role of individual resources, which may mediate the relationship between reforms of formal ECEC services and parental satisfaction in various domains and with life in general. Given that day-care services have been shown to affect maternal employment and may also impact on the kinds of jobs taken by mothers, the mediating role of maternal work return choices (in terms of swiftness of return, working hours, and job

characteristics) may be a promising avenue for future research on ECEC policies and parental subjective well-being. With future waves of the data we might be able to investigate such mechanisms in more detail, in particular by applying multilevel growth curve models. Moreover, a promising path for future research lies in extending the study at hand by differentiating more heterogeneous effects across education and income groups. This may offer important insights to mediating factors, such as work-care ideals, or the necessity of mothers contributing to household income in different educational groups, once additional data become available.

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Table 1: Descriptive statistics of pooled county sample 2007-2011

	West Germany		East Germany	
	Mean	SD	Mean	SD
<i>Dependent variables</i>				
Maternal satisfaction with...				
life overall	7.69	1.26	7.15	1.37
family life	8.36	1.40	8.12	1.43
child care available	6.94	2.05	7.55	1.80
health	7.52	1.51	7.23	1.59
personal income	4.91	2.27	4.47	2.20
Paternal satisfaction with...				
life overall	7.57	1.24	7.30	1.19
family life	8.60	1.18	8.38	1.36
child care available	7.07	1.86	7.54	1.60
health	7.29	1.57	7.42	1.44
personal income	6.31	1.82	5.65	2.01
<i>Independent variables</i>				
Rate of day-care use	14.99	6.16	45.69	7.96
Age of youngest child in months	22.67	7.15	23.58	6.73
No. Children	1.97	0.81	1.87	0.81
Rate of cohabitation	0.12	0.25	0.31	0.36
Rate of single parenthood	0.08	0.21	0.22	0.34
Mother age	33.09	4.51	31.26	4.69
Father age	35.85	5.24	34.42	5.94
Unemployment rate	7.67	3.02	16.09	3.49
n of counties		303		104

Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011

Note: Sample limited to parents with children aged under three years.

Table 2: Fixed-effects model of maternal satisfaction in various domains in East and West Germany 2007-2011

Maternal satisfaction with..	West Germany					East Germany				
	available child care	family life	health	personal income	life overall	available child care	family life	health	personal income	life overall
Rate of day-care use	0.08** (0.03)	0.07*** (0.02)	0.07*** (0.02)	0.08*** (0.02)	0.03* (0.02)	0.20** (0.06)	0.09* (0.04)	0.07 (0.05)	-0.06 (0.06)	0.03 (0.04)
Age of youngest child	-0.00 (0.01)	-0.02*** (0.01)	-0.01+ (0.01)	-0.02 (0.01)	-0.03*** (0.01)	0.03 (0.02)	-0.01 (0.01)	-0.00 (0.02)	0.00 (0.02)	-0.02 (0.02)
No. children	0.26+ (0.14)	-0.18* (0.09)	-0.15 (0.10)	-0.25+ (0.13)	-0.13+ (0.07)	0.19 (0.26)	-0.15 (0.20)	0.02 (0.29)	-0.49* (0.21)	-0.12 (0.24)
Mother's age	-0.04 (0.03)	-0.03+ (0.02)	-0.01 (0.02)	0.06* (0.02)	0.01 (0.01)	-0.05 (0.05)	-0.05 (0.03)	-0.06+ (0.03)	0.05 (0.05)	-0.01 (0.03)
Rate of consensual unions	0.49 (0.44)	-1.07*** (0.31)	0.21 (0.31)	0.11 (0.42)	-0.91*** (0.27)	-0.47 (0.62)	-0.68 (0.51)	0.04 (0.55)	-0.45 (0.58)	-0.53 (0.57)
Rate of single parents	-0.05 (0.79)	-1.44** (0.49)	-0.76+ (0.42)	-0.32 (0.52)	-1.51*** (0.39)	-0.71 (0.68)	-1.48* (0.65)	-0.97 (0.73)	-0.70 (0.71)	-1.16* (0.52)
Unemployment rate	-0.10 (0.12)	0.11 (0.07)	0.20* (0.08)	-0.13 (0.11)	0.06 (0.06)	0.02 (0.08)	0.00 (0.06)	0.07 (0.08)	-0.03 (0.09)	-0.11 (0.07)
Constant	7.31*** (1.36)	8.79*** (0.84)	6.05*** (0.89)	3.62** (1.37)	7.38*** (0.84)	-1.16 (4.06)	6.44** (2.34)	4.88 (3.40)	7.18+ (3.87)	9.11** (3.10)
n of county years	909	1,014	1,014	1,014	1,014	269	292	292	292	292
n of counties	295	303	303	303	303	102	104	104	104	104
R2 within	0.0631	0.120	0.0496	0.0613	0.110	0.160	0.145	0.0558	0.0471	0.116
R2 between	0.0146	0.00832	0.00333	0.0210	0.0697	0.0336	0.0190	0.0152	0.0105	0.0809
R2 overall	0.0288	0.0429	0.00460	0.0349	0.0821	0.0433	0.0492	0.0176	0.0319	0.113

Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011

Note: Sample limited to mothers with children aged under three years. Robust standard errors in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Table 3: Fixed-effects model of satisfaction for fathers with youngest child aged under three years

Paternal satisfaction with..	West Germany					East Germany				
	available child care	family life	health	personal income	life overall	available child care	family life	health	personal income	life overall
Rate of day-care use	0.06* (0.03)	0.04* (0.02)	0.02 (0.02)	-0.01 (0.02)	0.02 (0.02)	0.12+ (0.06)	0.02 (0.05)	0.08 (0.05)	-0.00 (0.08)	0.05 (0.05)
Age of youngest child	0.01 (0.01)	-0.02** (0.01)	-0.02* (0.01)	-0.02 (0.01)	-0.02*** (0.01)	0.01 (0.03)	-0.00 (0.02)	0.00 (0.02)	0.01 (0.02)	-0.01 (0.02)
N children	0.31+ (0.17)	-0.01 (0.09)	-0.21+ (0.11)	-0.08 (0.14)	-0.11 (0.10)	0.07 (0.31)	0.04 (0.22)	0.44* (0.20)	-0.01 (0.37)	0.01 (0.19)
Mother age	-0.01 (0.03)	-0.03+ (0.01)	0.01 (0.02)	0.01 (0.02)	0.03* (0.01)	0.04 (0.05)	-0.03 (0.05)	-0.06 (0.04)	0.05 (0.07)	0.02 (0.05)
Rate of cohabitation	0.35 (0.52)	-0.58* (0.25)	-0.82** (0.30)	-0.71 (0.43)	-0.55* (0.27)	-0.08 (0.71)	-1.07+ (0.63)	-1.17* (0.56)	-1.20 (0.73)	-1.11* (0.44)
Rate of single parents	-0.68 (0.84)	0.05 (0.59)	-0.81 (0.66)	-0.24 (0.69)	-0.03 (0.51)	0.58 (0.80)	-0.72 (0.71)	0.26 (0.57)	-0.90 (1.08)	-0.70 (0.71)
Unemployment rate	-0.19+ (0.10)	0.03 (0.07)	0.10 (0.08)	-0.02 (0.10)	-0.00 (0.06)	0.06 (0.09)	-0.01 (0.10)	0.14+ (0.08)	0.01 (0.10)	-0.00 (0.06)
Constant	7.05*** (1.37)	9.28*** (0.87)	6.96*** (0.94)	7.03*** (1.28)	7.27*** (0.77)	-0.49 (4.64)	9.36** (3.50)	2.74 (3.92)	4.35 (5.72)	4.99 (3.11)
n of county years	828	923	923	923	923	234	247	247	247	247
n of counties	280	287	287	287	287	93	95	95	95	95
R2 within	0.0648	0.0544	0.0378	0.0147	0.0550	0.0700	0.0738	0.165	0.0542	0.141
R2 between	0.000526	0.000299	0.000796	0.0126	8.17e-05	0.0280	0.00269	0.00407	0.00805	0.0166
R2 overall	0.0131	0.0168	0.00676	0.0225	0.0203	0.000328	0.0165	0.0229	0.00920	0.0406

Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011

Note: Sample limited to mothers with children aged under three years. Robust standard errors in parentheses.

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Figure 1: Theoretical model of the relationship between day-care availability and parental subjective well-being

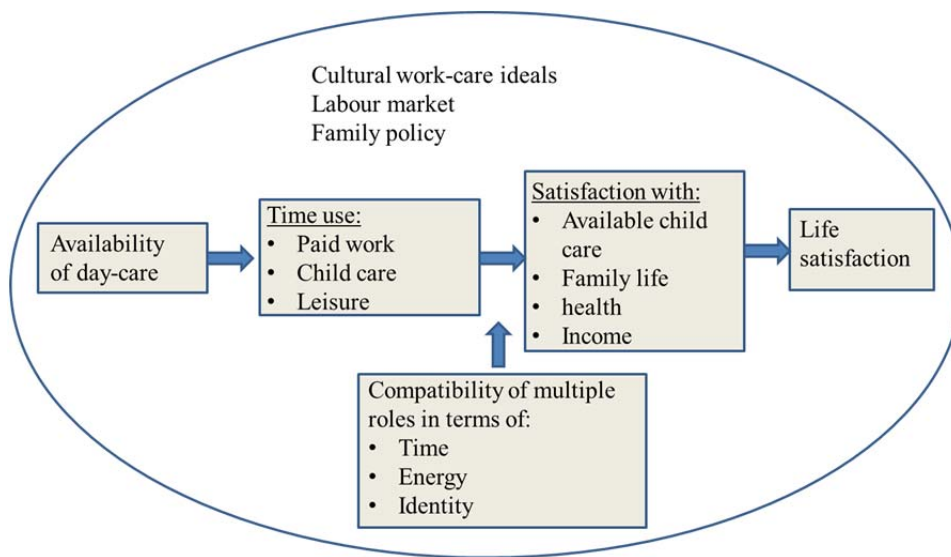
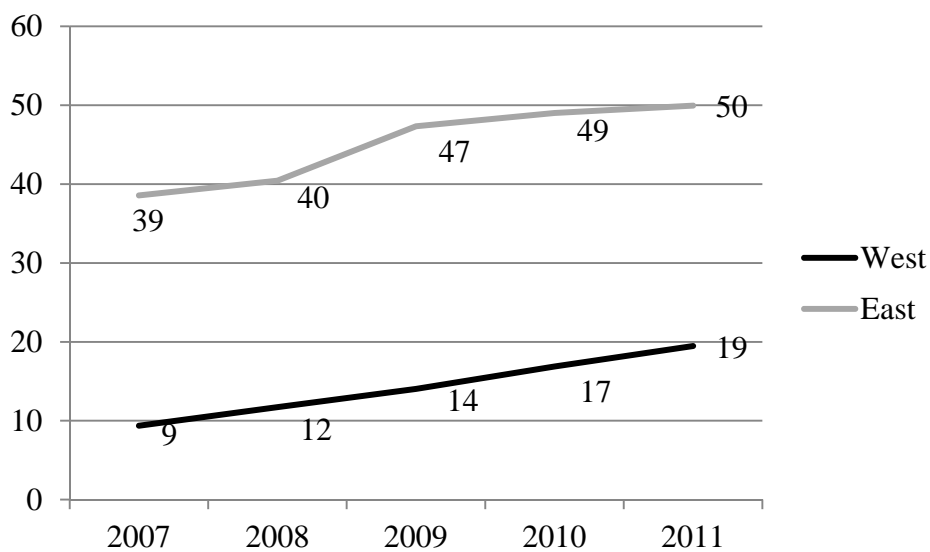
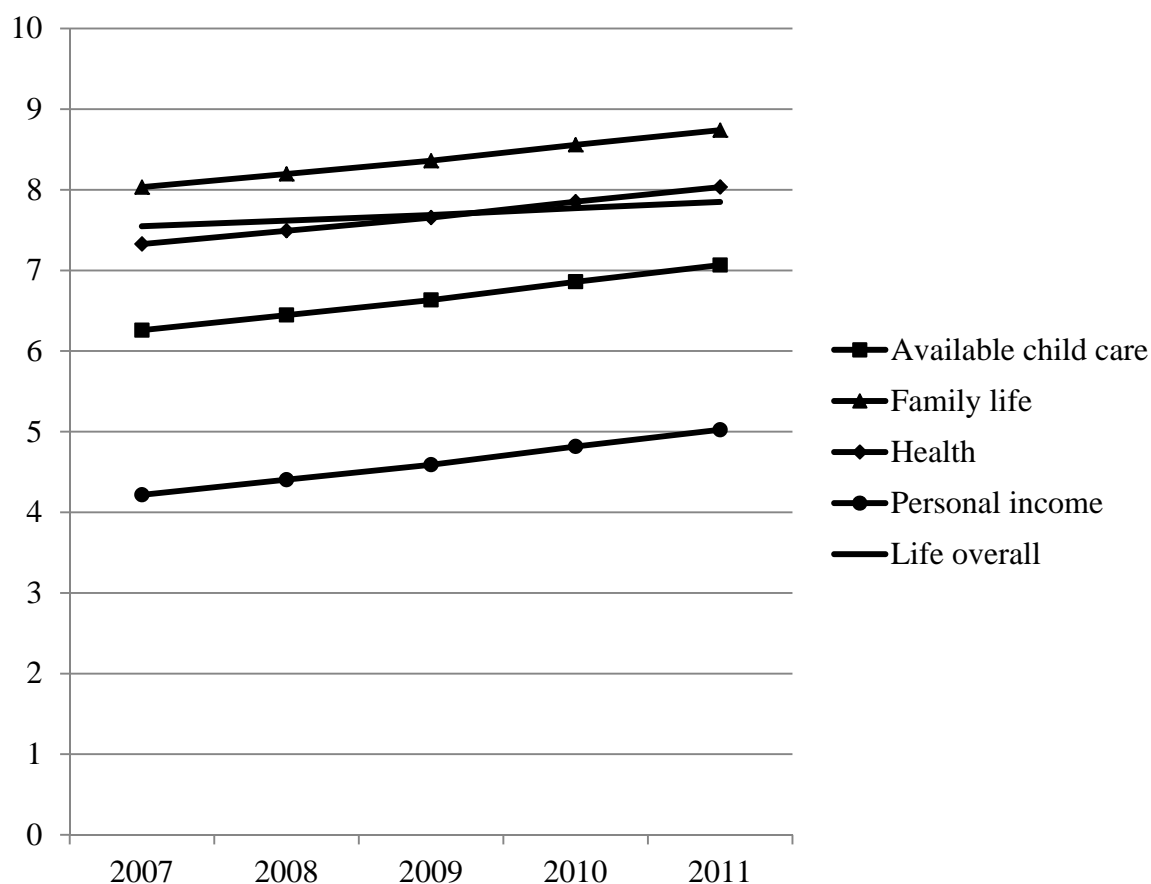


Figure 2: Trend in day-care attendance rate for under three year old children in West and East Germany 2007-2011 (in per cent of all children aged under three years)



Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011, N=407counties.

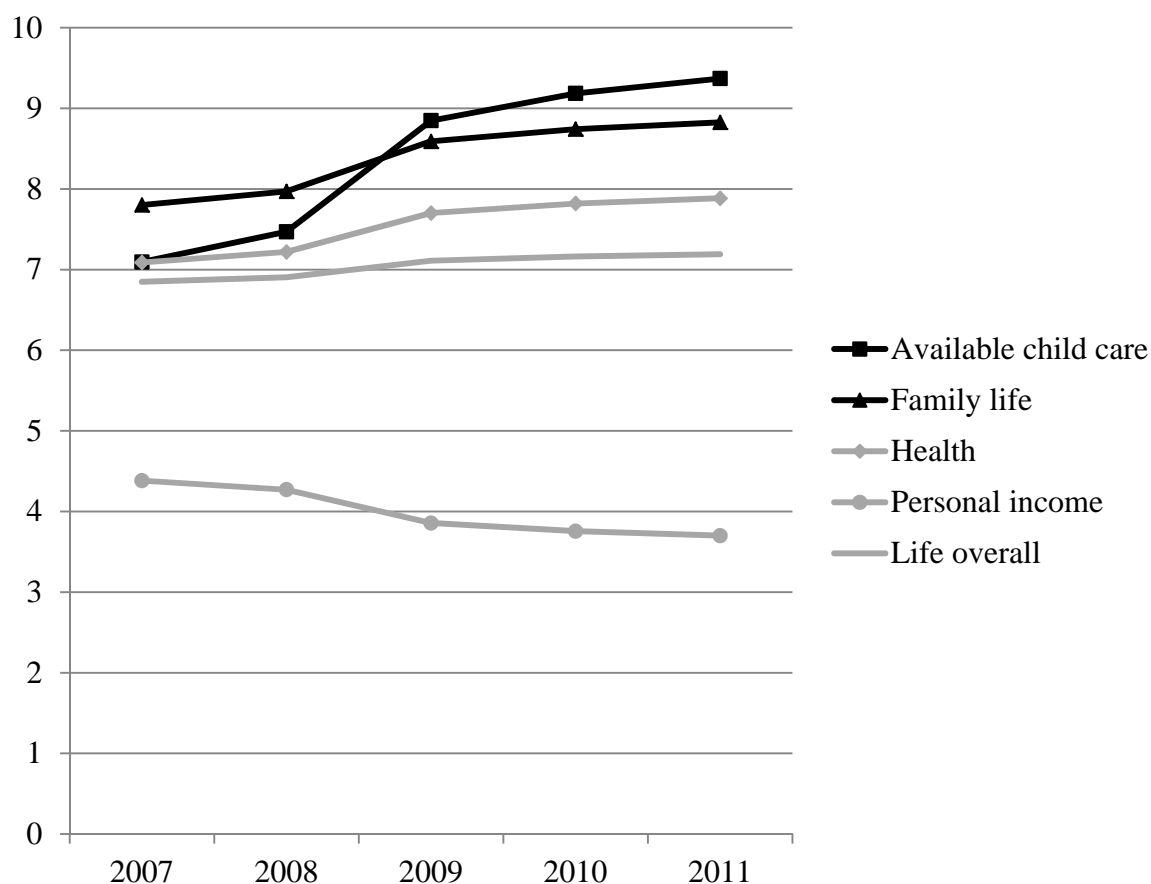
Figure 3: Estimated effects of the day-care expansion on maternal satisfaction with different domains. West Germany 2007-2011



Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011

Note: Baseline: mean satisfaction in 2007. Satisfaction measured on scale from 0 to 10. N=303 counties. Black lines indicate statistically significant associations of day-care availability with satisfaction.

Figure 4: Estimated effects of day-care expansion on maternal satisfaction with different domains. East Germany 2007-2011



Source: SOEP 2007-2011 and FID v2.0 2010-11 linked with regional data from youth welfare offices 2007-2011

Note: Baseline: mean satisfaction in 2007. Satisfaction measured on scale from 0 to 10. N=104 counties. Black lines indicate statistically significant associations of day-care availability with satisfaction.