Does the availability of childcare influence the employment of mothers?

Findings from western Germany

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Abstract: There is a vast empirical literature investigating the effects of childcare costs on female employment. Day-care costs are usually treated as a reduction in female wages and are supposed to reduce a woman's propensity to participate in the labor market. In this paper we argue that an analysis of the effects of childcare on the employment of mothers in Germany should focus on the *availability* rather than the *affordability* of care, due to peculiarities of the German day-care regime. Our empirical findings cast doubt on the effectiveness of the current German day-care regime. Specifically, we question the extent to which it enables mothers to participate in the labor market.

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1. Introduction

In most industrialized countries, there is a general consensus that day care should be publicly subsidized. While in some countries day-care subsidies are intended to promote female employment, others place the focus more on improving the chances for children from deprived social backgrounds or on educating pre-school children. Since the pioneering work by HECKMAN (1974), day-care costs are usually considered as a reduction in female wages, which is supposed to reduce a woman's propensity to work in the labor market. However, by focusing primarily on cash subsidies, one has lost sight of the question, how the access to childcare affects the employment of mothers.

In Germany, as in most western European countries, childcare slots are provided by local municipalities. Due to heavy regulations, high market barriers of entry, and a dominance of public providers, there are hardly any private providers of day care. It might therefore be the case that individual behavior is less influenced by the *affordability* of day care than by its *availability*.

In the first part of this paper, we review the standard neoclassical approach that relates childcare subsidies to individual behavior. In part two, we discuss the German day-care regime and specific features thereof. Because of the peculiarities of this system, the standard application of neoclassic models of labor supply and childcare demand is less appropriate. Finally, we employ a multinominal logit model to estimate how the availability of public and informal day-care arrangements affects female labor-force participation in western Germany. As a data source, we use the *German Socio-Economic Panel* (SOEP). Additional information is drawn from the *Statistik Regional* database (STATISTISCHES BUNDESAMT 1997).

2. Childcare costs and individual behavior

The application of the neoclassical economic framework to childcare costs is straightforward. They are generally understood as costs incurred by parents who put their child in a day-care center or employ a child minder rather than taking care of it themselves. The child minder or the day-care center charges the parents for having their child in care. These costs are assumed to affect various 'spheres' of individual decision-making, such as the demand for care, fertility, the consumption of other goods and services, or labor supply. Economists have focused their attention on the effects of childcare costs on the female labor supply. The simultaneity of labor supply and the demand for care is usually addressed in two- or three-equation models (e.g., CONELLY 1992) or by means of instrumental variable techniques (e.g., GELBACH 1998). In accordance with HECKMAN (1974), the costs of childcare are generally viewed as a reduction in female net wages, which results in a flatter budget constraint for women with children. Although the theoretical model leaves open whether the income or the substitution effect dominates, it is generally believed that higher childcare costs reduce female labor supply.

Government intervention comes into the model in the form of childcare subsidies. Such subsides are treated similarly to other transfer payments, i.e. they are assumed to affect the shape of the budget constraint. If a mother receives an hourly supplement for each hour she works, for example, the supplement is regarded as equivalent to a wage change of equal magnitude (HECKMAN 1974). Therefore, the costs of childcare can just as well be viewed as a tax that reduces net wages (e.g., ERMISCH 1993), and means-tested childcare subsidies can be treated as a proportional income tax (e.g., ILMAKUNNAS 1996). Empirical tests that have set out to investigate the relationship between the

female labor supply and childcare subsidies have mostly found the expected negative relationship between labor supply and childcare costs (e.g., BLAU / ROBINS 1988).

When childcare costs are included in the economic model, it is usually assumed that there is a functioning market system, where the parents' willingness to pay determines the amount of childcare they purchase. This model fits the analysis of the childcare tax credit in the US or the childcare cash rebate and childcare assistance in Australia. For Germany, this framework might fit the analysis of the child-rearing benefits (*Erziehungsgeld*) or child benefits (*Kindergeld*). However, neither measure can be viewed as childcare subsidy. Child-rearing benefits foster parental care, but they provide no incentive for out-of-home care. In Germany, cash transfers supporting the use of (out-of-home) childcare are of very limited importance.[1] Instead, the government provides public day-care slots. Apart from that it heavily regulates non-profit providers and sets up high market barriers of entry for private providers. The cost of care (i.e. the question of affordability) loses some of its importance in the context of a day-care system that is characterized by a high share of public provision and a rather unimportant private market. What really matters instead seems to be the question of availability of childcare slots.[2]

In the following, we describe the German day-care regime and how it deviates from the

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[1] It should be noted that childcare costs are tax deductible in Germany (*Abzugsmöglichkeiten für Kinderbetreuungskosten*). So far, this has only been the case for single parents, but the law will be revised and extended to all parents in 2000 (BUNDESVERFASSUNGSGERICHT 1999).

[2] STOLZENBERG and WAITE (1984) discuss the influence of the availability of childcare in a local area on the market activity of mothers in a US context. They find that not only low prices but also sufficient availability of childcare induce greater participation of mothers in the labor force.

'ideal' of a childcare market where the price of care regulates supply and demand.

3.   The German day-care regime

GUSTAFSSON and STAFFORD (1994) point out that childcare policy can substantially affect the behavior and well-being of individuals living under a given 'day care regime'. Such regimes may be categorized by the following indicators:

- the form of childcare subsidies (in-kind or cash transfers),

- the coverage level reached by public intervention, and

- the degree of quality regulation.

On the basis of this scheme, the US childcare regime could be described as a system that mostly provides cash transfers, has a low coverage level, and a low level of quality regulation, while Germany's day care regime can best be described as a system where day care is publicly provided and where there is a high level of quality regulation (SPIESS 1998). There is a medium level of coverage in western Germany and a high level in eastern Germany.

The distinct features of the German system that we are going to discuss in detail are

- regional variations in supply,

- the organization of public supply,

- childcare fees, and

- the non-existence of a private childcare market.

Regional variations in supply

Analyses of the German day-care system are normally carried out on the state level (*Bundesländer*). It is the local communities, however, that are responsible for financing and providing public day care. In 1994 they spent about 20 billion DM (about $10 billion) on the provision of day care (STATISTISCHES BUNDESAMT 1996). Regional variations in supply reflect the fact that the actual planning of the number of slots to be provided takes place at the community level.

One can best classify public day-care centers by the age group of the children they care for. This classification makes sense because the provision of day-care for the different age groups differs substantially. Moreover, most day-care centers only serve one age category, i.e. there are

- day-care centers for infants aged 0-3 (*Krippe*),

- day-care centers for pre-school children aged 3-6 (*Kindergarten*), and

- day-care centers for (primary) school-age children aged 6-10 (*Hort*).

Table 1 displays the average provision rates on the *Kreis* level[3] for each western German state in 1994, plus the corresponding coefficient of variation.

[Table 1 about here]

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[3] *Kreise* are administrative units that are very close to the community level and are the smallest regional unit for which data are available. Because reliable data for East German *Kreise* are not available yet, we do not include the eastern states in the analysis. Altogether, there are 327 western German *Kreise* (not including West-Berlin).

Day care for preschoolers became established in the 1970s, and since 1996 the local communities are even required by law to offer day care for all children between age of three and school age for half of the day (COLBERG-SCHRADER / ZEHNBAUER 1996). Therefore, we find a high provision rate for pre-school children. But although the relatively low coefficients of variation indicate a rather homogenous distribution of childcare slots within the federal states, we still find substantial differences across states. While in Nordrhein-Westfalen, for example, there are only 737 slots available for 1,000 children of the respective age group, the supply seems to exceed the number of children in Baden-Württemberg, where 1,078 slots are available for 1,000 children. Care is usually provided in the morning hours only, and this usually does not include lunch-time.[4]

There are still hardly any day-care slots available for infants (age 0-3). Here, too, variation across states is high, especially if one compares the city states of Hamburg and Bremen (with the highest provision rates) to the other western German states. Similar comments apply to school-age children. This is of major importance in Germany, as schools are open only in the morning hours and do not start or end the same time every day. Moreover, the rather high coefficients of variation show that there are substantial differences in the provision of slots for infants and school-age children between *Kreis*e within individual states.

In a representative survey, TIETZE, ROSSBACH and ROITSCH (1993) interviewed local youth welfare departments in western Germany about the supply of day care in their

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[4] Unfortunately we are not able to distinguish day-care slots by opening hours on the regional level.

region. They found significant variation in the provision of day care for infants and school age children between rural and urban areas. They conclude that rural areas are at a disadvantage concerning the provision of day care. In Table 2, we display the provision rate on the *Kreis* level by population density. Similarly to the study by TIETZE, ROSSBACH and ROITSCH (1993), we find that western German *Kreis*e with a population density of 500 or fewer inhabitants per square kilometer provide less than half as many day-care slots per 1,000 infants (age 0-3) as *Kreis*e with a higher population density. On average, the latter provide even four times as many slots for school-age children as do more rural *Kreise*. The observed discrimination against less populated areas does not hold true, however, as regards the provision of *Kindergarten* slots.

[Table 2 about here]

The differences between eastern and western Germany are still profound. In the eastern part of the country there is still a high number of day-care slots – an inheritance from the socialist German Democratic Republic (WAGNER / HANK / TILLMANN 1995). The provision of children's day-care has been cut down significantly since unification, though. Nevertheless, provision rates for infants and school-age children in eastern Germany are more than ten times as high as in western Germany (see Table 3). The most severe difference, however, is in the opening hours of the day-care centers. In western Germany, day care for children at pre-school age is in general for half of the day only and does not include lunch. Only 17 percent of the day-care centers there offer all-day care. In the east, on the other hand, almost all day-care centers for pre-school children (97 percent) offer full-time care.

The organization of public supply

The provision of public day care is financed and planned on the community level. However, Germany has a long tradition of the so called 'subsidiarity principle' (*Subsidiaritätsprinzip*). In keeping with this principle, social services should preferably be provided by non-profit organizations (*Verbände*). Because local governments must still follow the subsidiarity principle, the government either provides its own day care slots, or it allocates money to NPOs, which in turn provide day care. These subsidies generally cover up to 90 percent of the operating costs (FLEHMIG / BINDER / WAGNER 1995). While in western Germany about half of all slots in day-care centers are supplied by subsidized NPOs (particularly church organizations), these are of minor importance for the supply of day care in eastern Germany (RAUSCHENBACH 1995). Day care provided by NPOs is not public day care in the narrowest sense. Nevertheless, we will also refer to it as such, since it is mainly funded by the tax payer. Moreover, admission policy and fees do not differ significantly between public day-care centers and those run by NPOs.

It is decided on the community level which providers receive subsidies and whether the community itself should provide public day-care centers. This planning process is supposed to take into account the needs of the parents. One can doubt, however, whether it really does since information flows in one direction only. While the local representatives are informed about an excess supply of slots, there is no mechanism to inform them about an excess demand. It is quite common, for instance, that the number

of slots provided in the previous year is simply extrapolated, correcting for population growth (COLBERG-SCHRADER / ZEHNBAUER 1996). Apart from population growth, local municipalities hardly take into account any other indicators of possible changes in the demand for day care. If there is an excess supply, however, i.e. if slots are not used, they will be cut in the further planning process. This was to be observed in eastern Germany, for example. In the years following unification, female unemployment and women's making use of three years of maternity leave reduced the demand for out-of-home care. As a consequence, public supply was cut with a certain time lag. It is rather doubtful if it will be extended again, should the demand for childcare slots increase again in the future.

For these reasons one can argue that parents have to take the provision of day care as given. Interviews conducted by the DEUTSCHES JUGENDINSTITUT (1998) support this line of argumentation. They conclude that parents' demand for day care develops in reference to the slots they assume to be publicly provided in the area they live in and not necessarily with regard to their actual needs.

Childcare fees

Parents who have a child in day care must pay a fee. The actual amount is usually specified by the federal state or the local community. Childcare fees are supposed to take into account the parents' income. If this really were the case, working parents would face higher childcare costs than parents who do not work. Empirically, however, there is hardly any correlation to be found between household income and childcare fees charged (KREYENFELD / WAGNER / TILLMANN 1998). Generally, childcare fees should cover 10 to 20 percent of the operating costs (FLEHMIG / BINDER / WAGNER 1995). Data

from the *German Socio-Economic Panel* suggest that in 1996 the monthly fee for a pre-schooler in all-day care (which does not necessarily include lunch-time) is 150 DM (about $ 80). The average monthly fee paid for childcare by US parents is $ 240, i.e. about three times this amount (ANDERSON / LEVINE 1999). This suggests that even if childcare fees do have an effect on mothers' employment in Germany, it can be treated as rather small.[5]

The non-existence of a private childcare market

The most interesting feature of the German childcare regime is that no private day-care market has ever really evolved. In other countries, e.g. Great Britain, private child minders or private day-care centers have developed to meet the demand that is not satisfied by public providers. Hardly anything like that has happened in Germany, and there are a number of potential reasons for this lack of a private day-care market:

(1) A substantial share of employed mothers in western Germany relies on informal childcare arrangements (see Table 4). This could be because western German parents tend to think that day care – at least for the very young – harms the well-being of their children (INSTITUT FÜR PRAXISORIENTIERTE SOZIALFORSCHUNG 1996). For this reason they might prefer to have their children cared for by close relatives if they are not able to take care of them themselves. This would consequently lead to a lack of demand for out-of-home care and prevent the emergence of a private childcare market. It seems

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[5] MERKLE (1994) imputes missing childcare costs on the basis of a tobit model and uses these calculated costs to estimate their effect on the probability that a mother is employed in the labor market. She finds no significant effect of childcare costs on female employment in Germany.

unlikely, however, that all western German parents have relatives who live close by and are willing to take care of their children. Moreover, it can be doubted whether all parents believe that care in family networks is indeed high-quality care. But why then does no market for high-quality day care develop?

[Table 4 about here]

(2) One might argue that in a manner similar to the famous 'market for lemons', market failure prevents a market system for day care from evolving, particularly high-quality care. However, a cross-national comparison casts doubt on the market failure hypothesis. SPIESS (1998) shows that there is little evidence that childcare is so different from other goods and services which are regularly provided by the market system. Other countries, such as the US, show that a market system can function to provide day care.[6]

(3) Is it the unwillingness to pay the market price of day care that prevents the emergence of private providers in Germany? Indeed, some evidence can be found that there is only lukewarm willingness among German women to pay the market price for day care. ENGELBRECH and JUNGKUNST (1998) found that only 11 percent of all working mothers in western Germany (and 17 percent in eastern Germany) are willing to pay more than 400 DM per month for day care (see Table 5). One could speculate that parents who are used to paying only relatively small fees for public day care subjectively evaluate the charges of private providers as too high.

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[6] KREYENFELD and WAGNER (2000) discuss a reform of the German childcare system involving more market elements. They suggest the introduction of a voucher system.

[Table 5 about here]

(4) Most importantly, however, there is good reason to believe that the institutional set-up of the German day care regime systematically prevents the development of a private day care market. The commission that investigated monopolistic structures in the German economy (MONOPOLKOMMISSION 1996/97) stated that the dominance of public providers and strict regulations keep out private day-care centers and child minders.

Private providers of day-care centers must be officially registered with the local youth office, and they have to fulfill stringent regulations concerning space and – most importantly – the qualifications of the staff (REIDENBACH 1996). In contrast to public providers or NPOs, they are not allowed to receive subsidies. In an environment where private providers have to compete with heavily subsidized public providers, and where they are confronted with a less than overwhelming degree of willingness on the part of parents (who are used to low fees of public day care centers) to pay, running a private day-care center seems anything but profitable.

In contrast to the US, no market for child minders has ever evolved either. Although the use of *Tagespflege* (child minders) has increased slightly since the 1980s, it is still of only minor importance at best in Germany. ENGELBRECH and JUNGKUNST (1998) found that in 1995 the use of child minders by employed mothers varied between 4 and 10 percent, depending on the age of the child and the region of residence. There is practically no use of child minders in eastern Germany (see Table 4).

Parents' unwillingness to pay the high wages of German child minders can only be regarded as part of a more comprehensive explanation. The essentially insignificant role

of private child minders seems rather to be the result of a widespread attitude that child minders are not adequately qualified (TRIMPIN / BAUER 1996). On the other hand, efforts to increase in the quality of child minders have never been supported seriously. Particularly the trade unions have feared that a spread of *Tagespflege* could weaken the well-established profession of the German *Erzieherin* (nursery school teacher). The same applies to the German government, which clearly disapproves of the establishment of professional child minders (BLÜML 1996).

In a situation where private day-care centers do not exist, where child minders play an insignificant role, and where a largely exogenous public supply of day care is established, it becomes rather dubious to focus a study on the effect of childcare costs on female labor force participation. Especially in the German context, it is therefore more appropriate to emphasize the question of availability rather than affordability when one analyzes the impact of childcare on individual decision making.

4. The availability of day care and mothers' labor force participation in western Germany

Method

Using a multinominal logit model, we estimate the probability that a western German mother with at least one child under age 12 would participate in the labor market at the time of the interview. We distinguish three employment states: not working, working part-time, and working full-time. A majority of about two-thirds of the women in our sample did not work in the labor market, about 25% worked part-time, and a minority of only 11% were employed full-time. Our main focus is on the effects of the availability

of formal, i.e. public, and informal day-care arrangements on a mother's decision to participate in the labor market. We use information from the 1996 interview (wave 13) of the *German Socio-Economic Panel* (SOEP).[7] Further information is drawn from the *Statistik Regional* database (STATISTISCHES BUNDESAMT 1997).

We have to take into account that the women in our sample share regional contexts and therefore face similar constraints to an extent, e.g. regarding the regional provision of childcare slots and the regional labor market structure (see STOLZENBERG / WAITE 1984). If one uses a simple logistic regression, for example, one neglects the nested structure of such data. This leads to biased estimated standard errors of the coefficients because the random disturbances in the regression are correlated (e.g., MOULTON 1990). The robust Huber-White estimator of variance allows us to relax the assumption of independence of the observations. It takes into consideration the clustering of individuals in regional units, thereby producing correct standard errors (in the measurement sense) even if the observations are correlated (STATACORP. 1999).

In our multinominal logit model we therefore apply the Huber-White estimator when we estimate the probability that a western German mother either does not work, is employed part-time, or is employed full-time. As was stated above, we restrict our analysis to western Germany because only western *Kreis*e can be properly linked with the SOEP data[8] and reliable *Kreis*-level information on the provision of day care in eastern Germany is not yet available.

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[7] For a detailed description of the dataset, see PROJEKTGRUPPE PANEL (1995).

[8] Of these 327 *Kreise* (not including West-Berlin), 54 were dropped because none of the individuals in our sample lived there. This leaves us with 273 *Kreise* for the analysis.

Discussion of the independent variables

Availability of public day care. Our main variable of interest is the availability of day care. The availability of public care for infants, pre-school, and school-age children is measured by the number of day-care slots per 1,000 children of the respective age group in the *Kreis*. Assuming that arranging childcare for the youngest child is the most difficult, we consider the childcare arrangements for this child only. However, if there is more than one child in the household, the transaction costs involved in organizing childcare increase because it becomes more difficult for the family to find an arrangement that relies solely on institutional care. To account for this effect, we insert a dummy variable indicating the presence of more than one child in the household under the age of 12.

Social network. Apart from public provision of day care, access to informal childcare arrangements might also affect a mother's labor market decision. We control for the access to informal childcare arrangements by a dummy variable that indicates whether the grandparents of the child(ren) live in the same town.

Age of youngest child. The age of the child is regarded as an important determinant of a woman's propensity to seek a job in the labor market. There are special regulations, such as eligibility for child-rearing benefits or maternity leave, which are likely to reduce a mother's propensity to engage in work earlier than three years after the birth of

her child.[9] Furthermore, a majority of western Germans consider it appropriate for a mother to stay at home and take care of a child that is not yet of *Kindergarten* age (BERTRAM / DANNENBECK 1991), i.e. women are under social pressure not to participate in the labor market. Regarding children's ages, only the age of the youngest child is considered in our analysis.

To control for the effect of the age group the child is in, generally dummy variables are used. However, to allow the effect of the age variable to vary more flexibly, we insert it as a linear spline. The range of the independent variable is then partitioned into segments, and a separate beta coefficient is estimated for each segment to pick up the corresponding age effect (STATACORP. 1999). The segments we define in our analysis are 0-3, 4-6, and 7-11 years.

Human capital characteristics.[10] Women with higher educational degrees are by and large expected to be more likely to work. From an economist's perspective, the assumption is generally that a more highly-educated person can expect to receive higher labor market wages and is therefore more likely to work than others. Sociologists, on the other hand, tend to believe that education is correlated with attitudes towards gender roles (BLOSSFELD / HUININK 1989). From this perspective, more highly-educated women are more likely to work because they have different attitudes towards employment. In

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[9] Germany offers one of the longest periods of entitlement for maternity leave of any country in the world. A mother is eligible to take up to three years of leave. For the first two years she is entitled to means-tested child-rearing benefits. See BUNDESMINISTERIUM FÜR FAMILIE, SENIOREN, FRAUEN UND JUGEND (1997) for details.

[10] We are aware that women who are employed may have acquired more human capital than those who are not, because they planned to participate in the labor market from the outset. However, we clearly cannot address possible endogeneity problems in this context.

our model we use dummy variables to distinguish between having no degree (reference category), having a vocational degree, or having a college degree.

Foreign mother. The differences between native and foreign-born women with regard to their engagement in employment and the structure of the families they live in are well known and need not be discussed at length here (see, e.g., MERZ-KROBOVA 1993). We account for such differences by inserting a dummy variable in the regression to indicate the mother's nationality (German or foreign-born).

Single mother. We also control for single motherhood by means of a dummy variable. By single mothers we mean women who have at least one child, are not married, and do not cohabit with a partner. We assume that their labor market behavior differs from that of women who are married or live in a partnership. It is not clear, however, in which way: Single mothers could be more likely to work since they have no second income to rely on. On the other hand, single mothers could be less likely to work than married mothers since they are more likely to receive means-tested social security benefits. Furthermore, a single mother has one childcare option less, because there is no spouse to help take care of the child.

Partner's wage. Taxes and transfers are usually considered to be a key variable in an explanation of the labor supply in economic models. In Germany, most transfer payments are means-tested. Thus, there should be a negative gradient in the effect of the partner's income on the supply of female labor. Such an effect is supported by the German tax system, which allows tax splitting for married couples (WAGNER 1989). To control for this effect in a very simple way, we use information on the partner's monthly net wage as an indicator of family income unrelated to the mother's own employment. For single mothers and women with unemployed partners, the partner's wage is set to

zero. We use a dummy variable equal to one if the partner's wage exceeds 1,000 DM. In addition, we apply linear splines for the monthly income segments 1,000-4,500 DM and over 4,500 DM.

Regional unemployment rate. The labor supply certainly depends not only on the willingness of women to participate in the labor market but also on job availability. As an indicator for this, we insert the average unemployment rate on the *Kreis* level in 1996 (the year of the SOEP interview).

[Table 7 about here]

Regression results[11]

Control variables

The outcome of the human capital characteristics in our model is consistent with standard findings in analyses of female employment. Having a vocational degree increases a mother's propensity to participate in the labor force by more than 4 percentage points over those who have no post-secondary education. If the mother has a college degree, she is almost 13 percentage points more likely to be employed part-time, and even 21 percentage points more likely to be employed full-time than women in the reference category.

While the partner's wage only weakly influences a mother's propensity to be employed

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[11] In a multinominal logistic regression, the estimated coefficients are logged odds. To facilitate the interpretation of the coefficients, marginal effects (for the mean values of the variables) are estimated.

part-time, we find a strong impact on full-time employment. However, the interpretation of the coefficients is not straightforward. If the partner has a monthly net income of more than 1,000 DM (binary variable), the woman is significantly more likely to be employed full-time than otherwise. This finding contradicts standard economic theory. If means-tested social benefits are considered, however, it might very well be that a woman acts rationally if she does not participate in the labor market. If she did so and earned her own labor market income, the family would lose its eligibility for social assistance, for example.[12] For a partner's wage of between 1,000 and 4,500 DM (linear spline), we find the expected negative correlation between partner's income and female full-time employment. This negative effect becomes insignificant if the partner's monthly wage exceeds 4,500 DM.

Being a single mother or of foreign nationality has no significant influence on the mother's probability of being employed full-time. However, foreign mothers are less likely to be employed part-time than their western German counterparts. Single mothers, on the other hand, show an above average propensity to work part-time.

The labor force participation of mothers in general depends very much on the age of their children. If the youngest child is under the age of four, a mother's probability of being employed full-time increases by 57 percentage points with each additional year. The marginal effect of the child's age is even higher on part-time employment (92 percentage points). When the youngest child is of *Kindergarten* age, the effect of an

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[12] A more thorough investigation of the impact of taxes and transfers on female employment is beyond the scope of this paper. See ERMISCH and WRIGHT (1991), for example, for an analysis of the impact of welfare benefits on single parents' employment in Great Britain.

additional year is much smaller (roughly 20 percentage points for part-time and full-time employment), but it still is significant. Once a child has entered school, however, growing older does not significantly influence the mother's propensity to be employed. The unemployment rate in the *Kreis* does not have a significant impact on a mother's labor force participation.

Childcare characteristics

In our data, we find no evidence for the regional availability of day-care slots to significantly influence a mother's decision to participate in the labor market.[13] We view this result as an effect of the inadequacies of the western German day-care regime. Although *Kindergarten* slots are available for almost all children, this does not necessarily mean that the availability of day-care facilitates employment. Due to very limited opening hours, a mother may not even be able to work part-time. And even if she can, the lack of slots for school-age children would possibly mean a renewed break in her employment career once the child leaves *Kindergarten*. Because there are no regular school hours in Germany, a mother cannot rely on the school to be a place where her child is taken care of while she is working.

Thus, mothers who wish to work must find other (at least supplementary) care arrangements for their children. However, even our social network variable turns out to be insignificant for a mother's labor force activity.

If the child has at least one other sibling, the mother's propensity to work part-time

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[13] A model specification including interaction terms, e.g. for childcare characteristics and being a single mother or for childcare characteristics and urban residence, did not produce any results different from those presented here.

decreases by 5 percentage points, and the likelihood that she works full-time decreases by as much as 11 percentage points. One might argue that this is due to a stronger general orientation of mothers with more than one child towards staying home and taking care of their children. We believe, however, that it is nearly impossible for a mother to organize (formal or informal) care for more than one child and also keep a paid job.

[Table 8 about here]

5.   Conclusions

There is a vast body of theoretical and empirical literature on the effects of childcare subsidies on female employment. Day-care costs are largely viewed as a reduction in female wages and are therefore assumed to reduce the labor market participation of mothers. Such an approach relies on the assumption of a functioning market system where parents have the opportunity to purchase the childcare they require. In this paper we have argued that a functioning day-care market cannot be taken for granted, at least not for Germany. Public childcare is provided by local municipalities, and there are hardly any private providers. We argue that for the analysis of the effects of childcare on female employment, one should focus on the *availability* of care rather than on its *affordability*. In our empirical model, we estimate the impact of having access to (formal and informal) day care arrangements on the mother's employment status. We find no significant effect of the regional provision of public day care on female labor force participation in western Germany. This result casts doubt on the effectiveness of the current German day-care regime as regards its ability to enable mothers to

participate in the labor market. Local authorities have not yet understood the necessity to adjust the supply of day-care slots to the needs of working parents. Childcare policies in western Germany aim particularly at providing high-quality day care with a focus on educating children. To maintain this high level of quality and meet the demand for more flexible and more extensive (full-time) day care for children of all ages, a profound reform of the German childcare regime is necessary.

References

Anderson, Patricia M. / **Levine**, Phillip B. (1999): Child Care and Mothers' Employment Decisions. NBER Working Paper No. W7085. Available

http://papers.nber.org/papers/W7058

Bauerreiß, Renate / **Bayer**, Hiltrud / **Bien**, Walter (1997): Familienatlas II: Lebenslagen und Regionen in Deutschland. Opladen. Data available at

http://www.dji.de/2_rdb/default.htm

Bertram, Hans / **Dannenbeck**, Clemens (1991): Familien in städtischen und ländlichen Regionen. In: Bertram, H. (Ed.): Die Familie in Westdeutschland. Opladen: 79-110.

Blau, David M. / **Robins**, Philip K. (1988): Child-care costs and family labor supply. In: Review of Economics and Statistics, Vol. 70, No. 3: 374-381.

Blossfeld, Hans-Peter/ **Huinink**, Johannes (1989): Die Verbesserung der Bildungs- und Berufschancen von Frauen und ihr Einfluß auf den Prozeß der Familienbildung. In: Zeitschrift für Bevölkerungswissenschaft, Vol. 15, No. 4: 383-404.

Blüml, Herbert (1996): Das System Familientagesbetreuung. In: Bundesministerium für Familie, Senioren, Frauen und Jugend (Ed.): Kinderbetreuung in Tagespflege. Stuttgart: 149-164.

Bundesministerium für Familie, Senioren, Frauen und Jugend (1997): Handbuch zum Erziehungsurlaub. Bonn.

Bundesverfassungsgericht (1999): Auch zugunsten in ehelicher Gemeinschaft lebender Eltern sind Kinderbetreuungskosten sowie ein Haushaltsfreibetrag steuermindernd zu berücksichtigen. Pressemitteilung Nr. 5 vom 19.01.1999.

Colberg-Schrader, Hedi / **Zehnbauer**, Anne (1996): Rechtsanspruch auf einen Kindergartenplatz. Bedarfsplanung, Notlösungen, alternative Angebote. Deutsches Jugendinstitut, München.

Conelly, Rachel (1992): The effects of child care costs on married mother's labor force participation. In: Review of Economics and Statistics, Vol. 74, No. 1: 83-90.

Deutsches Jugendinstitut (1998): Tageseinrichtungen für Kinder. Pluralisierung von Angeboten. Zahlenspiegel. München.

Engelbrech, Gerhard / **Jungkunst**, Maria (1998): Erwerbsbeteiligung von Frauen und Kinderbetreuung in Ost- und Westdeutschland. Institut für Arbeitsmarkt- und Berufsforschung (Ed.): IAB Werkstattbericht, Nr. 2.

Ermisch, John (1993): Familia Econometrica. A survey of the economics of the family. In: Scottish Journal of Political Economy, Vol. 40, No. 4: 353-374.

Ermisch, John F. / **Wright**, Robert E. (1991): Welfare Benefits and Lone Parents' Employment in Great Britain. In: Journal of Human Resources, Vol. 31, No.3: 425-456.

Flehmig, Susanne / **Binder**, Marion / **Wagner**, Gert (1995): Der "Markt" für vorschulische außerhäusige Kinderbetreuung in Westdeutschland. Expertise im Auftrag der Hans-Böckler-Stiftung. Düsseldorf.

Gelbach, Jonah B. (1998): How large an effect do child care costs have on single mothers' labor supply? University of Maryland at College Park, mimeo.

Gustafsson, Siv / **Stafford**, Frank (1994): Three regimes of childcare: The United States, the Netherlands, and Sweden. In: Bland, R. (Ed.): Social protection versus economic flexibility: Is there a trade-off? Chicago / London: 336-361.

Heckman, James J. (1974): Effects of Child-Care Programs on Women's Work Effort. In: Journal of Political Economy, No. 82: S136-S169.

Ilmakunnas, Seija (1996): Child Care Costs in Labor Supply Models. Labor Institute for Economic Research Helsinki. Discussion Paper 133.

Institut für Praxisorientierte Sozialforschung (1996): Gleichberechtigung von Frauen und Männern - Wirklichkeit und Einstellungen in der Bevölkerung. Bundesministerium für Familie, Senioren, Frauen und Jugend (ed.). Materialien zur Frauenpolitik Nr. 55. Mannheim.

Kreyenfeld, Michaela / **Wagner**, Gert / **Tillmann**, Katja (1998): Finanzierungsmodelle sowie Verteilungs- und Finanzierungsrechnungen für eine bedarfsgerechte Kinderbetreuung von Vorschul- und Schulkindern in Deutschland. Forschungsbericht im Auftrag der Hans-Böckler-Stiftung. Düsseldorf.

Kreyenfeld, Michaela / **Wagner**, Gert (2000): Die Zusammenarbeit von Staat und Markt in der Sozialpolitik: Das Beispiel Betreuungsgutscheine und Qualitäts-Regulierung für die institutionelle Kinderbetreuung. DIW Discussion Paper No. 199. Berlin. Available http://www.diw.de/Diskussionspapiere/deutsch/dp_2000.htm

Merkle, Lucie (1994): Frauenerwerbstätigkeit und Kinderbetreuung: Eine theoretische und empirische Analyse für die Bundesrepublik Deutschland. Heidelberg.

Merz-Krobova, Michaela (1993): Ausländische Frauen auf dem schweizerischen Arbeitsmarkt. In: Schweizerische Zeitschrift für Volkswirtschaft und Statistik, No.3: 401-313.

Monopolkomission (1996/97): 13. Hauptgutachten der Monopolkommission. Bonn.

Moulton, Brent R. (1990): An illustration of a pitfall in estimating the effects of aggregate variables on micro units. In: Review of Economics and Statistics, No.32: 334-338.

Projektgruppe Panel (1995): Das Sozio-oekonomische Panel (SOEP) im Jahre 1994.

In: Vierteljahrshefte zur Wirtschaftsforschung, Vol. 64: 5-15.

Rauschenbach, Thomas (1995): Die öffentliche Jugendhilfe im Prozeß der deutschen Wiedervereinigung: Bausteine zur Transformation des Sozialen. In: Rauschenbach, T., et al. (Eds.): Von der Wertgemeinschaft zum Dienstleistungsunternehmen. Jugend- und Wohlfahrtsverbände im Umbruch. Frankfurt am Main.

Reidenbach, Michael (1996): Kommunale Standards in der Diskussion. Setzung und Abbau von Standards am Beispiel der Kindergärten. Deutsches Institut für Urbanistik. Berlin.

Spieß, Katharina (1998): Theorie und Empirie staatlicher Eingriffe in Märkte für Kinderbetreuung: Analysen im internationalen Vergleich (Deutschland/USA) unter besonderer Berücksichtigung der Nachfrageseite. Dissertation. Frankfurt a. M. (et al.).

StataCorp. (1999). Stata Statistical Software: Release 6.0. College Station, TX: Stata Corporation.

Statistisches Bundesamt (1996): Sozialleistungen. Ausgaben und Einnahmen der Öffentlichen Jugendhilfe. Fachserie 13, Reihe 6.4. Stuttgart.

Statistisches Bundesamt (1997): Statistik Regional 1997 Komplettversion: Daten und Informationen der statistischen Ämter der Länder und des Bundes. Wiesbaden.

Stolzenberg, Ross M. / **Waite**, Linda J. (1984): Local Labor Markets, Children and Labor Force Participation of Wives. In: Demography, No.2: 157-170.

Tietze, Wolfgang / **Roßbach,** Hans-Günther / **Roitsch,** Karin (1993): Betreuungsangebote für Kinder im vorschulischen Alter. Ergebnisse einer Befragung von Jugendämtern in den alten Bundesländern. Schriftenreihe des Bundesministeriums für Frauen und Jugend. Stuttgart (et al.).

Trimpin, Ursula/ **Bauer**, Hanne (1996): Der Tagesmütter-Bundesverband für Kinderbetreuung in Tagespflege e.V. In: Bundesministerium für Familie, Senioren, Frauen und Jugend (Ed.): Kinderbetreuung in Tagespflege. Stuttgart: 527-548.

Wagner, Gert (1989): Arbeits- und sozialpolitische Möglichkeiten einer erziehungsfreundlichen Erwerbsarbeit. In: Wagner, G., et al. (Eds.): Familienbildung und Erwerbstätigkeit im demographischen Wandel. Berlin (et al.): 314-332.

Wagner, Gert / **Hank,** Karsten / **Tillmann,** Katja (1995): Außerhäusige Kinderbetreuung in Ostdeutschland - 1990 und 1994 im Vergleich zu Westdeutschland, Diskussionspapier aus der Fakultät für Sozialwissenschaft der Ruhr-Universität Bochum, Nr. 95-18. Available http://www.ruhr-uni-bochum.de/sowi

Tables

Table 1: Regional variation of slots in day-care centers per 1,000 children of different age groups – western Germany 1994[*]

Federal State	Krippe (Age 0-3)	Kindergarten (Age 3-6)	Hort (Age 6-10)
Schleswig-Holstein	13.0 (0.80)	757.5 (0.09)	45.2 (0.92)
Hamburg[**]	119.0	593.0	212.0
Niedersachsen	15.9 (0.97)	747.4 (0.10)	30.0 (1.02)
Bremen	45.0 (0.97)	709.5 (0.18)	128.5 (0.53)
Nordrhein-Westfalen	14.6 (0.63)	736.7 (0.08)	36.4 (0.92)
Hessen	19.4 (1.03)	904.1 (0.10)	61.0 (1.23)
Rheinland-Pfalz / Saarland	12.1 (0.94)	1044.3 (0.08)	31.5 (1.11)
Baden-Württemberg	14.7 (1.13)	1077.8 (0.07)	30.6 (1.24)
Bayern	13.2 (0.93)	898.8 (0.13)	45.7 (1.09)

Note: Mean provision rates are calculated on the basis of *Kreis* level information. They are not standardized and therefore do not reflect the actual provision rate in the state. Coefficients of variation in parentheses.

[*] Not including West-Berlin.
[**] No coefficient of variation is displayed, as Hamburg consists of one *Kreis* only.

Source: BAUEREISS / BAYER / BIEN 1997, authors' calculations

Table 2: Provision of slots in day-care centers per 1,000 children of different age groups by regional population density – western Germany 1994 (Mean values. Coefficients of variation in parentheses.)

Population density of *Kreis*	*Krippe* (Age 0-3)	*Kindergarten* (Age 3-6)	*Hort* (Age 6-10)
≤ 150 inhabitants per square kilometer	9.05 (0.49)	869.84 (0.17)	17.93 (0.82)
≤ 500 inhabitants per square kilometer	10.50 (0.72)	923.50 (0.17)	22.63 (0.93)
> 500 inhabitants per square kilometer	25.95 (0.83)	857.71 (0.17)	83.50 (0.69)

Source: BAUEREISS / BAYER / BIEN, 1997, STATISITK REGIONAL 1997, authors' calculations

Table 3: Childcare provision rates in eastern and western Germany 1994

	East Germany	West Germany
Krippe (0-3)	41 %	2 %
Kindergarten (3-6)	116 %	85 %
Kindergarten (3-6), all day - including lunch	97 %	17 %
Hort (6-10)	60 %	5 %

Source: DEUTSCHES JUGENDINSTITUT 1998

Table 4: Use of care arrangements of employed mothers by age of the child – eastern and western Germany 1995 (Multiple answers allowed.)

	West Germany		East Germany	
	Age 0-4	Age 4-6	Age 0-4	Age 4-6
Mother	84 %	69 %	36 %	37 %
Spouse	34 %	31 %	9 %	16 %
Grandparent	45 %	33 %	30 %	21 %
Other relative	10 %	8 %	9 %	2 %
Child minders	10 %	7 %	3 %	2 %
Day care	5 %	57 %	21 %	74 %

Source: ENGELBRECH / JUNGKUNST 1998

Table 5: Willingness of working mothers to pay for childcare – eastern and western Germany 1995

	West Germany		East Germany	
Age of the child	Age 0-3	Age 4-6	Age 0-3	Age 4-6
0 DM	16 %	20 %	8 %	6 %
Up to 200 DM	45 %	54 %	39 %	54 %
200 to 400 DM	28 %	34 %	36 %	34 %
400 DM or more	11 %	6 %	17 %	6 %

Source: ENGELBRECH / JUNGKUNST 1998

Table 6: Description of variables

Childcare characteristics

Childcare provision rate	Number of publicly provided day-care slots per 1,000 children in the *Kreis* in 1994. Depending on the age of the child, slots are provided in a *Krippe*, a *Kindergarten*, or a *Hort*.
More than one child in household	Binary variable that equals one if there is more than one child under age 12 in the household.
Social network	Binary variable that equals one if the child's grandparents live in the same town.
Age of youngest child	Linear splines, i.e. the age variable is split into three different segments: 0-3, 4-6, and 7-11 years.

Individual characteristics

Mother's education	Three binary variables, indicating the highest educational degree of the mother. We distinguish between no degree (reference category), vocational degree, and college degree.
Foreign mother	Binary variable that equals one, if the mother's nationality is not German.
Lone mother	Binary variable that equals one for single mothers whose partner does not live in the same household.
Partner's wage	One binary variable – that equals zero if the partner's monthly net wage is below 1,000 DM, or if the mother does not have a partner – and two linear splines: 1,000-4,500 DM, and more than 4,500 DM. The original variable was divided by 1,000.

Labor market characteristics

Mother's employment status	Dependent variable that equals zero if the mother is not employed (reference category), one if she is part-time employed, and two if she is full-time employed.
Unemployment rate	Average unemployment rate in the *Kreis* in 1996 (in percent).

Table 7: Descriptive sample statistics

Variable	Mean (Standard deviation)
Dependent variable	
Not employed	0.65
Part-time employed	0.24
Full-time employed	0.11
Age of child	4.80 (3.09)
Childcare characteristics	
Childcare provision rate	0.29 (0.40)
More than one child in household	0.43
Social network	0.53
Education	
No degree	0.32
Vocational degree	0.60
College degree	0.08
Other individual characteristics	
Foreign mother	0.24
Lone mother	0.08
Partner's wage	3,958 (3,525)
Unemployment rate	0.09
No. of cases	1222

Note: Standard deviation in parentheses. No standard deviation is displayed for binary variables.

Source: SOEP 1996, STATISTIK REGIONAL 1997, authors' calculations

Table 8: Regression results from multiniominal logit model (reference category: not employed)

	Employed part-time					Employed full-time				
	b	exp(b)	Marginal effect	t		b	exp(b)	Marginal effect	t	
Intercept	-3.916	0.020		-8.672	***	-3.039	0.048		-5.349	***
Childcare characteristics										
Childcare provision rate	-0.057	0.944	-0.063	-0.211		0.429	1.535	0.412	1.163	
More than one child in household	-0.401	0.669	-0.051	-2.410	**	-0.745	0.475	-0.111	-3.917	***
Social network	0.052	1.054	0.004	0.388		0.236	1.266	0.037	0.434	
Age of child (linear spline)										
0 – 3	0.977	2.657	0.924	8.649	***	0.613	1.845	0.568	3.519	***
4 – 6	0.248	1.281	0.232	1.961	*	0.260	1.298	0.245	2.111	**
7 – 11	-0.082	0.921	-0.08	-0.821		0.049	1.050	0.049	0.462	
Education										
Vocational degree	0.314	1.369	0.044	4.173	***	0.340	1.404	0.049	2.572	**
College degree	0.888	2.431	0.127	3.874	***	1.196	3.307	0.213	2.880	***
Other individual level characteristics										
Foreign mother	-0.905	0.404	-0.127	-5.711	***	-0.117	0.890	-0.005	-0.438	
Lone mother	0.662	1.938	0.133	2.034	**	-0.334	0.716	-0.063	-0.739	
Partner's wage:										
More than 1,000 DM (binary)	0.912	2.489	0.124	1.950	*	1.118	3.059	1.146	3.508	***
1,000 – 4,500 DM (linear spline)	-0.144	0.866	-0.126	-1.007		-0.665	0.514	-0.634	-10.058	***
4,500 DM or more (linear spline)	-0.040	0.960	-0.037	-0.885		-0.083	0.920	-0.079	-1.245	
Local unemployment rate	-0.036	0.965	-0.034	-0.955		-0.029	0.971	0.027	-0.841	

Note: Huber-White estimator of variance applied. Significance: ***p<.01; **p<.05; *p<.10

Source: SOEP 1996, STATISTIK REGIONAL 1997, authors' calculations