Maternal partner and employment changes: how do they influence early childhood outcomes?

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Abstract:

As presented in recent literature (see e.g. Cunha and Heckman 2007, 2009), parental environment considerably influences child development. This is particularly true for the early years. In this paper we focus on the stability of the parental environment. We analyze partner and employment changes for mothers with children aged two to six. We use data from the German Socio-Economic Panel Study (SOEP) to examine the association between changes in parental environments and child outcomes. Preliminary results show a correlation between multiple partner changes and the socio-emotional behavior of five-to-six-year-olds. The analysis demonstrates a significant association between partner changes and child outcome of preschoolers: This accounts for children who have experienced a separation and then a new partner comes into the household. Additionally, we depict that 'exogenous' changes in maternal employment (e.g. employment exits) are negatively correlated with preschoolers' prosocial behavior. We find a negative correlation between the adaptive behavior of two-to-three-year-olds and mothers employment status: Children of mothers that are continuously employed are more developed in some of the skill domains we capture.

JEL classification: J10; J12; J13

Keywords: family structure, child development, joblessness, skills

1 Introduction

How important is a child's parental environment for its skill development during early childhood? Are (multiple) changes in parental environment negatively correlated with early child outcomes? Is a less stable environment associated with child outcomes in the early years? There exists substantial evidence that children's skills are influenced by family characteristics, such as parental education and income, as well as other factors that are part of the parental environment. Even more so, family related factors that form a child's environment seem to be of particular importance, probably more important for the explanation of child outcomes than the environment of other caretaking institutions, such as day care centers or schools. Carneiro and Heckman (2003: 75) summarize this as follows: "Families are just as important, if not more important than schools in producing human capital". Significant literature shows for instance, that children with low educated parents or children who live in poor circumstances do worse than their counterparts. Studies illustrate that parental education or income are associated with the channels through which intergenerational transmission of ability works (for a full overview see Black and Devereux 2010 or Björklund and Salvanes 2010). But other family related indicators affecting parental quality are important as well. With respect to children's skills Cunha and Heckman (2009) show that parental income or education are not the only explanatory factors for inequality in child outcomes. Along the lines of these findings, this paper focuses on the impact of changes in parental environment during children's early years (from birth until the age of six) on adaptive and socio-emotional behavior.

In our study changes in parental environment can either be transitions in maternal employment patterns or in the family structure, respectively the partner of the mother. Thus the purpose of this paper is to analyze if children who experience an 'instable' parental environment – i.e. mothers experience partner changes or employment changes – possess different child outcomes than children who live with mothers who do not separate or change employment. On the one hand one might hypothesize that the separation of parents affects child outcomes negatively. On the other hand some authors argue that this depends on whether the child anticipates this separation (Amato 2005). Moreover, Fomby and Cherlin (2007) argue that multiple partner changes might impose more stress on children than living in a single parent household. With respect to employment changes possible correlations could point in two directions as well. A negative respectively positive correlation might be due to transitions out or in employment reflecting income changes. Apart from income losses, an employment loss has other

implications: Rege et al. (2007), e.g. emphasize that joblessness is likely to inflict stress on parents and this could lead to disruptions in children's environment. Thus being exposed to changes in maternal employment patterns may lead to lower family income and stressed mothers and thus may lead to worse outcomes of children. On the contrary, mothers might have more time for their children, once they work less due to an employment loss. This might affect child outcomes in a positive way.

We concentrate on short-term associations, as they are arguably the most important for later outcomes (see Carneiro and Heckman 2003, or Cunha and Heckman 2007). This is a new focus, since the literature on parental environment as a potential influence on child outcomes so far usually focuses on school children or even older children, and in doing so does not reveal what is happening earlier. Although our analysis depicts the short-run, other papers have shown that long-term implications exist. A paper using British data for instance shows that non-cognitive skills during childhood are important for outcomes measured at the age of 42 (Carneiro et al. 2007). Using UK data of children born in 1970 Blanden et al. (2007) examine whether behavior observed in middle childhood (age 10) are correlated with earnings at age 30. Their findings are consistent when controlling for cognitive skills during childhood. Thus, correlations between changes in parental environment and early child outcomes are likely to imply long-term consequences.

Our analysis uses German data for children during their six years of life. We observe children from five birth cohorts (2002 until 2006). The first two cohorts (2002 and 2003) are analyzed at two points in their life – at the age of two or three (adaptive behavior) and at the age of five or six (socio-emotional behavior)[1]. Thus, children have not yet entered school. We use data from the German Socio-Economic Panel Study (SOEP) to examine the association between changes in family environments and early childhood outcomes. We study toddlers and preschoolers separately in order to depict possible correlatins of parental environment and child outcomes at different stages over the life cycle. Children might experience changes of their mother's partner or maternal employment patterns differently during childhood. Maternal employment is observed for toddlers and preschoolers alike, while changes in maternal partners are only considered for preschoolers. This is mainly due to the small number of partner changes during the first three years of a child's life.

We focus in our analyses on changes related to the mother. Similar to other industrialized countries, in Germany, mothers are the primary care giver during the early years. Due to generous parental leave regulations mothers can stay at home, until the third birthday of their child. In 2006, only 8 percent of all children below the age of three attended day care in West Germany, and 39.7 percent in East Germany (DJI 2007). From age three onwards nearly all children are enrolled in day care, but mainly part-time day care.[2]

The remainder of the paper is structured as follows: After a summary of previous findings in section 2 we explain our data and methods in section 3 and 4, before we present our results in section 5 and section 6 concludes.

2 Previous Literature

There are various studies focusing on the correlations between maternal employment and child outcomes (such as James-Burdumy 2005, Baum 2003). The same is true for family structure. Various authors have studied the association between family structure and child outcomes (Mahler and Winkelmann 2004, Del Bono et al. 2007, Francesconi et al. 2008 and 2009). However, only few studies focus on the changes of these two aspects. Among these fewer studies emphasizing changes in employment patterns and child outcomes is the Norwegian study by Rege et al. (2007). They analyze the effect of parental job loss on teenager's academic performance using Norwegian register data. Their study uses a natural experiment approach to estimate a possible causal effect of parental job loss and children's school outcome.[3] They find that fathers' exposure to plant closure imposes stress on a father and this stress has more impact if future employment is discouraging and thus causes children to perform worse in school. Kalil and Ziol-Guest (2007) estimate children's performance as a function of parental employment patterns using US data. They focus on involuntary employment losses. Along the lines of Rege et al. (2007), they find no significant correlation between mothers' employment experiences and child outcomes.

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[1] This is due to the structure of our data. The German Socio-Economic Panel study (SOEP) surveys child development through specific mother-child questionnaires at distinct points in time of each birth cohort. Please see section 3 for a detailed description of our data.

[2] In West Germany 86.2 percent of all children aged three to six years and 92.4 percent in East Germany (DJI 2007).

[3] They assume that plant closures in Norway between 1999 and 2005 are determined by exogenous shocks and are independent of unobservable determinants of children's school performance.

In line with Rege et al. (2007) other studies examine the effect of plant closure on child outcomes. Bratberg et al. (2008) use Norwegian employer-employee data to analyze the effects of fathers' displacement on children's earnings. They find no effect on earnings of children ten years after the employment shock, yet job loss is negatively related with earnings and employment for those affected. Using Canadian data to examine the intergenerational transmission of earnings caused by firm closure, Oreopoulos et al. (2008) argue that a plant closing can be thought of as exogenous employment shocks. Oreopoulos et al. (2008) find that children whose fathers lost their jobs from plant downsizing have lower annual earnings than children whose fathers did not experience an employment exit.

With regard to family structure changes, Hill et al. (2001) test existing theories and relevant literature in order to disentangle possible influences of changes in parental environment on children's outcomes later in life. They use detailed definitions of family structure incorporating novel perspectives on mother-only structures. By analyzing U.S. data, Hill et al. (2001) find that changes are important, timing of experience matters and the influence can vary by outcome measures. They use educational attainment reported between 20 and 25 and the risk of nonmarital childbirth for young females between age 15 and 25. Another study for the U.S. (Fomby and Cherlin 2007) points out that children who experience multiple changes of their mother's partner might be worse off than children growing up in stable families – either two-parent or single parent families. They emphasize that the number of changes play an important role in determining how children's outcomes are affected. Fomby and Cherlin (2007) show that children's cognitive test scores are negatively correlated with the number of partner changes, yet also with living the first four years in a single mother household. The externalizing behavior of white children is negatively associated with multiple changes. They do not find any correlation for number of changes for their African American sample.

A paper using Danish data estimates the effect of divorce and remarriage on socio-emotional behavior of children (Andersen et al. 2007). Using the same index of socio-emotional behavior as we do and a measure of the number of problems at start of first grade as outcome measures, the authors show that experiencing a divorce early in life worsens child development in the short-run. They also point out that if a divorce or separation is followed by a remarriage or a new cohabiting partner the child is even worse off than just experiencing the one time event. Würtz-Rasmussen (2009) uses Danish data as well and estimates the effect of family structure changes on children's health outcomes. In order to separate the effect from other parental background variables, Würtz-Rasmussen (2009) applies a difference-in-difference (DiD)

model. She concludes that children who experience a separation or divorce after the age of six are exposed to worse health outcomes than children without a change of their mother's partner.

Ginther and Pollak (2003) point out that a child-based classification of family structure categorizes a blended family for one child into a stepfamily and for another child into two-parent family. Thus, they analyze associations between changes in the family structure and child outcomes using a family-based classification. By controlling for family structure and other variables (e.g., mother's education and family income) Ginther and Pollak (2003) conclude that, for their U.S. data, regressions display a different pattern of family structure effects – for instance, living in a single parent family is no longer significant compared to living in a blended family. For the U.S. Fomby and Osborne (2008) argue that experiencing repeated formation and dissolution of household composition could influence children's behavioral development. Yet, the exposure to frequent conflict between parents and their partners might undermine children's development rather than the experience of disruption. Taking into account both difficulties – family structure transitions and conflicts – their results indicate that very young children might be more affected by parental conflict rather than by family structure changes.[4] Still, conflict and transitions in household composition cannot be regarded as complete separate issues, since family variations – especially new partners of parents – may worsen the already existing conflict.

3 Data and Methods

3.1 Data

For our empirical analysis we use data from the German Socio-Economic Panel Study (SOEP). The SOEP started in 1984 and is a representative annual household panel.[5] In 2003, the SOEP introduced a series of mother-child questionnaires to survey the development of children from birth onwards. The first of these questionnaires (M1) targets mothers of newborn children. In 2005, a follow-up questionnaire (M2) was implemented collecting information from mothers of

[4] Fomby and Osborne (2008) use data from the Fragile Families Study – a longitudinal birth cohort study in the U.S. including children born between 1998 and 2000.

[5] For more information about the SOEP see Wagner et al. (2007).

children aged two to three. The latest questionnaire in this series (M3) was introduced in 2008 to survey development and family life of preschool children.[6]

In our analyses we use data obtained from the M2 and M3 mother-child questionnaire. We include personal and household-specific data to control for socio-economic characteristics after the birth of the child. The period t = 0 indicates the period when the child is newborn and maternal partner information can be observed as the 'initial condition' of family composition. Maternal partner changes over time are then gradually observed every year up to period t = 6, i.e. when the child is five to six years old. The sample for t = 6 comprises 431 observations, primarily regarding the mother and the child. Maternal employment patterns are observed from period t = 0 for children aged two to three and from period t = 3 onwards for children aged five to six. We observe changes in employment every year, i.e. from birth until the age of three for toddlers and from the age of three until the age of six for preschoolers. The sample of children aged two to three consists of 1,128 observations. This sub sample is larger than the sub sample of five-to-six-year-olds due to the fact that the mother-child questionnaire for toddlers precedes the questionnaire on preschoolers' development by three years (2005 compared to 2008 as starting point).

Child outcome measures

Our primary measures of child outcomes are *adaptive behavior* for children aged two to three and *socio-emotional behavior* for preschool children – aged five to six. Within the SOEP a modified version of the German Vineland Adaptive Behavior Scale (VAB) proposed by Sparrow et al. (1984) is used to collect information on age-specific development of toddlers. This scale measuring children's adaptive behavior enables us to compose the 'VAB scores' using a total of 20 items.[7] It measures skills of toddlers in four areas: verbal skills, activities of daily living, motor skills, and social skills. Mothers are asked to rate their child's ability performing five skills per domain with 'yes', 'to some extent' or 'no'. The scores are summed across the five tasks per area to create four domain-specific VAB scores ranging from 0 to 10. These indices indicate a child's skill attainment in each of the four domains. We use a total VAB score, which is the sum of the four domain-specific scores and ranges from 0 to 40.[8] In

[6] For more information about the mother-child questionnaires in the SOEP, see Schupp et al. (2008) and Siedler et al. (2009).

[7] For a detailed description of this measure in the SOEP, see Schmiade et al. (2008).

[8] For other studies using the VAB's scores in the SOEP, see Coneus and Pfeiffer (2007), Cawley and Spiess (2008), and Coneus and Sprietsma (2009).

the Appendix we include an English translation of the M2 mother-child questionnaire. Figure 1a illustrates the distribution of the Total VAB score from which it becomes clear that the score is nearly normally distributed, although it is slightly skewed to the right.

Figure 1a about here

For children aged five to six we use a non-cognitive skill measure, namely the socio-emotional behavior (SEB). It is based on versions of the Strength and Difficulties Questionnaire (SDQ) proposed by Goodman (1997). The SDQ is also part of a self-completion module filled out mainly by mothers. Mothers answer 'not true', 'somewhat true' and 'certainly true'. In the SOEP the socio-emotional behavior comprises 17 items over five separate dimensions: Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behavior (see the Appendix for an English translation). The first four dimensions are summed to a Total Difficulties Score, taking on values from 0 to 40, varying between 0 and 29 in our data with a mean of 10.7 and a standard deviation of 6 (see Figure 1b). According to Goodman (1997) the child can be classified into different behavior: normal, borderline or abnormal depending on its score of socio-emotional behavior. Here, we construct a binary variable 'abnormal' taking on the value 1 if the Total Difficulties Score is above 17 and the value 0 if the Total Difficulties Score is between 0 and 16. The Prosocial Behavior Score ranges from 0 to 10 and is depicted in Figure 1c.

Figure 1b and 1c about here

With respect to the independent variables our key variables of interest are the variables describing maternal partner and employment changes. We focus on the type of changes by implicitly accounting for the number of changes experienced.

Maternal employment changes

Employment pattern variables are based on yearly labor force participation from the child's year of birth until the age of two to three for toddlers and from the age of three until the age of five to six for preschoolers. The primary focus is on the group of mothers who experience an 'exogenous' employment exit or an employment entry. We compare these mothers to their counterparts who are continually employed. Employment exits can at first be any exit into 'not employed' observed from one year to next. In a second step we define an exogenous job loss to be either caused by a *dismissal by employer*, a *termination of contract by time limit* or a *job loss*

due to plant closure. In doing so we create a sub sample which then contains only 'exogenous' employment exits. We depict employment patterns that are related to income changes in order to show latent disadvantages to which families and in particular children may be exposed. We create dummy variables indicating maternal employment experiences besides those coded *exogenous job loss*. The additional categories are *no job change experienced* – working continually from period t_1 until t_3 or from t_3 until t_6 – *continually not working including parental leave* and *employment entry*. For some children we cannot determine whether maternal employment transitions are exogenous or not, due to higher item non-response rates for this question compared to the question on employment. Thus we have to analyze a smaller sub sample when controlling for exogenous job loss (see table 2).

In contrast to family structure transitions, we infer the relationship of employment transitions and early child outcomes for children aged two or three, since job loss and employment entries are more likely to be observed for toddlers than are maternal partner changes.

In our two data sets we observe different proportions of maternal employment patterns for mothers of children aged two to three and of children aged five to six. Tables 2 and 3 give a descriptive summary on maternal employment patterns for our different samples.

Table 2 and 3 about here

Maternal partner changes

Since only biological mothers and not biological fathers of children can be identified definitively in our data set we rely on maternal information regarding the household structure. Apart from the fact that the mother is the main care giver of children in most cases. In terms of the father we assume the male household member observed at time of birth of the child to be the biological father. Any observed male household member surveyed in a child's family at a later period is either a social father or a new life partner of the child's mother. We define a change in partners – be it either a different partner, new partner or no partner – of a child's mother from one year to the next to be a partner change. It can occur due to separation without divorce, separation with divorce or new partners moving in, being newly married or cohabiting. Thus a family structure change is any relationship change of the mother that a child experiences. It does not necessarily have to be enforced by law by divorce or remarriage. We compare these children to their counterparts whose parents live in stable relationships over the entire observation period. From the obtained partner changes we then construct several dummy

variables as well as an ordinal measure comprising the number of changes experienced. We observe a maximum of three changes in the household composition for children in our sample. These changes are coded into three dummy variables depicting a separation (one change), a new partner moving to the household (one change) or multiple changes (two or three changes), i.e. separation/new partner or separation/new partner/separation. In order to analyze all possible correlations of family structure changes with the socio-behavioral outcome of preschoolers, we examine the number of changes and types of changes separately. Table 4 gives a descriptive overview on the distribution of the types of changes experienced by five-to-six-year-olds.

Table 4 about here

3.2 Methods

The purpose of this paper is to shed some light on the association between changes in parental environment and early childhood outcomes. We analyze changes in maternal employment for both samples – toddlers and preschoolers, while we estimate maternal partner changes only for children aged five to six.

Let S_{jia} measure skill development j of child i at age a. The main objective is to identify the parameter β_{ij} in the following linear model of child development:

$$S_{jia} = \beta_{ij} Ch_{ij} + \gamma_i X_i + \eta_i \quad (1)$$

We examine equation 1 by ordinary least squares (OLS) which controls for family and household characteristics (X_i) and measures the "effect"[9] of experiencing changes either in maternal employment or maternal partnership. If $j=1$ of S_{jia} it captures the Total Vineland Score of each child i at age two to three and if $j=2$ the Total Difficulties Score of each child i at age five to six. Ch_{ij} represents changes in maternal employment if $j=1$, e.g. exogenous job loss or employment entry by child i at age a, and if $j=2$, Ch_{ij} captures changes in family structure, such as divorce or separation, new partner or multiple changes and η_i is an error term.

As described in section 3 the socio-emotional behavior of children comprises not only the Total Difficulties score but also a score of prosocial behavior. Additionally, the Total Difficulties score can be classified into three categories 'normal', 'borderline' and 'abnormal'. We estimate

equation 1 by ordinary least squares if $j=3$ (total score of prosocial behavior.) and if $j=4$ (abnormal behavior) we analyze a binary logit model, since 'abnormal' is a dummy variable taking on the value of 1 if the child is classified 'abnormal', and the value 0 if the child fits into the categories 'normal' or 'borderline'. Furthermore, the adaptive behavior of children aged two to three contains not only the Total Vineland Score, but also total scores of the four sub-dimensions (verbal skills, activities of daily living, motor skills and social skills) that amount to the Total Vineland Score. We estimate the domain-specific scores also by using ordinary least squares.

The parameter of interest is the estimated change coefficient β_{ij}, which, for example, captures the incremental increase in a child's socio-behavioral outcome from having experienced a maternal partner change relative to those children who live in stable families. Estimating equation 1 will yield unbiased estimates of β_{ij} given that there is no correlation of child *i's* outcome with changes in the household composition. Yet, a potential problem to our analysis of changes in parental environment is reverse causality. A maternal partner change might not only be correlated with difficult socio-emotional behavior of the child, but might also result from having an 'abnormal' child. Put in a formal way: If the error term η_i comprises 'parental stress originating from difficult child' and is correlated with Ch_{ij}, the estimate of β_{ij} will be biased.

Our explanatory variables – especially with respect to maternal partner change – do not allow us to address the problem of reverse causality, since there is no plausible instrument that could be implemented in our small sample. However, we argue that in the case of maternal partner change the empirical incidence for developmental problems of the child causing a 'partner change' is assumed to be very small. Even more so, since our child outcome measure, the socio-emotional behavior of the child is not a measure for a clinically very severe problem. In the case of employment patterns the empirical evidence might be more plausible. Mothers might exit employment to stimulate their child in a more intensive way. Yet, for the inference of maternal employment we analyze in a second step 'exogenous changes' in order to account for reverse causality. Only exogenous job losses such as a dismissal by employer or plant closure are considered as employment exit and thus enable us to check whether our findings on maternal employment exits are robust. However, we cannot entirely rule out reverse causality in the case of an employment entry. It could be that mothers enter employment because their

[9] If we use the term "effect" in this paper with respect to our analysis, this is not correct in the strict sense, as we do not claim to find causal relationships. However, for the reason of simplicity we use this term in the following without quotation marks.

child is well developed, or it could be that the child has on average higher daily activity scores for example, because the mother is working. We argue that the significance of such an argumentation is not that strong, since a mother's entry decision is influenced by other factors such as her own labor market attachment, the financial situation of the household and so on. Another latent problem to our analysis is unobserved heterogeneity. Repeated transitions of employment might be correlated with 'poor' education. Controlling for maternal education can lessen this endogeneity problem, yet ability remains unexplained.

4 Results

Since the focus of our analysis is twofold, we separate the presentation of our results accordingly. First, we report potential effects of changes in employment patterns on adaptive behavior for toddlers and on socio-behavioral outcomes for preschoolers. In a second step, we discuss how maternal partner changes are associated with children's socio-emotional behavior at the age of five or six.

4.1 Changes in maternal employment

We estimate two models in order to assess potential correlations between maternal employment patterns and early childhood outcomes. All analyses contain age of mother, years of education (mother and partner), no partner present, child's age in months, gender of the child, hours spent in formal care, and number of siblings as control variables. First we analyze all possible changes in maternal employment, i.e. employment exits, entries, and being continuously on parental leave or continuously not employed. As described in section 3, employment exits into 'not employed' can be any exit, hence also quitting voluntarily. In a second step, we estimate only exogenous changes in maternal employment focusing on employment exits caused by dismissals or plant closure. The second model ensures a more exogenous analysis of maternal employment patterns than the first. Although our second estimation of potential associations between early childhood outcomes and mothers' employment does not completely account for unobserved heterogeneity, we argue that controlling for 'cause of change' enables us to present to some extent more robust results. In both steps we estimate two variations of maternal employment changes. First we define all 'stable employment patterns', such as being continuously employed, not employed or on parental leave to be the baseline of our analysis (tables labeled 'a'). Second, in tables labeled 'b' the group of 'stable employment' is even more

restricted. In this specification our baseline group only covers mothers who are continuously not employed or on parental leave. Thus we exclude mothers who are continuously employed, as they have at least interrupted for the so-called mother protection period ('Mutterschutz') for 8 weeks after birth. Moreover, it could be possible that they have been on parental leave for a short period of time, which we is not comprised in the employment information we use. Our interpretation mainly focuses on these specifications.

Changes in maternal employment and the adaptive behavior of 2-3-year-old children

Our sample consists of 1,128 children aged two to three, whose mothers are either continuously employed, not employed or on parental leave, as well as exiting and entering employment. In sum, 4 percent of mothers experience an employment exit, while 1 percent exits due to dismissal by the employer or plant closure. The majority of mothers in this sample is either continuously not employed or on parental leave (44 percent), whereas only 11 percent are continuously in employment.

Table 5b shows that maternal employment patterns are correlated with children's adaptive behavior. Children of mothers who are continuously employed for the period from a child's birth until the age of two or three have on average a higher total VAB score than children of mothers who have not been employed continuously. This overall positive correlation of children's development at a young age and mothers working remains if we consider each dimension of the adaptive behavior separately (with the exception of social skills and daily activities). There is a positive correlation between children's ability in verbal and motor skills and mothers who are employed for the entire observation period. The adaptive behavior of children is higher for children whose mother enter employment or experience both an employment exit and entry. The interpretation of these results can be two folded: On the one hand mothers who have more developed children might enter employment with a higher probability or on the other hand as mothers enter employment their children have to cope with other care takers and thus they might be more developed on average.

Table 5a and 5b about here

Restricting the sample to more exogenous changes alters our results slightly. The overall VAB score remains positively correlated with being continuously employed or employment entry. The relationship of children's verbal skill performance and maternal employment patterns

shifts. Table 6a and 6b show that an 'exogenous' employment exit is positively associated with children's ability to understand brief instructions or to speak in full sentences. Other studies examining job loss of parents and children's development also find positive correlations between a child's ability and mother's job loss (see for example Rege et al. 2007). This might be explained by the fact that mothers with an employment exit are more likely to substitute employment with time devoted to their children, and thus talking with their children.[10]

Table 6a and 6b about here

Changes in maternal employment and the socio-emotional behavior of 5-6-year-old children

In our sample of preschoolers, maternal employment is distributed differently than for mothers of children aged two to three. Here the majority of mothers is continuously employed (50 percent), whereas only 20 percent of mothers are continuously not employed including parental leave absences. This is related to our observation period, since we analyze employment patterns for three-year-old children until the age of five or six. In this sample, 5 percent of mothers experience an employment exit during this period, while 2 percent are 'exogenously' terminated.

In table 7b we depict the results from our first model estimating maternal employment including all types of possible employment exits. Thereby, we find a negative effect of maternal employment exits and children's socio-emotional behavior. A positive correlation with regards to the Total Difficulties Score implies higher scores and thus a higher likelihood of having socio-behavioral problems.

Table 7a and 7b about here

Table 8b shows our results when focusing on 'exogenous' employment changes only. Here a different picture enfolds: Maternal exogenous job loss is no longer significantly correlated with children's Total Difficulties Score, but with their score of prosocial behavior. The impact of the effect remains negative, hence children whose mother experiences an 'exogenous' termination of employment possess less prosocial abilities than children whose mothers are continuously

[10] Yet, our results only depict potential correlations and cannot fully resolve the matter of unobserved heterogeneity.

employed. The prosocial behavior depicts children's willingness to help others or to share with others.

Table 8a and 8b about here

4.2 Maternal partner change

Maternal partner change and the socio-emotional behavior of 5-6-year-old children

For our analysis with regards to changes in family structure, we again present two models, all of which contain age of mother, years of education (mother), household income near the time of birth, child's age in months, gender of the child, hours spent in formal care, younger sibling present and older sibling present as control variables. The first model includes types of family structure changes, while the second model includes the number of changes experienced. In table 9 we only present the estimates for the variables of interest: family change variables.

Before discussing these estimates, it is noteworthy that the absence of a parent when the child is aged five or six significantly increases a child's socio-emotional behavior (by 0.35 standard deviations controlling for all the variables in the model other than partner change). Children who experience a divorce or separation have a higher Total Difficulties Score than children who experience no change in their family structure. The same significant relationship is true for those children who experience two or three family structure changes. Multiple changes in their household composition worsen their socio-emotional behavior. Table 9 shows that the probability of being abnormal on the other hand is only negatively correlated with the experience of divorce or separation. The prosocial behavior of children is negatively affected when a new partner moves into the household.

Table 9 and Table 10 about here

Table 10 depicts the potential effect of number of changes as such. The results show that children who experience a higher number of changes (no matter what type) are more likely to have socio-emotional problems. These children have a higher Total Difficulties Score and a higher probability of being abnormal than children who experience no change or a smaller number of changes.

5 Discussion

As presented in recent literature (see Cunha and Heckman 2007, 2009) early child outcomes are influenced by parental environment. Children's skills are determined early in life and thus early childhood experiences are important. Our paper focuses on parental environment taking the perspective of the mother when children are toddlers and preschoolers. Given the assumption that changes in maternal employment or in the partner of the mother are correlated with parental quality, we examine the association of these changes with two non-cognitive skill measures for early childhood. Thus our analysis depicts short-term outcomes.

Our analysis of early childhood development and (multiple) changes in parental stability shows that children whose mother is continuously employed are more developed in the skills we measure in comparison to those children whose mothers are continuously not employed or on parental leave. This might be due to the fact that children of employed mothers have to learn particular skills earlier than their counterparts as their mothers work, or it could be that these mothers work as their children are on average more developed. Moreover, an employment exit is associated with higher verbal skills. For our other child outcome measure the following can be summarized: Employment exists seem to affect the socio-emotional behavior of preschoolers in a negative way.

In respect to maternal partner changes it can be shown that multiple changes are also significantly correlated with the socio-emotional behavior. Stable environments in respect to family structure seem to be best for this child outcome. These results are consistent with studies for other countries (see for instance Andersen et al. 2007). In reference to developmental psychology, our results indicate that a disruption of family bonds is 'harmful' in early years. Loosing an attachment figure once or twice early in life is likely to result in a drawback for children's development. The attachment theory proposed by Bowlby (1964) indicates that the relationship between a child and its primary caregiver enables to determine later socio-emotional behavior.

Policy conclusions will follow.

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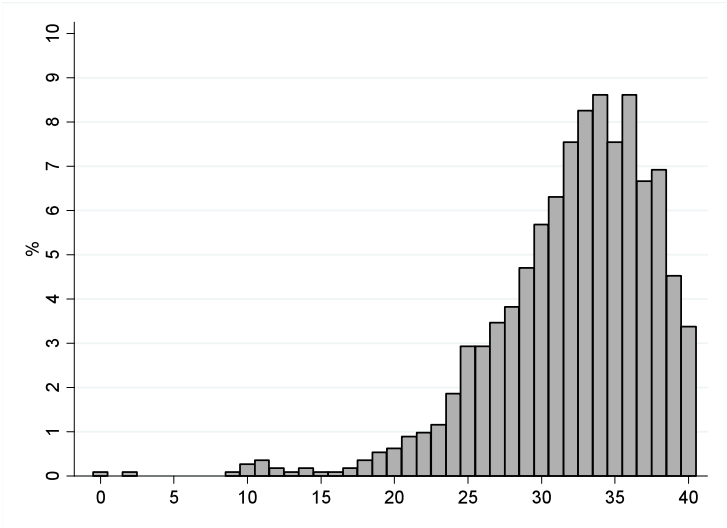
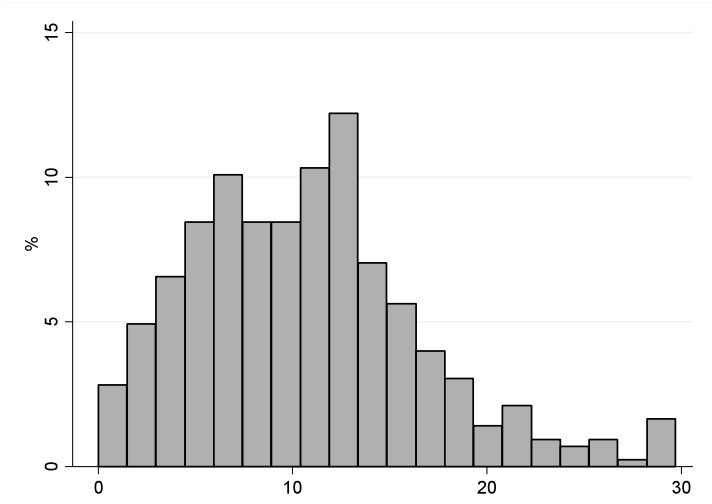
Figure 1a. Distribution of the Total VAB score



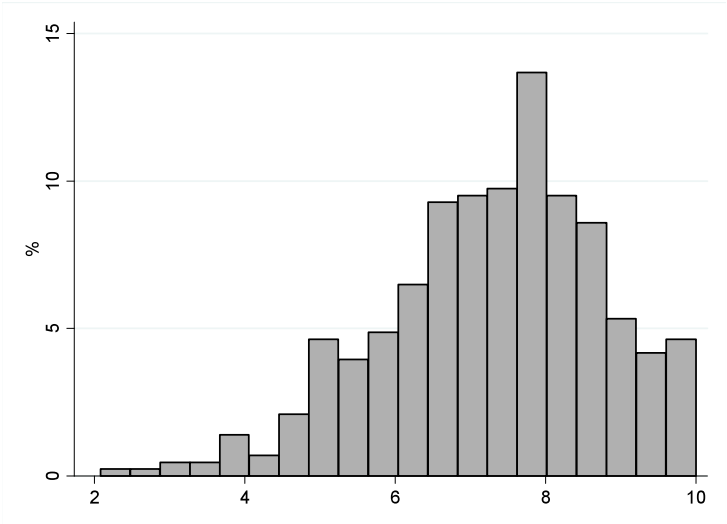
Note: Data from the SOEP (2005-2009), own calculations, N = 1126.

Figure 1b. Distribution of the Total Difficulties Score



Note: Data from the SOEP (2008-2009), own calculations, N = 426.

Figure 1c. Distribution of the Prosocial Behavior Score



Note: Data from the SOEP (2008-2009), own calculations, N = 431.

Table 2: Descriptive statistics of employment changes (children aged 2-3)

	Mean	Std. dev.	N
Employment exit	0.045	0.21	1075
***exogenous** employment exit*	0.007	0.08	990
Employment entry	0.283	0.45	1075
Both employment exit and entry	0.125	0.33	1075
Continuously not employed including parental leave	0.440	0.49	1075
Continuously employed	0.109	0.31	1075

Note: Data from the SOEP (2002-2009), pooled data, own calculation.

Table 3: Descriptive statistics of employment changes (children aged 5-6)

	Mean	Std. dev.	N
Employment exit	0.049	0.22	421
***exogenous** employment exit*	0.022	0.15	403
Employment entry	0.156	0.36	421
Both employment exit and entry	0.078	0.27	421
Continuously not employed including parental leave	0.204	0.40	421
Continuously employed	0.496	0.51	421

Note: Data from the SOEP (2006-2009), pooled data, own calculation.

Table 4: Descriptive statistics of family structure changes (children aged 5-6)

	Mean	Std. dev.	N
Always partnered	0.809	0.39	431
Separation/divorce	0.074	0.26	431
New partner	0.044	0.21	431
Multiple changes	0.035	0.18	431
Never partnered	0.037	0.19	431

Note: Data from the SOEP (2002-2009), pooled data, own calculation.

Table 5a: Estimation of adaptive behavior and maternal employment

	Adaptive behavior	Verbal skills	Daily activities	Social skills	Motor skills
Baseline: cont. employed, not employed, on parental leave					
Employment exit	0.139	-0.053	0.035	0.249	-0.054
	[0.8053]	[0.2251]	[0.3609]	[0.1821]	[0.2805]
Employment entry	0.927**	0.152	0.313*	0.165	0.309*
	[0.3589]	[0.1021]	[0.1576]	[0.1090]	[0.1229]
Both exit and entry	0.730	0.137	0.309	0.195	0.181
	[0.4530]	[0.1356]	[0.2046]	[0.1337]	[0.1557]
N	1124	1124	1124	1124	1124
R^2	0.187	0.100	0.200	0.099	0.115

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2002-2009).

Table 5b: Estimation of adaptive behavior and maternal employment

	Adaptive behavior	Verbal skills	Daily activities	Social skills	Motor skills
Baseline: cont. not employed, on parental leave					
Employment exit	0.336	0.001	0.092	0.273	0.018
	[0.8100]	[0.2236]	[0.3650]	[0.1855]	[0.2819]
Employment entry	1.208**	0.231*	0.395*	0.200+	0.414**
	[0.3869]	[0.1111]	[0.1664]	[0.1180]	[0.1307]
Both exit and entry	1.015*	0.214	0.392+	0.229	0.284+
	[0.4713]	[0.1410]	[0.2108]	[0.1396]	[0.1616]
Cont. employed	1.247*	0.351*	0.364	0.155	0.468*
	[0.5670]	[0.1484]	[0.2379]	[0.1628]	[0.1886]
N	1124	1124	1124	1124	1124
R^2	0.191	0.104	0.202	0.100	0.120

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2002-2009).

Table 6a: Estimation of adaptive behavior and maternal employment

	Adaptive behavior	Verbal skills	Daily activities	Social skills	Motor skills
Baseline: cont. employed, not employed, on parental leave					
Employment exit	-1.331	0.776**	-1.037	-0.483	-0.468
(exogenous)	[1.8757]	[0.2432]	[0.9594]	[0.5409]	[0.6436]
Employment entry	1.077**	0.192+	0.349*	0.219+	0.337*
	[0.3777]	[0.1064]	[0.1665]	[0.1124]	[0.1309]
Both exit and entry	0.892+	0.080	0.327	0.304*	0.247
	[0.4951]	[0.1505]	[0.2240]	[0.1368]	[0.1659]
N	946	946	946	946	946
R^2	0.180	0.090	0.197	0.094	0.117

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2002-2008).

Table 6b: Estimation of adaptive behavior and maternal employment

	Adaptive behavior	Verbal skills	Daily activities	Social skills	Motor skills
Baseline: cont. not employed, on parental leave					
Employment exit (exogenous)	-1.735	0.690**	-1.176	-0.540	-0.624
	[1.8804]	[0.2382]	[0.9671]	[0.5505]	[0.6238]
Employment entry	1.415**	0.260*	0.465**	0.263*	0.459**
	[0.4085]	[0.1166]	[0.1758]	[0.1219]	[0.1398]
Both exit and entry	1.248*	0.149	0.450+	0.350*	0.372*
	[0.5156]	[0.1572]	[0.2305]	[0.1437]	[0.1732]
Cont. employed	1.468*	0.296+	0.504*	0.196	0.535**
	[0.6063]	[0.1600]	[0.2508]	[0.1753]	[0.2019]
N	946	946	946	946	946
R^2	0.186	0.093	0.201	0.095	0.124

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2002-2008).

Table 7a: Estimation of socio-emotional behavior and maternal employment

	Socio-emotional behavior	Prosocial Behavior
Baseline: cont. employed, not employed, on parental leave		
Employment exit	2.812+	0.053
	[1.4415]	[0.3435]
Employment entry	-0.809	-0.071
	[0.7055]	[0.2112]
Both exit and entry	0.133	0.195
	[1.1607]	[0.2828]
N	419	424
R^2	0.101	0.055

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2006-2009).

Table 7b: Estimation of socio-emotional behavior and maternal employment

	Socio-emotional behavior	Prosocial Behavior
Baseline: cont. not employed, on parental leave		
Employment exit	2.829^{+}	0.076
	[1.5482]	[0.3696]
Employment entry	-0.791	-0.046
	[0.9098]	[0.2525]
Both exit and entry	0.149	0.218
	[1.2589]	[0.3125]
Cont. employed	0.026	0.037
	[0.7826]	[0.2057]
N	419	424
R^2	0.101	0.055

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2006-2009).

Table 8a: Estimation of socio-emotional behavior and maternal employment

	Socio-emotional behavior	Prosocial Behavior
Baseline: cont. employed, not employed, on parental leave		
Employment exit (exogenous)	1.070	-0.933*
	[2.1130]	[0.4451]
Employment entry	-0.930	-0.098
	[0.7193]	[0.2109]
Both exit and entry	0.004	0.286
	[1.2116]	[0.2882]
N	377	381
R^2	0.095	0.067

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2006-2008).

Table 8b: Estimation of socio-emotional behavior and maternal employment

	Socio-emotional behavior	Prosocial Behavior
Baseline: cont. not employed, on parental leave		
Employment exit (exogenous)	1.073	-0.933*
	[2.1015]	[0.4466]
Employment entry	-1.088	-0.075
	[0.9344]	[0.2514]
Both exit and entry	-0.146	0.308
	[1.3215]	[0.3153]
Cont. employed	-0.233	0.034
	[0.8084]	[0.2079]
N	377	381
R^2	0.096	0.067

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), years of education (partner), no partner present, age of child (months), gender, hrs spent in childcare, number of siblings. Own calculations: SOEP (2006-2008).

Table 9: Estimation of socio-emotional behavior and maternal partner changes

	Socio-emotional behavior	Prosocial Behavior	Abnormal Behavior (marg. eff.)
Baseline: No change			
One change: separation/divorce	2.984*	-0.488	0.328**
	[1.4658]	[0.3519]	[0.1118]
One change: new partner	-0.050	-0.673*	-0.021
	[1.2447]	[0.3142]	[0.0836]
Multiple changes:	2.921*	-0.078	0.109
e.g. separation/new partner/sep.	[1.4709]	[0.4844]	[0.1349]
N	421	426	410
R^2	0.101	0.064	
pseudo R^2			0.079

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), log of household income near birth, age of child (months), gender, hrs spent in childcare, younger siblings present, and older siblings present. Own calculations: SOEP (2002-2009).

Table 10: Estimation of socio-emotional behavior and maternal partner changes

	Socio-emotional behavior	Prosocial Behavior	Abnormal Behavior (marg.eff.)
Number of changes	1.285*	-0.214	0.056*
	[0.5300]	[0.1581]	[0.0286]
N	421	426	410
R^2	0.093	0.056	
pseudo R^2			0.051

Robust standard errors in second row, $^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$. Note: We control for age of mother, years of education (mother), log of household income near birth, age of child (months), gender, hrs spent in childcare, younger siblings present, and older siblings present. Own calculations: SOEP (2002-2009).

Appendix A

Below is the full text (English translation) of the relevant parts of the M2 and M3 SOEP questionnaires that were used to create the measures of the Vineland Adaptive Behavior (VAB) of 2-3 year old children and the measures of Socio-Emotional Behavior (SEB) of 5-6 year old children.

Vineland Adaptive Behavior (VAB) of children aged 2-3 years (M2 SOEP questionnaire):

For parents, it is always a big event when their child learns something new. Please tell us what those new things are in the case of your child. (Rate child's ability to perform each task as either ''yes'', ''to some extent'' or ''no'')

Talking:

V.1. Understands brief instructions such as ''go get your shoes''.

V.2. Forms sentences with at least two words.

V.3. Speaks in full sentences (with four or more words).

V.4. Listens attentively to a story for five minutes or longer.

V.5. Passes on simple messages such as ''dinner is ready''.

Activities of daily living:

ADL.1. Uses a spoon to eat, without assistance and without dripping.

ADL.2. Blows his/her nose without assistance.

ADL.3. Uses the toilet to do ''number two''.

ADL.4. Puts on pants and underpants the right way around.

ADL.5. Brushes his/her teeth without assistance.

Movement:

M.1. Walks forwards down the stairs.

M.2. Opens doors with the door handle.

M.3. Climbs up playground climbing equipment and other high playground structures.

M.4. Cuts paper with scissors.

M.5. Paints/draws recognizable shapes on paper.

Social relationships:

S.1. Calls familiar people by name; for example, says ‘‘mommy’’ and ‘‘daddy’’ or uses the father's first name.

S.2. Participates in games with other children.

S.3. Gets involved in role-playing games (‘‘playing pretend’’).

S.4. Shows a special liking for particular playmates or friends.

S.5. Calls his/her own feelings by name, e.g. "sad", "happy", "scared".

The answers to each item are coded to 2 („yes“), 1 („to some extent“), and 0 („no“). The answers are summed up to construct the four domain-specific scores Verbal skills, Activities of daily living, motor skills and social skills, which hence can each take on values between 0 and 10. The four domain-specific scores are further summed up to obtain the Total VAB score which might take on values between 0 and 40.

Socio-Emotional Behavior (SEB) of children aged 5-6 years (M3 SOEP questionnaire):

To what extent do or don’t each of the following statements apply to your child? For each answer, think about your child’s behavior in the last six months. (Answer „not at all“, „somewhat true“ or „completely true“)

My child...

1. is thoughtful.

2. is restless, hyperactive, can’t sit still long.

3. likes to share with other children (sweets, toys, crayons, etc.).

4. often has tantrums, is quick-tempered.

5. is a loner, usually plays alone.

6. is helpful when others are hurt, sick, or sad.

7. is always fidgety.

8. often fights with or picks on other children.

9. is often unhappy or downcast, cries a lot.

10. is generally well-liked by other children.

11. is easily distracted, unfocused.

12. is nervous or clinging in new situations, easily loses self-confidence.

13. is often teased or picked on by others.

14. often helps others of his/her own accord (parents, teachers, children).

15. gets along better with adults than with children.

16. has many fears, gets scared easily.

17. finishes what he/she starts, can concentrate for a long time.

The answers to each item are coded as 0 („not at all"), 1 („somewhat true") and 2 („completely true"). Thirteen of these items form the four dimensions: Emotional Symptoms (items: 9, 12, 16), Conduct Problems (items: 4, 8), Hyperactivity/Inattention (items: 2, 7, 11, 17), and Peer Relationship Problems (items: 5, 10, 13, 15). The four dimensions are equally weighted to construct the Total Difficulties Score, which finally takes on values between 0 and 40.

The four items 1, 3, 6, and 14 are used to construct the Prosocial Behavior Score, the score is coded to take on values between 0 and 10.