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# Effects of Early Childhood Intervention on Maternal Employment, Fertility and Well-Being. Evidence from a Randomized Controlled Trial

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## Abstract

This paper presents results from a randomized evaluation of a home visiting program implemented in three German federal states for disadvantaged first-time mothers and their families. I analysis the impact of the intervention on maternal employment, school attendance, child care use, fertility, life-satisfaction and well-being. Biannual telephone interviews with the participating mothers until the third birthday of the child give a rich data source to evaluate these outcomes. I find that the intervention increases fertility and maternal life-satisfaction and well-being, whereas the treatment does not affect maternal employment, school attendance, and child care use. These results are in contrast to previous studies from the US where home visiting programs decreased fertility.

JEL-Classification: J13, J12, I21, H52

Keywords: Early Childhood Intervention, Randomized Experiment, Fertility

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# 1 Introduction

The outcomes of early childhood intervention programs have gained much attention in economic literature in recent years . Evidence from randomized experiments suggests that these programs improve cognitive and socioemotional abilities, as well as the health of disadvantaged children (see Almond and Currie, 2011; Karoly et al., 2005, for a review of the literature). Because of the dynamic process of skill formation, these early investments in children can reduce later inequality and can cause high cost-benefit ratios in the long run (Cunha and Heckman, 2007; Heckman and Masterov, 2007; Belfield, 2006).

Despite these promising results for children, so far there has been little economic research on the impact of early childhood interventions on certain dimensions of the maternal life course, such as maternal employment, education, fertility, child-care use, and maternal well-being. This neglect is surprising as many interventions mainly focus on the mother. Among these interventions home visiting programs probably have the strongest maternal focus. In home visiting programs nurses directly address disadvantaged mothers under the belief that parents mediate changes for their children. Accordingly, home visiting tries to enhance parental skills such as attachment behavior, interaction, and teaching skills. Furthermore, many home visiting programs directly try to increase women’s personal strengths like self-efficacy, problem-solving abilities, self-esteem, or emotional functioning and the ability to tie and maintain social networks.

It is likely that these improved parental skills and personal strengths could have effects on the maternal life course. However, the direction and the size of the effects are unclear. On the one hand, the intervention could lead to higher labor market or education participation because of the improved parental skills and personal strengths. On the other hand, the intervention could increase satisfaction with the maternal role, partner stability or subjective well-being. This could lead to higher satisfaction with the maternal role and, therefore, to higher fertility and as a consequence to longer work force abstinence.

This paper examines the first randomized experiment of one such home visiting

program in an European context, the *Pro Kind* Project, to evaluate which of the two effects is predominant. The intervention starts during pregnancy and continues until the second birthday of the child. Exclusively first-time mothers receiving social welfare benefits or with a comparable low income are enrolled. Biannual telephone interviews with the participants give detailed information about objective outcomes like employment, fertility and child care use, as well as subjective statements about well-being and life-satisfaction. The obtained data is unique in the respect that it offers a particular close look in the life outcomes of disadvantaged first-time mothers in the first three years after birth of their first child.

I find that the *Pro Kind* Project has significantly increased the hazard of a second birth in the intervention group. The birth rate increased, although the share of second pregnancies is equal in treatment and control group. The smaller share of pregnancies, which lead to a life birth in the control group is mainly caused by more abortions in this group. There is evidence that mothers in the treatment group more often welcomed a further pregnancy and that this reduced the abortion rate. Additionally, the intervention positively influences the maternal subjective well-being and life-satisfaction, which might also influence fertility decisions. There are no statistical significant effects on maternal employment, school attending, childcare use, or partnership duration. However, tendency is strong that the intervention group uses institutional childcare more frequently and earlier.

The results in this study substantially differ from the results of previous studies conducted in the US, where home visiting decreased fertility and increased maternal employment (Olds et al., 2007, 1997; Brooks-Gunn et al., 1994). One interpretation for the differences might be the arrangement of the German welfare state. This welfare state is characterized by generous social assistance rules for mothers, which guarantee a fixed welfare amount per child and unconstrained social assistance until the third birthday of a child. In this social environment, in which mothers with small children have no work obligations and their income increases with a further birth, it is likely that the interventions' impact on maternal skills and life-satisfaction might lead to subsequent birth. In contrast, incentives for a further child are small in the US because of maternal budget constraints induced by the stricter welfare

regulations, especially since the mid 90's.<sup>1</sup> Therefore, an increased well-being might lead to higher work force participation in the US.

The remainder of the paper is organized as follows. The next section provides a description of the *Pro Kind* Project. Section 3 reviews the existing literature about the effects of home visiting on maternal life course. Section 4 describes the experimental design, the baseline sample and the data. Section 5 explains the estimation methods to identify the causal effects of the intervention. Section 6 presents results while section 7 provides concluding remarks.

## 2 Description of the *Pro Kind* Project

*Pro Kind* is a home visiting program for disadvantaged first-time mothers and their families. The intervention starts between the 12th and 28th week of pregnancy and ends at the second birthday of the child. The program is located in three German federal states, two in West and one in East Germany. Families were affiliated between November 2006 and December 2009. Midwives, nurses, or social pedagogues conduct the home visits alone or in a team. The frequency of the home visits varied by age of the child between weekly, bi-weekly and monthly visits, with the highest frequency directly before and after birth. Overall, 52 home visits with a duration of 90 minutes are scheduled between pregnancy and the child's second birthday. Teaching materials and guidebooks structure the theme and the aim of each home visit. Nevertheless, the home visitors have the flexibility to improvise the content to the needs of the mothers and their families. All home visitors regularly receive feedback, encouragement, reflection, and support from their nurse supervisors. These supervisors have an academic qualification and they do not consult more than ten home visitors each. *Pro Kind* is an adaptation of the Nurse Family Partnership (NFP) program, which provided instructions for home visitation frequency, employee selection, teaching material and guidebooks (see Jungmann et al., 2009; Olds, 2006, for

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<sup>1</sup>In 1996 the Temporary Assistance to Needy Families (*TANF*) eliminated the legal entitlement to cash welfare by imposing a 60-months lifetime time limit on benefit receipt and requiring individuals to leave welfare for work after two years. Furthermore, three of the four stated goals of *TANF* involved reducing non-marital births and encouraging marriage (Blank, 2002). Nevertheless, also the program which preceded *TANF*, Aid to Families with Dependent Children (*AFDC*), can be seen as more strict than the welfare regime in Germany today. Only single mothers were eligible to rather low cash benefits (benefits for a single-parent family with two children and no income ranged from \$120 in Mississippi to \$597 in Vermont). Additionally *AFDC* strongly used in-kind transfers like food stamps and strong work obligations (Moffitt, 1998; Gebhardt and Jacobs, 1997).

more information about the *Pro Kind* program and NFP).

Because of the *Pro Kind* affiliation criteria only first-time mothers during their 12th and 28th weeks of gestation were registered. Additionally all participating mothers had to be financially or socially disadvantaged. Financial disadvantage is defined as recipient of social welfare benefits, unemployment benefits, an income that is as low as social welfare benefits or over-indebtedness. The considered social risk factors included the following: low education, teenage pregnancy, isolation, experienced violence or health problems. Project partners, like gynecologists, job centers, pregnancy information centers and youth welfare offices referred three quarters of the participants to *Pro Kind*. About one quarter of the participants volunteered to register themselves to the program.

To monitor the program fidelity, the home visitors documented each home visit (e.g., duration, covered topics, maternal interest). This documentation reports that on an average, a family got 32.7 home visits with a minimum of 0, a maximum of 94 and a standard deviation of 19 home visits. During pregnancy, the families received nine home visits on an average. Because participation in *Pro Kind* is voluntary, 166 (42.2%) mothers decided to leave the program before the child's second birthday (main reasons: no further interest [n=68], not reachable [n=37] and moving away from a *Pro Kind* community [n=28]). Considering only families who received the full program dosage increases the average number of home visits to 45.3 (SD= 10.7) with a minimum of 11 visits. The average duration of a home visit was 82 minutes.

A major goal of the *Pro Kind* program is the improvement of families' economic self-sufficiency by helping parents to develop a perspective for their future and make appropriate decisions about planning future pregnancies, finishing their education, and finding employment. One question about this aim is why home visiting in general, and *Pro Kind* in particular, should produce effects in these domains. This is especially crucial since the German welfare state is quite generous to mothers of infants and toddlers. For example, there are no work obligations or welfare cuts as long as a mother has no child care arrangement. Therefore, there are little incentives for maternal labor market participation. Furthermore, additionally to the *Pro Kind* program, various services offer help and support especially for these mothers (e.g.,

the labor agency offers special programs for unemployed who are younger than 25 years and for single mothers).

The main answer why the *Pro Kind* program can still have an effect on the maternal life course and employment is the relationship which the home visitor develops with the mothers during their pregnancies and their children's early years. The strongest base for inducing and deepening this relationship is the first time experience of a new born child. Olds et al. (2010) state that through this relationship nurses could help parents gradually gain a sense of mastery in overcoming challenges and position themselves to create the kind of life they want. Furthermore, mothers with newborns are often open-minded about guidance during this fundamental life transition, as they make important choices that shape the subsequent trajectories of their life and those of their children. Thus, building relationships and meeting open minded clients are the strongest advantages of home visiting compared to other programs and can lead to changes in maternal life.

The importance of maternal life course and employment in the *Pro Kind* program is illustrated by the time, which the home visitors spent for this topic. Table 1 illustrates that at all developmental stages the home visitors invests 40% of their time in the family for domains related to maternal life course and employment. Additionally, *Pro Kind* spent more time on these domains than the NFP average and the recommended average of the NFP. These figures show that life course and employment are fundamental parts in the implementation of the *Pro Kind* program, in which effects are likely and which, therefore, requires investigation.

### **3 Previous Evaluations**

As the *Pro Kind* program is conceptually similar to NFP, this subsection presents a closer look at NFP and its results. NFP is a program of prenatal and infancy home visiting for low income, first-time mothers and their families. The nurses start visiting families as early as possible during pregnancy and continue the visits until the child's second birthday. NFP is evaluated in three different trials by randomized experiments in the US. The first evaluation was conducted in Elmira, New York,

Table 1: Topical Focus of the Home Visits in NFP and *Pro Kind* (Jungmann et al., 2009; The National Center for Children Families and Communities, 2005)

	Pro Kind Average	NFP-Average	Recommended Average by NFP
<b>During Pregnancy</b>			
Maternal Health	28%	37%	35%-40%
Maternal and Parental Role	19%	23%	23%-25%
Environmental Health	10%	11%	5%-7%
Life Course Development	16%	13%	10%-15%
Family and Friends	15%	16%	10%-15%
Social and Health Services	12%	-	-
<b>During Infancy</b>			
Maternal Health	16%	20%	14%-20%
Maternal and Parental Role	30%	36%	45%-50%
Environmental Health	11%	14%	7%-10%
Life Course Development	17%	15%	10%-15%
Family and Friends	14%	15%	10%-15%
Social and Health Services	11%	-	-
<b>During Toddlerhood</b>			
Maternal Health	13%	17%	10%-15%
Maternal Role	30%	37%	40%-45%
Environmental Health	10%	14%	7%-10%
Life Course Development	22%	17%	18%-20%
Family and Friends	14%	15%	10%-15%
Social and Health Services	11%	-	-

Notes: The percentage rates give the share of the total time in the family, which the home visitors spent for a certain topic. The data is collected by a documentation system, in which the home visitors note the duration and the covered topic for each home visit.

starting 1980 with mainly white first-time mothers participating. The next evaluation started in Memphis, Tennessee, in 1990 enrolling mainly black, low income, single, first-time mothers. In 1995, the third evaluation was initiated in Denver, Colorado. Participants were mainly Hispanic low income, single, first-time mothers. In all three trials maternal life course was always of core interest beside child outcomes. Depending on the start of the trial, outcomes for different endpoints are available. Follow-up data is available between four years in Memphis and 15 years in Elmira. Tables 2 to 4 present results concerning maternal life course for the three trials.

Overall, the literature shows that the NFP reduces the rates of subsequent pregnancies and births and increases the intervals between first and second pregnancies and births in all three trials within the first four years. In two trials an increase in maternal employment is found. Women's use of welfare is reduced in all three trials. Mainly more stable partnerships and reduced subsequent births explain these effects. Long-term follow-ups reveal that effects on maternal life course do not di-



Table 2: NFP Results Elmira (Olds et al., 1988, 1997).

Outcome	Observation Period		
	6 Months	4 Years	15 Years
<b>School:</b>	More School Enrollment of School Dropouts		
<b>Employ.:</b>	More Employment (15.54 Months vs. 8.64 Months) By trend more Employment (95 months vs. 80 Months)		
<b>Fertility:</b>	Fewer Subsequent Pregnancies (0.58 vs. 1.02) Fewer Subsequent Births (1.3 vs. 1.6) Longer Interval Between First and Subsequent Birth (65 Months vs. 37 Months)		
<b>Transfer:</b>	Less Months Eligible to Transfer (60 Months vs. 90 Months)		

Notes: If not indicated differently, all treatment effects are significant at a five % level. Employ. = Employment

Table 3: NFP Results Memphis (Kitzman et al., 1997; Olds et al., 2004, 2007, 2010).

Outcome	Observation Period			
	2 Years	6 Years	9 Years	12 Years
<b>Employ.:</b>		By trend more Employment (p<0.1)	By trend more Employment (p<0.1)	By trend more Employment (p<0.1)
<b>Fertility:</b>	Fewer Subsequent Pregnancies (0.36 vs. 0.47)	Fewer Subsequent Pregnancies (1.16 vs. 1.38)	Fewer Cumulative Subsequent Births per Year (0.81 vs. 0.93)	
<b>Transfer:</b>		Less Months Eligible to Transfer per Year (7.21 Months vs. 8.96 Months)	Less Months Eligible to Transfer per Year (5.21 Months vs. 5.92 Months)	

Notes see Table 2

Table 4: NFP Results Denver (Olds et al., 2002, 2004).

Outcome	Observation Period	
	2 Years	4 Years
<b>Employ.:</b>	More Employment (6.83 Months vs. 5.65 Months)	More Employment (15.13 Months vs. 13.38 Months)
<b>Fertility:</b>	Fewer Subsequent Births (0.12 vs. 0.19) Longer Interval Between First and Subsequent Birth (24.51 Months vs. 20.39 Months)	

Notes see Table 2

minish over the years. The intervention does not affect school graduation in any trial, although higher school attendance is recognized in Elmira.

In the Elmira and the Memphis trial NFP reaches the fiscal break-even point through the presented changes in maternal life course. In Elmira the program cost of \$3.133 face discounted savings of \$3.246 expressed in 1980 US-\$ by child age four. Higher maternal employment, shown in Table 2, is the main reason for savings. In Memphis the NFP causes \$12.300 in discounted savings compared with a program cost of \$11.511, both expressed in 2006 US-\$ by child age twelve. Higher maternal employment and less government spending on food stamps, Medicaid, AFDC, and TANF, presented in Table 3, generate these savings.

Additionally, a recent study examines the effects of NFP on time to second pregnancy within two years of the first infant’s birth with a quasi-experimental research design (Rubin et al., 2010). The investigation takes place after statewide NFP implementation in the Commonwealth of Pennsylvania. Therefore, it is possible to examine whether the effects of earlier NFP trials sustain after dissemination in state level. Rubin et al. (2010) find that the program effects on pregnancy planning emerge after an implementation period of three years and the effects are particularly strong among younger mothers.

## 4 Experimental Design and Data

### 4.1 Randomization Process and Sample Baseline Characteristics

The causal effects of the *Pro Kind* intervention are evaluated using a randomized controlled trial. In the beginning of the randomization process, all women, who were referred or registered at *Pro Kind* themselves, answered a short screening questionnaire to check if the affiliation criteria were fulfilled. Most of the time, this screening questionnaire was conducted over telephone. If the affiliation criteria were met, the supervisor visited the mother at her home. At this visit, first of all, participants or, if they were underage, their parents signed an informed consent for participating in the study. Participants then, answered a baseline questionnaire to obtain socio-demographic and psychological characteristics, and risk factors. Up to this

moment, the mothers only received information about the research study and as little information as possible about the home visits in order to minimize the “John Henry” effect for those mothers in the control group.<sup>2</sup> After answering the baseline questionnaire, women received the results of the randomization which sorted them into a home visiting or a control group.

After randomization, mothers in both, the control and home visiting groups had access to the regular welfare state services. Both groups received an address list with support services and monetary incentives for participating in the research. However, only the home visiting group was eligible for the *Pro Kind* home visits. Overall 394 mothers were allocated to the treatment group and 361 mothers to the control group. Appendix A gives an overview of the randomization outcomes in each federal state and community.

I use the basic model in Equation 1 to prove whether the randomization process provided two groups with equally balanced baseline characteristics.

$$h_{ic} = \beta_0 + \beta_1 HV_{ic} + \alpha_c + \epsilon_i \quad (1)$$

where  $h_{ic}$  is a risk factor or characteristic at baseline for mother  $i$  in community  $c$  and  $HV_{ic}$  is an indicator variable for whether the mother received the home visiting program. Hence, the estimate of the coefficient  $\beta_1$  indicates the differences between treatment and control mothers. Additionally, I include a community fixed effect estimator  $\alpha_c$  in Equation 1, because the randomization results in Appendix A reveal that the number of participants in treatment and control group are not equally distributed in all communities.

If the randomization process worked well, no coefficients of  $\beta_1$  would be significantly correlated with characteristic  $h_{ic}$  in any model specification. I present the comparison of mother and family characteristics at baseline in Table 5. Column (1) contains  $\beta_0$  which gives the average of characteristic  $h_{ic}$  in the control group. Columns (2) and (3) present the estimated differences between the treatment and control groups for demographic characteristics and selected psychological and physi-

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<sup>2</sup>The “John Henry” effect explains the unexpected outcome of an experiment caused by the control group’s knowledge of its role within the experiment. This knowledge causes the group to perform differently and often better than usual, eliminating the effect of the experimental manipulation (Salkind, 2010).

cal baseline characteristics. The model in Column (2) does not include any controls, while the model in Column (3) controls for community fixed effects.

If a missing occurred in one of the base line variables, I include sample means or values from a multivariate imputation procedure for the missing. However, for most variables complete data is available. Only in the income variables the share of missings is higher than three percent (see Appendix B and C). The results do hardly change if the missings are used instead of the sample means or imputed values. In almost all variables the missings are equally distributed between control and treatment group.

Table 5: Sample Balance Across Treatments

Dependent Variable	Control Mean	Treatment Difference Including No Controls	Treatment Difference Including Community Fixed Effects
	(1)	(2)	(3)
<i>Demographic Characteristics</i>			
Age in Years	21.53	-0.263 (0.316)	-0.274 (0.313)
Week in Pregnancy	20.30	-0.540 (0.420)	-0.528 (0.423)
Underage	0.177	0.033 (0.029)	0.035 (0.028)
Migration	0.177	-0.053** (0.026)	-0.049* (0.025)
Monthly HH-Income (€)	916.6	20.66 (41.78)	17.54 (40.60)
Debt over € 3000	0.168	0.021 (0.027)	0.020 (0.028)
Education Risk	0.748	0.054 (0.038)	0.055 (0.038)
Income Risk	0.809	0.011 (0.028)	0.012 (0.028)
Employment Risk	0.856	-0.036 (0.027)	-0.040 (0.027)
No Partner	0.283	0.009 (0.033)	0.004 (0.033)
Living with Parents	0.267	0.014 (0.033)	0.011 (0.033)
Persons in HH	2.451	0.102 (0.120)	0.089 (0.120)
<i>Selected Psychological and Physical Characteristics</i>			
Unwanted Pregnancy	0.166	0.014 (0.028)	0.012 (0.028)
Daily Smoking	0.340	-0.003 (0.034)	-0.003 (0.034)
Isolation	0.080	-0.019 (0.019)	-0.020 (0.019)
Foster Care Experience	0.194	0.039 (0.030)	0.041 (0.030)
Neglect Experience	0.385	-0.009 (0.035)	-0.012 (0.036)
Lost Experience	0.539	-0.045 (0.036)	-0.048 (0.036)
Violence Experience	0.551	0.002 (0.036)	-0.001 (0.037)
Depression	0.133	-0.031 (0.023)	-0.031 (0.024)
Anxiety	0.177	-0.007 (0.028)	-0.008 (0.028)
Stress	0.288	0.027 (0.033)	0.028 (0.034)
Aggression	0.186	-0.041 (0.027)	-0.039 (0.027)
Risk Pregnancy	0.113	0.000 (0.023)	-0.005 (0.023)
Body-Mass-Index	23.22	0.150 (0.394)	0.160 (0.394)
Sum Risk Factors	5.864	-0.131 (0.178)	0.035 (0.028)
Observations	361	755	755

Notes: Robust standard errors are shown in parentheses. The first column indicates the dependent variable. Column (1) indicates the mean of the characteristic in the control group. The variables in Columns (2) and (3) have the value one if the mother is in the treatment group. They contain estimates of the average difference in characteristics between the control and treatment participants, without controls and with community fixed effects, respectively. See Appendices B and C for variable definitions.

p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

The differences in average characteristics between the control and the treatment

group are all small and mostly statistically insignificant. Migration status, defined as women who do not have German citizenship or who are not born in Germany, is the only demographic characteristic which is significantly different having a higher proportion of immigrants in the control group. None of the differences in psychological or physical risk characteristics are statistically significant. Including community fixed effects does not change the results. Furthermore, I conduct a test of joint significance of all the baseline characteristics. The F-statistic is 1.19 which does not reject that the characteristics in the treatment and control groups are the same. Hence, overall, the randomization appears to have been successful in creating comparable treatment and control groups.

Analyzing the demographic and psychological characteristics of the participants reveals that women in both groups are highly disadvantaged and in a young age. Most of the mothers are unemployed at time of the baseline interview and have never been regularly employed. The low employment opportunities seem to be a consequence of the high percentage of mothers (about 75%) with less than eleven years of schooling and many of these dropped out of school. Furthermore, the average household income is €928.6. Considering the average household size of 2.49 persons, this average income is below the poverty line in Germany. These are just two examples of many characteristics which underline the disadvantage status of the *Pro Kind* participants indicating that *Pro Kind* was successful in acquiring high burdened women and families who are the target population of the intervention.

## 4.2 Data Collection

Biannual telephone interviews with the mothers are used as the main data source to examine the impact of *Pro Kind* on maternal life course. The telephone interviews start during pregnancy and continue at six month interval until the third birthday. The interviews are computer assisted and contain questions about household, income, employment, childcare use, family planning, as well as questions about service utilization by mother and child. The questionnaire includes all questions, which are recommended when using German Socioeconomic Panel (GSOEP) as a reference data set (Siedler et al., 2009). Furthermore, the interviews include the

GSOEP activity calendar to learn about the employment status of the participants on a monthly base (see Lutz and Sandner, 2010, for more details about the telephone interviews).

Most variables in the questionnaire measure time durations in monthly intervals. This gives an exact insight into the lives of the young mothers and their families. Due to the high frequency of the interviews the danger of recall bias is low. Furthermore, most questions in the questionnaires ask for objective outcomes like whether the mother is occupied or not. Research about questionnaire design concludes that for those questions the answer reliability is high (Bradburn, 2004; Groves et al., 2004).

Table 6: Sample Composition Telephone Interviews

<b>Treatment Group</b>	<b>Control</b>	<b>Home Visiting</b>	<b>Total</b>
Allocated to Treatment	361	394	755
Research Refusals	31	30	61
Fetal Demises	8	2	10
Infant Deaths	2	2	4
<b>Completed Telephone Interviews</b>			
34-Weeks Pregnancy	320 (88.6%)	360 (91.4%)	680
3 Months	273 (75.6%)	309 (78.4%)	582
9 Months	229 (63.4%)	257 (65.2%)	486
15 Months	204 (56.5%)	238 (60.4%)	442
21 Months	195 (54.0%)	223 (56.6%)	418
27 Months	199 (55.1%)	239 (60.7%)	438
36 Months	169 (46.8%)	205 (52.0%)	374
Complete data until second birthday	161 (44.6%)	187 (47.5%)	348
Complete data until third birthday	137 (38.0%)	159 (40.4%)	296

Table 6 demonstrates the sample composition for the conducted telephone interviews. During pregnancy the participation rate is very high. After birth of the child the rate declines and stabilizes at 60% from 9 months to 27 months. Only for the last interview the rate declines again to about 50%. The drop at 36 months is caused by the end of the research project in November 2012. At this point of time, some children had not reached the age of three yet. It is likely that the participation rate would reach 60% also in this interview if data collection would have continued. Participation in the telephone interviews is slightly higher in the treatment group, but the difference is not significant at a ten percent level at any interview, tested by a two side proportion test.

The telephone interviews tried to contact all randomized mothers at each time

point. The only exception was an infant death or a fetal demise of a participating mother. Refused participation or switching mobile numbers were the main reasons why missing values occur. To minimize missing values, the interviewer tried to contact the participant four times within two months. If no contact could be made in this time span, the interviewer tried to contact the mother for the next scheduled interview, which was four months later. If the contact could be realized for this interview, a combined interview was conducted. However, no interview covers a time period of more than 12 months in order to avoid recall bias. Therefore, some participants miss only one or two telephone interviews. Finally, 296 mothers have participated in all interviews until the third birthday and 348 mothers participated in all interviews until the second birthday.

### **4.3 Sample Attrition**

As expressed in Table 6 less than 50% of the randomized mothers participated in all telephone interviews until the third birthday of the child. These attrition rates do not bias the randomization outcome if they are not selective regarding the maternal baseline characteristics between treatment and control groups. I use the basic model from equation 1 to prove if there is any selective attrition between the two groups. Table 7 presents the differences in the baseline demographic characteristics between treatment and control groups for each interview. Appendix D shows the differences of the psychological characteristics and Appendix E presents the differences in the baseline characteristics only for these mothers who participated in all interviews until the second and third birthday.

The results reveal that the equal distribution of the baseline characteristics is only slightly reduced by the attrition. Only the difference in the share of mothers with migrational background which is already existent at baseline stays significant in almost all interviews. The psychological characteristics show some smaller differences. Similarly to the personal interviews mothers with risk of aggression drop out more often in the control group. However, mothers with foster care experience participate more often in the treatment group. For the mothers who participated in all interviews until the second or third birthday the picture is similar indicating

that mothers with similar baseline characteristic drop out in treatment and control group.

However, there could be selective attrition compared to the baseline between attritors and participants. Again, I use the model in equation 1 to estimate the difference between attritors and non-attritors. As seen in Appendix F and G some characteristics and risk factors are different between those who attrite and the participants in the follow-up interviews. Mainly the participating mothers are older and have less cumulative risk factors.<sup>3</sup> The psychological characteristics are less correlated with attrition but almost all coefficients have a positive sign which indicates higher risk rates for the attritors. However, the mothers who participate still belong to a highly disadvantaged sub-population.

Table 7: Selective Attrition between TG and CG Demographic Characteristics - Telephone Interviews

	Pregnancy	3 months	Difference TG/CG		21	27	36
	(1)	(2)	9 months	15 months	months	months	months
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Demographic Characteristics</i>							
Age in Years	-0.164 (0.332)	0.004 (0.366)	0.107 (0.411)	-0.043 (0.433)	0.114 (0.447)	-0.184 (0.434)	0.236 (0.481)
Week in Pregnancy	-0.491 (0.441)	-0.579 (0.472)	-0.151 (0.528)	-0.235 (0.553)	-0.362 (0.557)	-0.318 (0.552)	-0.017 (0.596)
Migration	-0.063** (0.027)	-0.068** (0.029)	-0.045 (0.032)	-0.059* (0.035)	-0.065* (0.035)	-0.064* (0.036)	-0.059 (0.040)
Underage	0.036 (0.029)	0.021 (0.032)	0.016 (0.033)	0.038 (0.035)	0.032 (0.035)	0.044 (0.034)	0.033 (0.037)
Mon. HH-Inc. (€)	11.01 (43.38)	18.73 (47.24)	-18.35 (50.34)	-17.39 (53.45)	-0.52 (52.69)	-11.44 (51.69)	-22.77 (57.09)
Debt over €3000	0.032 (0.030)	0.031 (0.033)	0.033 (0.037)	0.039 (0.038)	0.043 (0.039)	0.017 (0.038)	0.041 (0.042)
Education Risk	0.036 (0.033)	0.021 (0.036)	0.021 (0.041)	0.035 (0.043)	0.020 (0.044)	0.043 (0.043)	0.020 (0.048)
Income Risk	0.016 (0.030)	0.012 (0.033)	0.025 (0.036)	0.031 (0.039)	0.020 (0.040)	0.022 (0.040)	0.033 (0.044)
Employment Risk	-0.036 (0.029)	-0.038 (0.032)	-0.046 (0.035)	-0.037 (0.038)	-0.055 (0.039)	-0.051 (0.037)	-0.051 (0.041)
No Partner	0.011 (0.035)	0.024 (0.037)	0.046 (0.041)	0.033 (0.043)	0.020 (0.045)	0.033 (0.044)	0.032 (0.049)
Living with Parents	0.013 (0.034)	-0.001 (0.037)	-0.024 (0.039)	-0.020 (0.041)	-0.016 (0.043)	-0.016 (0.043)	-0.048 (0.047)
Persons in HH	0.100 (0.124)	0.116 (0.136)	0.034 (0.144)	0.022 (0.154)	-0.018 (0.148)	-0.054 (0.143)	-0.072 (0.157)
Observations	680	582	486	442	418	438	374

Notes: Robust standard errors are shown in parentheses. The variables have the value one if the mother is in the treatment group. They contain estimates of the average difference in characteristics between the control and treatment students including community fixed effects. See Appendices B and C for variable definitions.

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

<sup>3</sup>Most mothers who attrite are between 19 and 21 years old.



## 5 Estimation Methods

I use objective and subjective outcomes to measure the impact of *Pro Kind* on maternal life course. The objective data contains labor market participation, fertility, childcare use, and partnership stability. Most of the objective data is measured in time durations. The months after birth of the treatment child is the analysis time.<sup>4</sup> Therefore, an analysis time of 36 months is available for mothers, who participated in all telephone interviews. The subjective data includes maternal well-being and life-satisfaction, obtained at the 27 months telephone interview. I examine intent-to-treat (ITT) effects, because compliance to the randomization outcome is almost complete and for those, who did not receive any home visit, data is often missing. Therefore, the results do hardly change if the randomization outcome is used as an instrument for the treatment received.

To give a descriptive overview of the outcomes, I start my analysis with comparing the means of the objective outcomes. Afterwards, I estimate Equation 2:

$$Y_{ic} = \beta_0 + \beta_1 HV_{ic} + \beta_2 h_{ic} + \alpha_c + \epsilon_{ic}, \quad (2)$$

where  $Y_{ic}$  denotes an outcome variable (employment, fertility, childcare use, and partnership stability) for mother  $i$  from community  $c$ .  $HV_{ic}$  is a dummy variable that takes value one if the mother receives the home visits.  $h_{ic}$  is a vector of demographic and psychological family characteristics at baseline;  $\alpha_c$  are community dummies; and  $\epsilon_{ic}$  is the error term.  $\beta_1$  measures the difference between treatment and control group in outcome  $Y$ . All outcomes are binary coded and take the value one if the outcome (e.g., employment or second pregnancy) occurs. Therefore, I estimate linear probability models and report the marginal effect of  $HV_{ic}$  on outcome  $Y_{ic}$ . In the descriptive overview and in the estimation only mothers, who participated in all interviews are included to avoid biases due to right censoring of the mothers who attrite.

Next, I examine the mothers' probability of "surviving" beyond a certain point of time  $t$ , where  $t$  is measured in months since birth of the intervention child. In

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<sup>4</sup>Throughout this chapter, the treatment child indicates the first child of the mother who was in focus of the intervention.

context of maternal life course “surviving” means not bearing a second child, not starting work or school after birth or not using institutional childcare. To capture the nature of the duration data, I apply statistical methods within a hazard rate framework (Kleinbaum and Klein, 2005; Cleves, 2010). Such techniques have the huge advantages of accounting for censoring and of taking into account the precise duration until the event, which causes “failing”, occurs. Accounting for right-censoring is necessary, because some participants may not experience the event of “failing” within the observation period of 36 months and for some participants the complete data is not available for the whole observation period. Surviving is reported by the survivor function  $S(t)$  (Equation 3), with  $0 \leq S(t) \leq 1$  and with  $T$  as a non-negative random variable that denotes the time of the event.

As  $S(t)$  is estimated by the nonparametric Kaplan-Meier estimator (Equation 4), where  $n_j$  is the number of participants at risk at time  $t_j$  and  $d_j$  the number of events at  $t_j$  there is no matter at which point of time censoring occurs.

$$S(t) = 1 - F(t) = P(T > t) \quad (3)$$

$$\hat{S}(t) = \prod_{j|t_j \leq t} \left( \frac{n_j - d_j}{n_j} \right) \quad (4)$$

Therefore, I can test the equality of survivor functions in intervention and control groups. If the test of equality is rejected, an impact of the intervention can be assumed.

In a next step I use Cox proportional hazards regression models for covariate analysis to improve the precision of the coefficients. The Cox regression asserts that the hazard rate for the  $j$ th subject in the data is

$$h(t|x_j) = h_0(t) \exp(\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k) \quad (5)$$

where the regression coefficients,  $\beta_x$  are to be estimated from the data. The hazard rate  $h(t)$  can be calculated by the hazard function

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{P(t + \Delta t > T > t | T > t)}{\Delta t} \quad (6)$$

The baseline hazard  $h_0(t)$  in Equation 5 is given no particular parametrization and, in fact, can be left unestimated.

In order to guarantee the duration structure of the data, I use the following procedure: data for childcare use is collected in each interview beginning at the 9-Month interview. Participants are asked whether their child attends institutional childcare and if so, they are asked for the starting month. If the participant states that her child attends institutional childcare but does not know the exact starting point, the date of the interview is used as starting point. For subsequent pregnancy and birth, I follow the same procedure with the only difference that mothers are asked for fertility at the 15-month interview the first time. Employment and school attendance are surveyed in each interview on the base of a monthly activity calendar. I only consider the first status switch after birth as a fail, therefore, it is not recognized how long the participants stay in this status. For example, in the case of school enrollment, analysis considers if a participant starts school but not if she continues school a month later.

Finally, the subjective ratings of the mothers are analyzed. For this I also compare the ratings in control and treatment group with Equation 2. Additionally, I estimated ordered probit models for those dependent variables, which are measured on a scale from 0 to 10. However, the results do not add new insights in comparison to the OLS estimates. Furthermore, I compare the self-ratings of well-being and satisfaction with ratings from GSOEP first time mothers.

## 6 Results

### 6.1 Objective Outcomes

#### 6.1.1 Comparison of Means and Multivariate Analysis

Table 8 reports the percentage of mothers, who had a second pregnancy, a second birth or used child care until the second or third birthday of the treatment child. The variable partner in household indicates whether the mother lives with her partner in the same household at the child's second or third birthday. The table only includes mothers who either participated in all interviews until the end of the intervention,

Table 8: Fertility, Child Care Use and Partnership in Treatment and Control Group

<b>Only Mothers with complete 24 Months Data</b>			
	Control	Treatment	P-value Diff. C-T
<i>24 Months after first Birth (Means)</i>			
Second Pregnancy	0.23	0.27	0.358
Second Birth	0.07	0.12	0.117
Child Care Use	0.35	0.41	0.316
Partner in HH	0.50	0.48	0.773
<i>Observations</i>	161	187	
<b>Only Mothers with complete 36 Months Data</b>			
	Control	Treatment	P-value Diff. C-T
<i>24 Months after first Birth (Means)</i>			
Second Pregnancy	0.23	0.26	0.451
Second Birth	0.08	0.13	0.202
Child Care Use	0.32	0.40	0.180
Partner in HH	0.50	0.47	0.597
<i>36 Months after first Birth (Means)</i>			
Second Pregnancy	0.32	0.35	0.574
Second Birth	0.18	0.28	0.038**
Child Care Use	0.58	0.67	0.142
Partner in HH	0.48	0.46	0.735
<i>Observations</i>	137	159	

Notes: P-values base on z-statistic of a two-group test of proportions. Observations in *Only Mothers with 24 Months Data* are based on mothers who participated in all interviews until the **second** birthday of their child. Observations in *Only Mothers with 36 Months Data* are based on mothers who participated in all interviews until the **third** birthday of their child. C=Control Group; T=Treatment Group.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

at the second birthday of the treatment child or in all interviews until the third birthday.

24 months after birth of the treatment child, the rates of second pregnancies and births are 4-5 percentage points higher in the treatment group than in the control group. Child care use is slightly higher in the treatment group. In both groups around 50% of the mothers live with their partner in the same household which is equal to the rate at baseline.

At 36 months the group difference in the cumulated share of pregnancies is smaller than at 24 months. However, in the treatment group ten percentage points more mothers state that they gave birth to a second child. Comparing the pregnancies at 24 months and the births at 36 months reveals that almost all pregnancies in the treatment group lead to a life birth while this is not the case in the control group (I discuss this fact in more detail in chapter 6.1.3). In the treatment group two thirds of the children are in institutional childcare at 36 months. This rate is nine percentage points smaller in the control group. The share of mothers who live with

Table 9: Maternal Work Participation in Treatment and Control Group

	(1)	(2)	(3)	(4)	(5)	(6)
Only Mothers with complete 24 Months Data						
	Control Group		Treatment Group			
	at least one Month	Average Months	at least one Month	Average Months	P-Value Diff.	P-Value Diff.
24 Months after Birth (Means)						
Apprenticeship	0.16	1.14	0.18	1.46	0.597	0.448
Minijob	0.21	1.56	0.14	0.94	0.076*	0.093*
Part/Fulltime employed	0.20	1.17	0.16	0.83	0.225	0.241
Any occupation	0.45	3.87	0.38	3.23	0.202	0.290
School	0.10	0.91	0.09	0.91	0.788	0.997
Welfare	0.90	19.71	0.96	20.28	0.020**	0.997
Observations	161		187			
Only Mothers with complete 36 Months Data						
	Control Group		Treatment Group			
	at least one Month	Average Months	at least one Month	Average Months	P-Value Diff.	P-Value Diff.
24 Months after Birth (Means)						
Apprenticeship	0.15	1.21	0.16	1.35	0.810	0.775
Minijob	0.20	1.55	0.15	1.04	0.228	0.217
Part/Fulltime employed	0.21	1.11	0.17	0.92	0.359	0.563
Any occupation	0.43	3.87	0.39	3.31	0.477	0.404
School	0.09	0.90	0.08	0.83	0.691	0.872
Welfare	0.90	19.57	0.96	20.27	0.052*	0.406
36 Months after Birth (Means)						
Apprenticeship	0.26	2.67	0.22	3.11	0.475	0.559
Minijob	0.25	2.53	0.23	1.86	0.756	0.265
Part/Fulltime employed	0.30	2.36	0.29	1.84	0.851	0.331
Any occupation	0.55	7.57	0.55	6.82	0.896	0.481
School	0.10	0.93	0.09	1.01	0.679	0.880
Welfare	0.91	26.51	0.96	27.78	0.127	0.298
Observations	137		159			

Notes: P-values base on results from two-sample mean-comparison tests and from two-group test of proportions. P-values in column 5 base on comparison between the means in column 1 and 3. P-values in column 6 base on comparison between the means in column 2 and 4. Minijob is an employment with less than 400 Euros wage per month. In *24 Months* all mothers are included who participated in the interviews until the **second** birthday of their first child. In *36 Months* all mothers are included who participated in the interviews until the **third** birthday of their first child. Welfare includes households which receive *Arbeitslosengeld II (ALGII)*, *Hilfe zum Lebensunterhalt (HLU)* or *Sozialhilfe*.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

their partner in the same household decreases slightly in both groups.

The higher birth rates at 36 months could be caused by selective attrition of mothers who are pregnant at 24 months because these mothers might be more time constraint and therefore have less time for the telephone interviews. However, 24 months after birth of the treatment child the outcome rates look similar between the mothers with complete 24 months data and complete 36 months data. If disproportionate or selective attrition would be the case, 24 months after birth the rate of mothers with a second pregnancy or birth would have been higher in the sample with the complete 24 months data compared to the sample with the complete

36 months data. Therefore, the similar results 24 months after birth confirm that women, who are pregnant or gave birth do not leave the sample disproportionate or selective in treatment or control groups.

Next, I examine the effects of *Pro Kind* on occupation and public assistance. The first rows in column 1 and 3 of Table 9 present the percentage of mothers who worked at least one months in apprenticeship, *Mini Job* or part/full time employment. The variable “any occupation” has the value one if the mother worked at least one month in one of the three kinds of occupation independently whether she worked in more than one kind of occupation. The last two rows show if a mother went to school or lived in a household which received public assistance. Column 2 and 4 present the average sum of months a mother spent in a certain occupation, attended school or received public assistance. A mother can have only one kind of occupation in each month. However, she can be employed but also receive public assistance. Just as Table 8, Table 9 only includes mothers who participated in all interviews until the second birthday and until the third birthday, respectively.

24 months after birth the average sum of months in occupation or at school is very low. This is not surprising since the mothers have an infant at home. In contrast, the percentage of mothers who started any occupation (45%) is high compared to the average sum of months in occupation. This indicates a high job fluctuation and short employment periods. The differences between the treatment and control group are small. Nevertheless, in the control group more mothers worked in a *Mini-Job*.

Ten percent of the control group mothers live in households who have not received any public assistance since birth of the treatment child versus four percent in the treatment group. This is surprising since receiving public assistance is an affiliation criteria and there were no differences between this characteristic at baseline. However, the average months with public assistance did not differ. In both groups the household received welfare in average almost 20 months. Therefore, it is likely that in the treatment group some households receive public assistance just for one or two months and that similar household are completely without public assistance in the control group. Again, no difference occurs for occupation or for public assistance between women with complete 36 and 24 months data.

36 months after birth the share of mothers who are employed or do an apprenticeship increases. The average sum of months almost doubles indicating that from the second to the third birthday the mothers participate more in the workforce than in the first two years. The sum of months in apprenticeship increases most strongly and is the most frequent occupation after 36 months. This is not surprising considering that the *Pro Kind* sample consists of many young women without a complete apprenticeship. The differences between the two groups are smaller than 24 months after birth. This is surprising since more second births which might reduce employment occur in the treatment group. Hence, analyzing only mothers without a second child reveals a higher employment rate in the treatment group. However, the difference is not significant. The average sum of months on public welfare increases. Nevertheless, the months without public welfare increase stronger. This indicates a greater economic self-sufficiency when the child gets older. The group difference between the households who received any public assistance vanishes.

Table 10: Maternal Life Course Multivariate Analysis

	(1)	(2)	(3)	(4)	(5)
	Second Pregnancy	Second Birth	Child Care Use	School	Any Employment
Home visiting	0.017 (0.046)	0.104*** (0.025)	0.064 (0.054)	0.019 (0.029)	-0.042 (0.046)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	296	296	296	296	296
$R^2$	0.12	0.14	0.15	0.20	0.05

Notes: Standard errors are shown in parentheses. All outcome variables are binary. Therefore, all estimates are linear probability models and coefficients report the influence of home visiting on the outcome in percentage points. The models include all mothers, who participated in the interviews until the **third** birthday of their first child. All models use extended baseline control variables and community fixed effects.

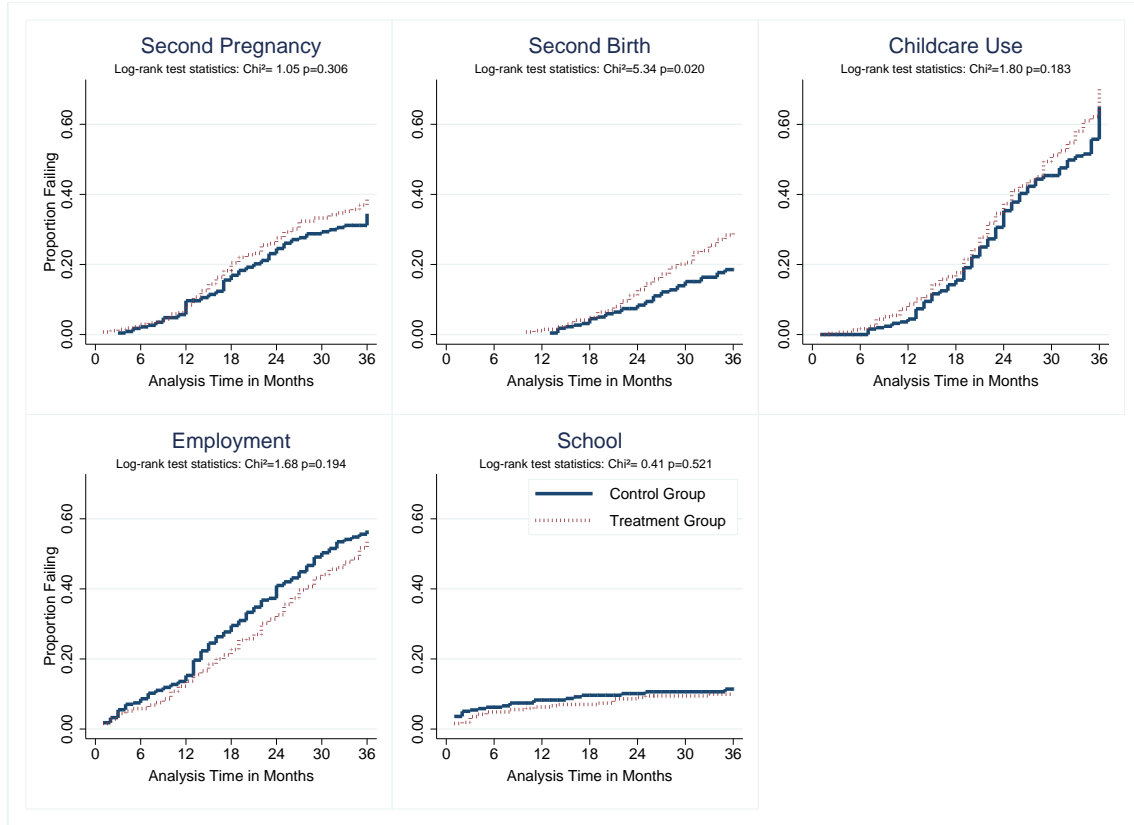
\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Overall, the descriptive statistics show that *Pro Kind* affected maternal fertility, whereas other life course outcomes are not significantly affected. Next, I examine whether these results remain in a multivariate model which includes baseline controls. Table 10 presents the results 36 months after birth for fertility, child care, school attendance and any employment. All dependent variables are binary and take the value one if the mother was in the status until the third birthday of her first child. The multivariate analysis confirms the descriptive results. In the treatment group the rate of second births is 10.4 percentage points higher than in the

control group which means that the second births are increased by more than 50% in the treatment group. There are no significant effects on the other outcomes.

### 6.1.2 Duration Analysis

Figure 1: Kaplan Meier Survival Functions - All Participants



This section considers the duration characteristics of the data. Duration analyses are robust when censoring occurs at some time other than an observed failure time. Therefore, all observations can be included, independent whether data is available only from one or from more interviews. Figure 1 provides the failure graphs of the investigated outcomes for the treatment and the control group. In line with the previous results the graphs for second birth significantly diverge between treatment and control group.

The duration analysis gives the possibility to investigate the timing of the second birth. This is important because rapid repeat birth (RRB) which is defined as a birth occurring within 24 months after a previous birth has been identified as a risk factor for adverse perinatal outcomes (Klerman et al., 1998; Zhu et al., 1999). Appendix



H shows that the hazards for a second birth diverge mainly after 18 months and the divergence pikes around 30 months. Therefore, RRB occurs more often in the treatment group. However, because there are only small differences in the hazard rate before 18 months it seems that RRB is only a slightly greater problem in the treatment group compared to the control group.

Looking at the other outcomes reveals that child care use and employment increase well correlated. However, some mothers use childcare without being in any employment. As in the analyses above, employment does not drop behind in the treatment group although more second births occur in this group. Most mothers who start to attend school do this close after the birth of the treatment child indicating that mostly mothers who went to school before the birth of the treatment child continue their school education. Appendix I presents the failure graphs which only include the data of mothers who participated in all interviews until the third birthday. The results hardly change compared to Figure 1.

Table 11 presents the results of the multivariate Cox regression including baseline characteristics as controls. Being in the treatment group increases the hazard of having a second child by 68%. The effect is significant at a 1 percent level. In contrast the hazard of having a second pregnancy is not increased by the treatment. The results hardly change in an estimation without covariates (not shown in a table). Overall, these multivariate duration analyses confirm the results of the previous sections.

Table 11: Maternal Life Course Cox Regression Analysis

	(1)	(2)	(3)	(4)	(5)
Change to	Second Pregnancy	Second Birth	Child Care Use	School	Any Employment
Home visiting	1.190 (0.151)	1.684*** (0.222)	1.183 (0.134)	0.945 (0.259)	0.858 (0.098)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	500	499	598	594	594
Number of failure	164	101	293	56	250

Notes: Standard errors (in parentheses). All coefficients present hazard rates. Observation time is 36 months. The models include all mothers who participated in an interview after birth of the treatment child. All models use extended baseline control variables and community fixed effects.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 6.1.3 Effects on Pregnancy Outcomes

The results of the former sections illustrated that the *Pro Kind* intervention affected second births but not second pregnancies. Table 8 gave first evidence that attrition of pregnant participants does not cause these results. Therefore, it is likely that more pregnancies in the control group did not lead to a live birth. Table 12 shows the pregnancy outcomes of all 122 mothers, who stated to be pregnant until the second birthday of the treatment child. I only include pregnancies until the second birthday of the treatment child to ensure that the pregnancy outcome is within the observation period. Pregnancy outcomes could be either loss to follow-up, live birth, abortion or miscarriage.

Along with the results of the previous sections Table 12 reveals that the percentage of pregnancies which lead to a live birth is significantly higher in the treatment group. Beyond that the table demonstrates that abortions and miscarriages are significantly higher in the control group. However, the rate of pregnant women who are loss to follow-up is only slightly higher in the treatment group. This confirms that selective attrition does not cause the effects on fertility, but reduced abortions and miscarriages in the treatment group.

Table 12: Second Pregnancy Outcomes in Treatment and Control Group

	Control	Treatment
Pregnancies at 24 Months	53	69
Pregnancy Outcome in %		
Abortion	0.28	0.12
Miscarriage	0.12	0.06
Life Birth	0.54	0.72
Loss to follow-up	0.06	0.10
Diff. C-T: $p=0,032^{**}$ ;		

Notes: P-Values base on  $\chi^2$  test statistics. The data includes all mothers who stated to be pregnant until 24 months after first birth. C= Control Group; T= Treatment Group

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

The program goal of *Pro Kind* is not to decrease or increase fertility but to enhance appropriate decisions about fertility. In this context appropriate decisions means that only mothers who want a second child and who are able to deal with the challenges of a further child get pregnant. After demonstrating that in the treatment group a lower percentage of pregnancies ended in an abortion, it is still unclear whether this is the result of appropriate decisions about planning future

pregnancies and births. To investigate this question I analyse the life situation and the attitudes towards second pregnancies of the mothers who gave birth to a second child or were pregnant a second time.

Table 13: Life Situation of Mothers who Gave Birth to a Second Child

	Control		Treatment		P-value
	n	%	n	%	Diff. C-T
<i>Before Birth of sec. Child</i>					
Wish for sec. preg. at 6 Mo.	31	0.23	48	0.21	0.854
Wish for sec. preg. at 12 Mo.	29	0.28	44	0.25	0.805
<i>After Birth of sec. Child</i>					
Unplanned Preg.	37	0.57	65	0.62	0.636
Father Does not Live In HH	37	0.27	63	0.38	0.259
No Other Care Apart From Mother	37	0.30	64	0.50	0.047**
Mother has no Partner	35	0.06	61	0.16	0.128
Age of the Sec. Child in Mo.	34	8.03	65	6.62	0.398
Age of the Moth. at Births in Years	35	23.4	65	23.9	0.594

Notes: P-values base on z-statistic of a two-group test of proportions. The presented data contains all second children for who data is available. C=Control Group; T=Treatment Group.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 13 only includes mothers who gave birth to a second child. The first two rows in the table present statements before occurrence of the pregnancy which lead to a second birth. In treatment and control group only around 25% of the second time mothers wished a second pregnancy 6 and 12 months after birth of their first child. The next rows present answers to questions whether the child was unplanned or whether the mother is without a partner. These questions are asked after birth of the second child. If the mothers makes appropriate decisions about family planning, one can expect that these characteristics are uncommon with second time mothers. However, 62% of the mothers in the treatment group state that their second child was unplanned. In the control group this rate is 57%. Also the other characteristics, like “no partner” or “father does not live in the household” occur more often in the treatment group. The difference in “no other care giver apart from the mother” is even significant.

These results could indicate that mothers with less resources got pregnant in the treatment group and that these mothers are less responsible in their family planning. However, these group differences are difficult to interpret because more mothers abort their pregnancies in the control group. Analyzing the mothers who abort their pregnancies reveals that two third of the mother have no partner and that these mothers often call a potential further pregnancy catastrophic before the

pregnancy occurs. Therefore, the higher rate of abortions in the control group supposes that the attitudes regarding a further pregnancy are more positive in the treatment than in the control group before a pregnancy occurs.

To proof this, Table 14 analyses the use of contraception and the attitude towards a second pregnancy of those mothers who got pregnant a second time. The information come from questions which are asked before the second pregnancy occurred. In the treatment group significantly more mothers are happy or have no worries about a further pregnancy. Additionally, there are less mothers who do not want a further child. These statements indicate that the mothers who give birth to a second child in the treatment group were more positive about a further pregnancy which could explain the lower rate of abortions in the treatment group.

Table 14: Attitudes Towards a Second Pregnancy

	Control Group		Treatment Group		P-value
	n	%	n	%	Diff. C-T
Happy or no Worries about Further Pregnancy	31	0.35	41	0.56	0.083*
No Further Child Wanted	29	0.17	39	0.10	0.401
No or Unregular Use of Contraception	31	0.39	42	0.33	0.619

Notes: Notes: P-values base on z-statistic of a two-group test of proportions. The presented data contains statements of mothers before their second pregnancy which lead to a second birth. C= Control Group; T= Treatment Group.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Overall, less abortions and less miscarriages mainly cause the effect of the *Pro Kind* project on fertility. It seems that at least partly more appropriate decisions about family planning in the treatment group causes this effect since the treatment group has more positive attitudes towards a second child and, considering the higher abortion rate in the control group, less unplanned pregnancies. One explanation why *Pro Kind* increases the rate of mothers who want a second child might be higher maternal satisfaction. This satisfaction might be caused by more positive experiences with their first child and higher personal strengths. Another explanation why more mothers in the control group decide for an abortion might be depression and low well-being. Both conditions are strongly correlated with abortion (Suri et al., 2004; Aavitsland, 2009). These mental health problems might be reduced due to the intervention. If these explanations are valid, they must be confirmed by

measures of maternal subjective life-satisfaction and well-being which are analysed in the next section.

## 6.2 Subjective Outcomes

This section investigates whether the *Pro Kind* intervention influences maternal subjective life-satisfaction and well-being. These outcomes are obtained at the interview 27 months after birth of the treatment child. The questionnaires use measures, which are also used by the GSOEP and which are intensively tested on reliability and validity (Krueger and Schkade, 2008; Bertrand and Mullainathan, 2001). It is important to investigate these subjective outcomes because previous research showed that a higher maternal life-satisfaction and well-being can positively influence child outcomes (Berger and Spiess, 2011). Furthermore, the investigation of the maternal life-satisfaction can help to explain the reason why *Pro Kind* affects fertility.

The telephone questionnaire contains 13 items concerning subjective life-satisfaction and well-being, eight of these 13 items measure various satisfaction dimensions, one item measures general life-satisfaction and four measure well-being. Appendix J gives a descriptive overview about the outcomes in the treatment and control group and for GSOEP first time mothers. In eight of the nine satisfaction dimensions the mothers in the treatment group state to be more satisfied than the mothers in control group. The picture is similar in the four questions regarding well-being. The mothers in the treatment group feel less often sad, angry, worried and more often happy. Comparison with the GSOEP mothers shows that these mothers are less often sad, more often happy and in most categories more satisfied than the *Pro Kind* mothers. Only in the category housework the *Pro Kind* mothers are more satisfied which could be arise from lower opportunities in the labor market and therefore higher satisfaction with home production.

Table 15 and 16 show that the difference between control and treatment group is significant in seven of the 13 items at a ten percent level after including controls. Furthermore, the non significant coefficients are all positive indicating higher satisfaction and well-being in the treatment group. The standardized effect sizes are meaningful with values around 0.2 SD.

Table 15: Well-Being in the last Four Weeks and Satisfaction with Life in General

	(1)	(2)	(3)	(4)	(5)
	Angry	In the last four weeks Worried	Happy	Sad	Satisfaction with Life in General
Home Visiting	-0.106 (0.062)	-0.289*** (0.086)	0.088 (0.085)	-0.191** (0.083)	0.147** (0.062)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	429	427	427	427	427

Notes: Standard errors (in parentheses). The dependent variables in columns 1-4 are measured in a five point likert scale. The dependent variables in column 5 is measured in a eleven point likert scale. All dependent variables are standardized with mean of zero. All models include extended baseline control variables, community fixed effects and age of the treatment child. Measurement is in average at 28 months after birth of the treatment child.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

After showing that *Pro Kind* increased the maternal life-satisfaction and well-being, I continue investigating if these subjective measures are related to the fertility decisions. In line with the literature that unhappier women more often tend to an abortion, these mothers have a general satisfaction value of 5.74. Although it is not clear if low life-satisfaction caused the abortion or the abortion the low life-satisfaction, it gives a first hint that low life-satisfaction is correlated with abortions.

Table 16: Life-Satisfaction in Different Areas

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Health	Housework	Household Income	Personal Income	Place of Dwelling	Free Time	Child Care Availability	Family Life
Home Visiting	0.096* (0.054)	0.175 (0.132)	0.253*** (0.056)	0.156* (0.073)	0.014 (0.065)	0.148* (0.081)	-0.047 (0.085)	0.067 (0.061)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	424	419	423	419	424	424	415	424

Notes: Standard errors (in parentheses). The dependent variables are measured in an eleven point likert scale. All dependent variables are standardized with mean of zero. All models include extended baseline control variables, community fixed effects and age of the treatment child. Measurement is in average at 28 months after birth of the first child.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Another hint that the higher life-satisfaction in the treatment group is related to fertility comes from a comparison between mother who gave birth to a second child in the treatment and control group. The life-satisfaction differs significantly with a value of 7.61 in the treatment group and 6.42 in the control group ( $T=3.06$ ;  $nTG=60$ ;  $nCG=33$ ). It is possible that the birth of the second child caused this happiness increase. However, it is unlikely that the higher life-satisfaction is not influenced by better experiences with the first child and that, therefore, the mothers are already happier before their second pregnancies. If this is the case, this

higher happiness could give an explanation for the smaller rate of abortions in the treatment group.

## 7 Conclusion

Home visiting programs are a popular type of early childhood interventions to support disadvantaged families. While many studies investigated how these programs affect child outcomes, this study has explored by a randomized experiment the much less investigated question how home visiting programs affect maternal life course. The few previous studies, which have investigated this topic have found positive effects on maternal employment and reductions in fertility. In contrast, the analysis of the *Pro Kind* Project reveals that the intervention has no effects on employment but strong effects on fertility. The effects on fertility are mainly driven by less abortions in the treatment group. Furthermore, *Pro Kind* increased the life-satisfaction and well-being of the participating mothers.

The previous studies which examined the effects of home visiting on the maternal life course were located in the US, whereas the *Pro Kind* program is located in Germany. Therefore, the different welfare state systems might explain much of the variation between the outcomes in the previous studies and the *Pro Kind* study. In the US welfare state, mothers who receive welfare have less incentives to give birth to a second child than in Germany. In this European country each additional child increases the amount of welfare and there are no work obligations or benefit cuts until the third birthday of the child. Therefore, an increase in maternal skills and life-satisfaction due to the intervention could lead to further birth in Germany, whereas in the US these improved skills might be used for higher labor market participation.

A randomized experiment is used to evaluate the effects of *Pro Kind* on the maternal life course. Therefore, the effects can be causally linked to the intervention. However, around half of the randomized mothers did not participated in all interviews until the third birthday of the treatment child. Nevertheless, this attrition is not selective between treatment and control group in respect to the baseline char-

acteristics and there is no indication that mothers who are pregnant or employed leave the sample selectively. Therefore, it is unlikely that the sample attrition causes problems to the validity of the results.

The results of this study can help to better understand the mechanisms through which early childhood interventions work. It is likely that improved maternal life-satisfaction and well-being can explain partly why these programs improve various child outcomes. Furthermore, the results give new insights how welfare regimes influence fertility. Although the literature presents inconclusive results if welfare affects fertility (Moffitt, 1998; Kearney and Levine, 2012) the picture could be different if the welfare regime interacts with an early childhood intervention. Considering these results might be helpful for other policies from the US which will be implemented in Europe in the future.



## References

- Aavitsland, P. (2009). Abortion and Depression: Cause or Confounding? *Scandinavian Journal of Public Health* 37, 327–328.
- Almond, D. and J. Currie (2011). Human Capital Development before Age Five. In Orley Ashenfelter and David Card (Ed.), *Handbook of Labor Economics*, pp. 1315–1486. Elsevier.
- Belfield, C. R. (2006). The High/Scope Perry Preschool Program: Cost-benefit Analysis Using Data from the Age-40 Followup. *Journal of Human Resources* 41(1), 162–190.
- Berger, E. M. and C. K. Spiess (2011). Maternal Life Satisfaction and Child Outcomes: Are They Related? *Journal of Economic Psychology* 32(1), 142–158.
- Bertrand, M. and S. Mullainathan (2001). Do People Mean What They Say? Implications for Subjective Survey Data. *American Economic Review* 91(2), 67–72.
- Blank, R. M. (2002). Evaluating Welfare Reform in the United States. *Journal of Economic Literature* 40(4), 1105–1166.
- Bradburn, N. M. (2004). Understanding the Question-Answer Process. *Survey Methodology* 30(1), 5–15.
- Brooks-Gunn, J., M. McCormick, S. Shapiro, A. A. Benasich, and G. Black (1994). The Effects of Early Education Intervention on Maternal Employment, Public Assistance, and Health Insurance: The Infant Health and Development Program. *American Journal of Public Health* (84), 924–931.
- Cleves, M. A. (2010). *An Introduction to Survival Analysis Using Stata* (3 ed.). College Station and Tex: Stata Press.
- Cunha, F. and J. Heckman (2007). The Technology of Skill Formation. *American Economic Review* 97(2), 31–47.
- Gebhardt, T. and H. Jacobs (1997). American conditions? - Social Assistance in the U.S.A. and Germany : a Comparison From a Historical, Institutional and Legal

- Perspective: Amerikanische Verhältnisse? - Sozialhilfe in den USA und Deutschland : ein Vergleich aus historischer, institutioneller und rechtlicher Perspektive. *Zeitschrift für Sozialreform* 43(8), 597–634.
- Groves, R., F. Fowler, M. Couper, J. Lepkowski, E. Singer, and T. R. (2004). *Survey Methodology*. Hoboken and New Jersey: John Wiley & Sons.
- Heckman, J. J. and D. V. Masterov (2007). The Productivity Argument for Investing in Young Children. *Review of Agricultural Economics* 29(3), 446–493.
- Jungmann, T., Y. Ziert, V. Kurtz, and T. Brand (2009). Preventing adverse developmental outcomes and early onset conduct problems through prenatal and infancy home visitation: The German Pilot Project Pro Kind. *European Journal of Developmental Science* 3(3), 292–298.
- Karoly, L., M. R. Kilburn, and J. Cannon (2005). *Early Childhood Interventions: Proven Results, Future Promise*. Labor and Population. Santa Monica: RAND Corporation.
- Kearney, M. S. and P. B. Levine (2012). Why is the Teen Birth Rate in the United States So High and Why Does It Matter? *Journal of Economic Perspectives* 26(2), 141–166.
- Kitzman, H., D. Olds, C. Henderson, C. Hanks, R. Cole, R. Tantelbaum, and et al (1997). Effects of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing: A Randomized Controlled Trial. *The Journal of the American Medical Association* (278), 644–652.
- Kleinbaum, D. G. and M. Klein (2005). *Survival Analysis: A Self-Learning Text* (2 ed.). New York and NY: Springer.
- Klerman, L., S. Cliver, and R. Goldenberg (1998). The Impact of Short Interpregnancy Intervals on Pregnancy Outcomes in a Low-Income Population. *American Journal of Public Health* 88, 1182–1185.
- Krueger, A. B. and D. A. Schkade (2008). The Reliability of Subjective Well-Being Measures. *Journal of Public Economics* 92(8-9), 1833–1845.

- Lutz, P. F. and M. Sandner (2010). Zur Effizienz Früher Hilfen: Forschungsdesign und erste Ergebnisse eines randomisierten kontrollierten Experiments. *DIW-Vierteljahrshefte zur Wirtschaftsforschung* 79(3), 79–97.
- Moffitt, R. (1998). The Effect of Welfare on Marriage and Fertility: What Do we Know and What Do We Need to Know? In R. Moffitt (Ed.), *Welfare, the Family and Reproductive Behaviour: Research Perspectives*. Washington D.C.: National Academy Press.
- Olds, D., J. Eckenrode, C. Henderson, H. Kitzman, J. Powers, R. Cole, and et al (1997). Long-Term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect: 15-Year Follow-Up of a Randomized Trial. *The Journal of the American Medical Association* 278(8), 637–643.
- Olds, D., C. Henderson, R. Tatelbaum, and R. Chamberlin (1988). Improving the Life-Course Development of Socially Disadvantaged Mothers: A Randomized Trial of Nurse Home Visitation. *American Journal of Public Health* 78(11), 1436–1445.
- Olds, D., H. Kitzman, R. Cole, C. Hanks, and K. Arcoleo (2010). Enduring Effects of Prenatal and Infancy Home Visiting by Nurses on Maternal Life Course and Government Spending: Follow-up of a Randomized Trial Among Children at Age 12 Years. *Archives of Pediatrics and Adolescent Medicine* 164(5), 419–424.
- Olds, D., J. Robinson, L. Pettitt, D. Luckey, J. Holmberg, R. Ng, and et al (2004). Effects of Home Visits by Paraprofessionals and by Nurses: Age 4 Follow-Up Results of a Randomized Trial. *Pediatrics* 114(6), 1560–1568.
- Olds, D. L. (2006). The Nurse–Family Partnership: An Evidence-Based Preventive Intervention. *Infant Mental Health Journal* 27(1), 5–25.
- Olds, D. L., H. Kitzman, C. Hanks, R. Cole, E. Anson, K. Sidora-Arcoleo, D. W. Luckey, C. R. Henderson, J. Holmberg, R. A. Tutt, A. J. Stevenson, and J. Bondy (2007). Effects of Nurse Home Visiting on Maternal and Child Functioning: Age-9 Follow-up of a Randomized Trial. *Pediatrics* 120(4), e832–e845.
- Olds, D. L., J. Robinson, R. O’Brien, D. W. Luckey, L. M. Pettitt, C. R. Henderson, R. K. Ng, K. L. Sheff, J. Korfmacher, S. Hiatt, and A. Talmi (2002). Home

- Visiting by Paraprofessionals and by Nurses: A Randomized, Controlled Trial. *Pediatrics* 110(3), 486–496.
- Rubin, D., A. O'Reilly, X. Luan, D. Dai, A. Localio, and C. Christian (2010). Variation in Pregnancy Outcomes Following Statewide Implementation of a Prenatal Home Visitation Program. *Archives of Pediatrics and Adolescent Medicine* 165(3), 198–204.
- Salkind, N. J. (2010). *Encyclopedia of Research Design*. Thousand Oaks and Calif: Sage.
- Siedler, T., J. Schupp, C. K. Spieß, and G. G. Wagner (2009). The German Socio-Economic Panel as Reference Data Set. *Schmollers Jahrbuch* 129(2), 367–374.
- Suri, R., L. Altshuler, and J. Mintz (2004). Depression and the Decision to Abort. *American Journal of Psychiatry* 161(8), 1502.
- The National Center for Children Families and Communities (2005). Sample NFP: Sample County Health Department - Sample Report IV Initiation(August 1999) through December 31, 2003.
- Zhu, B., R. Rolfs, B. Nangle, and J. Horan (1999). Effect of the Interval Between Pregnancies on Perinatal Outcomes. *New Englan Journal of Medicine* 340, 589–594.

## Appendix A: Randomization Outcomes per Municipality

Federal State	Community	CG	TG	Enrollment Period
Lower Saxony	Braunschweig	26	32	1.11.2006
	Celle	15	25	
	Garbsen	10	12	
	Göttingen	12	13	-
	Laatzen	4	4	30.4.2009
	Wolfsburg	11	15	
	Hannover	54	52	
Bremen	Bremen	77	83	15.4.2007 - 15.3.2009
	Bremerhaven	31	29	
Saxony	Leipzig	36	44	1.1.2008
	Plauen	13	18	
	Muldentalkreis	16	12	-
	Dresden	46	43	31.12.2009
	Vogtlandkreis	10	12	
$\Sigma$		<b>361</b>	<b>394</b>	

**Appendix B: Baseline Variable Definitions - Demographic Characteristics**

<b>Variable</b>	<b>Type</b>	<b>Description</b>	<b>n</b>
Age in Years	Metric	Participants' Age in Years at Baseline	755
Week in Pregnancy	Metric	Week in Pregnancy at Randomization	755
Underage	Binary	1 if Participant is Younger than 18 Years	755
Migration	Binary	1 if Participant is not Born in Germany or has no German Nationality	755
Monthly HH-Income in €	Metric	Monthly Net-Income in Participants' Household	647
Debt over € 3000	Binary	1 if Debt is over € 3000 in Participants' Household	728
Education Risk	Binary	1 if Participant has less than 11 Years of Schooling	755
Income Risk	Binary	1 if Net-Income is below €1250 in Participants' Household	647
Employment Risk	Binary	1 if Participant has no Regular Employment	755
No Partner	Binary	1 if Participant is in a Partnership	755
Living with Parents	Binary	1 if Participant Lives in her Parents Household	751
Persons in HH	Metric	Number of Persons in Participants' Household at Baseline	737

**Appendix C: Baseline Variable Definitions - Psychological and Physical Characteristics**

<b>Variable</b>	<b>Type</b>	<b>Description</b>	<b>n</b>
Unwanted Pregnancy	Binary	1 if Participant States that Pregnancy was Unwanted	747
Daily Smoking	Binary	1 if Participant Smokes Daily	755
Isolation	Binary	1 if Participant has Infrequently Contact to Friends or Relatives	747
Foster Care Experience	Binary	1 if Participant Lived at Least Once in a Foster Family or Foster Care	735
Neglect Experience	Binary	1 if Indication of Neglect Experience during Childhood	730
Lost Experience	Binary	1 if Participant Lost an Attachment Figure due to Death or Divorce	736
Violence Experience	Binary	1 if Participant ever Experienced Violence in her Life	751
Depression	Binary	1 if Value higher 20 for Depression on the Depression Anxiety Stress Scale (DASS)	749
Anxiety	Binary	1 if Value higher 15 on Anxiety on the DASS	744
Stress	Binary	1 if Value higher 25 on Stress on the DASS	749
Aggression	Binary	1 if Value higher 10 on the <i>Fragebogen zur Erfassung von Aggressivitätsfaktoren (FAF)</i>	743
Medically Indicated Risk Preg.	Binary	1 if participant has physical problems or if participant is older than 35	724
Body-Mass-Index	Metric	Participants' <i>Weight/Height<sup>2</sup></i> (Weight Before Pregnancy)	750
Sum Risk Factors	Metric	Sum of Risk Factors	755

## Appendix D: Selective Attrition TG and CG Psychological Characteristics - Telephone Interviews

	Pregnancy	3 Months	9 Months	Difference TG/CG 15 Months	21 Months	27 Months	36 Months
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Selected Psychological and Physical Characteristics</i>							
Unwanted Pregnancy	0.016 (0.029)	0.025 (0.031)	0.023 (0.032)	0.007 (0.034)	0.010 (0.034)	0.000 (0.035)	0.000 (0.037)
Daily Smoking	0.006 (0.036)	-0.008 (0.039)	-0.014 (0.042)	-0.001 (0.044)	-0.010 (0.046)	-0.020 (0.045)	-0.027 (0.049)
Isolation	-0.021 (0.019)	-0.022 (0.021)	-0.013 (0.023)	-0.006 (0.024)	0.001 (0.024)	0.006 (0.025)	0.025 (0.029)
Foster Care Exper.	0.053* (0.030)	0.057* (0.032)	0.051 (0.035)	0.068* (0.036)	0.066* (0.036)	0.060* (0.035)	0.051 (0.038)
Neglect Experience	-0.007 (0.037)	-0.003 (0.040)	0.006 (0.044)	0.006 (0.046)	0.009 (0.048)	0.001 (0.046)	-0.003 (0.051)
Lost Experience	-0.041 (0.038)	-0.074* (0.041)	-0.050 (0.045)	-0.037 (0.048)	-0.077 (0.049)	-0.043 (0.048)	-0.004 (0.052)
Violence Ever	-0.008 (0.020)	-0.009 (0.021)	-0.031 (0.023)	-0.032 (0.025)	-0.020 (0.026)	-0.009 (0.026)	-0.022 (0.029)
Depression	-0.022 (0.024)	-0.001 (0.025)	0.006 (0.028)	0.008 (0.028)	0.010 (0.030)	0.013 (0.029)	0.006 (0.032)
Anxiety	-0.008 (0.029)	0.007 (0.031)	0.008 (0.033)	0.001 (0.036)	-0.010 (0.037)	0.001 (0.035)	0.002 (0.038)
Stress	0.031 (0.036)	0.033 (0.038)	0.037 (0.042)	0.037 (0.044)	0.024 (0.046)	0.000 (0.044)	-0.006 (0.049)
Aggression	-0.048* (0.029)	-0.051* (0.030)	-0.066* (0.033)	-0.084** (0.036)	-0.064* (0.036)	-0.050 (0.035)	-0.041 (0.037)
Medic. Indic. Risk Preg.	0.008 (0.024)	0.003 (0.025)	-0.020 (0.028)	-0.034 (0.029)	-0.017 (0.031)	-0.002 (0.030)	0.004 (0.033)
BMI	-0.293 (0.419)	-0.276 (0.458)	-0.140 (0.506)	-0.063 (0.537)	-0.161 (0.527)	-0.125 (0.550)	-0.125 (0.614)
Sum Risk Factors	-0.076 (0.181)	-0.125 (0.193)	-0.099 (0.209)	-0.108 (0.221)	-0.160 (0.226)	-0.078 (0.226)	-0.054 (0.250)
Observations	680	582	486	442	418	438	374

Notes: Robust standard errors shown in parentheses. The variables are one if the mother is in the treatment group. They contain estimates of the average difference in characteristics between the control and treatment students including community fixed effects. See Appendix B and C for variable definitions.  
p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01



## Appendix E: Sample Balance Across Participants with all Interviews until the Second and Third Birthday

	All Interviews 36		All Interviews 24	
<i>Demographic Characteristics</i>				
Age in Years	0.413	(0.562)	-0.057	(0.503)
Week in Pregnancy	(0.071)	0.663	-0.291	(0.620)
Migration	-0.066	(0.045)	-0.074*	(0.040)
Underage	0.028	(0.040)	0.038	(0.037)
Mon. HH-inc. in €	7.67	(64.45)	17.34	(58.41)
Debt over 3000 €	0.064	(0.047)	0.037	(0.042)
Education Risk	0.028	(0.054)	0.059	(0.049)
Income Risk	0.026	(0.050)	0.012	(0.045)
Employment Risk	-0.072	(0.049)	-0.057	(0.044)
No Partner	0.029	(0.056)	0.021	(0.050)
Living with Parents	-0.051	(0.051)	-0.021	(0.046)
Persons in HH	-0.143	(0.182)	-0.096	(0.166)
<i>Selected Psychological and Physical Characteristics</i>				
Unwanted Pregnancy	-0.018	(0.041)	-0.015	(0.038)
Daily Smoking	-0.022	(0.055)	-0.012	(0.050)
Isolation	0.026	(0.033)	0.002	(0.029)
Foster Care Exper.	0.060	(0.042)	0.081*	(0.039)
Neglect Experience	0.034	(0.058)	0.038	(0.053)
Lost Experience	-0.004	(0.058)	-0.031	(0.054)
Violence Ever	-0.043	(0.034)	-0.031	(0.030)
Depression	0.013	(0.036)	0.013	(0.033)
Anxiety	0.003	(0.045)	-0.005	(0.040)
Stress	0.010	(0.055)	0.007	(0.050)
Aggression	-0.086**	(0.043)	-0.078*	(0.040)
BMI	0.087	(0.662)	0.191	(0.593)
Medic. Indic. Risk Preg.	-0.023	(0.036)	-0.029	(0.033)
Sum Risk Factors	-0.097	(0.279)	-0.082	(0.254)
Observations	296		348	

Notes: Robust standard errors shown in parentheses. The variables are one if the mother is in the treatment group. They contain estimates of the average difference in characteristics between the control and treatment students including community fixed effects. See Appendix B and C for variable definitions.

p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

Table 17: Appendix F: Selective Attrition to Baseline Demographic Characteristics - Telephone Interviews

	Pregnancy (1)	3 Months (2)	9 Months (3)	15 Months (4)	21 Months (5)	27 Months (6)	36 Months (7)
<i>Demographic Characteristics</i>							
Age in Years	-1.363*** (0.455)	-1.183*** (0.335)	-1.718*** (0.301)	-1.612*** (0.313)	-1.858*** (0.301)	-1.946*** (0.297)	-1.848*** (0.308)
Week in Pregnancy	-1.929*** (0.740)	-1.267*** (0.511)	-1.007*** (0.443)	-0.925*** (0.430)	-0.523 (0.427)	-1.217*** (0.428)	-1.425*** (0.426)
Migration	-0.057 (0.038)	-0.035 (0.028)	-0.004 (0.026)	-0.028 (0.025)	-0.023 (0.025)	-0.061** (0.025)	-0.058** (0.025)
Underage	0.057 (0.049)	0.049 (0.035)	0.075** (0.031)	0.059* (0.030)	0.099*** (0.029)	0.110*** (0.029)	0.088*** (0.029)
Mon. HH-Inc. in €	-211.82*** (56.04)	-198.50*** (43.73)	-108.16*** (44.86)	-146.50*** (44.02)	-125.92*** (42.89)	-154.13*** (43.48)	-171.91*** (42.59)
Debt over 3000 €	-0.072* (0.040)	-0.043 (0.032)	-0.054* (0.029)	-0.024 (0.029)	-0.044 (0.028)	-0.036 (0.028)	-0.045 (0.028)
Education Risk	0.179*** (0.038)	0.130*** (0.032)	0.158*** (0.029)	0.149*** (0.030)	0.158*** (0.030)	0.161*** (0.030)	0.167*** (0.031)
Income Risk	0.090** (0.039)	0.080** (0.031)	0.067*** (0.029)	0.091*** (0.028)	0.080*** (0.028)	0.089*** (0.028)	0.106*** (0.029)
Employment Risk	0.106*** (0.034)	0.060** (0.029)	0.075*** (0.027)	0.093*** (0.026)	0.099*** (0.026)	0.084*** (0.027)	0.094*** (0.027)
No Partner	-0.009 (0.056)	-0.003 (0.040)	0.007 (0.035)	-0.010 (0.034)	-0.005 (0.034)	-0.046 (0.034)	-0.055* (0.034)
Living with Parents	-0.057 (0.053)	0.011 (0.040)	0.048 (0.035)	0.044 (0.034)	0.031 (0.033)	0.007 (0.034)	-0.014 (0.033)
Persons in HH	0.070 (0.234)	0.106 (0.145)	0.219* (0.131)	0.133 (0.126)	0.183* (0.123)	0.224 (0.125)	0.159 (0.121)
Observations	755	755	755	755	755	755	755

Robust standard errors shown in parentheses. The variables are one if the mother is in the treatment group. Estimates include community fixed effects.

See See Appendix B and C for variable definitions.

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01

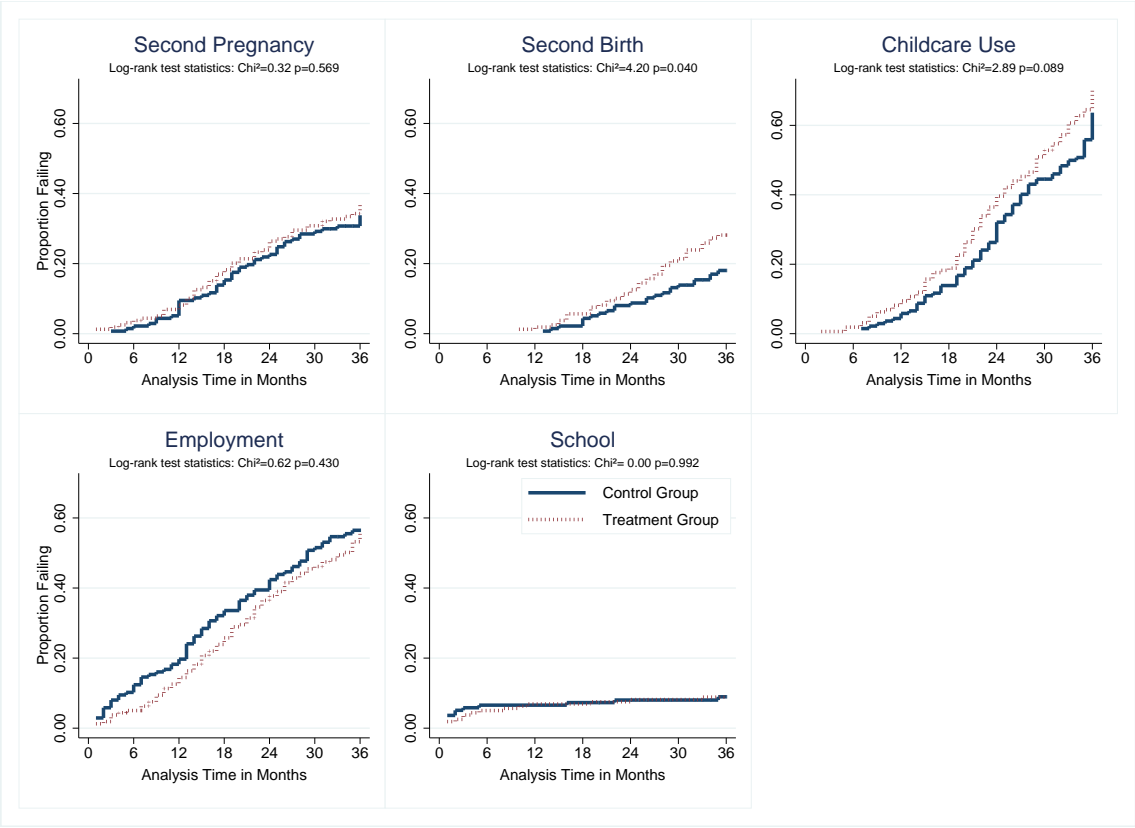
Table 18: Appendix G: Selective Attrition to Baseline Psychological Characteristics - Telephone Interviews

	Pregnancy (1)	3 Months (2)	Difference Attritors 9 Months (3)	Non-Attritors 15 Months (4)	21 Months (5)	27 Months (6)	36 Months (7)
<i>Selected Psychological and Physical Characteristics</i>							
Unwanted Pregnancy	-0.038 (0.044)	0.002 (0.034)	0.069** (0.030)	0.073** (0.029)	0.067** (0.029)	0.034 (0.029)	0.027 (0.028)
Daily Smoking	0.048 (0.058)	0.093** (0.042)	0.039 (0.037)	0.061* (0.036)	0.067* (0.035)	0.045 (0.035)	0.040 (0.035)
Isolation	0.050 (0.040)	0.020 (0.025)	0.008 (0.021)	0.000 (0.020)	0.014 (0.020)	-0.005 (0.019)	-0.016 (0.019)
Foster Care Exper.	0.180*** (0.058)	0.111*** (0.039)	0.081** (0.033)	0.101*** (0.032)	0.114*** (0.030)	0.121*** (0.031)	0.112*** (0.030)
Neglect Experience	0.101 (0.062)	0.103** (0.043)	0.049 (0.038)	0.062* (0.037)	0.039 (0.036)	0.081** (0.036)	0.069* (0.036)
Lost Experience	-0.035 (0.062)	-0.008 (0.044)	0.004 (0.039)	0.043 (0.038)	0.037 (0.037)	0.016 (0.037)	0.039 (0.037)
Violence Ever	0.133*** (0.047)	0.075** (0.029)	0.068*** (0.024)	0.050** (0.022)	0.035 (0.021)	0.029 (0.021)	0.021 (0.021)
Depression	0.090* (0.048)	0.049 (0.032)	0.029 (0.025)	0.041* (0.025)	0.027 (0.024)	0.037 (0.025)	0.024 (0.024)
Anxiety	0.079 (0.051)	0.057 (0.035)	0.034 (0.029)	0.028 (0.028)	0.012 (0.028)	0.050* (0.028)	0.047* (0.028)
Stress	0.036 (0.058)	0.016 (0.041)	0.001 (0.035)	0.017 (0.035)	0.009 (0.034)	0.032 (0.035)	0.025 (0.035)
Aggression	0.035 (0.049)	0.041 (0.034)	0.031 (0.029)	0.030 (0.028)	0.032 (0.028)	0.053* (0.028)	0.063** (0.028)
BMI	-0.839 (0.640)	-0.503 (0.452)	-0.751* (0.409)	-0.764* (0.399)	-0.710* (0.402)	-1.391*** (0.388)	-1.208*** (0.399)
Medic. Indic. Risk Preg.	0.024 (0.044)	0.033 (0.029)	0.009 (0.025)	0.007 (0.025)	-0.008 (0.024)	0.009 (0.024)	-0.004 (0.024)
Sum Risk Factors	1.110*** (0.336)	0.735*** (0.229)	0.705*** (0.190)	0.760*** (0.184)	0.742*** (0.180)	0.824*** (0.182)	0.818*** (0.178)
Observations	755	755	755	755	755	755	755

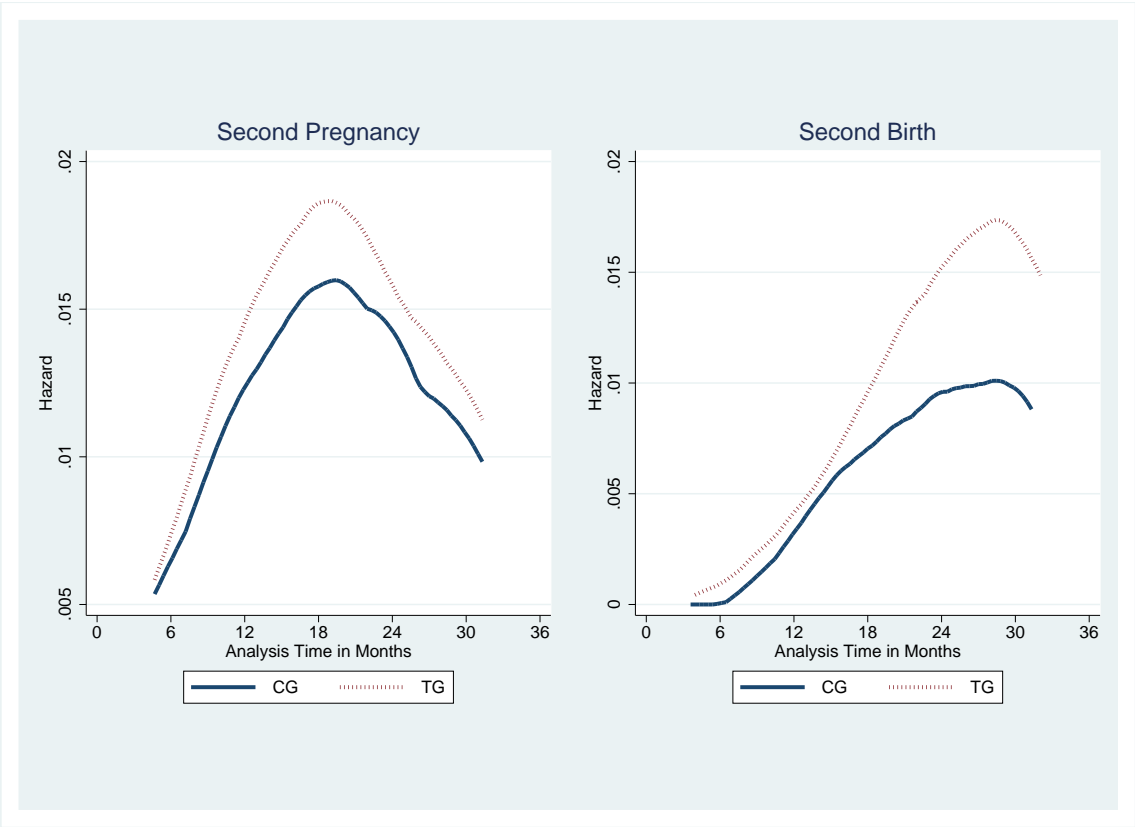
Robust standard errors shown in parentheses. The variables are one if the mother is in the treatment group. Estimates include community fixed effects. See Appendix B and C for variable definitions.

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Appendix H: Kaplan Meier Survival Functions - Only Participants with Complete 36 Months Data



Appendix I: Hazard Rates for Second Pregnancy and Birth



## Appendix J: Descriptive Statistics for Well-Being and Life-Satisfaction

	Control Group			Treatment Group			GSOEP		
	Mean	sd	n	Mean	sd	n	Mean	sd	n
<i>How Often or Seldom Have You Experienced this Feeling in the Last Four Weeks?</i>									
Angry	3.05	1.00	195	2.91	1.09	239	3.09	0.89	394
Worried	2.09	1.04	194	1.77	0.94	238	1.99	0.91	393
Happy	3.66	0.90	195	3.76	0.88	237	3.90	0.78	394
Sad	2.71	1.07	195	2.49	1.03	237	2.40	0.98	394
<i>How Satisfied are you Today with the Following Areas of Your Life?</i>									
Health	6.55	2.97	194	6.83	2.88	235	7.38	1.89	601
Housework	6.92	2.33	193	7.37	2.32	231	6.39	2.19	579
Household Income	4.92	2.70	193	5.58	2.89	235	5.47	2.77	578
Personal Income	4.14	2.90	191	4.57	3.05	233	6.42	2.82	582
Place of Dwelling	6.56	3.16	194	6.63	3.12	235	6.83	2.34	599
Free Time	5.67	2.91	195	6.23	2.87	234	6.77	2.51	563
Child Care Availability	6.73	3.01	192	6.68	3.33	228	7.36	2.18	590
Family Life	7.46	2.35	195	7.63	2.52	234	7.43	2.19	509
Life in General	7.13	2.10	195	7.44	1.91	237	7.41	1.56	601

Notes: For the outcomes in the first four rows the scale is: 1=Very Rarely, 2=Rarely, 3=Occasionally, 4=Often, 5=Very Often. For the other outcomes the scale is: 0=totally unhappy to 10=totally happy. GSOEP includes mothers whose first child has an age between two and three years. The average age of the first child in the *Pro Kind* sample is 30.06 months. sd=standard deviation.