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Effects of Early Childhood Intervention on Fertility and Maternal Employment: Evidence from a Randomized Controlled Trial

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Effects of Early Childhood Intervention on Fertility and Maternal Employment: Evidence from a Randomized Controlled Trial

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Malte Sandner*

Effects of Early Childhood Intervention on Fertility and Maternal Employment: Evidence from a Randomized Controlled Trial

Abstract

This paper presents the results of a randomized study of a home visiting programme implemented in Germany for low-income, first-time mothers. A major goal of the programme is to improve the participants' economic self-sufficiency and family planning. I use administrative data from the German social security system and detailed telephone surveys to examine the effects of the intervention on maternal employment, welfare benefits, and household composition. The study reveals that the intervention decreased maternal employment and increased subsequent births. These results contradict those of previous studies from the United States, where home visiting programmes successfully increased employment and decreased fertility. Low employment incentives and generous welfare state arrangements for disadvantaged mothers with young children in Germany may explain the different results.

JEL Classifications: J13, J12, I21, H52

Keywords: Early Childhood Intervention, Randomized Experiment, Fertility

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1 Introduction

Home visiting is an early childhood intervention for disadvantaged mothers that aims not only to improve child outcomes but also to improve maternal outcomes, such as employment and family planning. Home visiting affects these outcomes by family midwives, who consult mothers for a longer period after birth, to enhance maternal skills (e.g., attachment behaviour, interactions, and teaching skills) and to increase women's personal strengths, including self-efficacy, problem-solving abilities and self-esteem. Home visiting programmes are popular in many developed countries. For example, in the U.S. the Obama administration has requested $500 million for fiscal year 2016 and $15 billion over the next 10 years to continue to expand these programmes (U.S. Department of Health and Human Services, 2015) and in the U.K. home visiting programmes deliver services to 16,000 disadvantaged new parents each year (Department of Health, 2013).

Although home visiting programmes aim to improve aspects of the maternal life course, it is arguable whether they will reach this aim. On the one hand, the intervention could be successful and lead to higher maternal participation in the workforce by improving mothers' awareness of their personal strengths. Due to higher occupational aspirations, the mothers may decide to delay further births. On the other hand, the intervention could increase women's satisfaction with their maternal role by improving their maternal skills. Greater maternal satisfaction and well-being could increase fertility or the length of time the mother wants to stay at home with her child, both could lead to longer absences from the workforce as a consequence. The only evidence from randomized field experiments regarding which of the two effects predominates comes from the U.S., where home visits successfully decreased fertility and increased maternal employment (Olds et al., 2007, 1997; Brooks-Gunn et al., 1994).

However, there are reasons to believe that in Europe, and particularly in Germany, the employment decreasing and the fertility increasing effect may dominate. First, in Germany social assistance programmes for mothers with small children are more generous than those in the U.S.[1] The German programmes include means-

[1] In 1996, the Temporary Assistance to Needy Families (TANF) programme eliminated the legal entitlement to

tested welfare payments which do not include work obligations or benefit cuts until the child's third birthday. Additionally, financial incentive programmes that encourage work among low-income families with children, such as the Earned Income Tax Credit (EITC) in the U.S., do not exist in Germany. This welfare state environment provides few incentives for maternal workforce participation; therefore, the intervention's impact on maternal skills and life satisfaction might dominate over its impact on personal strengths, leading to longer maternity leave periods and subsequent births instead of higher employment. Second, knowledge and use of contraception tend to be higher among disadvantaged young women in Europe than in the U.S. (Kearney and Levine, 2012). Therefore, home visiting may have less space to improve contraception adherence and to reduce unwanted pregnancies, which might lower the potential to decrease fertility.

This paper analyses the first randomized experiment of one such home visiting programme for disadvantaged first-time mothers in Germany, named *Pro Kind*. The results in fact suggest that the intervention *increased* fertility and *decreased* employment. The effects are sizeable, implying that among the intervention group, the probability of a second birth increased by 36 percent and employment decreased by 24 percent relative to the mean of the control group. Employment decreased directly after birth, suggesting that mothers in the treatment group decided to stay longer at home with their child. The effect on fertility is concentrated on these non-employed mothers and is mainly explained by a reduction in abortions in this group of women. The fewer abortions were not caused by more favourable family environments (e.g., more stable partnerships) in the treatment group. However, the intervention positively influenced subjective maternal well-being and life satisfaction, which might have influenced abortion and fertility decisions. The content, implementation, and participants of the home visiting programmes were very similar in the *Pro Kind* study and U.S. studies. Therefore, national characteristics such as the arrangement of the welfare state or contraception behaviour and knowledge are

cash welfare by imposing a 60-month lifetime limit on benefits and requiring individuals to leave welfare for work after two years. Furthermore, three of the four stated goals of the TANF programme involved reducing non-marital births and encouraging marriage (Blank, 2002). However, even Aid to Families with Dependent Children (AFDC), the programme that preceded TANF, was stricter than the welfare system in Germany today. Under AFDC, only single mothers were eligible for cash benefits, which were rather low (the monthly benefits for a single-parent family with two children and no income ranged from $120 in Mississippi to $597 in Vermont) (Moffitt, 1998; Gebhardt and Jacobs, 1997).

the most compelling explanation for the different results.

My analysis draws on administrative data from the German social security system, containing information on employment, wages, welfare benefits and household composition and on biannual telephone interviews. The administrative data are available for over 90% of the sample over the first three years after the birth of the first child. They are objectively measured and should not be biased by the treatment and control groups differentially reporting outcomes. The survey data allow for the examination of a much richer set of outcomes, such as fertility planning, childcare use, and subjective statements about well-being and life satisfaction, allowing me to identify channels for the findings. To my knowledge, this is the first study combining administrative and survey data to evaluate the effects of an early childhood intervention.

The effects of home visiting on fertility and early employment can contribute to the understanding how early childhood interventions generate effects on children. For example, shorter spacing between births has negative effects on the test scores of older siblings (Buckles and Munnich, 2012). A literature in economics has shown that children from larger families tend to have lower educational attainment, lower IQ scores, poorer employment outcomes, and a greater likelihood of engaging in risky behaviour (Kessler, 1991; Hanushek, 1992; Black et al., 2010). Although the observation period is currently too short, to analyse the effects on completed fertility, the results on spacing may reduce the potential of home visiting to improve child development. On the contrary, mothers decided to stay home longer with their child and reported higher well-being, which both can positively affect child development (Carneiro et al., 2015; Berger and Spiess, 2011). The finding of Sandner and Jungmann (2016) that the *Pro Kind* programme has smaller effects on infant development compared with studies in the U.S. suggests that, at least in the short term, the development reducing effect predominates.

This paper provides also new insights into how welfare systems influence fertility. The literature presents inconclusive findings regarding whether welfare arrangements, such as work incentives,benefit time limits or the amount of welfare, affect fertility (Moffitt, 1998; Grogger and Bronars, 2001; Kearney, 2004). However, the

results could be clearer if the welfare system interacts with early childhood interventions. The findings of the *Pro Kind* program imply that, on the one hand, a more generous welfare system can increase fertility when combined with home visiting or other counselling services. On the other hand, home visiting may increase the effectiveness of workfare reforms for disadvantaged mothers, as the example from the U.S. shows. Attention to these results might be helpful when considering policies from the U.S. that may be implemented in Europe in the future.

Finally, the findings on maternal welfare dependency and employment decisions are of high short-term fiscal relevance since disadvantaged mothers receive a substantial amount of total welfare spending in many developed countries.[2] In addition, Dahl et al. (2014) showed that changes in the welfare participation of the current generation can affect the participation behaviour of the next generation as well. Following this finding, the effects of home visiting on maternal welfare might also increase welfare receipt of their children and have long term fiscal consequences. However, a cost-benefit perspective that considers the positive effects on life satisfaction and fertility (assuming home visiting increases completed fertility) may conclude that, despite higher welfare expenditure, the intervention may have a positive cost-benefit relation.[3]

The remainder of the paper is organized as follows: Section 2 reviews the existing literature on the effects of home visiting on maternal life course. Sections 3 and 4 provide descriptions of the *Pro Kind* programme, the experimental design, the baseline sample, and the data used in this study. Section 5 proves the validity of the experimental design, and Section 6 presents the estimation strategy. Section 7 shows the results, and Section 8 compares them with the results of U.S. studies. Section 9 provides concluding remarks.

[2]For example, in Germany in 2008, families with children younger than three received €4.7 billion in welfare payments.

[3]Bauernschuster et al. (2016) compared the cost-effectiveness of pro-natalist interventions, such as providing public childcare or increased child benefits, in Germany, which is known as a low fertility country with the policy aim to increase fertility. In comparison to these interventions *Pro Kind* increased fertility at a much lower costs.

2 Related Literature

Few studies in the literature have examined the impact of early childhood programmes in general, and of home visiting programmes in particular, on parents. For example, Heckman et al. (2010) evaluated 715 outcomes of the famous Perry Preschool Program; although home visits were part of the intervention, none of these outcomes focused on parents. However, the effects on parents might be one undetected link affecting the success of the programme. The only programme in which effects on parents were systematically evaluated is the Nurse Family Partnership Program (NFP) in the U.S. This program is conceptually similar to the *Pro Kind* programme, and like the *Pro Kind* programme, it aims to increase maternal economic self-sufficiency.

The NFP was evaluated in three randomized controlled trials located in Elmira, New York, in 1980; in Memphis, Tennessee, in 1990; and in Denver, Colorado, in 1995. All trials enrolled unemployed and low-income first-time mothers (Olds et al., 1997, 2010, 2004), and both the maternal life course and child outcomes were of prime interest. The availability of follow-up outcome data varies among the trials and ranges from four years to 15 years of data. The NFP literature shows a reduction in the rates of subsequent pregnancies and births and an increase in the intervals between first and second pregnancies and births in all three trials for the first four years after mothers entered the programme. A shortcoming of the studies is that they do not present information on whether less sexual activity or more frequent contraception use led to fewer pregnancies, and they do not present information about abortions.

In all three trials, the intervention reduced women's use of welfare, and in two of the three trials, the intervention increased maternal employment. More stable partnerships and the reduction in subsequent births are channels to explain the effects on welfare and employment. Long-term follow-up revealed that the impacts on the maternal life course did not diminish over the years. The intervention did not affect the mothers' school graduation rates in any of the trials, although higher school attendance was observed in the Elmira trial. Appendix Table A1 summarizes

the three trials' results regarding the maternal life course. Only one study (Brooks-Gunn et al., 1994) other than the NFP analysed the effects of home visiting on the maternal life course using a randomized experiment. In that study, home visiting significantly reduced maternal unemployment.

Cost/benefit analyses of the Elmira and Memphis trials indicate that the NFP reached the fiscal break-even point via its effects on the maternal life course, even before considering effects on the children. In Elmira, the programme cost of $3,133 was outweighed by discounted savings of $3,246 (expressed in 1980 U.S.-$) by child age four. The main reason for these savings was increased maternal employment (Olds et al., 1993). In Memphis, the NFP resulted in $12,300 in discounted savings per intervention compared with the programme's cost of $11,511 (both expressed in 2006 U.S.-$) by child age twelve. Higher maternal employment and lower government spending on food stamps, Medicaid, AFDC, and TANF generated the savings (Olds et al., 2010). These results show that home visiting programmes, and the NFP in particular, have strong effects on the maternal life course and that these effects are fiscally relevant in the U.S. context.

3 The *Pro Kind Programme*: A Social Experiment

3.1 Background

The home visiting programme *Pro Kind* is an adaptation of the previously described NFP programme, which provides instructions for home visit frequency, employee selection, teaching materials, and guidebooks (see Jungmann et al., 2009; Olds, 2006, for additional information on the *Pro Kind* programme and NFP). The intervention begins between the 12th and 28th weeks of pregnancy and ends at the child's second birthday. Family midwives conduct the home visits either continuously or in a tandem model with social pedagogues and a paediatric nurse (Brand and Jungmann, 2012). The frequency of the home visits varies, according to the NFP model prescription, between weekly, biweekly, and monthly visits, with the highest visit frequency occurring directly before and after birth.

Overall, 52 home visits with an average duration of 90 minutes are scheduled

between pregnancy and the child's second birthday. Teaching materials and visit-by-visit guidelines structure the theme and aim of each home visit. Nevertheless, home visitors have the flexibility to adapt the contents to maternal needs and the familial situation. All home visitors regularly receive feedback, encouragement, reflection, and support from nurse supervisors.

The *Pro Kind* programme registers only first-time mothers between their 12th and 28th weeks of gestation. All participants must receive social welfare or unemployment benefits, have an income that qualifies them for social welfare benefits or have excessive debt. Additionally, all participants must have one of the following social risk factors: a low educational level, teenage pregnancy, isolation, health problems, or having been a victim of violence. However, none of these risk factors were binding because all applicants with economic constraints had at least one of them. Project partners, such as gynaecologists, job centres, pregnancy information centres, and youth welfare offices, referred approximately 75% of the participants to *Pro Kind*, and approximately 25% of participants self-registered in the programme.

The *Pro Kind* programme was implemented in three German federal states at 13 implementation sites between 2006 and 2012 (see Appendix Table A2 and Figure A1). Although the chosen sites are not fully representative of Germany, the communities cover both rural and urban regions as well as regions in both East and West Germany. This mixture of sites ensures that the programme is implemented under varying regional conditions in terms of availability of childcare, healthcare provision, and labour market conditions.

A major goal of the *Pro Kind* programme is to improve families' economic self-sufficiency by helping parents develop a perspective for their future and make appropriate decisions about planning future pregnancies, finishing their education, and finding employment. The question arises why home visiting in general, and *Pro Kind* in particular, would produce effects in these domains. This question is especially crucial because the German welfare state offers generous benefits to the mothers of infants and toddlers. For example, there are no work obligations or welfare cuts as long as the child is under three years old, even when childcare is available (German Federal Employment Agency, 2014). As a result, there are few incentives for

mothers to participate in the labour market.

The main answer why the *Pro Kind* programme could have additional effects on maternal life course and employment is given by the relationships that the home visitors develop with the mothers during their pregnancies and their children's early years. The mother's first time experience of giving birth is the strongest factor that initiates and deepens this relationship. Olds et al. (2010) state that through this relationship, nurses can help parents gradually gain a sense of mastery for overcoming challenges and position themselves to create the kind of life they want. Furthermore, mothers with newborns are often open-minded to guidance during this fundamental life transition, during which they make important choices that shape the trajectories of their lives and those of their children. Thus, the home visitors' ability to build relationships and meet clients in an open-minded life situation are home visiting programmes' greatest advantages over other interventions.

3.2 Randomization Process and Sample Description

The causal effects of the *Pro Kind* intervention were evaluated using a randomized controlled trial. At the beginning of the randomization process, all women answered a brief screening questionnaire, typically by telephone, to assess whether they fulfilled the affiliation criteria. If a woman met the criteria, the supervisor visited the woman at her home. During this visit, the participant (or, if she was underage, her parents) signed an informed consent form for participation in the study. Thereafter, participants completed a baseline questionnaire to assess demographic and psychological characteristics, as well as risk factors. Until this point, the mothers had received only information on the research study and as little information as possible on the home visits to minimize the "John Henry" effect for mothers in the control group.[4] After answering the baseline questionnaire, women received the results of the randomization that assigned them either to the home visit or the control group. The final sample for the *Pro Kind* experiment consisted of 755 mothers, of whom 394 were assigned to the treatment group and 361 to the control group.

[4]The "John Henry" effect explains an unexpected outcome of an experiment caused by the control group's knowledge of its role in the experiment. This knowledge encourages the group to perform differently and often better than they would have otherwise, eliminating the effect of the experimental manipulation (Salkind, 2010).

After randomization, mothers in both research groups had access to the regular German welfare state services. They received an address list with support services in their communities and monetary incentives for participating in the study.[5] Therefore, families in the control group also received more support than the average first-time low-income family in Germany. However, only women in the treatment group received the *Pro Kind* home visits, and no other comparable home visiting services were available in any of the communities.

Table 1 reports the means and the differences in means according to treatment status for the baseline variables.[6] Differences in the average characteristics of the control and treatment groups were small and generally not statistically significant. Migrant status, defined among the mothers as not having German citizenship or not having been born in Germany, is the only demographic characteristic that was significantly different; the control group had a higher proportion of immigrants than the treatment group. None of the differences in psychological or physical risk characteristics were statistically significant. Furthermore, I conducted a test of joint significance of all the baseline characteristics. The F-statistic is 1.19; thus, the possibility that the characteristics of the treatment and control groups were the same could not be rejected. Hence, overall, the randomization appears to have successfully created comparable treatment and control groups.

An analysis of the demographic and psychological characteristics of the participants reveals that the women in both groups were young and highly disadvantaged. Most of the mothers were unemployed at the time of the baseline interview and had never been regularly employed. The low employment levels seem to be a consequence of the fact that a high percentage of the mothers (approximately 75%) had less than eleven years of schooling; many of them dropped out of school. Furthermore, the average monthly household income was €928.60. Considering the mean household size of 2.49 persons, the participants' average income was below the poverty line in Germany. These figures indicate that *Pro Kind* was successful in recruiting families

[5]The monetary incentive was €15 for the each telephone interview.

[6]I use sample means or values from a multivariate imputation procedure in the case of missing values for baseline variables. However, complete data are available for most variables (see Appendix Tables A3 and A4). The present missing values are equally distributed between the control and treatment groups and results hardly change when non-imputed data are used.

Table 1: Descriptive Statistics

	Control Group Means (1)	**Treatment Group Means** (2)	**Treatment vs. Control** (3)
Demographic Characteristics			
Age in Years	21.53	21.27	-0.27 (0.31)
Week in Pregnancy	20.30	19.76	-0.53 (0.42)
Teenage	0.44	0.47	0.03 (0.04)
Migration Background	0.18	0.12	-0.05* (0.03)
HH-Income per Month (€)	916.62	937.28	17.54 (40.60)
Debt Over €3,000	0.17	0.19	0.02 (0.03)
No Graduation	0.75	0.78	0.03 (0.04)
Low Income	0.81	0.82	0.01 (0.03)
No Employment	0.86	0.82	-0.04 (0.03)
No Partner	0.28	0.29	0.01 (0.03)
Unmarried	0.93	0.90	-0.03 (0.02)
Living with Parents	0.27	0.28	0.01 (0.03)
Persons in HH	2.45	2.55	0.09 (0.12)
Psychological and Physical Characteristics			
Unwanted Pregnancy	0.17	0.18	0.01 (0.03)
Daily Smoking	0.34	0.34	-0.01 (0.03)
Social Isolation	0.08	0.06	-0.02 (0.02)
Foster Care Experience	0.19	0.23	0.04 (0.03)
Experience of Neglect	0.39	0.38	-0.01 (0.04)
Experience of Loss	0.54	0.49	-0.05 (0.04)
Experience of Violence, ever	0.09	0.08	-0.01 (0.04)
Depression	0.13	0.10	-0.03 (0.02)
Anxiety	0.18	0.17	-0.01 (0.03)
Stress	0.29	0.31	0.03 (0.03)
Aggression	0.19	0.14	-0.04 (0.03)
Med. Indicated Risk Preg.	0.11	0.11	-0.01 (0.02)
Body Mass Index (BMI)	25.31	25.22	0.16 (0.39)
Sum Risk Factors	5.86	5.73	0.04 (0.03)
Observations	361	394	755

Notes: Robust standard errors are reported in parentheses in column 3. Dependent variables shown in the first column. The treatment indicator has the value one if the mother is in the treatment group. Column 3 contains estimates of the average difference in characteristics between mothers in the control and treatment group. See Appendix Tables A3 and A4 for variable definitions.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

on welfare and those with low education levels, who were the target population of the intervention.

3.3 Utilization of *Pro Kind* Home Visiting

To monitor the quality of the programme implementation, the home visitors documented each visit (e.g., duration, covered topics, and maternal interest).[7] In total, 12,894 home visits with an average duration of 82 minutes were conducted. The families in the treatment group received 32.7 home visits on average (SD = 19, range: 0-94). Only 9 of the 394 mothers in the treatment group received no home

[7]See Brand and Jungmann (2014) for further description of programme design and implementation.

visits. Because participation in the *Pro Kind* programme is voluntary, 166 (42.2%) mothers decided to leave the programme 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 *Pro Kind* home visits until the child's second birthday increases the average number of home visits to 45.3 (SD = 10.7, range: 11-94) showing that the intervention was well implemented for families who stayed until the end of the programme. The home visiting documentation demonstrates that at all developmental stages, home visitors invested 40% of their time with the family to address issues related to the maternal life course and employment (Appendix Table A5). This finding points out that maternal life course issues and economic self-sufficiency are fundamental topics of the *Pro Kind* programme.

4 Data

4.1 Administrative Data

The German Record Linkage Center (GRLC) of the Institute for Employment Research obtained individual-level labour market biographies from the German social security system and matched them to the treatment indicator and date of affiliation based on the participants' full name, full address, and date of birth.[8] The data contain information on maternal outcomes, such as employment, type of employment, wage, welfare benefit use, job search, age, community of residence and household composition. Studies that have also used these German social security data in other settings include, for example, Schmieder et al. (2012), Card et al. (2013) and Dustmann et al. (2009). From the submitted information of 740 participants, the GRLC was able to track 703 participants to their labour market biographies.[9] For all the tracked participants data are available from affiliation into the project until 36 months after the birth of the treatment child.[10] My primary outcomes of employ-

[8]Staff of the GRLC (www.record-linkage.de) linked the data. Questions concerning the linkage can be directed to the GRLC. The GRLC receives funding from the German Research Foundation (grant number: BE3172/1-2).

[9]Of the 755 participants in the baseline sample, 15 refused to provide informed consent and were not used for the merging process.

[10]Throughout this article, the treatment child indicates the first child, who was in focus of the intervention, of the mother.

ment and welfare use thus have an effective postrandomization "attrition rate" of 7%. Only household composition, which I use as measure of fertility, has a slightly higher "attrition rate" of 11% because the information was available only if the mother was either engaged in a job search or received welfare benefits.[11]

4.2 Telephone Survey Data

In addition to the administrative data, I use data from biannual telephone interviews with the mothers. The telephone interviews begin during pregnancy and continue at six-month intervals until the child's third birthday. The interviews are computer-assisted and contain all of the questions that are recommended when using the German Socioeconomic Panel (SOEP) as a reference data set, including questions on the participants' household, income, employment, childcare use, family planning and partnership, maternal well-being, and life satisfaction (Siedler et al., 2009). Furthermore, the interviews contain the SOEP activity calendar to record the participants' employment status on a monthly basis, questions about use of contraceptives, and the SOEP mother-child questionnaire to record maternal attitudes towards each newborn child of the mother (Anger et al., 2009).

The telephone interviewers attempted to contact all mothers at each point in time, except in cases of miscarriage or infant death. To guarantee a high participation rate, the interviewer attempted to contact the participant four times within two months near the interview date. If no contact could be made during this time span, the interviewer attempted to contact the mother for the next scheduled interview four months later. If contact was made for this interview, a combined interview regarding the time span for the two interviews was conducted. However, no interview covered a period longer than 12 months to avoid recall bias. Therefore, some participants missed one or two telephone interviews and continued to participate in subsequent telephone interviews. The main reasons for missed interviews were switching telephone numbers or refusing to participate. Overall, nearly 80% (n = 602) of the mothers were interviewed at least once after pregnancy, and for 71% (n =

[11] Information on community of residence is only available if the mother was employed, engaged in job search, or received welfare benefits. The information is not available if the mothers simply "stayed at home" without being employed, looking for a job or receiving welfare benefits.

539) of the mothers, data are available for at least 12 months after birth. Moreover, 39% (n = 296) participated in all interviews without missing data for any months after birth.

5 Validity of the Experimental Design

Table 2: Sample Composition Administrative Data and Telephone Survey Data

	Control Mean (std. dev.) for Full Sample (1)	Difference Between TG and CG (2)
Panel A: Administrative Data		
Consent to Merging	0.986	-0.012
	(0.117)	(0.010)
		[0.257]
Merged	0.945	-0.026
	(0.229)	(0.018)
		[0.162]
Panel B: Telephone Survey Data		
At Least One Interview After Birth	0.784	0.026
	(0.412)	(0.029)
		[0.381]
Data Available for 12 Months After Birth	0.698	0.030
	(0.460)	(0.033)
		[0.357]
Data Available for 24 Months After Birth	0.557	0.045
	(0.497)	(0.036)
		[0.214]
Complete Data from Birth Until Third Birthday	0.380	0.024
	(0.486)	(0.036)
		[0.500]
Observations	*361*	*755*

Notes: Robust standard errors in parentheses and p-values in brackets. Administrative data in Panel A are available for 36 months after birth of treatment child. TG = Treatment Group; CG = Control Group.

Differences in attrition or in the pre-randomization characteristics of the treatment and control analysis samples would raise concerns regarding the validity of the experiment for identifying causal inference. Therefore, Table 2 summarizes the sample composition from the administrative (Panel A, Column 1) and survey data (Panel B, Column 1) and analyses the treatment-control balance (Column 2). The results in Column 2 indicate no significant differences between the treatment and control groups in the response rate for either the merged administrative data or the survey data.

Table 3 presents the differences in the baseline demographic characteristics be-

Table 3: Selective Attrition between TG and CG Demographic Characteristics - Administrative and Survey Data

	Difference TG/CG for:				
	Merged	At Least One Interview After Birth	Data Available for 12 Months After Birth	Data Available for 24 Months After Birth	Complete data from Birth Until Third Birthday
	(1)	(2)	(3)	(4)	(5)
Demographic Characteristics					
Age in Years	-0.314	-0.0637	0.0411	0.0872	0.313
	(0.329)	(0.364)	(0.393)	(0.445)	(0.578)
Week in Pregnancy	-0.423	-0.623	-0.429	-0.164	0.0986
	(0.433)	(0.466)	(0.495)	(0.548)	(0.665)
Migration	-0.0594**	-0.0592**	-0.0546*	-0.0548	-0.0701
	(0.0259)	(0.0298)	(0.0317)	(0.0355)	(0.0462)
Teenage	0.0358	0.0223	0.0173	0.000	0.0185
	(0.0376)	(0.0404)	(0.0425)	(0.0467)	(0.0550)
Mon. HH-Inc. in €	18.24	33.60	5.046	-3.292	31.79
	(43.69)	(48.27)	(48.63)	(54.22)	(67.26)
Debt over 3000 €	0.0259	0.0275	0.0230	0.0319	0.0565
	(0.0294)	(0.0319)	(0.0342)	(0.0381)	(0.0478)
Education Risk	0.0310	0.0213	0.0214	0.0223	0.0505
	(0.0319)	(0.0359)	(0.0387)	(0.0441)	(0.0552)
Income Risk	0.0193	0.00392	0.0117	0.0229	0.0102
	(0.0291)	(0.0327)	(0.0349)	(0.0399)	(0.0506)
Employment Risk	-0.0272	-0.0353	-0.0429	-0.0495	-0.0734
	(0.0279)	(0.0312)	(0.0336)	(0.0384)	(0.0495)
No Partner	0.0163	0.0324	0.0422	0.0351	0.0268
	(0.0346)	(0.0369)	(0.0386)	(0.0435)	(0.0546)
Unmarried	-0.0296	-0.0394	-0.0436	-0.0343	-0.0571
	(0.0221)	(0.0231)	(0.0252)	(0.0285)	(0.0376)
Living with Parents	0.00674	0.0104	-0.00503	-0.0155	-0.0311
	(0.0336)	(0.0365)	(0.0383)	(0.0422)	(0.0508)
Persons in HH	0.0508	0.148	0.0897	0.0316	-0.0784
	(0.126)	(0.136)	(0.136)	(0.148)	(0.181)
Lower Saxony	0.0319	0.0189	0.0346	0.0238	0.00308
	(0.0365)	(0.0395)	(0.0416)	(0.0460)	(0.0570)
Bremen	-0.0234	-0.00335	-0.0178	-0.00195	0.0247
	(0.0345)	(0.0377)	(0.0399)	(0.0447)	(0.0552)
Saxony	-0.00851	-0.0155	-0.0167	-0.0219	-0.0278
	(0.0356)	(0.0383)	(0.0406)	(0.0451)	(0.0523)
	703	602	539	438	296

Notes: Robust standard errors are shown in parentheses. Dependent variables shown in the first column. The treatment indicator has the value one if the mother is in the treatment group. Column (1) contains estimates of the average difference in characteristics between mothers in the control and treatment group for the participants merged with the administrative data. Column (2)-(5) contain these estimates for the survey data. See Appendix Tables A3 and A4 for variable definitions. TG = Treatment Group; CG = Control Group.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

tween the treatment and control groups for the administrative data (Column 1) and the survey data grouped by data availability (Columns 2-5). Appendix Table A6 shows the differences in psychological characteristics. The results reveal that the attrition only slightly reduced the equal distribution of the baseline characteristics. Only the difference in the proportion of mothers with migrant backgrounds, which

was already significant at baseline, remained significant for almost all interviews.[12]

6 Estimation Strategy

To analyse the effects of the intervention on maternal employment, fertility, childcare use, and partnership stability, I estimate the intent-to-treat (ITT) effects of the *Pro Kind* intervention using the multivariate model in Equation 1:

$$Y_{ic} = \beta_0 + \beta_1 HV_{ic} + \beta_2 h_{ic} + \alpha_c + \epsilon_{ic}, \tag{1}$$

where Y_{ic} denotes an outcome variable for mother i from community c. HV_{ic} is a dummy variable that takes a value of one if the mother belongs to the treatment group. h_{ic} is a vector of demographic and psychological family characteristics at baseline; α_c are community dummies; and ϵ_{ic} is the error term. β_1 measures the difference in outcome Y between the treatment and control groups.

I estimate the extensive and intensive margin of employment and welfare benefits with linear models. The results are not sensitive for estimating non-linear models for the binary outcomes instead and for including or excluding baseline variables. In the estimations with the administrative data, the only available baseline characteristics are maternal age and community of residence at baseline, whereas in the survey data several baseline characteristics can be included to give more precision to the estimates. I cannot estimate the effect of treatment on the treated using the randomly assigned treatment intended as an instrumental variable for treatment received because the data on compliance with the intervention are not merged with the administrative data. However, the effect of treatment on the treated would be marginally different from the present results because the implementation research showed that 97.7% of the treatment group participants received at least some treatment.

[12] Appendix Table A7 shows that some characteristics and risk factors differed between those who dropped out and those who participated in the follow-up interviews. Generally, the participating mothers were older and had fewer cumulative risk factors. The only difference between the participants who were merged and those who were not merged with the administrative data was migration status. This difference is likely due to those women who recently migrated having fewer years of employment and welfare history, which reduces the probability of identifying them in the social security data.

7 Results

7.1 Administrative Data

Table 4 examines the effects of *Pro Kind* on employment, public assistance and household composition using administrative data from the German social security system. In the first row, Column 1 presents the percentage of mothers who were employed for at least one month in the first three years after the birth of the treatment child. The next three rows separate employment into part-/full-time employment, apprenticeship and marginal employment.[13] Column 4 shows the mean total number of months in one of the occupations.

Among the mothers in the control group, 51 percent participated in the labour market in the first 36 months after birth. They were employed for 6.1 months on average during this period, indicating a high amount of job fluctuation and short employment periods in the sample. Participants were most frequently employed in marginal employment, but apprenticeship also played a large role, particularly when total months employed are considered. The prevalence of apprenticeship demonstrates that many participants had not completed their vocational training before giving birth and that they were oriented towards completing it after the birth.

Analysing the treatment impact on employment reveals that home visiting reduced the percentage of mothers with any employment (extensive margin) and the number of months employed (intensive margin). These effects are large and significant. The treatment reduced the rate of mothers who were employed for at least one month by 8.7 percentage points, to a rate of 42 percentage points; the average number of months employed was reduced by 1.51 months to 4.59 months, which is a 24.7 percent decrease relative to the mean time worked by the mothers in the control group. When analysing the different types of employment, the effect is strongest for part-time/full-time employment, for which the treatment reduced the extensive margin by 26.4 percent and the intensive margin by 39.1 percent relative to the mean of the control group.

[13] In Germany, an apprenticeship includes on-the-job training in a company and attendance of a vocational school. Completing an apprenticeship, which usually takes three years, is strongly correlated with labour market success in Germany. Marginal employment is, according to German social security law, an employment relationship with a low absolute level of earnings (a wage of less than 450 Euros per month) or an employment relationship of short duration.

Table 4: Maternal Life Course Outcomes 36 Months after the Birth of the Treatment Child - Administrative Data

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
			0 - 36 Months after Birth			
Any Employment	0.507	-0.087**	0.020	6.102	-1.509**	0.017
	[0.501]	(0.038)		[8.825]	(0.630)	
Parttime/Fulltime Employed	0.185	-0.049*	0.075	1.548	-0.606**	0.048
	[0.389]	(0.027)		[4.669]	(0.306)	
Apprenticeship	0.202	-0.034	0.250	2.246	-0.233	0.593
	[0.402]	(0.029)		[5.777]	(0.434)	
Marginal employment	0.293	-0.053	0.113	2.226	-0.648*	0.056
	[0.456]	(0.033)		[4.993]	(0.338)	
Welfare	0.941	0.037**	0.014	28.39	1.634**	0.046
	[0.235]	(0.015)		[11.51]	(0.817)	
Observations	*341*	*703*		*341*	*703*	
Second Child in HH	0.183	0.066**	0.037			
	[0.363]	(0.032)				
Observations	*323*	*677*				

Notes: Standard deviations in square brackets; robust standard errors in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base from affiliation to 36 months after birth. TG = Treatment Group; CG = Control Group; HH=Household.
* p < 0.1, ** p < 0.05, *** p < 0.01

The fourth row, "Welfare", indicates whether and for how many months on average a mother lived in a household that received public assistance. The figures in Column 1 shows, corresponding to the affiliation criteria, that 94.1 percent of the mothers in the control group received public assistance for at least one month during the first 36 months after birth. Moreover, the total number of months (28.39) indicates that the participants' households received welfare in 78.8 percent of the months during this period. In line with the reduction in employment, the treatment significantly increased the share of participant households on welfare and the number of months on welfare.

Table 5: Employment, Welfare, and Fertility by Age of the Treatment Child - Administrative Data

Panel A: Effects on Employment, Welfare, Fertility by Age of the Treatment Child

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
0 - 12 Months after Birth						
Any Employment	0.264	-0.098***	0.002	1.416	-0.427*	0.055
	[0.441]	(0.031)		[3.045]	(0.222)	
Welfare	0.897	0.028	0.192	10.261	0.430	0.193
	[0.304]	(0.022)		[4.558]	(0.329)	
Observations	*341*	*703*		*341*	*703*	
Second Child in HH	0.035	0.014	0.444			
	[0.189]	(0.019)				
Observations	*323*	*677*				
13 - 24 Months after Birth						
Any Employment	0.305	-0.054	0.114	1.935	-0.460*	0.076
	[0.461]	(0.034)		[3.604]	(0.259)	
Welfare	0.879	0.021	0.380	9.489	0.391	0.213
	[0.326]	(0.024)		[4.283]	(0.313)	
Observations	*341*	*703*		*341*	*703*	
Second Child in HH	0.070	0.034*	0.098			
	[0.257]	(0.021)				
Observations	*323*	*677*				
25 - 36 Months after Birth						
Any Employment	0.387	-0.053	0.145	2.751	-0.621**	0.041
	[0.488]	(0.036)		[4.214]	(0.303)	
Welfare	0.833	0.048*	0.068	8.645	0.813**	0.017
	[0.374]	(0.021)		[4.760]	(0.341)	
Observations	*341*	*703*		*341*	*703*	
Second Child in HH	0.078	0.018	0.389			
	[0.267]	(0.015)				
Observations	*323*	*677*				

Panel B: Effects on Fertility by Employment Status

	Any Employment 0-24 Months			Not Employed 0-24 Months		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
0 - 36 Months after Birth						
Second Child in HH	0.121	-0.002	0.968	0.221	0.085**	0.042
	[0.231]	(0.043)		[0.416]	(0.042)	
Observations	*122*	*233*		*199*	*444*	

Notes: Standard deviations in square brackets; robust standard errors in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base. TG = Treatment Group; CG = Control Group; HH=Household.
* p < 0.1, ** p < 0.05, *** p < 0.01

Next, I turn to the outcome of fertility. "Second Child in HH" is a binary variable that takes a value of 1 if two or more children are living in the household and 0 if one child or no children are living in the household.[14] Because the data recorded household composition only for households that receive welfare benefits or were engaged in job seeking, the number of observations is slightly reduced. The results show that while 18.3 percent of control group participants lived in a household with two or more children within the 36 months after the birth of the treatment child, this rate is 6.6 percentage points higher in the treatment group, leading to 24.8 percent of households with more than one child, which is an increase of 36 percent relative to the mean of the control group. As a robustness check, I assigned no second child to mothers with missing fertility data, which slightly increases the treatment coefficient on fertility. All effects on employment, welfare and fertility also hold and become slightly larger if the models include the community and age of the mother as controls (Appendix A8).

To examine the dynamics in the maternal fertility and employment decisions, Table 5, Panel A presents the employment, welfare and fertility outcomes separately for the first, second and third years after the birth of the treatment child. The effects on different types of employment by age are presented in Appendix A9. While the effect on fertility is small in the first 12 months, mothers in the treatment group already worked less and received slightly more months of welfare than their counterparts in the control group. In the second year, the treatment effect on births emerges and the differences in employment and welfare remain stable. In the third year, the effect on fertility decreases but remains positive, while the effects on welfare and employment increase. These figures suggest that the increase in fertility only partly explains the decrease in employment because employment was already lower in the treatment group before fertility increased. Only in the third year increased fertility seems to have a slight employment-reducing effect. Panel B in Table 5 shows that the fertility effect is concentrated in mothers who had not worked in the first

[14]There could be no children in the household in the event of miscarriage of the first pregnancy or when the treatment child did not live with the mother, most likely because the child was given to foster parents or, lived with the grand parents or the father. This was the case in 11 households. As a robustness check, I excluded these women from the fertility and employment and welfare analyses without any changes showing that these women were equally balanced between treatment and control groups.

24 months after birth which confirms that the lower employment in the treatment group in the first 24 months is not explained by mother stopping employment after a subsequent births. Analyses by age or federal state show no further heterogeneous effects.

Overall, the results from the administrative data indicate that the intervention had unintended effects, which are in contrast to the results of studies from the U.S. Instead of the intended higher levels of maternal employment and economic self-sufficiency and a lower rate of second births, we observe the opposite. The reduction in employment and the increase in welfare dependency were likely caused because the mother decided to stay at home longer directly after birth, and then these mothers who stayed at home decided to have another child. Only in the third year after birth, parity seems to increase welfare receipt and to reduce employment in the treatment group. In the next section, I use survey data to examine which channels most likely explain the identified results.

7.2 Survey Data

Table 6 presents the results of the telephone survey for the first three years after birth including the 296 mothers who participated in all interviews until the third birthday of the treatment child.[15] The first six rows of Table 6 include the same outcomes as Table 4. The only difference is that the variable "Second Child in Household" is labelled "Second Birth" because the survey directly asked for second births and not only for household composition. To increase the comparison between the survey sample and the administrative sample and to account for the potential bias that non-response may introduce, I weighted the models with the predicted probabilities of participating in all interviews. The weights are calculated by a logit model using a set of baseline characteristics.

In the survey data, the extensive and intensive rates of overall and type of employment are slightly higher than in the administrative data. However, the differences in employment between the treatment and control groups are similar in size without being statistically significant because of larger standard errors. In line with the

[15] I include only mothers who participated in all interviews to ensure that the outcomes can be interpreted in the same way as the outcomes from the administrative data.

reported higher employment, fewer mothers in the control group reported receiving welfare than indicated by the administrative data. However, also in this category, the treatment effect corresponds in size and significance to that in the administrative data. Analysing fertility in the survey data shows that the rate of second births in the control group is comparable to the respective figure in the administrative data. The difference between the treatment and control groups in the survey data is 8.6 percentage points, which is even higher than in the administrative data. Investigating the effects separately by age of the treatment child reveals similar results to the administrative data, with higher employment directly after birth.

Table 6: Maternal Life Course Outcomes 36 Months after Birth of the Treatment Child - Survey Data

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
Any Employment	0.600	-0.061	0.347	8.312	-1.415	0.246
	[0.491]	(0.065)		[9.322]	(1.217)	
Parttime/Fulltime Employed	0.303	-0.028	0.628	2.486	-0.643	0.314
	[0.460]	(0.058)		[5.301]	(0.638)	
Apprenticeship	0.304	-0.076	0.211	3.256	0.029	0.975
	[0.461]	(0.060)		[6.360]	(0.941)	
Marginal Employment	0.262	-0.045	0.419	2.570	-0.801	0.210
	[0.440]	(0.055)		[5.625]	(0.638)	
Welfare	0.919	0.052*	0.071	26.093	2.217*	0.089
	[0.273]	(0.029)		[10.852]	(1.301)	
Second Birth	0.203	0.086	0.147			
	[0.403]	(0.059)				
Second Pregnancy	0.360	0.011	0.863			
	[0.481]	(0.065)				
Inconsistent Use of Contraceptives	0.205	0.047	0.405			
	[0.404]	(0.056)				
Constant Partnership	0.401	-0.005	0.927			
	[0.491]	(0.057)				
Change in Marriage Status	0.183	-0.025	0.566			
	[0.387]	(0.044)				
School	0.120	-0.016	0.714	1.081	0.468	0.537
	[0.326]	(0.044)		[4.087]	(0.758)	
Childcare Utilization	0.589	0.061	0.349	7.268	1.953	0.125
	[0.493]	(0.065)		[8.869]	(1.269)	
Observations	137	296		137	296	

Notes: Robust standard errors in parentheses; Standard deviations in square brackets. Columns (2) and (5) report the coefficient and standard error on home visiting (HV) from estimating equation (1) by OLS. The estimations are weighted by the inverse probability to participate in all interviews. TG = Treatment Group; CG = Control Group; HH=Household.

The last six rows in Table 6 contain information which was measured only through the telephone surveys, including the occurrence of a second pregnancy, inconsistent

use of contraceptives, constant partnership, change in marriage status, school attendance, and childcare use. These six outcomes can help to identify channels why the intervention had unintended effects on employment, welfare use and fertility, which we observed in the administrative data. School attendance and childcare use were recorded on a monthly basis while the status at the time of the interview was recorded for the other outcomes.[16]

Analysing the rate of second pregnancies reveals that, in contrast to the rate of second births, it does not differ between the treatment and control groups. In both groups, approximately one-third of the mothers became pregnant a second time within 36 months after the birth of the treatment child. This finding indicates that a difference in pregnancy outcomes must be present, at least to some extent. As expected, since the home visits did not affect second pregnancies, they also did not affect inconsistent use of contraceptives.[17]

The next four rows examine partner stability, marriage status, school attendance and childcare use. Partner stability represents the percentage of women who stayed with the same partner from pregnancy until the third birthday of the treatment child. Change in marriage status indicates whether a women became married during the observation period. The treatment did not change the rate of mothers in a stable partnership or the marriage rate, indicating that it is not a more stable family situation which lead to more births or that a higher family income from a partner decreases maternal employment probability. School attendance is an indicator that could explain the lower employment rate in the treatment group due to mothers returning to or starting school after birth. Increased school attendance would be in line with the goals of the intervention. However, the survey data reveal no increase in school attendance for the mothers in the treatment group.[18]

Less or later childcare use in the treatment group might explain the lower rate of employment. However, following the *Pro Kind* guidelines, the home visitors supported the mothers in the childcare application process and in finding adequate

[16]Childcare utilization is a broad measure of whether a child attends childcare. It does not include hours or quality of childcare.

[17]The question regarding the use of contraceptives was asked in three interviews at 15, 27 and 36 months. A mother was considered to use contraceptives inconsistently if she stated in one interview that she did not always use a contraceptive method. Mothers who were sexually inactive, pregnant or trying to become pregnant were excluded from the sample.

[18]Enrolment in higher education was of negligible relevance in the treatment and control groups.

childcare if the mothers wanted to use childcare. Additionally, the home visitors might gave advice that childcare is subsidized or even completely free for mothers on welfare in Germany. The results show that the intervention slightly increased the average months of childcare use, suggesting that home visitors were successful at supporting mothers in locating care. An analysis of the timing of childcare use reveals that the two groups used childcare similarly in the first 12 months; only afterwards the usage increased stronger for the treatment group. Therefore, lower childcare use does not explain the lower employment after birth in the treatment group. Instead, it seems that some mothers, although not working, used institutional childcare. If these mothers perceived external childcare as a relief of strain, the better provision might be one reason why they decided to have a second child.

Overall, the results of the survey data confirm the findings from the administrative data that the intervention increased second births and welfare dependency and decreased employment. Appendix A10 shows the unweighted results, which appear similar in size with the exception that the coefficient for second birth becomes significant in the unweighted estimation. Since more immigrants were in the control group at baseline, Appendix A11 presents the results without immigrants which changes the results only slightly. Investigating the channels for the results indicates that a change in second pregnancy outcomes most likely explains the increase in second births, while partner stability and school attendance are unlikely to be explanations. This finding is again in contrast to results from the U.S., where the intervention reduced not only second births, but also second pregnancies in all three trials.

The analyses included only mothers who participated in all the interviews. Although there are no differences between the treatment and control group baseline characteristics in this sample, the results require careful interpretation because the survey sample does not have the same characteristics as the baseline sample. Therefore, in the next section, I remove the sample restriction and include all mothers who participated in at least one interview after birth to examine how pregnancy outcomes, as the main driver of the fertility effect, differ between the treatment and control groups.

7.2.1 Pregnancy Outcomes

Table 7, Panel A shows that the rate of second pregnancies in this sample of control group mothers is slightly lower than in the sample that includes only mothers who participated in all the interviews. Presumably, the rate is lower because some mothers participated in only one interview after birth, which was most likely before a further pregnancy occurred. The rate of second pregnancies in the treatment group is 5.5 percentage points higher, but the difference is not statically significant at the ten percent level, thereby confirming the results from the analyses of the mothers who participated in all the interviews. Altogether, 175 second pregnancies occurred among the mothers who participated at least in one interview after birth.[19]

Table 7: Second Pregnancy Outcomes in Treatment and Control Groups

Panel A: Second Pregnancy Occurred			
	Control Mean	Diff. TG/ CG	p-value
Pregnancy after First Birth	0.261	0.055	0.136
	[0.440]	(0.037)	
Obs.	*283*	*602*	
Panel B: Second Pregnancy Outcomes (Descriptives)			
	Control Mean	Treatment Mean	Overall Mean
Live Birth	0.527	0.634	0.589
Abortion	0.243	0.149	0.189
Miscarriage	0.135	0.089	0.109
Unobserved	0.095	0.129	0.114
Obs.	*74*	*101*	*175*
Panel C: Multinomial Logit			
	Birth vs. Abortion	Birth vs. Miscarriage	Birth vs. Unobserved
Home Visiting	-0.677*	-0.600	0.123
	(0.405)	(0.503)	(0.512)
Obs.	*175*	*175*	*175*

Notes: Standard errors in parentheses; Standard deviations in square brackets. The table includes all mothers with at least one interview after birth. Panel B includes all pregnancies from Panel A. Panel C is a multinomial logit estimation with Live Birth as baseline category. TG = Treatment Group; CG = Control Group;
* p < 0.1, ** p < 0.05, *** p < 0.01

Panel B presents the outcomes of these 175 second pregnancies, which could be live birth, abortion, miscarriage or unobserved pregnancy outcome. Along with the results of the previous sections, Panel B reveals that the percentage of pregnancies that led to a live birth was higher in the treatment group (63%) than in the control group (53%), resulting in 103 observed second births. Additionally, the table demonstrates that abortions (24% vs. 15%) and miscarriages (14% vs. 9%)

[19]The 175 pregnancies only include the first pregnancy of each participant after the birth of the treatment child.

were more common in the control group than in the treatment group. In contrast, the percentage of pregnant women with unobserved pregnancy outcomes was only slightly higher in the treatment group.

Panel C uses a multinomial logit function to examine the differences in pregnancy outcomes in greater detail. I am interested in whether the treatment influenced the probability of a live birth relative to the other three outcomes. The analysis reveals that the probability of a pregnancy ending in an abortion instead of a live birth was significantly lower in the treatment group than in the control group. For miscarriage, the coefficient is in the same direction and of approximately the same size but is not significant. Finally, the probability of not observing the outcome of the pregnancy relative to that of a live birth was only slightly higher in the treatment group. These findings confirm that the differences in fertility between the two groups were not caused by selective attrition; rather, they were the result of a reduced number of abortions and miscarriages in the treatment group.

One concern about the validity of the abortion result is the possibility of misreporting. The validity is violated if mothers in the treatment group reported abortions or pregnancies differently than mothers in the control group. This might be the case if mothers in the treatment group did not want the home visitor to know about an unwanted pregnancy; therefore, being in the treatment group might increase a mother's likelihood to underreport pregnancies and, consequently, abortions and/or miscarriages. However, the interviewers guaranteed the participants that their answers would not be relayed to the home visitors. Additionally, it is very unlikely that the home visitors would not recognize a client's pregnancy, possibly making the reporting bias smaller in the treatment group than in the control group. Another concern is that abortions might be reported as miscarriages as a socially more acceptable termination. However, this misreporting would imply that the intervention's effects on abortions are only a lower bound, since miscarriages were higher in the control group.

Placing the rate of abortions in the *Pro Kind* programme in relation to the abortion rates in the overall population helps interpret the abortion results. From 2008 to 2011, there were approximately 16 abortions per 100 live births in the overall

German population.[20] Ratios for at-risk mothers who are comparable to the *Pro Kind* sample are not available. However, data for unmarried women, who might be more similar to the *Pro Kind* sample than the overall population, indicate 27 abortions per 100 live births (Statistisches Bundesamt, 2014). The control group of the *Pro Kind* sample had a ratio of 46 abortions per 100 live births, whereas the ratio in the treatment group was 23 to 100, which is close to the population average and lower than the average for unmarried mothers. This might indicate that mothers in the treatment group were as confident in their ability to raise a second child as average mothers.

Despite the finding that a lower percentage of pregnancies ended in an abortion in the treatment group than in the control group, it remains unclear whether this is the result of appropriate family planning decisions, which is a goal of the *Pro Kind* programme. In this context, appropriate decisions mean that only mothers who plan a second birth and who are able to meet the challenges of another child give birth to a second child. The analysis of the survey data indicated that the treatment did not affect partner stability, which might be related to appropriate family planning. To investigate in greater detail the question of whether appropriate family planning increased, I analysed the life situations of the *Pro Kind* second-time mothers in treatment and control groups and compared them with SOEP second-time mothers.

Table 8: Life Situations of Mothers who Gave Birth to a Second Child

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Control		Treatment		P-value	SOEP	
	n	Mean	n	Mean	Diff. C-T	n	Mean
After Birth of sec. Child							
Unplanned Preg.	35	0.57	62	0.61	0.689	799	0.19
Father Does not Live In HH	35	0.29	60	0.40	0.262	803	0.06
No Other Care Apart From Mother	35	0.31	62	0.48	0.104	804	0.08
Mother has no Partner	33	0.06	58	0.17	0.130	803	0.01
Age of the Sec. Child in Mo.	32	8.41	62	6.49	0.352	802	6.96
Age of the Moth. at Births in Years	35	23.4	62	23.9	0.594	766	32.08

Notes: P-values base on z-statistic of a two-group test of proportions. The presented data contains all second children for whom data are available. *Age of the Sec. Child in Mo.* gives the age of the second child at the time of the interview. C = Control Group; T = Treatment Group.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 includes data from the interview after the birth of the second child for 97 of the 103 second children. The first two rows present responses to questions con-

[20] German official statistics only report the rate of abortions in comparison to live births and not the rate of pregnancies that end in abortion.

cerning whether the child was unplanned and whether the mother had a partner. If the mothers had made appropriate family planning decisions, one would expect that unplanned pregnancies and pregnancies among women without partners would be uncommon among second-time mothers. However, 61% of the mothers in the treatment group stated that their second child was unplanned. In the control group, this rate was 57%. Furthermore, other characteristics, such as "no partner" or "father does not live in the household", occurred more often in the treatment group. Although none of these differences are statistically significant, the results may indicate that mothers in the treatment group with fewer resources had a second child and that these mothers were less accurate with respect to family planning than the mothers in the control group. The findings that only 39% of the mothers planned their second pregnancy and 48% had no care support from another person indicates little appropriate family planning in the treatment group. These figures are even more illustrative when compared to population representative SOEP mothers (Columns 6 and 7): 81% of the SOEP mothers stated that the pregnancy that led to a second child was planned, and only 8% stated that they were alone responsible for the child.

The next question is why the mothers in the treatment group decided to have another child despite not having planned a second birth, being unemployed and seeming to be unable to meet the challenges of having another child. As an explanation, the home visitor might have directly influenced the decision of the pregnant mother. There are no recommendations concerning abortions in the *Pro Kind* or NFP guidelines, and I do not have information about the behaviour of the home visitors in this situation. Although, the nurse supervisors stated in in-depth interviews that abortion was essentially not a topic in the nurse supervision, they also stated that a nurse or midwife would hardly advise a client to abort a pregnancy. However, mothers in the treatment and control groups also received encouragement to keep the baby from other sources because German law permits abortions only if the woman has received consultation from a family counselling office, and many of the mothers decided against an abortion after the second birthday of the treatment child, when the intervention had already ended. Therefore, in addition to the direct

advice of the home visitors and the family counselling office, it is likely that other channels were also important for the decision of the mothers.

In the literature on further parity progression, life satisfaction and well-being play important roles. As Margolis and Myrskylä (2015) showed, a decline in life satisfaction during the transition to parenthood reduces the probability of subsequent births. Therefore, a potential reason why the *Pro Kind* programme increased both fertility and the duration that mothers stayed at home directly after birth is increased satisfaction with their lives and their maternal role. This higher satisfaction might have resulted from more positive experiences and greater attachment to the first child due to enhanced maternal skills in the treatment group. To test this hypothesis, the next section investigates whether the *Pro Kind* intervention influenced reports of maternal life satisfaction and well-being.

7.2.2 Life Satisfaction and Well-being

I begin the analysis with a descriptive overview of the treatment and control groups' outcomes and the SOEP data for first-time mothers. These outcomes were obtained at the interview 27 months after the birth of the treatment child. Appendix Table A12 shows that on eight of the nine satisfaction dimensions, the mothers in the treatment group reported being more satisfied than the mothers in the control group. The results are similar for the four questions regarding well-being. The mothers in the treatment group reported feeling sad, angry, or worried less often and happy more often. Compared with the first-time mothers from the SOEP sample, the mothers in the *Pro Kind* treatment group also had higher well-being and were more satisfied in most categories. Table 9 shows that the differences between the control and treatment groups are significant at the 10% level for the well-being index, which captures satisfaction with life in a variety of specific areas and in general.[21] The standardized effect sizes are meaningful, with values near 0.15 SD.

After showing that the *Pro Kind* programme increased maternal life satisfaction and well-being, the investigation sought to determine whether these subjective mea-

[21] Well-being is based on an index indicating how often one is happy versus sad, angry, or worried. Life satisfaction in different areas is based on an index of eight questions related to satisfaction with health, housework, household income, personal income, place of dwelling, free time, childcare availability and family life. Following Kling et al. (2007), indices are defined to be the equally weighted average of z-scores of its components. The z-scores are calculated by subtracting the control group mean and dividing by the control group standard deviation.

Table 9: Well-Being and Satisfaction with Life

	(1)	(2)	(3)	(4)	(5)	(6)
	Index of Well-Being		Index of Life Satisfaction in Different Areas		Satisfaction with Life in General	
Home Visiting	0.189***	0.167***	0.118*	0.106*	0.155*	0.147**
	(0.069)	(0.043)	(0.061)	(0.051)	(0.097)	(0.062)
Household Controls	No	Yes	No	Yes	No	Yes
Observations	*434*	*429*	*430*	*425*	*432*	*427*
R^2	*0.02*	*0.18*	*0.01*	*0.26*	*0.01*	*0.18*

Notes: Standard errors (in parentheses). Well-Being is an index of being less often sad, angry, or worried and more often happy. Life Satisfaction in Different Areas is an index of eight questions concerning satisfaction with health, housework, household income, personal income, place of dwelling, free time, childcare availability and family life. All dependent variables are standardized with mean of zero. Controls include extended baseline variables, community fixed effects and age of the treatment child. Measurement occurred in average at 28 months after the birth of the treatment child. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

sures are related to fertility decisions. Mothers who aborted their pregnancy in the *Pro Kind* sample had a general satisfaction value of 5.74, which is lower than the general satisfaction of mothers with and without a second birth. Although it is unclear whether low life satisfaction caused the abortions or the abortions led to low life satisfaction, this association provides a first indication that low life satisfaction is correlated with abortions. Further evidence that the greater life satisfaction in the treatment group is related to fertility comes from comparing the mothers who gave birth to a second child in the treatment group with those in the control group. Their life satisfaction levels differed 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 increase in happiness. However, it is likely that greater life satisfaction was also influenced by better experiences with the first child and that, as a result, the mothers were already happier before they became pregnant a second time. If this is the case, this higher level of happiness could be an explanation for the lower rate of abortions in the treatment group.

8 Comparison to U.S. Results

In this section, I first discuss whether programme implementation and participants' characteristics can explain why the effects on maternal outcomes differ so substantially from the results of the U.S. studies, mainly the NFP. Then I discuss different

explanations for the reversed effects, such as welfare state arrangements for mothers with small children and contraception use.

Table 10: Programme and Participant Characteristics of Pro Kind and NFP

	Nurse Family Partnership			Pro Kind
Characteristics of the Intervention				
Location	Elmira, NY	Memphis, TE	Denver, CO	Germany
Year	1980	1990	1995	2007
Evaluation Design	RCT	RCT	RCT	RCT
Randomized Participants	264	1139	490	755
Home Visits (Mean)	32	33	27.5	33
Materials	NFP Guidebooks			German Adaptation of NFP Guidebooks
Home Visitors (Qualification)	Family Nurses			Family Midwifes, Social Pedagogues
Home Visitors (Training)	NFP Guidelines			NFP Guidelines
Participants Characteristics				
Parity	First			First
Date of Randomization	Pregnancy			Pregnancy
Socioeconomic Status	Low			Low
Age	18.9	18.1	19.9	21.4
Unmarried in %	100	98	85	92
Years of Education	10.7	10.2	11.2	10.7
Results Maternal Life Course				
Employment	+	+	+	-
Second Birth	-	-	-	+

Table 10 summarizes the *Pro Kind* implementation and participants' characteristics. The table shows that, compared with the NFP home visitors, the *Pro Kind* home visitors had similar qualifications, received the same training and used the same materials and guidebooks (translated into German), during their home visits. Additionally, the average number of conducted home visits in the *Pro Kind* programme is close to the average number of home visits in the NFP trials. Consequently, programme costs are very similar in the two programmes. As discussed above, the average intervention cost in the NFP Memphis trial was $11,511 (expressed in 2006 U.S. dollars). The average cost of the *Pro Kind* intervention was €8,705 (expressed in 2008 Euros), or approximately $11,752 assuming an exchange rate of 1.35 €/$ (Maier-Pfeiffer et al., 2013). Finally, the implementation data show that the home visitors spent a similar amount of time on the various programme topics in *Pro Kind* and NFP (Appendix Table A5). The next rows in Table 10 compare sample characteristics between *Pro Kind* and NFP. With respect to marriage status and years of education, the populations in the NFP randomized trials show similar

characteristics. Only the average age of the participants appears slightly younger. However, it is important to note that in both *Pro Kind* and NFP, all participants were disadvantaged, pregnant, first-time mothers. These criteria alone should result in highly comparable populations in the U.S. and German studies. Taking all these aspects together, it is unlikely that differences in implementation or the participants' characteristics alone can explain the dramatic difference between the results from the U.S. studies and the German study.

One alternative explanation might be the different welfare state arrangements in Germany and the U.S. for families with children under three. In Germany, social assistance is means-tested and increases with parity. There are no work obligations or benefit cuts until the child's third birthday. If a welfare-dependant mother decides to work, the benefits are withdrawn at a rate of almost 100%. As an example of these low incentives, Blundell et al. (2009) showed that the budget line for a low-wage single mother with two children was hardly affected by her working hours.[22] In contrast, in the U.S., welfare programmes include work obligations, in-kind transfers and family caps, limiting either partially or completely any additional benefit for having a subsequent child while receiving welfare benefits. In addition, Meyer and Rosenbaum (2001) demonstrated that between 1984 and 1996, changes in tax and transfer programmes, such as the EITC, sharply increased the incentive for low-income mothers and single mothers to work. If the intervention success on maternal personal strengths interacts with employment incentives, then home visiting might be successful in increasing employment in the U.S., while in Germany the effect on maternal skills and life satisfaction might predominate and consequently lead to longer employment absence after birth and more second births.

Another reason for the different fertility effects apart from welfare, might be different levels of knowledge concerning contraception among young women in the U.S. and Germany. Although institutional settings for abortions are comparable in both countries and all contraceptives are generally available for purchase in Germany

[22] A single mother with one child receives approximately €1,370 in welfare payments per month (which is $1850, assuming an exchange rate of 1.35 €/$). If she earns the German hourly minimum wage of €8.5, she earns €1,200 with full-time employment after deductions for health insurance (childcare is generally free for low-income mothers in Germany). Thus, the single mother must work full-time and must earn an hourly wage of €9.5 to meet the reservation wage.

and the U.S.,[23] it has been documented that teen pregnancies are higher in the U.S. than in Germany (Kearney and Levine, 2012). One explanation for the higher rate in the U.S. is less contraceptive use and knowledge of contraceptives among young women (Darrach et al., 2001). If this is the case, home visiting in the U.S. may have more space to achieve an impact, e.g., due to recommendation of safer contraception methods, whereas it is more difficult to reach additional benefits in this topic in Germany. In line with this argument, NFP reduces not only births but also pregnancies. While it is difficult to reject this explanation, two findings challenge it. First, assuming that knowledge of contraception is lower among teenagers, I would expect to find a smaller effect of the *Pro Kind* intervention on teenage fertility, which is not the case. Second, Kearney and Levine (2015) showed that mandatory sex education has only limited effects on teen births and that lack of knowledge seems not to be the main driver of teen fertility. Therefore, it remains an open question to what extent education in contraception by home visitors or increased personal strengths reduced further pregnancies in the U.S. studies.

9 Conclusion

Home visiting programmes are a popular type of early childhood intervention for supporting disadvantaged families. While many studies have investigated how these programmes affect child outcomes, this study used a randomized experiment to answer the much less thoroughly investigated question of how home visiting programmes affect the maternal life course. The few previous studies that investigated this topic found that home visiting programmes had positive effects on maternal employment and reductions in fertility. In contrast, this analysis of the *Pro Kind* programme reveals that the intervention had negative effects on employment and positive effects on fertility. The effects on fertility were mainly driven by the lower number of abortions in the treatment group. Furthermore, the *Pro Kind* programme

[23] German law permits abortions up to the 12th week of a pregnancy if the woman received consultation and passed a subsequent waiting period of three days. After the 12th week of the pregnancy, abortions are possible without time limits if there is a risk to the life and health of the mother (medical indication) or if the pregnancy is the result of a crime (criminal indication). The expenses for abortions based on the two indications are typically borne by health insurances, whereas abortions following a consultation are paid privately. Although abortion laws are more lenient in the U.S. relative to Germany, abortion is legal in both countries; therefore, a comparable situation persists (Levine, 2004; Cygan-Rehm and Riphahn, 2014).

increased the life satisfaction and well-being of the participating mothers. Although it is not clear how the observed increase in fertility and decrease in employment will affect child development and government spending, it is encouraging that the relationship between home visitors and mothers seem sufficiently strong to affect two very fundamental life decisions of disadvantaged mothers. This finding shows how promising the concept of home visiting is in general.

A randomized experiment was used to evaluate the effects of *Pro Kind* on the maternal life course. Therefore, the effects can be causally linked to the intervention. For the main analysis, I used administrative data that are not subject to the risk of missing data or reporting error. For the analysis of the channels that lead to the unintended outcomes, I relied on survey data that suffered from survey non-response. Nevertheless, a comparison of the baseline characteristics of the treatment and control groups indicates that this attrition was not selective. Therefore, it is unlikely that the sample attrition reduced the validity of the results.

Previous studies that examined the effect of home visiting on the maternal life course were conducted in the U.S., whereas the *Pro Kind* programme is located in Germany. The content and implementation of the programme and the programme participants are very similar in *Pro Kind* and the U.S. studies. Therefore, the differences in the two countries' welfare systems might explain much of the variation in outcomes between the previous studies and the *Pro Kind* study. Studies of other early childhood programmes, particularly when they are implemented in settings other than the U.S., should consider the results of the *Pro Kind* programme. One example in which an evaluation of a home visiting programme did not consider maternal employment and fertility as outcomes is a recent large RCT in the U.K., which evaluated an adaptation of NFP (Robling et al., 2016). That study considered second pregnancies as the only life course outcome. Consistent with the *Pro Kind* results, the findings showed no differences between the treatment and control groups. Further research should investigate whether the U.K. intervention has also similar effects than *Pro Kind* on the other life course outcomes.

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Appendix A

See Tables A1-A10 and Figure A1.

Table A1: NFP Results Elmira, Memphis and Denver

NFP Results Elmira

Outcome	Observation Period		
	6 Months	**4 Years**	**15 Years**
School:	More School Enrolment of School Dropouts		
Employ.:		More Employment (15.54 Mon. vs. 8.64 Mon.)	More Employment (95 Mon. vs. 80 Mon.) (p<0.1)
Fertility:		Fewer Subsequent Pregnancies (0.58 vs. 1.02)	Fewer Subsequent Pregnancies (1.5 vs. 2.2) Fewer Subsequent Births (1.1 vs. 1.6) Longer Interval Between First and Subsequent Birth (65 Mon. vs. 37 Mon.)
Welfare:			Less Mon. Eligible to Welfare (60 Mon. vs. 90 Mon.)

NFP Results Memphis

Outcome	Observation Period			
	2 Years	**6 Years**	**9 Years**	**12 Years**
Employ.:		More Employment (p<0.1)	More Employment (p<0.1)	More Employment (p<0.1)
Fertility:	Fewer Subsequent Pregnancies (0.36 vs. 0.47)	Fewer Subsequent Pregnancies (1.16 vs. 1.38) Fewer Subsequent Births per Year (1.08 vs. 1.28)	Fewer Cumulative Subsequent Births per Year (0.81 vs. 0.93)	
Welfare:		Less Mon. Eligible to Transfer per Year (7.21 Mon. vs. 8.96 Mon.)	Less Mon. Eligible to Transfer per Year (5.21 Mon. vs. 5.92 Mon.)	

NFP Results Denver

Outcome	Observation Period	
	2 Years	**4 Years**
Employ.:	More Employment (6.83 Mon. vs. 5.65 Mon.)	More Employment (15.13 Mon. vs. 13.38 Mon.)
Fertility:	Fewer Subsequent Pregnancies (0.29 vs. 0.41) Fewer Subsequent Births (0.12 vs. 0.19)	Longer Interval Between First and Subsequent Birth (24.51 Mon. vs. 20.39 Mon.)

Notes: If not indicated differently, all treatment effects are significant with p<0.05. Employ. = Employment. Mon. = Months Source: NFP Results Elmira (Olds et al., 1988, 1997), Memphis (Kitzman et al., 1997; Olds et al., 2004, 2007, 2010), Denver (Olds et al., 2002, 2004)

Table A2: Randomization Outcomes per Municipality

Federal State	Community	CG	TG	Enrollment Period
Lower Saxony	Braunschweig	26	32	1.11.2006 - 30.4.2009
	Celle	15	25	
	Garbsen	10	12	
	Göttingen	12	13	
	Laatzen	4	4	
	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 - 31.12.2009
	Plauen	13	18	
	Muldentalkreis	16	12	
	Dresden	46	43	
	Vogtlandkreis	10	12	
$\sum$		**361**	**394**	

Table A3: Baseline Variable Definitions - Demographic Characteristics

Variable	Type	Description	n
Age in Years	Metric	Participants' Age in Years at Baseline	755
Week in Pregnancy	Metric	Week in Pregnancy at Randomization	755
Teenage	Binary	1 if Participant is Younger than 20 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
Unmarried	Binary	1 if Participant is not married or living in divorce	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

Table A4: Baseline Variable Definitions - Psychological and Physical Characteristics

Variable	Type	Description	n
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 *Fragebogen zur Erfassung von Aggressivitätsfaktoren (FAF)*	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' $Weight/Height^2$ (Weight Before Pregnancy)	750
Sum Risk Factors	Metric	Sum of Risk Factors (Risk factors include: Being Underage, No Graduation, Low Income, No Employment, Unwanted Pregnancy, Alcohol Consumption Once a Week, Regular Drug Use, No Partner, Social Isolation, Foster Care Experience, Experience of Neglect, Experience of Loss, Experience of Violence (During Pregnancy), Experience of Violence (Ever), Mental Illness, Depression, Anxiety, Stress and Aggression.	755

Table A5: Topical Focus of the Home Visits in NFP and *Pro Kind*

	***Pro Kind* Average**	**NFP-Average**	**Recommended Average by NFP**
During Pregnancy			
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%	-	-
During Infancy			
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%	-	-
During Toddlerhood			
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. Source: Jungmann et al. (2009); The National Center for Children Families and Communities (2005).

Table A6: Selective Attrition between TG and CG Psychological Characteristics - Administrative and Survey Data

	Difference TG/CG for:				
	Merged	At Least One Interview After Birth	Data Available for 12 Months After Birth	Data Available for 24 Months After Birth	Complete data from Birth Until Third Birthday
	(1)	(2)	(3)	(4)	(5)
Unwanted Pregnancy	0.0122	0.0224	0.0318	0.0183	-0.00863
	(0.0288)	(0.0310)	(0.0313)	(0.0333)	(0.0416)
Daily Smoking	0.00186	0.000532	-0.0133	-0.00888	-0.0256
	(0.0360)	(0.0384)	(0.0407)	(0.0442)	(0.0540)
Isolation	-0.00685	-0.0146	-0.00474	-0.00712	0.0151
	(0.0189)	(0.0204)	(0.0213)	(0.0246)	(0.0319)
Foster Care Exper.	0.0409	0.0471	0.0424	0.0548	0.0573
	(0.0313)	(0.0321)	(0.0338)	(0.0359)	(0.0430)
Neglect Experience	0.00810	-0.00346	-0.0136	-0.00800	0.0396
	(0.0368)	(0.0393)	(0.0416)	(0.0460)	(0.0565)
Lost Experience	-0.0474	-0.0679*	-0.0667	-0.0485	0.000505
	(0.0377)	(0.0408)	(0.0431)	(0.0480)	(0.0585)
Violence Ever	-0.00510	-0.00210	-0.0127	-0.0247	-0.0393
	(0.0211)	(0.0213)	(0.0219)	(0.0239)	(0.0318)
Depression	-0.0154	-0.00256	0.00532	0.0110	0.0173
	(0.0241)	(0.0250)	(0.0262)	(0.0289)	(0.0368)
Anxiety	-0.00761	0.00400	0.00552	0.00189	0.00193
	(0.0287)	(0.0301)	(0.0315)	(0.0348)	(0.0438)
Stress	0.0329	0.0277	0.0214	0.0202	0.00161
	(0.0348)	(0.0374)	(0.0394)	(0.0438)	(0.0540)
Aggression	-0.0328	-0.0450	-0.0462	-0.0652*	-0.0819**
	(0.0282)	(0.0294)	(0.0312)	(0.0336)	(0.0401)
Body-Mass-Index	-0.0154	-0.265	-0.114	-0.170	0.391
	(0.401)	(0.445)	(0.477)	(0.519)	(0.652)
Medic. Indic. Risk Preg.	0.00459	0.0135	0.0113	-0.0132	-0.00358
	(0.0240)	(0.0255)	(0.0274)	(0.0297)	(0.0373)
Sum Risk Factors	-0.0336	-0.120	-0.140	-0.121	-0.0928
	(0.184)	(0.192)	(0.200)	(0.217)	(0.271)
Observations	*703*	*602*	*539*	*438*	*296*

Notes: Robust standard errors are shown in parentheses. Dependent variables shown in column (1). The treatment indicator has the value one if the mother is in the treatment group. Column (2) contains estimates of the average difference in characteristics between mothers in the control and treatment group for the participants merged with the administrative data. Column (3)-(6) contain these estimates for the survey data. See Appendix Tables A3 and A4 for variable definitions.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A7: Selective Attrition between "Attritors" and "Non-Attritors"

	Difference "Attritors" / "Non-Attritors" for:				
	Merged	At Least One Interview After Birth	Data Available for 12 Months After Birth	Data Available for 24 Months After Birth	Complete data from Birth Until Third Birthday
	(1)	(2)	(3)	(4)	(5)
Age in Years	0.801	1.261**	1.679***	1.858***	2.180***
	(0.623)	(0.390)	(0.344)	(0.313)	(0.313)
Week in Pregnancy	-0.480	1.404**	1.162*	0.808	1.060*
	(0.829)	(0.520)	(0.463)	(0.424)	(0.428)
Migration	-0.190***	0.0484	0.0410	0.0350	0.0761**
	(0.0509)	(0.0323)	(0.0287)	(0.0263)	(0.0265)
Teenage	-0.0505	-0.137**	-0.150***	-0.165***	-0.201***
	(0.0716)	(0.0449)	(0.0398)	(0.0363)	(0.0364)
Mon. HH-Inc. in €	-61.91	194.9***	111.0*	135.3**	158.7***
	(85.35)	(53.59)	(47.53)	(42.64)	(42.55)
Debt over 3000 €	0.0902	0.0374	0.0513	0.0386	0.0538
	(0.0552)	(0.0348)	(0.0309)	(0.0283)	(0.0286)
Education Risk	0.0167	-0.130***	-0.153***	-0.159***	-0.170***
	(0.0610)	(0.0381)	(0.0337)	(0.0307)	(0.0310)
Income Risk	0.0693	-0.0686	-0.0652*	-0.0858**	-0.106***
	(0.0559)	(0.0351)	(0.0312)	(0.0285)	(0.0288)
Employment Risk	-0.00974	-0.0732*	-0.0790**	-0.0905***	-0.121***
	(0.0531)	(0.0334)	(0.0296)	(0.0271)	(0.0272)
No Partner	0.164*	-0.00840	-0.0384	0.000605	0.0552
	(0.0648)	(0.0410)	(0.0365)	(0.0334)	(0.0337)
Unmarried	0.0963*	-0.0227	-0.0391*	-0.0351*	-0.0572**
	(0.0396)	(0.0251)	(0.0223)	(0.0204)	(0.0205)
Living with Parents	-0.0840	-0.00294	-0.0267	-0.0346	-0.0352
	(0.0648)	(0.0410)	(0.0363)	(0.0331)	(0.0334)
Persons in HH	-0.312	-0.0562	-0.195	-0.194	-0.163
	(0.234)	(0.151)	(0.133)	(0.122)	(0.124)
Unwanted Pregnancy	0.0418	0.00448	-0.0617*	-0.0816**	-0.0409
	(0.0545)	(0.0343)	(0.0305)	(0.0278)	(0.0282)
Daily Smoking	0.158*	-0.0502	-0.0309	-0.0844*	-0.0520
	(0.0679)	(0.0429)	(0.0382)	(0.0348)	(0.0353)
Isolation	-0.0485	-0.0185	-0.0184	0.00138	0.0179
	(0.0367)	(0.0232)	(0.0206)	(0.0189)	(0.0191)
Foster Care Exper.	0.0859	-0.116**	-0.0885**	-0.109***	-0.0862**
	(0.0590)	(0.0370)	(0.0329)	(0.0301)	(0.0305)
Neglect Experience	0.119	-0.0889*	-0.0641	-0.0625	-0.0140
	(0.0697)	(0.0439)	(0.0391)	(0.0358)	(0.0362)
Lost Experience	0.0587	0.00802	0.00973	-0.0509	-0.0322
	(0.0718)	(0.0453)	(0.0403)	(0.0368)	(0.0373)
Violence Ever	0.00843	-0.0576*	-0.0564*	-0.0442*	-0.00606
	(0.0401)	(0.0252)	(0.0224)	(0.0205)	(0.0208)
Depression	-0.0194	-0.0587*	-0.0507*	-0.0383	-0.00834
	(0.0462)	(0.0290)	(0.0258)	(0.0237)	(0.0240)
Anxiety	0.0211	-0.0611	-0.0553	-0.0435	-0.00755
	(0.0545)	(0.0343)	(0.0305)	(0.0279)	(0.0283)
Stress	0.0765	-0.0229	-0.0309	-0.0178	0.00896
	(0.0660)	(0.0416)	(0.0370)	(0.0339)	(0.0343)
Aggression	0.0525	-0.0563	-0.0358	-0.0486	-0.0423
	(0.0533)	(0.0335)	(0.0298)	(0.0273)	(0.0276)
Body-Mass-Index	0.200	0.433	1.015*	0.908*	0.882*
	(0.766)	(0.483)	(0.428)	(0.392)	(0.396)
Medic. Indic. Risk Preg.	-0.00159	-0.0211	-0.00257	-0.0157	0.00158
	(0.0457)	(0.0288)	(0.0256)	(0.0235)	(0.0237)
Sum Risk Factors	0.752*	-0.772***	-0.837***	-0.879***	-0.587**
	(0.349)	(0.219)	(0.194)	(0.177)	(0.180)
Lower Saxony	-0.110	-0.0413	-0.0530	-0.0539	0.0160
	(0.0697)	(0.0440)	(0.0391)	(0.0358)	(0.0362)
Bremen	0.0843	0.0769	0.0626	0.0650	0.0730*
	(0.0652)	(0.0410)	(0.0365)	(0.0334)	(0.0338)
Saxony	0.0252	-0.0356	-0.00958	-0.0111	-0.0890*
	(0.0677)	(0.0426)	(0.0379)	(0.0347)	(0.0350)
Observations	*755*	*755*	*755*	*755*	*755*

Notes: Robust standard errors are shown in parentheses. Dependent variables shown in column (1). The treatment indicator has the value one if the mother is merged or participated in the interviews. Column (2) contains estimates of the average difference in characteristics for participants merged and not merged with the administrative data. Column (3)-(6) contain these estimates for for participants compliant and non compliant with the survey. See Appendix Tables A3 and A4 for variable definitions.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A8: Maternal Life Course Outcomes 36 Months after Birth of the Treatment Child - Administrative Data

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
			0 - 36 Months after Birth			
Any Employment	0.511	-0.092***	0.007	6.224	-1.557***	0.008
	[0.501]	(0.027)		[8.919]	(0.468)	
Parttime/Fulltime Employed	0.188	-0.056**	0.045	1.592	-0.601	0.104
	[0.392]	(0.026)		[4.744]	(0.336)	
Apprenticeship	0.206	-0.039	0.297	2.298	-0.295	0.504
	[0.406]	(0.036)		[5.852]	(0.442)	
Marginal employment	0.291	-0.054*	0.099	2.252	-0.642**	0.048
	[0.455]	(0.030)		[5.062]	(0.284)	
Welfare	0.951	0.017	0.194	29.17	1.085	0.251
	[0.235]	(0.013)		[10.81]	(0.892)	
Observations	*329*	*684*		*329*	*684*	
Second Child in HH	0.187	0.065**	0.032			
	[0.363]	(0.026)				
Observations	*316*	*663*				

Notes: Standard errors clustered on community level in square brackets; Standard deviations in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base from affiliation to 36 months after birth. Estimations include community fixed effects and controls for age and being underaged. TG = Treatment Group; CG = Control Group; HH = Household.

Table A9: Type of Employment by Age of the Treatment Child - Administrative Data

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
0 - 12 Months						
Parttime/Fulltime Employed	0.085	-0.044**	0.018	0.308	-0.068	0.517
	[0.231]	(0.018)		[1.307]	(0.104)	
Apprenticeship	0.106	-0.028	0.196	0.560	-0.082	0.597
	[0.308]	(0.022)		[2.117]	(0.155)	
Marginal employment	0.114	-0.048**	0.027	0.540	-0.274**	0.025
	[0.319]	(0.022)		[1.844]	(0.122)	
Observations	*341*	*703*		*341*	*703*	
13 - 24 Months						
Parttime/Fulltime Employed	0.103	-0.047**	0.020	0.463	-0.237**	0.042
	[0.304]	(0.020)		[1.824]	(0.117)	
Apprenticeship	0.106	-0.006	0.789	0.733	-0.048	0.796
	[0.308]	(0.023)		[2.486]	(0.186)	
Marginal employment	0.147	-0.014	0.593	0.730	-0.172	0.257
	[0.354]	(0.026)		[2.182]	(0.152)	
Observations	*341*	*703*		*341*	*703*	
25 - 36 Months						
Parttime/Fulltime Employed	0.123	-0.024	0.319	0.777	-0.302*	0.063
	[0.329]	(0.024)		[2.410]	(0.162)	
Apprenticeship	0.126	-0.005	0.855	0.953	-0.102	0.629
	[0.332]	(0.025)		[2.870]	(0.211)	
Marginal employment	0.196	-0.045	0.121	0.956	-0.202	0.255
	[0.398]	(0.029)		[2.485]	(0.177)	
Observations	*341*	*703*		*341*	*703*	

Notes: Standard deviations in square brackets; robust standard errors in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base from affiliation to 36 months after birth. TG = Treatment Group; CG = Control Group; HH = Household.
* p < 0.1, ** p < 0.05, *** p < 0.01

Table A10: Maternal Life Course Outcomes 36 Months after the Birth of the Treatment Child - Unweighed Survey Data

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
Any Employment	0.555	-0.008	0.896	7.569	-0.752	0.481
	[0.499]	(0.058)		[9.231]	(1.066)	
Parttime/Fulltime Employed	0.299	-0.010	0.852	2.365	-0.522	0.339
	[0.460]	(0.053)		[5.087]	(0.544)	
Apprenticeship	0.255	-0.035	0.479	2.672	0.442	0.554
	[0.438]	(0.049)		[5.810]	(0.744)	
Marginal employment	0.248	-0.015	0.757	2.533	-0.671	0.272
	[0.434]	(0.050)		[5.705]	(0.610)	
Welfare	0.912	0.050*	0.084	26.511	1.274	0.301
	[0.284]	(0.028)		[11.017]	(1.230)	
Second Birth	0.175	0.102**	0.036			
	[0.382]	(0.048)				
Second Pregnancy	0.321	0.031	0.574			
	[0.469]	(0.055)				
Inconsistent Use of Contraceptives	0.226	0.019	0.702			
	[0.419]	(0.049)				
Constant Partnership	0.401	-0.005	0.927			
	[0.491]	(0.057)				
School	0.102	-0.014	0.681	0.934	0.072	0.879
	[0.304]	(0.025)		[3.877]	(0.331)	
Childcare Utilization	0.584	0.083	0.144	7.175	1.894*	0.071
	[0.495]	(0.056)		[8.571]	(1.046)	
Observations	*137*	*296*		*137*	*296*	

Notes: Standard deviations in square brackets; robust standard errors in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base from affiliation to 36 months after birth. TG = Treatment Group; CG = Control Group; HH = Household.

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

Table A11: Maternal Life Course Outcomes 36 Months after the Birth of the Treatment Child - Without Immigrants

	Extensive Margin			Intensive Margin (in Months)		
	Control Mean	Diff. TG/CG	p-values	Control Mean	Diff. TG/CG	p-values
	(1)	(2)	(3)	(4)	(5)	(6)
Any Employment	0.606	-0.0274	0.695	8.766	-1.013	0.443
	[0.490]	(0.070)		[9.688]	(1.319)	
Parttime/Fulltime Employed	0.282	0.0152	0.808	2.547	-0.548	0.425
	[0.451]	(0.062)		[5.567]	(0.686)	
Apprenticeship	0.31	-0.0738	0.212	3.631	-0.210	0.819
	[0.463]	(0.059)		[6.880]	(0.919)	
Marginal employment	0.26	0.0133	0.824	2.588	-0.255	0.718
	[0.439]	(0.060)		[5.865]	(0.704)	
Welfare	0.916	0.0674**	0.026	25.509	2.145	0.129
	[0.278]	(0.030)		[11.015]	(1.408)	
Second Birth	0.198	0.0794	0.156			
	[0.399]	(0.056)				
Second Pregnancy	0.351	-0.026	0.682			
	[0.478]	(0.063)				
Inconsistent Use of Contraceptives	0.193	0.0268	0.67			
	[0.396]	(0.063)				
Constant Partnership	0.411	-0.0118	0.857			
	[0.493]	(0.065)				
Change in Marriage Status	0.142	-0.006	0.889			
	[0.349]	(0.045)				
School	0.124	-0.00947	0.818	1.233	0.349	0.583
	[0.330]	(0.041)		[4.455]	(0.635)	
Childcare Utilization	0.596	0.029	0.654	7.302	1.509	0.221
	[0.492]	(0.065)		[9.105]	(1.231)	
Observations	*105*	*238*		*105*	*238*	

Notes: Standard deviations in square brackets; robust standard errors in parentheses. Columns (2) and (5) report the coefficient and standard error on Home Visiting (HV) from estimating equation (1) by OLS. Data is available on a monthly base from affiliation to 36 months after birth. TG = Treatment Group; CG = Control Group; HH = Household.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A12: Descriptive Statistics for Well-Being and Life-Satisfaction

	Control Group			Treatment Group			SOEP		
	Mean	sd	n	Mean	sd	n	Mean	sd	n
How Often or Seldom Have You Experienced this Feeling in the Last Four Weeks?									
Angry	3.05	1.00	195	2.91	1.09	239	3.11	0.92	498
Worried	2.09	1.04	194	1.77	0.94	238	1.98	0.93	498
Happy	3.66	0.90	195	3.76	0.88	237	3.73	0.86	498
Sad	2.71	1.07	195	2.49	1.03	237	2.62	1.04	498
How Satisfied are you Today with the Following Areas of Your Life?									
Health	6.55	2.97	194	6.83	2.88	235	7.34	1.89	726
Housework	6.92	2.33	193	7.37	2.32	231	6.62	1.78	671
Household Income	4.92	2.70	193	5.58	2.89	235	6.16	2.28	726
Personal Income	4.14	2.90	191	4.57	3.05	233	4.84	2.86	686
Place of Dwelling	6.56	3.16	194	6.63	3.12	235	7.60	2.13	726
Free Time	5.67	2.91	195	6.23	2.87	234	6.22	2.25	727
Child Care Availability	6.73	3.01	192	6.68	3.33	228	6.75	2.62	630
Family Life	7.46	2.35	195	7.63	2.52	234	7.86	1.76	602
Life in General	7.13	2.10	195	7.44	1.91	237	7.33	1.54	727

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. SOEP 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.

Figure A1: ***Pro Kind*** Locations

Note: Orange points indicate locations in Lower Saxony, yellow points in Bremen, and red points in Saxony.

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