From Mothers to Children: Intergenerational Returns to Education*

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Abstract

This study examines the intergenerational effects of maternal education on early childhood development using the 1997 Turkish Compulsory Schooling Law in a regression discontinuity framework. Drawing on the 2018 Turkey Demographic and Health Survey, it evaluates how policy-induced increases in maternal schooling affect children's sociocognitive and physical development. Results show significant improvements in children's ability to follow directions, interact with peers, and in physical outcomes, including reduced stunting, higher birth weight, and better anthropometric measures. Benefits vary by maternal background: sociocognitive gains are concentrated among children of rural-origin mothers, while physical improvements are stronger for urban-origin mothers. Effects are amplified when maternal grandmothers are educated, highlighting intergenerational complementarities. The mechanisms appear to operate through maternal health behaviors and parental investments: more educated mothers are more likely to seek timely and higher-quality prenatal care, form partnerships with economically advantaged spouses, and provide more attentive supervision, thereby fostering supportive environments for child development.

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1 Introduction

Education is widely recognized as one of the most powerful drivers of economic prosperity and human capital accumulation. The individual-level returns to education—such as higher wages and improved labor market outcomes—are well documented in the literature (Angrist and Krueger, 1991; Card, 1999; Acemoglu and Angrist, 2000; Oreopoulos, 2007; Heckman et al., 2008). While these direct effects are crucial, education also generates broader societal benefits like intergenerational spillovers (Currie and Moretti, 2003). A particularly important and policy-relevant dimension of this process is the role of maternal education—a determinant long believed to influence children's health, cognitive development, and long-term success (Chou et al., 2017; Breierova and Duflo, 2004; Cochrane et al., 1982; Grossman, 2000; Currie and Moretti, 2003; Güneş, 2015; Christian et al., 2015; Haveman and Wolfe, 1995; Mirowsky, 2017; Andrabi et al., 2012; Macmillan and Tominey, 2023).

This connection is particularly important because the early years of life are a critical period when inequalities begin to emerge and accumulate. Developmental gaps that arise before school entry often persist into adulthood, shaping life outcomes (Shonkoff and Phillips, 2000; Currie and Hyson, 1999; Currie, 2000). Yet, despite widespread recognition of the importance of early childhood, drawing causal inferences in this domain is challenging due to the endogeneity of maternal education—more educated mothers may also differ in unobservable traits such as cognitive ability, access to resources, or health awareness, all of which may independently influence child outcomes. To address this, studies have begun leveraging exogenous variation in schooling, particularly through compulsory schooling laws (CSLs), which offer natural experiments for causal identification. Evidence from high-income countries using CSL reforms has been mixed and often focuses narrowly on children's physical development (McCrary and Royer, 2011; Lindeboom et al., 2009). Although some studies explore children's cognitive and socio-emotional outcomes, they tend to focus on later childhood or adolescence rather than the formative earliest years (Andrabi et al., 2012; Carneiro et al., 2013). Less is known about these effects in middle-income countries, where resource and health constraints may amplify or modify intergenerational impacts (Breierova and Duflo, 2004; Chou et al., 2017; Osili and Long, 2008). Even more critically, we know little about how maternal education translates into changes in developmental outcomes for children.

This paper aims to fill this gap by examining the causal impact of maternal education on the sociocognitive and physical development of children under five, while uncovering the behavioral channels—maternal health behaviors and parental investments—that drive the observed changes. This study leverages a highly relevant policy instance: the 1997 Turkish CSL, which extended mandatory schooling from five to eight years and has been shown to substantially raise educational attainment—especially for women, and particularly in rural areas (Dinçer et al., 2014; Güneş, 2015; Kirdar et al., 2016a; Aydemir and Kirdar, 2017; Erten and Keskin, 2018; Kırdar et al., 2018; Baltagi et al., 2019; De and Tümay, 2024).

Using nationally representative microdata from the 2018 Turkey Demographic and Health Survey (TDHS)—which includes a rich set of indicators on child health, development, and parenting practices—I employ a sharp regression discontinuity (RD) design based on the January 1987 birth cutoff, which determined eligibility for the extended compulsory schooling. This design isolates the causal impact of additional maternal schooling on children's development, offering new insights into how education policies targeting one generation can shape the human capital formation of the next.

The main outcomes of this study center on early childhood development (ECD), assessed comprehensively through measures of both sociocognitive and physical development. The sociocognitive indicators capture essential readiness skills, such as a child's ability to follow directions and get along with peers, while the physical development indicators include perceived size at birth, birth weight, and anthropometric measures (stunting, wasting, and related growth percentiles).

To explain the observed causal effects, the analysis is theoretically grounded in the human capital transmission framework developed by Currie and Moretti (2003), which highlights two main channels through which maternal education influences child outcomes: resources—as education may enhance health knowledge, time allocation, and financial capacity—and preferences—as more educated mothers may place greater value on child development and use resources more effectively. The empirical analysis operationalizes these channels by examining maternal health behaviors during pregnancy and infancy—such as the timing of antenatal care, ultrasound utilization, delivery setting, and breastfeeding duration—all of which are well-established determinants of child well-being (Noonan et al., 2013; Christian et al., 2015; Liu et al., 2017; Patnode et al., 2025)—as well as broader family dynamics, including assortative mating, fertility timing, and parenting practices. Together, these variables provide insight into the mechanisms linking maternal education to children's sociocognitive and physical development.

The empirical analysis proceeds in four steps. First, I establish that the 1997 CSL led to a significant increase in maternal educational attainment, particularly in the completion of junior high school (JHS), with the strongest effects observed among women from rural backgrounds—consistent with findings in the existing literature. Second, I demonstrate that these educational gains translated into significant improvements in child development outcomes. Specifically, children of mothers exposed to the CSL perform better on sociocognitive measures and exhibit improved physical development.

Third, I conduct heterogeneity analyses to examine how these effects vary by context. The results reveal that sociocognitive gains are particularly pronounced among children with rural-origin mothers, whereas improvements in physical health are more prominent among those with urban-origin mothers—highlighting the importance of local resources in shaping the returns to maternal education. Furthermore, I find that the positive effects of the CSL are substantially larger when the maternal grandmother is educated, suggesting intergenerational complementarities in human capital transmission. Together, these findings underscore that education policy alone is not a great equalizer—its effectiveness is deeply shaped by geographic and intergenerational context (Becker and Tomes, 1979; Chetty et al., 2014).

Finally, I investigate the potential mechanisms underlying these results. The evidence points to several pathways: improved maternal health behaviors, such as earlier initiation of antenatal care, increased use of ultrasounds, and a higher likelihood of delivering in private facilities, all of which underscore the role of education in fostering informed decision-making and access to quality healthcare;[1] positive assortative mating patterns, reflected in an increased likelihood of partnering with employed spouses, which enhances household resources and stability;[2] and improved parenting practices, such as reductions in child neglect, which foster nurturing environments conducive to child well-being. Together, these findings offer valuable insight into the processes through which expanded educational opportunities for women can generate far-reaching benefits for the next generation.

This paper makes several key contributions to the literature on the intergenerational effects of parental education, with a particular focus on child development. While a significant body of research has documented the link between parental education and child health

[1]These behavioral changes are consistent with the notion that more educated women possess greater awareness of modern healthcare services and are better equipped to navigate the medical system (Caldwell, 1979; Barrera, 1990).

[2]This pattern aligns with evidence that more educated women tend to have higher earnings potential and are therefore more likely to partner with similarly advantaged men (Behrman and Rosenzweig, 2002).

(Strauss and Thomas, 1995; Grossman, 2006; Currie and Moretti, 2003), causal evidence remains sparse, primarily due to concerns about endogeneity. Some studies have attempted to overcome this by exploiting exogenous sources of variation, such as changes in CSLs. For instance, research by Breierova and Duflo (2004), Chou et al. (2017), and Osili and Long (2008) examining reforms in Indonesia, Taiwan, and Nigeria, respectively, consistently find that higher parental education is associated with reductions in child and infant mortality. Yet, other studies question the generalizability of these findings. McCrary and Royer (2011), for example, using U.S. school entry policies, find that increases in maternal education have only modest and potentially heterogeneous effects on infant health. Similarly, Lindeboom et al. (2009), studying CSL changes in the United Kingdom, report that extending parents' education by one year had minimal impact on children's health outcomes. Furthermore, Zhang (2012), in their study of China's Cultural Revolution, shows that while women with a high school education were more likely to seek prenatal care, their education had no significant impact on key birth outcomes, such as low birth weight, premature births, or neonatal and infant mortality. These findings collectively suggest that the intergenerational returns to education are context-dependent, shaped by local socioeconomic conditions and access to health and social infrastructure.

Beyond physical health, growing evidence highlights how parental—especially maternal—education shapes children's cognitive and socio-emotional development. Education's influence extends beyond survival and health to children's readiness to learn, behavioral regulation, and socio-cognitive growth (Andrabi et al., 2012; Carneiro et al., 2013; Dickson et al., 2016; Macmillan and Tominey, 2023). Children of more educated mothers perform better on cognitive and language tasks and display stronger non-cognitive skills. Yet, most of this evidence focuses on school-age children, leaving much less known about effects that emerge earlier in life.[3] In particular, evidence from low- and middle-income countries (LMICs) on developmental outcomes among children under five remains scarce.

This paper contributes to this literature by providing new evidence on how maternal education affects children's sociocognitive and physical development before school entry in a middle-income setting. Exploiting the 1997 Turkish Compulsory Schooling Law (CSL) as an exogenous source of variation, it investigates how an increase in maternal education

[3] Except Dickson et al. (2016), who exploit the 1972 minimum school leaving age reform in England to estimate the causal effect of parental education. They find that increasing parental education has a positive causal effect visible already in preschool assessments at age 4 and persists through high-stakes examinations at age 16.

translates into improvements in children's ability to follow directions, interact with peers, and achieve better growth and health outcomes. The findings complement existing evidence from high-income countries by showing that the intergenerational effects of maternal education can emerge even earlier in the life course—during preschool ages—and extend beyond conventional measures to broader dimensions of sociocognitive skills and detailed anthropometric measures of physical development.

A key contribution of this study is its ability to isolate the intergenerational effects of maternal education from those of paternal education—an identification challenge that has long limited this literature. Because education reforms often affect both genders simultaneously, mothers' and fathers' schooling levels tend to be highly correlated, making it difficult to attribute effects to one parent independently. In this setting, however, the reform was mostly binding for women, not for men, creating a unique opportunity to disentangle these effects. Fathers' education shows no discontinuity at the reform cutoff, and the results remain robust to directly controlling for paternal schooling (see Section 4.1 for details). These features strengthen the credibility of the design and provide rare evidence on the distinct role of maternal education in shaping early childhood development.

Within the Turkish context, while three earlier studies have used the 1997 CSL in Turkey in this domain, their findings remain mixed. Dinçer et al. (2014) use regional variation in primary school teacher supply as an instrument for maternal education, finding limited impact on child mortality. Similarly, Baltagi et al. (2019), employing an IV strategy based on middle school expansion, report no significant effect of maternal education on infant birth weight once endogeneity is addressed. In contrast, Güneş (2015) finds that maternal education driven by CSL improves very low birth weight, height-for-age, and weight-for-age z-scores. Building on these studies, this paper makes several key advancements. First, it broadens the scope of child development outcomes by incorporating both anthropometric measures (e.g., stunting, wasting, growth percentiles) and novel sociocognitive indicators, such as children's ability to follow instructions and engage socially.[4] Furthermore, it leverages the most recent

[4]Beyond these studies, more recently a working paper by Akgündüz et al. (2024) provide evidence that the reform improved a broader set of early childhood development outcomes. Both my study and Akgündüz et al. (2024) use the 2018 TDHS data, but they differ in key dimensions. I construct a focused, standardized index of sociocognitive development based on children's ability to follow directions and get along with peers, while they include these items within broader readiness to learn and social-emotional development domains. For physical outcomes, I employ birth weight and anthropometric measures (stunting, wasting, and growth percentiles) to provide a continuous, medically meaningful assessment of chronic nutritional status, while they rely on functional, binary measures (picking up a small object; not being too sick to play) that capture only severe developmental setbacks. Finally, my study emphasizes behavioral pathways, particularly

(2018) Turkish Demographic and Health Survey (TDHS), which includes detailed modules on child development and parenting behaviors, offering a significant advantage over prior studies that relied on older waves from 2003, 2008, or 2013. By focusing on a more mature cohort of mothers (aged 26–36, compared to 18–29 in previous research), this analysis better captures the effects of maternal education on child outcomes. Collectively, these innovations contribute to a more holistic and contemporary understanding of the effects of educational reforms on intergenerational human capital formation.

Additionally, this paper makes a significant contribution by exploring the behavioral pathways through which maternal education influences child outcomes—an area that has been relatively underexplored in the literature. By integrating theory-driven measures to examine concrete, policy-relevant behaviors, the study identifies the key channels through which human capital is transmitted across generations. Linking these behaviors to exogenous variation in maternal education, it provides evidence on the microfoundations of human capital transmission. This approach offers a nuanced understanding of how maternal education shapes child development, bridging structural models of intergenerational human capital with practical policy evaluation. In doing so, it offers valuable insights for policymakers looking to design interventions that maximize the long-term benefits of educational reforms.

The remainder of the paper is organized as follows. Section 2 provides background on Turkey's compulsory schooling reform, while Section 3 describes the data and sample used in the analysis. Section 4 outlines the empirical methodology, focusing on the regression discontinuity design and validity checks. Section 5 presents the findings on the effects of the CSL on maternal education and child development, including robustness checks and heterogeneity analyses. Section 6 explores the mechanisms underlying these effects, and Section 7 concludes.

2 Background: Education System and the 1997 Compulsory Schooling Reform in Turkey

Until the late 1990s, the structure of Turkey's education system consisted of a five-year mandatory primary education, followed by two optional stages: three years of lower sec-

maternal health behaviors and reductions in child neglect, whereas their analysis focuses on increased paternal involvement. Overall, my study provides a more granular and multidimensional assessment of early childhood development, while they emphasize broader functional milestones.

ondary (middle school) and three years of upper secondary (high school). Secondary education offered multiple pathways—secular academic, vocational, and religious—with Imam-Hatip schools standing out for their dual emphasis on Islamic studies and general academic subjects. Many children, however, exited the education system after completing primary school, contributing to dropout rates nearing 40% in the 1996–97 academic year (Aydemir and Kirdar, 2017).

In 1997, Law No. 4306, known as the Basic Education Law, transformed the structure of Turkey's education system by extending compulsory schooling from five to eight years, integrating primary and lower secondary education into a single phase. Effective from the 1997–1998 academic year, the reform required that students who had not yet completed the fifth grade by the end of the 1996–1997 academic year remain in school through the end of eighth grade. As a result, the policy introduced a distinct cutoff, with children born on or after January 1987 being subject to the extended mandatory education requirement. This discontinuity stems from Turkey's school entry regulation, which stipulates that children begin first grade in September of the year in which they turn six. Therefore, those born before January 1987 would typically have completed fifth grade by 1997 and were permitted to leave school, while their younger peers—born in or after January 1987—were compelled to remain enrolled for an additional three years. Although exceptions existed due to factors like early entry, delayed school entry or grade repetition, the reform's design created a strong link between date of birth and the likelihood of exposure to the new compulsory education policy (Erten and Keskin, 2018).

While the reform had long been discussed in educational circles, its timing was closely tied to political developments. The secular-leaning government that had recently come to power viewed the extension of compulsory schooling as a way to delay and reduce enrollment in religious education programs, Imam-Hatip schools, which previously accepted students immediately after primary school. By pushing compulsory secular education to cover the middle school years, the government restricted access to religious instruction during early adolescence (Gulesci and Meyersson, 2015). Moreover, the reform aligned with Turkey's aspirations for full European Union membership, which motivated efforts to harmonize the education system with European standards (Dinçer et al., 2014). Crucially, there were no major macroeconomic shifts or concurrent policy changes at the time of implementation, minimizing the risk that its effects on schooling outcomes were confounded by other simultaneous interventions.

To accommodate the anticipated enrollment surge, the Ministry of National Education (MONE) significantly expanded infrastructure. MONE's share of public investment rose from 15% in 1996–1997 to over 37% by 1998, sustaining elevated levels into the early 2000s (Kırdar et al., 2016b). Between 1997 and 2003, over 104,000 new classrooms were constructed, and more than 70,000 primary school teachers were hired (Dulger, 2004). Strategies like double-shift schooling in urban areas, expanded boarding schools, and a fivefold increase in bussing services for rural students (1996–1997 to 1999–2000) addressed capacity constraints (Dayıoğlu and Kırdar, 2022). Notably, student-to-teacher and student-to-classroom ratios remained stable or improved, suggesting that educational quality was largely preserved (Dayıoğlu and Kırdar, 2022).

The reform substantially boosted educational attainment in Turkey. Prior studies document strong positive effects of the reform, particularly for the years students were legally mandated to remain in school (Aydemir and Kirdar, 2017; Kırdar et al., 2016b; Erten and Keskin, 2018; Güneş, 2015; Gulesci and Meyersson, 2015; Dayıoğlu and Kırdar, 2022; Dinçer et al., 2014). According to Aydemir and Kirdar (2017), enrollment in grades 1 through 8 rose by 16% between the 1997–1998 and 2000–2001 school years—from 9 million to 10.5 million—reversing a 1% decline in the three years prior. Güneş (2015) further highlights that the reform was especially transformative for rural girls: between 1997/98 and 1999/00, sixth-grade enrollment for rural females surged by an estimated 162%.

3 Data and Sample

This study uses data from the 2018 Turkey Demographic and Health Survey (TDHS), a nationally representative survey conducted by Hacettepe University Institute of Population Studies. The 2018 TDHS provides rich information on maternal and child health, household characteristics, and early childhood development (ECD). Unlike earlier rounds, the 2018 TDHS includes an ECD module developed by UNICEF for children aged 0–60 months, which collects detailed information from mothers on their children's developmental outcomes and home environment, making it well-suited for examining the intergenerational effects of maternal education on child development.

The 2018 TDHS includes interviews with 7,346 ever-married women aged 15–49, selected from 11,056 households across the country. For the purposes of this study, the sample is restricted to mothers who were born within a specified window—determined by the chosen bandwidth selection method—around January 1987, the cutoff date for exposure to the 1997 CSL, and their last-born children aged 0–60 months.[5] Focusing on the last-born child improves data reliability, as mothers typically have sharper recall for recent experiences and are better able to report accurate information about their youngest child's development(Güneş, 2015). To ensure the relevance of the reform exposure and maintain comparability, Syrian refugees are excluded from the analysis. These individuals began arriving in Turkey primarily after 2011, following the Syrian civil war, and were therefore not subject to the 1997 CSL.

This study centers on child development, encompassing both sociocognitive and physical domains. Sociocognitive development is measured through a standardized index based on children's ability to follow directions and get along with peers—key indicators of cognitive and social-emotional readiness. The index is constructed by standardizing the unweighted average of these two items.[6] Physical development is assessed through several key indicators. First, a binary variable captures whether the mother perceived the child's birth size as smaller than average, based on a five-point scale ranging from very large to very small. Birth weight is also included as a direct measure. Anthropometric data are calculated using the 2006 WHO child growth standards for children aged 0–5 years, adjusted for sex. These include binary indicators for stunting (height-for-age z-scores below -2 standard deviations, indicating chronic undernutrition) and wasting (weight-for-height z-scores below -2, reflecting acute malnutrition). Additionally, percentile measures for height-for-age, weight-for-height, and weight-for-age offer a more nuanced view of the child's growth relative to the global reference distribution.[7] Taken together, these outcomes provide a multidimensional view of children's sociocognitive and physical development in early life.

To explore the mechanisms through which maternal education may influence these outcomes, I focus on two broad categories using TDHS data: Maternal Health Behavior and Parental Investment. First, maternal health behaviors include the frequency and timing of

[5] The primary sample consists of mothers born within a 60-month symmetric window around the January 1987 cutoff and their youngest children aged 0–60 months. This corresponds to mothers aged 26–36 with a child under the age of five at the time of the survey. The exact sample size varies by outcome, as certain measures—such as those related to sociocognitive development—are only available for children aged 36 to 59 months. Observations with missing values in the outcome or maternal education variables are excluded from the analysis.

[6] In addition to this approach, alternative methods of index construction have also been employed. See Section 5.2 for details.

[7] The detailed description of the variables are provided in online Appendix A.

prenatal care visits, ultrasound use during pregnancy, postnatal checkup of infant (whether the infant's first check-up was conducted by a doctor, nurse, or midwife, and whether this check was at private facilities), history of induced abortion, contraceptive use, breastfeeding duration, and smoking behavior.[8] Second, parental investment is a comprehensive category encompassing both household resources and direct caregiving inputs. Household resources are proxied by partner employment and delayed fertility, as these factors likely enhance the household's financial capacity, allowing for greater investment in the child's development. Direct caregiving inputs include both positive and negative dimensions. Positive inputs are measured using mother and father engagement indices, constructed by standardizing the unweighted averages of binary variables indicating whether the parent read books, told stories, played with, or spent time outside with the child within the past three days. Negative inputs are captured by the number of days the child was left alone or under the supervision of another child.

The analysis controls for maternal characteristics to account for potential confounders, including birth-month fixed effects, a binary indicator for rural childhood residence (1 for subdistrict or village, 0 for province or district center), fixed effects for childhood region of residence (Central, East, West, North, South), and a dummy indicating whether the maternal grandmother had no schooling. These controls ensure that the estimated effects are not driven by systematic differences in maternal background.

Table 1 reports descriptive statistics for the sample of women aged 26 to 36 whose youngest child is between 0-5 years old. The sample is defined using a symmetric bandwidth of 60 months around the January 1987 cutoff, chosen to include the widest relevant sample for the descriptive analysis.[9]

Children's development outcomes exhibit substantial variation within this sample. The sociocognitive development index has a mean of approximately zero, as it is standardized using the full sample. For the component of this index, on average, 95% of children are reported to follow directions (standard deviation 0.22), while 83% are described as getting along with peers (standard deviation 0.38)—highlighting some variation across children in the sample. In terms of physical development, 22% of children are reported as smaller than

[8] The dataset includes only limited information on smoking—capturing whether the mother is currently smoking. While this does not directly measure smoking during pregnancy, current smoking may serve as a useful proxy.

[9] The maximum optimal bandwidth estimated across all outcome variables using the data-driven procedure proposed by Calonico et al. (2017) is 59 months for both uniform and triangular kernel weights.

average at birth, and the average birth weight is approximately 3,162 grams. According to WHO growth standards, 6% of children are classified as stunted and around 1–2% as wasted, indicating some degree of both chronic and acute undernutrition. Growth patterns also vary across the sample, as reflected in percentiles.

On the maternal side, health behaviors such as the number of antenatal visits (mean = 10.4) and near-universal ultrasound checks (98%) suggest relatively high engagement with prenatal care. Postnatal care coverage is high for physicians (87%) and lower for nurses (36%) and midwives (5%). The data also show that 38% of mothers used a private place for delivery/first check-ups. Approximately 9% of pregnancies ended in an induced abortion, while 79% of mothers reported using a modern contraceptive method. The average duration of breastfeeding was about 15 months, and 15% of mothers smoked regularly.

In terms of parental investment, 90% of partners were employed in the last seven days, and the average time between marriage and first birth was approximately 46.6 months. Fewer than half of mothers report engaging in cognitively stimulating activities such as book reading (23%), storytelling (20%), or playing with the child (35%), and paternal involvement is even lower across all indicators. Measures of supervision reveal that children are left alone on average 7.5% of the days and left in the care of another child on about 11% of the days.

4 Empirical Methodology

I employ a sharp regression discontinuity design to identify the causal impact of maternal education, induced by CSL, on child development outcomes. The running variable is the number of months between the mother's date of birth and the January 1987 cutoff. Mothers born in or after January 1987 are considered treated, while those born before are untreated. This design leverages the discontinuous jump in schooling attainment induced by the reform and assumes that, near the cutoff, the assignment to treatment is as good as random.

The estimating equation is as follows:

$$y_i = \alpha_0 + \beta T_i + f(x_i)I(T_i = 0) + g(x_i)I(T_i = 1) + X_i'\gamma + \varepsilon_i \quad (1)$$

$$\forall x_i \in (c - h, c + h),$$

where y_i is the outcome variable (e.g., child development measure or channel/intermediate variable) for child or mother i, and in a few cases for father. T_i is a binary indicator equal to 1 if the mother was born in or after January 1987, and x_i is the running variable (month-year of birth, normalized to zero at the cutoff). The functions $f(x_i)$ and $g(x_i)$ are polynomial functions of the running variable on either side of the cutoff, X_i is a vector of control variables as described in previously, h is the bandwidth (bw) around the cutoff point c, and ε_i is the error term. The parameter β captures the local average treatment effect of the CSL on the outcome at the cutoff.

I estimate this specification using both parametric and nonparametric approaches, with a primary focus on local polynomial regressions within a RD framework. To ensure robustness, I explore a range of model specifications, including local linear and quadratic polynomials, different kernel functions (uniform and triangular), and multiple bandwidth selection strategies. The uniform kernel serves as the baseline specification, assigning equal weight to all observations within the bandwidth. As a robustness check, I also employ the triangular kernel, which assigns greater weight to observations closer to the cutoff and less to those farther away, thereby enhancing the local nature of the estimation and improving precision near the threshold (Hahn et al., 2001; Imbens and Lemieux, 2008; Adamecz, 2023).

For bandwidth selection, I first use the data-driven optimal bandwidth procedure developed by Calonico et al. (2017), which selects bandwidths that minimize mean squared error by balancing bias and variance. In addition, I explore a range of fixed bandwidths to assess the robustness of the results to alternative window sizes. Standard errors are clustered at the level of the mother's birth month and year, as recommended by Lee and Card (2008), to correct for potential specification error in the forcing variable. Given the large number of child development and mechanism-related outcomes under investigation, I apply multiple hypothesis testing adjustments, following (Clarke et al., 2020). Finally, the inclusion of predetermined covariates improves the precision of the estimates and mitigates concerns about residual imbalance around the cutoff.

The analysis proceeds in three parts: first, I examine the first-stage effect of the 1997 CSL on mothers' educational attainment; second, I estimate the reduced-form effects of the CSL on child outcomes, capturing the total impact of increased maternal education; and third, I investigate potential mechanisms by analyzing intermediate outcomes in maternal health behavior and parental investment.

4.1 Internal Validity

To investigate the causal effects of the 1997 CSL, it is important to consider the plausibility of the identifying assumptions. Specifically, the RD design relies on the assumption that no other policy or shock simultaneously affected the outcomes at the cutoff. This assumption is credible given the historical and institutional context of the reform. While discussions about extending compulsory schooling had been ongoing for years, the 1997 enactment was closely tied to a specific political sequence: the newly empowered secular-leaning government viewed the reform as a strategy to limit early enrollment in religious schools, particularly Imam-Hatip institutions, by extending compulsory secular education to include middle school. This targeted motivation suggests that the timing of the reform was driven by political and ideological considerations. Importantly, the reform was implemented in the absence of major macroeconomic shifts or overlapping policy interventions, reducing the likelihood that its effects on schooling outcomes were confounded. This context strengthens the credibility of the RD design and motivates the subsequent empirical checks.

To empirically assess the validity of the RD design, I first examine the balance of key predetermined covariates around the 1997 cutoff. Online Appendix Table A1 reports means for treated and control groups and p-values from two-sided t-tests for three bandwidths (60, 48, and 36 months). Overall, covariates—including rural childhood, maternal education, and childhood region indicators (West, Central, South, North, East)—are well balanced across treatment and control groups. This provides support to the comparability of these groups within the various bandwidths.

Furthermore, I conduct two standard diagnostic tests following recommendations in the literature (Imbens and Lemieux, 2008; Erten and Keskin, 2018). First, I assess the validity of the RD design by testing whether the running variable—defined as the month and year of birth—is smoothly distributed around the cutoff (January 1987). To this end, I implement the McCrary (2008) density test, which examines whether there is a discontinuity in the distribution of observations at the threshold, potentially indicating manipulation or sorting around the cutoff. I estimate the local density using two different specifications: one with a local linear polynomial, p(1), and one with a local quadratic polynomial, p(2). Both specifications use a symmetric bandwidth of 60 months around the cutoff, corresponding to the largest sample used in this study—mothers aged 26–36 years old.[10] The test results show

[10] As in all analyses in this paper, the sample is restricted to mothers whose youngest child is between 0 and 5 years old.

p-values of 0.340 for p(1) and 0.243 for p(2), both statistically insignificant, indicating no detectable discontinuity at the cutoff. These findings suggest that the assignment variable is not manipulated and satisfies the continuity assumption for a valid RD design. The McCrary density plots are shown in Figure 1.

Second, I examine the continuity of predetermined characteristics around the cutoff. Figure 2 displays the average values of each covariate in monthly bins on either side of the January 1987 threshold. The fitted lines represent local linear trends estimated separately on both sides of the cutoff, and the dashed lines indicate 95% confidence intervals. The graphs do not show any significant discontinuities at the cutoff point. Overall, the predetermined covariates appear to be smoothly distributed around the threshold. To complement these graphical analyses, I also perform tests of continuity for each covariate. The results, reported in Table A2 of Online Appendix, confirm that none of the covariates exhibit statistically significant jumps at the threshold. A joint significance test using Seemingly Unrelated Regressions (SUR) produces a p-value of 0.890, further supporting the identification assumption.

A remaining concern for internal validity is the potential confounding role of paternal education. Because maternal and paternal schooling are typically correlated— through the potential direct effects of the CSL on fathers—it is important to assess whether the reform also altered paternal education. Existing evidence indicates that the 1997 CSL was significantly more binding for women than for men, as male cohorts were already completing at least eight years of schooling prior to the reform (Erten and Keskin, 2020). Consistent with this, Appendix Figure A1 shows no discontinuity in fathers' junior high completion around the cutoff. Moreover, re-estimating the main child outcomes while directly controlling for paternal education, measured as the highest grade completed, leaves the results unchanged (See 5.2 for details.). Together, these findings support the interpretation that the observed discontinuities in child outcomes are driven by maternal education, rather than paternal education.

5 Effects of the Compulsory Schooling Law

5.1 Mothers' JHS Completion

I begin the empirical analysis by examining the first-stage effect of the 1997 CSL on women's educational attainment, focusing on JHS completion—defined as completing grade 8 or higher. Figure 3 displays a RD plot of the proportion of mothers who completed JHS, plotted against their birth month relative to the January 1987 cutoff. The analysis uses a bandwidth of 45, corresponding to the optimal bandwidth calculated using the Calonico et al. (2017) algorithm for JHS completion in the full sample. Panel A, which includes all women whose youngest child is aged 0–5, shows a distinct upward shift at the cutoff, indicating that exposure to the CSL significantly increased the likelihood of completing JHS.

Table 2 quantifies these graphical insights, reporting RD estimates of the treatment effect on mothers' JHS completion under various bandwidth choices and kernel specifications. Columns 1–2 report estimates using a uniform kernel with two bandwidth choices—optimal h and $1.5h$—while columns 6–7 replicate the same specifications using a triangular kernel. The intermediate columns display the corresponding bandwidth values, sample sizes, and means. Across specifications using the full sample, I observe consistently positive estimates, with statistical significance in most cases. For instance, in column 1, row 1 , using the optimal bandwidth selected with a uniform kernel, the reform is associated with an 8.7 percentage points (pp)—13.1%, given that the mean value of the dependent variable is 66.6%—increase in JHS completion, significant at the 10% level. When the bandwidth is expanded to 1.5 times the optimal value, the estimated effect rises slightly to 9.2 pp, now significant at the 5% level. The corresponding estimate using triangular kernel yields similar results.

As a robustness check, I conduct placebo RD analyses using two fake cutoff dates preceding the actual reform. Specifically, I assign placebo thresholds in January 1980 and January 1982 and re-estimate the RD model for maternal JHS completion using the Calonico et al. (2017) optimal bandwidth selection with a uniform kernel. The results, reported in the Table 3, show no evidence of discontinuities at these false thresholds. The estimated coefficients are small and statistically insignificant, further supporting that the discontinuities observed at the true January 1987 cutoff are not driven by spurious trends or mechanical patterns. This exercise confirms that the significant jumps in outcomes are specific to the policy-relevant cutoff.

I also assess the first-stage estimates by addressing for the potential misclassification of treatment status for cohorts born immediately around the January 1987 cutoff. This misclassification may arise because individuals born close to the threshold may not strictly adhere to the policy: some women born in early 1987 (treated) might have entered school early, while some born in 1986 (untreated) might have delayed entry, becoming subject to it (Kırdar et al., 2016; Cesur and Mocan, 2018). To account for this, I use symmetric bandwidths of 48 and 60 months around the cutoff, and re-estimate the RD model while excluding the 1986 and 1987 cohorts, both separately and together. Table A3 in the Online appendix shows that the results remain robust, with estimates consistently positive and statistically significant (ranging from 8.0 to 15.3 pp). These findings suggest that the observed increase in maternal JHS completion is not driven by misclassification near the cutoff, and that the treatment effects are consistent across different bandwidths.

Subsample analyses reveal significant heterogeneity in the reform's impact. Panel B of Figure 3 shows a clear upward shift at the cutoff for women who lived in rural areas during childhood, indicating that the CSL substantially increased JHS completion. The corresponding RD estimates, reported in the second row of Table 2, show an increase of 19.1 pp using the optimal bandwidth with a uniform kernel. This effect is substantially larger than those observed for women with urban childhood residence, for whom the estimates are positive but smaller and generally less robust. This pattern aligns with the graphical evidence in Panel C of Figure 3, which shows a smaller upward shift at the threshold. These findings suggest that the CSL had a stronger effect in rural areas, where baseline educational attainment was lower.

I also examine heterogeneity by maternal education. Among women whose mothers had some formal education, the reform had a strong and consistent effect. Panel D of Figure 3 shows a distinct upward shift in JHS completion rates at the cutoff, with RD estimates in Table 2 indicating a 16.7 pp increase (significant at the 1% level) using a triangular kernel and optimal bandwidth. In contrast, Panel E shows no discontinuity for women whose mothers had no formal schooling. The RD estimates in Table 2 are near zero and statistically insignificant. These findings suggest that the reform was more effective among women whose mothers had some education, possibly due to the intergenerational transmission of educational aspirations, while its impact was limited for women from less-educated backgrounds.

In sum, the evidence shows that the CSL had a sizable and statistically significant effect on women's JHS completion. The policy effects are strongest among women raised in rural areas and those from more educated family backgrounds. These patterns underscore the importance of geographic and familial context in mediating the impact of education reforms, suggesting that both structural conditions and intergenerational dynamics shape how individuals respond to increased schooling mandates.

5.2 Child Development

This section examines the intergenerational impacts of the 1997 CSL on early childhood development outcomes. Figures 4 and 5 visually illustrate the discontinuities in children's sociocognitive and physical development outcomes around the January 1987 cutoff. Each figure plots the corresponding outcome against the mother's month of birth, using a bandwidth of 45 months—consistent with the optimal bandwidth identified by the Calonico et al. (2017) algorithm for junior high school completion of mothers. Both figures display overall upward shifts at the cutoff, indicating that children of mothers exposed to the reform experienced notable improvements in sociocognitive skills and physical health. These visual patterns mirror the first-stage results on maternal educational attainment, suggesting that the reform's positive effect on maternal education translated into enhanced child development.

Table 4 complements these graphical insights by reporting reduced-form RD estimates of the reform's impact on child development outcomes. The table captures both sociocognitive and physical dimensions, with estimates reported under two kernel choices (uniform and triangular) and two bandwidth specifications—optimal h and $1.5h$.

Panel A of Table 4 presents results on sociocognitive outcomes, with the standardized index of sociocognitive development showing consistently positive and statistically significant effects. Using a uniform kernel and the optimal bandwidth (baseline specification), the reform is associated with a 0.596 standard deviation (sd) increase in the index, significant at the 1% level.[11] Estimates across specifications range from 0.323 to 0.617 sd, confirming the robustness of the effect. The components of the index mirror this pattern: the likelihood of

[11] The baseline sociocognitive development index is constructed as a standardized average of two binary indicators: whether the child follows directions and gets along with peers. To assess the robustness of the results to alternative index construction methods, we also employ (i) principal component analysis (PCA) and (ii) factor analysis to extract a latent sociocognitive factor from the same items—yielding standardized indices whose associated treatment effects remain quantitatively similar and statistically significant, as shown in Online Appendix Table A4. This consistency confirms the robustness of the main findings across alternative index construction methods.

"following directions" increases by about 12–13 pp (≈13%), and "getting along with peers" rises by a similar margin (≈13 pp or 16%) under the baseline specification.

Panel B of Table 3 reports outcomes related to children's physical development, again indicating positive effects of the reform. Children of mothers exposed to the CSL are significantly less likely to be perceived by their mothers as physically small at birth: the probability of being reported as "smaller than average" falls by 13.5–27.0 pp, depending on the specification, with all estimates statistically significant. Similarly, objective health measures such as birth weight show large and statistically significant improvements. The estimated increase in birth weight ranges from 185 grams to 252 grams, all significant at conventional levels. Furthermore, the likelihood of being stunted—a key indicator of chronic malnutrition—is significantly reduced, with estimates ranging from –10.2 to –14.9 pp and significant across all specifications.

While the reform has no detectable impact on the rate of wasting—the evidence points to improvements in percentile-based anthropometric measures, which offer a relative ranking of children's physical status within a global reference population. Children of mothers exposed to the CSL score significantly higher on the weight-for-height percentile, height-for-age percentile, and weight-for-age percentile. For example, the weight-for-age percentile increases by 9.8 points under the uniform kernel and by 12.1 points under the triangular kernel with optimal bandwidth, with estimates statistically significant at conventional levels. Gains in weight-for-height and height-for-age percentiles show a similar pattern, reinforcing the conclusion that the reform led to meaningful improvements in children's physical development.

In sum, the evidence shows that the 1997 CSL not only significantly increased women's educational attainment but also generated meaningful intergenerational gains in child development. The reform enhanced both sociocognitive and physical development of children, emphasizing maternal education as a crucial channel for shaping early-life outcomes. These results highlight the far-reaching developmental benefits of schooling policies beyond individual-level gains.

5.2.1 Robustness Checks

To ensure the reliability of the child development estimates, I conduct a battery of robustness checks. First, I re-estimate the main specification using a static bandwidths with symmetric windows of 24, 36, 48, and 60 months around the cutoff. These results, reported in Online

Appendix Table A5, corroborate the baseline findings. For sociocognitive development, the estimates remain positive and statistically significant across all fixed bandwidths, with the main index showing effects of 0.565 to 0.580 sd at the narrower bandwidths (24 and 36 months), and 0.291 to 0.327 sd at the wider windows (48 and 60 months). Component-level outcomes show consistent and positive effects. Physical development indicators display similar robustness. Reductions in perceived small size at birth, significant increases in birth weight, and improved anthropometric percentiles persist across all bandwidths. The magnitude and significance of these estimates align closely with those from the main analysis using optimal bandwidths.

Second, I re-estimate the RD models using a nonparametric approach with a quadratic specification for the running variable, reported in Online Appendix Table A6. The estimates remain substantial and significant across both kernels and most bandwidth choices. For instance, using a triangular kernel, the estimated effects on the sociocognitive development index range from 0.625 to 0.640 sd, significant at the 5% or 1% levels. Similarly, birth weight increases by 247 to 356 grams, and the incidence of stunting is reduced by 14.5 to 16.2 pp across specifications. Percentile-based anthropometric indicators also show consistent gains, including statistically significant improvements in weight-for-age, height-for-age, and weight-for-height percentiles.[12]

Lastly, I applied the Romano–Wolf stepdown procedure to adjust for multiple hypothesis testing across the set of child development outcomes.[13] The child outcomes with statistically significant estimates in the baseline analysis remain significant after adjustment, with resampled p-values—obtained through repeated random reassignments of the treatment indicator to mimic the null distribution—confirming the robustness of these effects. For each outcome, the Calonico et al. (2017) optimal bandwidth selection with a uniform kernel, and the number of bootstrap replications was set to 500. Table A9 presents these results, where

[12] Additionally, I address concerns about the comparability of children in the treatment and control groups, particularly with respect to their age and birth order. Given that mothers in the control group tend to be slightly older, it is important to ensure that child-level characteristics are not driving the results. To account for this, I include controls for the child's age in months and birth order. The results of this specification, presented in Online Appendix Table A7, indicate that the estimates for all child outcome variables remain quantitatively and statistically similar. In some cases, the estimated effects are even slightly larger in magnitude. Furthermore, a two-sample t-test for equality of means confirms that the average age in months of children in the analysis sample does not differ significantly between the treatment and control groups. This test is conducted within a ±45-month bandwidth around the cutoff—corresponding to the optimal bandwidth selected using the Calonico et al. (2017) algorithm for junior high school completion.

[13] The rwolf2 command in Stata, developed by Clarke et al. (2020), is used.

Column 1 displays the baseline model p-values, Column 2 shows the resampled p-values, and Column 3 reports the Romano–Wolf adjusted p-values.[14]

Overall, these checks affirm the core findings: maternal education gains robustly improve early sociocognitive and physical development.

5.3 Heterogeneity in Policy Impact

This section examines how the 1997 CSL's impact on child outcomes varies by (i) the mother's childhood region (rural vs. urban) and (ii) the maternal grandmother's education, highlighting how maternal education effects differ across early-life geographic context and family background.

5.3.1 By Mother's Childhood Region

Table 5 presents RD estimates of the CSL's effects on child outcomes, separately for mothers who grew up in rural and urban areas. Columns 1–2 present estimates for mothers who spent their childhood in rural areas, using a uniform kernel and two bandwidth choices: the optimal bandwidth h and 1.5h. Columns 6–7 replicate these specifications for the mothers who grew up in urban areas. Taken together with the first-stage estimates, these results reveal considerable heterogeneity in the effect of the CSL, depending on the mother's childhood environment.

The first-stage estimates in Table 2 show a substantially stronger effect of the CSL on JHS completion for rural-origin mothers. These differential educational gains translate into distinct patterns in child development. As shown in Table 5, Panel A, the sociocognitive development index rises by 0.918 sd under the optimal bandwidth for children of rural-origin mothers—nearly twice the effect observed for children of urban-origin mothers (0.515 sd). Similarly, the probability of "getting along with peers" increases by 26.5 to 37.7 pp for children of rural-origin mothers, with all estimates significant, while effects for children of urban-origin mothers are smaller and insignificant. An exception is observed for the "follows directions" outcome, where the children of urban-origin mothers appear to benefit more.

[14] Additionally, to assess the sensitivity of the results to potential paternal education confounding, I re-estimate the main child outcomes while controlling for paternal education, measured as the highest grade completed. The results, shown in Table A8, remain consistent with the main findings

Panel B, focusing on physical development, reveals a more nuanced pattern. Among children of urban-origin mothers, the CSL leads to large and statistically significant improvements across multiple indicators. These children are 14.7–25.5 pp less likely to be reported as "smaller than average" at birth, have birth weights higher by roughly 268–370 grams, and face a 10–11 pp reduction in stunting. They also show notable gains in anthropometric percentiles, with weight-for-height and weight-for-age percentiles increasing by 13–14 and 15–21 points, respectively. In contrast, while children of rural-origin mothers experience a higher rise in maternal education, improvements in their physical outcomes are smaller and less consistent. The estimated effects on size at birth and stunting are generally weaker and often not statistically significant. Still, height-for-age percentile gains are more pronounced for children of rural-origin mothers—ranging from 8.9 to 13.8 points—whereas the same measure shows smaller, statistically insignificant changes for urban-origin counterparts.

In sum, these results underscore the importance of context in shaping how policy-induced maternal education gains translate into child development. Children of rural-origin mothers appear to benefit more in sociocognitive development, likely reflecting higher marginal returns to education in low-resource environments. In contrast, children of urban-origin mothers show stronger gains in physical development, possibly due to better access to healthcare and other services that amplify the effects of maternal education.

5.3.2 By Maternal Grandmother's Schooling

Table 6 explores whether the intergenerational effects of the 1997 CSL differ by maternal grandmother's education, capturing variation in family background and the intergenerational transmission of human capital. The analysis compares children whose maternal grandmothers had no formal schooling with those whose grandmothers had some schooling.

The first-stage estimates in Table 2 reveal clear heterogeneity in the reform's impact on maternal education. The reform had little effect on JHS completion among mothers whose own mothers lacked formal schooling, but it substantially increased completion rates for those with more educated maternal backgrounds—highlighting the role of baseline human capital in moderating the effectiveness of education reforms.

These first-stage differences are mirrored in the second-stage child outcomes. Panel A of Table 6 presents that children whose maternal grandmothers had some schooling experience markedly stronger gains in sociocognitive development. The index increases around 1 sd in this group (significant at the 5% or 1% level), while effects for children whose grandmothers had no schooling are inconsistent and insignificant. The same pattern appears in the index components: the likelihood of "following directions" increases by 13.4–33.0 pp in the educated-grandmother group, but remains unchanged for others. Results for "getting along with peers" are weaker, reaching significance only under the 1.5h bw (18.5 pp) for the educated-grandmother sample.

Panel B focuses on physical development; once again, effects are stronger among children whose grandmothers had some schooling. In this group, the likelihood of being reported as "smaller than average" at birth falls sharply—by 25.3–35.4 pp (significant at the 5% or 1% level)—while the corresponding declines among children with uneducated grandmothers are smaller (–1.4 to –12.0 pp). Both groups exhibit significant improvements in birth weight, though effects are more pronounced in the educated-grandmother group (279–325 grams) relative to the uneducated-grandmother group (71–342 grams).

Similar patterns appear in percentile-based indicators: children with educated grandmothers experience significant gains in weight-for-height (13.9–19.9 points) and weight-for-age percentiles (9.6–12.8 points), whereas changes among the uneducated-grandmother group are smaller or mostly insignificant. The only reversal occurs for height-for-age percentiles, where children with uneducated grandmothers show somewhat larger gains (6.7–11.0 points).

In sum, the evidence points to a reinforcing dynamic in which the intergenerational benefits of maternal education are amplified in families with higher baseline human capital. The CSL-induced improvements in child socicognitive and physical development are substantially larger when mothers themselves come from more educated households. This pattern supports theories of intergenerational human capital transmission and highlights the importance of family context in determining the returns to educational policy reforms.

6 Exploring Underlying Mechanisms

This section examines the mechanisms through which the 1997 CSL may have improved early childhood development. Building on the reduced-form evidence, I examine two broad mechanism categories: (i) maternal health behaviors, covering prenatal and postnatal care, delivery practices, breastfeeding, and maternal health inputs, and (ii) parental investment, a comprehensive category that combines household resources and direct caregiving inputs.

Household resources are proxied by partner employment and delayed fertility, which are likely to enhance the family's financial resources, supporting richer investments in the child's development. Direct caregiving inputs capture both positive activities—such as reading, storytelling, playing, and spending time with the child—and negative inputs, including days the child is left alone or under the supervision of another child.[15]

Figures 6 and 7 present RD plots illustrating discontinuities in these mechanism variables around the January 1987 cutoff. Each figure plots the mother's month of birth relative to the cutoff using a bandwidth of 45 months—the optimal bandwidth identified by the Calonico et al. (2017) algorithm for maternal schooling completion. Together, these visual patterns provide preliminary evidence of some positive shifts in maternal practices and household environments among mothers exposed to the reform.

Tables 7 and 8 complement the graphical analysis by reporting reduced-form RD estimates of the CSL's effects on these mechanisms. The estimates are shown for both uniform and triangular kernels, and for three bandwidths—optimal h, $0.75h$, and $1.5h$. Additional robustness checks based on fixed (24–60 months) and nonparametric bandwidths are presented in Online Appendix Tables A10 and A11.

6.1 Maternal Health Behaviors

This subsection explores in detail whether increased maternal education, induced by the 1997 CSL, influenced maternal health behaviors during pregnancy and infancy—periods that are well-established determinants of child health and development (Currie and Moretti, 2003; Noonan et al., 2013; Güneş, 2015; Christian et al., 2015; Liu et al., 2017; Patnode et al., 2025). Table 7 presents reduced-form RD estimates for a broad set of maternal behaviors including prenatal care, delivery characteristics, postnatal behaviors, breastfeeding, and contraceptive use.

The results reveal several behavioral shifts consistent with enhanced maternal health knowledge. Treated mothers initiate antenatal care 0.09 to 0.24 months earlier, with statis-

[15]Beyond maternal health behaviors and parental investment, maternal education may also operate through additional channels that enhance early childhood outcomes. For example, knowledge spillovers from treated mothers to other household members or peers can disseminate health and nutrition practices within the family or community. Educated mothers may also exert greater influence over household decision-making or foster social networks that provide informational and emotional support. However, these pathways are not directly observable in the available data and cannot be examined within this study.

tical significance emerging under the 1.5h bandwidth for both kernels. While estimates for the total number of antenatal visits are generally positive, they remain statistically insignificant. In addition, mothers exposed to the CSL are 2.9–3.6 pp more likely to receive at least one antenatal ultrasound exam. These estimates are statistically significant at the 5% or 1% level across all specifications, suggesting greater awareness of or adherence to recommended prenatal monitoring.

In terms of delivery characteristics, exposure to the CSL increases the probability of delivery in a private healthcare facility by around 10 pp under the uniform kernel and 11.1–14.6 pp under the triangular kernel, with statistically significant effects in all bandwidths. This shift suggests an enhanced demand for higher-quality medical care, consistent with improved health literacy.

Postnatal care also shows notable changes. Exposure to the reform significantly reduces the likelihood that an infant's first postnatal check is performed by a midwife, with estimates ranging from –6.3 to –9.9 pp and highly significant across all specifications. This decline is not offset by increased nurse involvement—estimates for nurse-conducted checks are small and statistically insignificant. However, the probability of a doctor conducting the first check increases by approximately 5 pp, though these estimates fall short of statistical significance at conventional levels. These findings, combined with the increased use of private facilities for postnatal care, suggest a substitution away from traditional midwifery toward more formal medical care, supporting the role of maternal education in promoting medically intensive healthcare settings.

Regarding breastfeeding, treated mothers breastfeed slightly longer—by 1.2 to 1.9 months depending on the specification—but the estimates are not significant. Similarly, negative point estimates for regular smoking, though not statistically significant, suggests a potential reduction in harmful behaviors, consistent with greater health awareness among more educated mothers, but the lack of statistical significance warrants cautious interpretation.

The CSL also influences reproductive health choices, particularly in the use of modern contraceptive methods and induced abortion. Exposure to the reform increases the likelihood of using modern contraceptives by 6.8–11 pp across specifications, with all estimates statistically significant. In a related finding, negative point estimates for induced abortion, though not statistically significant, indicate that increased maternal education may be associated with fewer induced abortions, potentially due to improved access to and use of modern contraceptives, which enable more informed and proactive reproductive choices. These patterns collectively point to enhanced reproductive health literacy among mothers exposed to the CSL, consistent with the existing literature (Rosenzweig and Schultz, 1989; Breierova and Duflo, 2004).

To reinforce these findings, I conduct two sets of robustness checks. First, I re-estimate the maternal health behavior outcomes using fixed symmetric bandwidths of 24, 36, 48, and 60 months around the January 1987 cutoff. These results, reported in Appendix Table A10, corroborate the primary estimates. In particular, the probability of antenatal ultrasound use remains consistently positive and statistically significant across all bandwidths, ranging from 2.7 to 3.0 pp. Earlier antenatal initiation also shows similar effect sizes and remains statistically significant in the 48- and 60-month samples. Other maternal behaviors—such as delivery in private healthcare facilities, contraceptive use, and reduced midwife involvement—are also robust across these alternative specifications. While some outcomes remain statistically insignificant, the direction and magnitude of estimates closely track the main RD results.

Second, I assess the sensitivity of results to the functional form of the running variable by estimating models that incorporate a quadratic specification. These results, presented in Appendix Table A11, remain largely consistent with the baseline linear models, confirming that the observed behavioral responses to maternal education are not an artifact of polynomial misspecification. Overall, these checks affirm that the improvements in maternal health behaviors are not sensitive to bandwidth choice or the functional form of the running variable, strengthening the interpretation of a causal link between the CSL and changes in health-related maternal behaviors.

Together, the results suggest that the CSL-driven increase in maternal education enhanced prenatal and early-life care, reflecting greater maternal agency and health literacy. These behavioral shifts align with the mechanisms through which maternal education can affect child health—namely, through improved prenatal care and better healthcare choices.

6.2 Parental Investment

This subsection examines whether exposure to the CSL influenced parental investment, broadly defined to include both household resources and direct caregiving inputs. The underlying hypothesis is that better-educated women are more likely to form unions with socioeconomically advantaged partners, thereby enhancing household resources and human capital for child development, while also shifting preferences, expanding knowledge, or altering opportunity costs in ways that increase engagement in child-centered activities. Table 8 presents reduced-form estimates across these investment outcomes.

The evidence suggests substantial improvements in household resources. Women exposed to the CSL are consistently more likely to have a partner who worked in the past seven days, with effect sizes ranging from 11 to 15 pp and statistically significant at conventional levels. Similarly, treated women tend to delay the transition to parenthood: the interval between marriage and first childbirth lengthens by 22–35 months on average, with statistical significance in several specifications. Taken together, the results indicate that CSL exposure led to the formation of more resource-rich family environments, characterized by higher partner employment and more deliberate fertility timing—both of which are consistent with improved household capacity to invest in children.

In terms of direct caregiving inputs, the results suggest a modest increase in parental engagement following exposure to the CSL. Mothers show small positive increases in the mother engagement index—which combines reading, storytelling, playing, and taking the child outside—ranging from 0.11 to 0.15 sd across specifications. Fathers similarly exhibit positive changes in the father engagement index, although the effects are smaller and less precisely estimated (up to 0.16 sd). Overall, these patterns indicate that maternal education gains may foster more stimulating and interactive caregiving environments.

The strongest and more robust evidence, however, relates to improvements in child supervision. Exposure to the CSL significantly reduces the probability that children are left alone or under the supervision of another child. The likelihood of being left alone falls by 11.3–15.5 pp (statistically significant at the 5% or 1%), while the probability of being cared for by another child declines by up to 12.2 pp. This pattern underscores a key channel through which maternal education may improve child development: by fostering more attentive and protective caregiving practices that reduce neglect risks.

The robustness analyses confirm that the main findings on parental investment are not driven by specific bandwidth choices. Using fixed symmetric windows of 24, 36, 48, and 60 months around the cutoff (Appendix Table A10), the positive effects on partner employment remain significant, ranging from 7.0 to 18.8 pp, while the interval between marriage and first childbirth increases by 13.9–35.5 months depending on the specification. Indicators of parental engagement also show consistent positive signs across these bandwidths, with statistical significance in select cases. The most robust pattern, however, concerns child supervision: reductions in neglect are large, negative, and statistically significant across all bandwidths.

Results from a quadratic specification of the running variable (Appendix Table A11) largely reinforce these conclusions. Partner employment effects remain strong and significant, delays in fertility persist at 29.8–46.3 months, and parental engagement indicators remain mostly positive, albeit still statistically imprecise.[16] Crucially, the estimated reductions in child neglect behaviors—being left alone or left with another child—persist across all quadratic specifications. These effects are large in magnitude and statistically significant in several bandwidths, including a 19.2 pp decline in being left alone (significant at the 1% level under the 1.5h uniform kernel).

Overall, the combined evidence on parental investment indicates that CSL exposure improved both the resource base of households and the quality of caregiving. While some estimates for engagement are suggestive rather than definitive, the robust reductions in child neglect strongly support the view that maternal education promotes protective family environments.[17]

6.3 The Explanatory Power of Potential Mechanisms

This subsection links the proposed mechanisms to observed effects on child development outcomes. I begin by examining whether individual mechanism variables are empirically relevant predictors of child outcomes using the full sample, irrespective of CSL exposure. Table A13 in the Online Appendix reports regressions of each child outcome on individual

[16] Additionally, Table A12 presents the Romano–Wolf stepdown adjustment for multiple hypothesis testing across the set of mechanism outcomes. Column 1 lists the p-values from the baseline estimates, Column 2 presents the resampled p-values—calculated by repeatedly and randomly reassigning the treatment indicator to approximate the null distribution—and Column 3 displays the Romano–Wolf adjusted p-values. The optimal bandwidth for each outcome was determined using the Calonico et al. (2017) method with a uniform kernel, and 500 bootstrap replications were employed. The results indicate that those mechanism outcomes found to be statistically significant in the baseline analysis remain so after adjustment.

[17] A detailed heterogeneity analysis of the potential mechanisms is presented in Online Appendix C. In brief, the behavioral responses to increased maternal education vary meaningfully across background characteristics. Mothers from rural origins exhibit stronger improvements in prenatal care, delivery practices, and maternal engagement, consistent with larger behavioral gains in lower-resource environments. In contrast, urban-origin mothers display smaller behavioral shifts but achieve greater improvements in children's physical development, suggesting that access to healthcare may amplify the returns to maternal education. Similarly, heterogeneity by maternal grandmother's schooling indicates that intergenerational human capital moderates the transmission of these effects: some behaviors respond more strongly among women from disadvantaged backgrounds, while others improve more among those from more educated families.

mechanism variables while controlling for baseline covariates. The results reveal that almost all potential mechanism variables explored exhibit some association with child outcomes, highlighting their empirical relevance.

Building on this, I group the mechanism variables into two blocks—Maternal Health Behavior and Parental Investment—and assess the incremental explanatory power each block adds to child development outcomes, controlling for baseline covariates, as reported in Online Appendix Table A14. The findings reveal that maternal health behaviors are particularly strong predictors of children's physical development, consistently improving the explanatory power of the models and showing joint statistical significance across most physical outcomes. For instance, incorporating maternal health behaviors increases the R-squared by 6.7 pp for being smaller than average at birth ($p < 0.001$) and by 4.3 points for birth weight ($p < 0.001$). Similarly, this block explains 3.9 additional pp of variation in stunting ($p = 0.001$) and 4.7 points in weight-for-height percentiles ($p = 0.007$). The predictive power is even higher for height-for-age and weight-for-age percentiles, with incremental R-squared values of 6.7 and 8.2 pp, respectively, both highly significant at $p < 0.001$. These results underscore the critical role of maternal health inputs in shaping early physical growth outcomes.

Parental investment contributes mainly to sociocognitive outcomes. The inclusion of parental investment block significantly increases the explanatory power for the sociocognitive development index (3.6 pp, $p = 0.003$), following directions (2.4 points, $p = 0.006$), and getting along with peers (2.6 points, $p = 0.041$). These associations suggest that direct parental interactions and investments in early childhood activities play an important role in supporting sociocognitive development. Parental investment also adds modest explanatory power for some physical outcomes, such as height-for-age percentile (e.g., incremental R^2 of 1.4 points, $p = 0.005$).

Together, these results indicate that maternal health behaviors predominantly shape children's physical development, while parental engagement and caregiving practices are more strongly linked to their sociocognitive outcomes. Overall, the evidence demonstrates that both maternal health behaviors and parental investments are empirically relevant mechanisms linking maternal education to child development. They provide a concrete behavioral foundation for interpreting the RD findings.

Second, I employ an attenuation analysis to evaluate the extent to which the estimated RD effects on child outcomes operate through the identified mechanisms. The logic of this test is straightforward: if a block of variables represents a true mechanism, controlling for it in the RD specification should lead to a notable reduction in the estimated treatment effect of maternal education. Table 9 reports these results, where the mechanism blocks—Maternal Health Behavior and Parental Investment—are added separately and jointly to the baseline RD model. The attenuation patterns closely mirror the predictive associations documented in the full-sample analysis.

For sociocognitive outcomes, attenuation is substantial. The baseline effect of the CSL on the sociocognitive development index is large and highly significant (0.596 sd). When maternal health behaviors are controlled, the coefficient declines by roughly 28% to 0.431 sd ($p < 0.05$), and by a similar magnitude (0.466 sd, $p < 0.05$) when controlling for parental investment alone. Controlling both mechanism blocks jointly reduces the estimate to 0.330 sd, which becomes statistically insignificant. The index components exhibit similar patterns. The baseline effect for "follows directions" (12.6 pp, $p < 0.1$) falls to 9.9 pp and loses significance once both mechanism sets are controlled for. Likewise, "getting along with peers" declines sharply from 13.3 pp ($p < 0.1$) to 2.4 pp (insignificant). These reductions indicate that much of the reform's impact on sociocognitive development operates through measurable changes in maternal health behaviors and parental investment.

For physical development outcomes, attenuation is more modest but still meaningful. For instance, the treatment effect on birth weight (185 grams) shrinks to 155 grams—and becomes insignificant—once maternal health behaviors are controlled for, and to 142 grams when both blocks are included. Stunting shows a similar attenuation: the baseline reduction of 14.9 pp falls to 10.5 pp with maternal health controls, 13.2 pp with parental investments controls, and 7.1 pp with all controls, although the effect remains statistically significant. For anthropometric percentiles, weight-for-age percentile gains nearly halve—from 9.8 points at baseline to 5.8 points with full controls—indicating that maternal behaviors and parental engagement mediate part of the improvement. In contrast, the weight-for-height percentile remains almost stable and significant across all specifications.

Taken together, these findings reveal that maternal health behaviors and parental investments explain a considerable share of the reform's impact on children's sociocognitive development and, to a lesser extent, on physical development. The smaller attenuation observed for physical outcomes implies the presence of additional, unobserved channels that are shaped by maternal education but not fully captured by the measured mechanisms.

7 Conclusion

This study investigates the intergenerational impacts of the 1997 CSL in Turkey, demonstrating how an exogenous increase in maternal education, served as a powerful catalyst for improved child development outcomes. Leveraging a sharp RD design around the January 1987 birth cutoff, the findings robustly indicate that the CSL not only succeeded in significantly boosting women's educational attainment—especially among rural populations, and those with more educated mothers—but also yielded substantial benefits for the next generation.

Children of mothers exposed to the CSL experienced significant improvements on both sociocognitive and physical dimensions of early childhood development. Sociocognitive skills, including the ability to follow directions and get along with peers, were notably enhanced, while physical health outcomes—such as birth weight, stunting, and anthropometric indicators—also improved significantly. These results highlight how maternal education functions as a powerful channel for fostering both socicognitive and physical development in the next generation, emphasizing the long-term value of policies that expand educational access.

The mechanisms driving these intergenerational benefits are multifaceted. While the paper explores maternal health behaviors and parental investment, the consistent theme is that increased maternal education fosters environments conducive to healthier child development. Mothers exposed to the CSL demonstrate improved health literacy, as seen in increased antenatal ultrasound use, earlier initiation of prenatal care, and a shift toward deliveries in private healthcare facilities. Additionally, the reform is associated with increased use of modern contraceptives and potential reductions in induced abortions, suggesting more informed reproductive planning. While effects on breastfeeding duration and smoking are less conclusive, the overall pattern points to enhanced maternal decision-making, which aligns with the observed improvements in child development. Furthermore, the CSL affects parental investment across multiple dimensions. It shapes household dynamics by increasing partner employment and delaying fertility, creating more resource-rich environments for child-rearing. At the same time, parental engagement improves, with some evidence of increased maternal involvement in cognitively stimulating activities and reductions in practices such as leaving children unsupervised.

Crucially, this study uncovers significant heterogeneity in the policy's impact, underscoring the importance of contextual factors. While rural-origin mothers experienced larger educational gains and their children showed greater improvements in sociocognitive development, urban-origin children benefited more broadly in terms of physical development, likely due to better access to complementary services like healthcare. At the same time, the study also indicates that mothers from less-educated backgrounds, experience fewer educational gains, which partly limits the downstream benefits for their children. These patterns underscore the importance of baseline conditions—such as infrastructure, and intergenerational human capital—in mediating the effectiveness of policy-driven education increases.

From a policy perspective, these findings provide strong evidence that expanding women's education can generate substantial intergenerational dividends. The Turkish CSL illustrates how compulsory schooling laws, when effectively enforced, can act as a powerful equalizer by raising the educational attainment of disadvantaged groups and translating these gains into improvements in child development. However, the heterogeneous effects observed in this study also highlight the limits of "one-size-fits-all" education policies. In contexts where infrastructure, healthcare access, or family backgrounds constrain the translation of education into tangible benefits, complementary interventions may be necessary. Investments in rural healthcare facilities, targeted support for mothers from less-educated families, and broader initiatives to reduce regional disparities can help ensure that the benefits of schooling reforms are equitably realized.

The external validity of these findings should be interpreted with care. Turkey's institutional and socio-economic environment in the late 1990s shaped both the magnitude and mechanisms of the CSL's effects. Nonetheless, the pathways documented here—enhanced health literacy, improved reproductive choices, and increased parental investments—are highly relevant to other low- and middle-income countries where female schooling remains limited and child development challenges persist. The results suggest that educational reforms, particularly those targeting women, can be a powerful lever for human capital accumulation across generations when complemented by supportive infrastructure and services.

While this study provides robust evidence of the CSL's impact, certain limitations point to directions for future research. Imprecise estimates for some outcomes—such as breastfeeding and smoking—indicate the need for larger samples or more detailed data to better understand these mechanisms. Future work should also track long-term outcomes, such as children's educational attainment or labor market performance, to assess the persistence of intergenerational effects.

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8 Figures

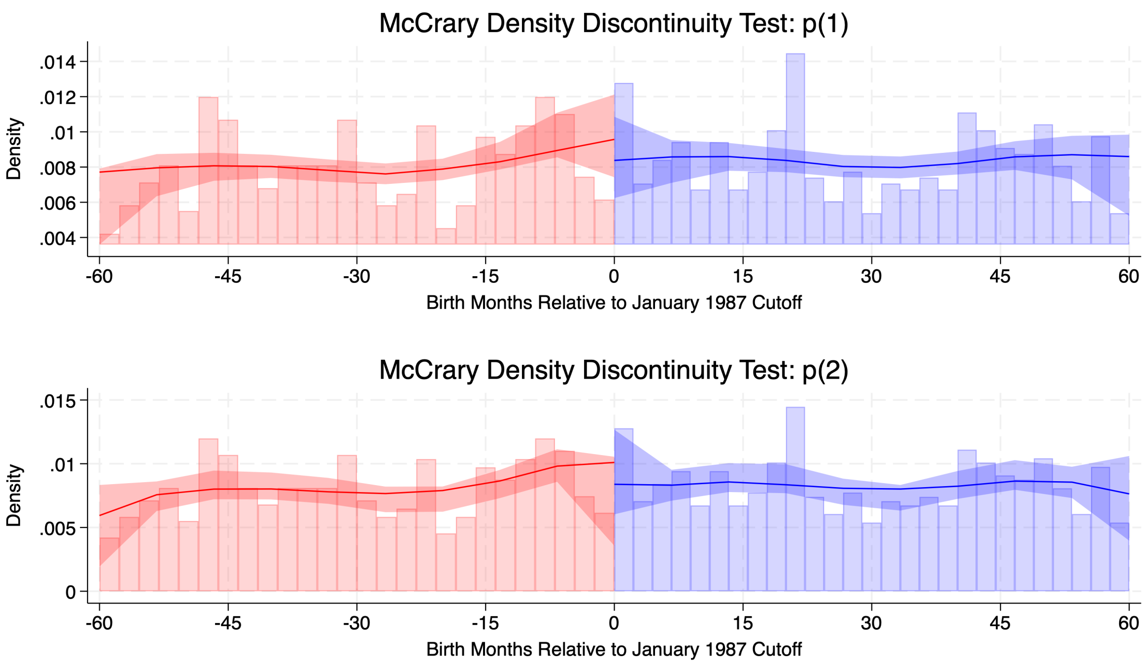

Figure 1: McCrary Density Test

Note: The sample consists of the women born within 60 months before and after the cutoff point, January 1987 whose last-born is between 0 and 5 years old. The graphs presents the results of the McCrary test with local linear polynomial (p(1)) and a local quadratic polynomial (p(2)). They examine whether there is a discontinuity in the density of the forcing variable (month of birth).

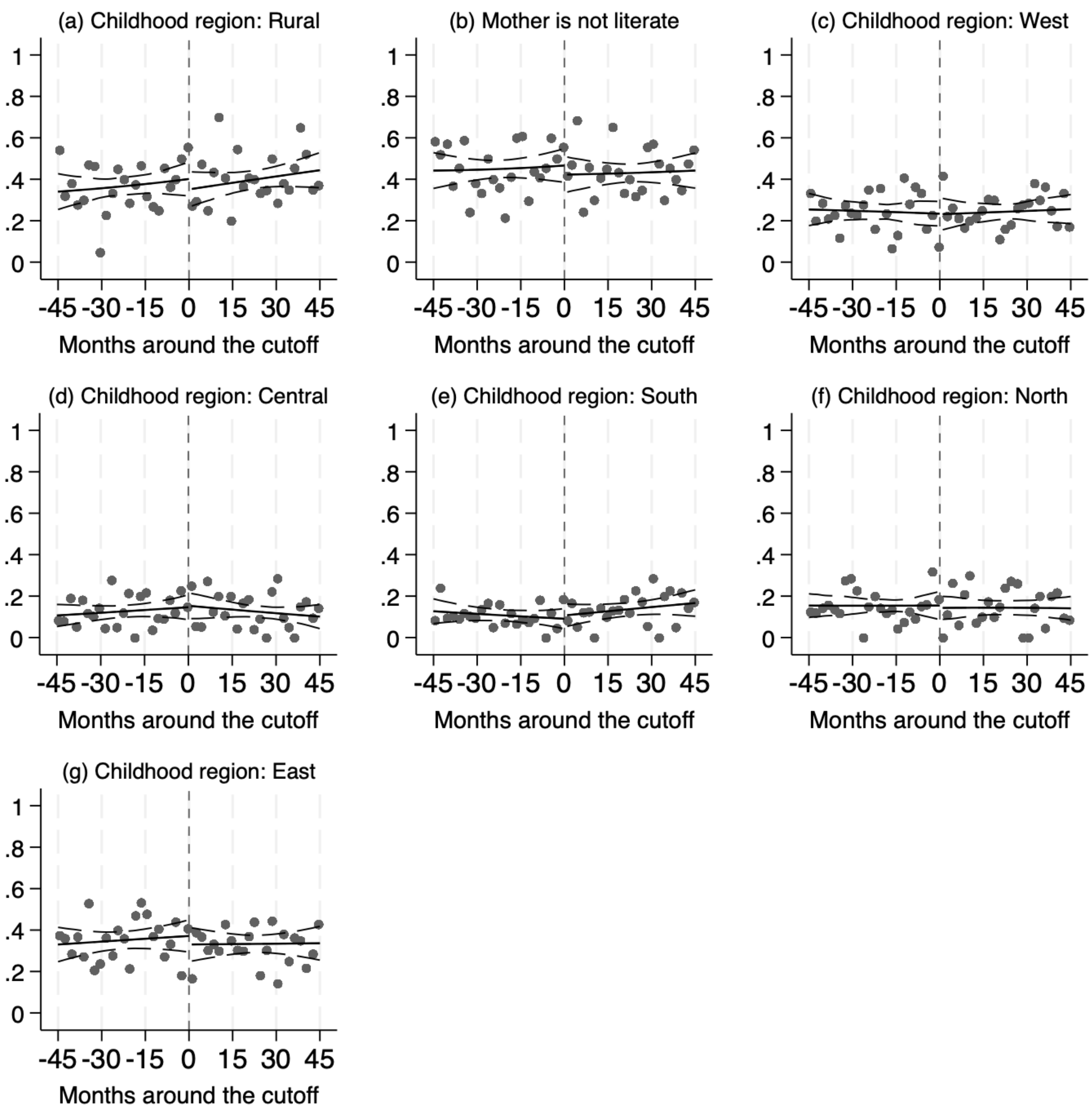

Figure 2: Balanced Covariates

Note: The sample includes women born within 45 months before or after the cutoff date of January 1987, whose youngest child is between 0 and 5 years old. Each graph displays a predetermined covariate, plotted in monthly bins against the mother's month of birth relative to January 1987. The vertical line marks the policy cutoff. Dashed lines represent 95% confidence intervals around the fitted mean values

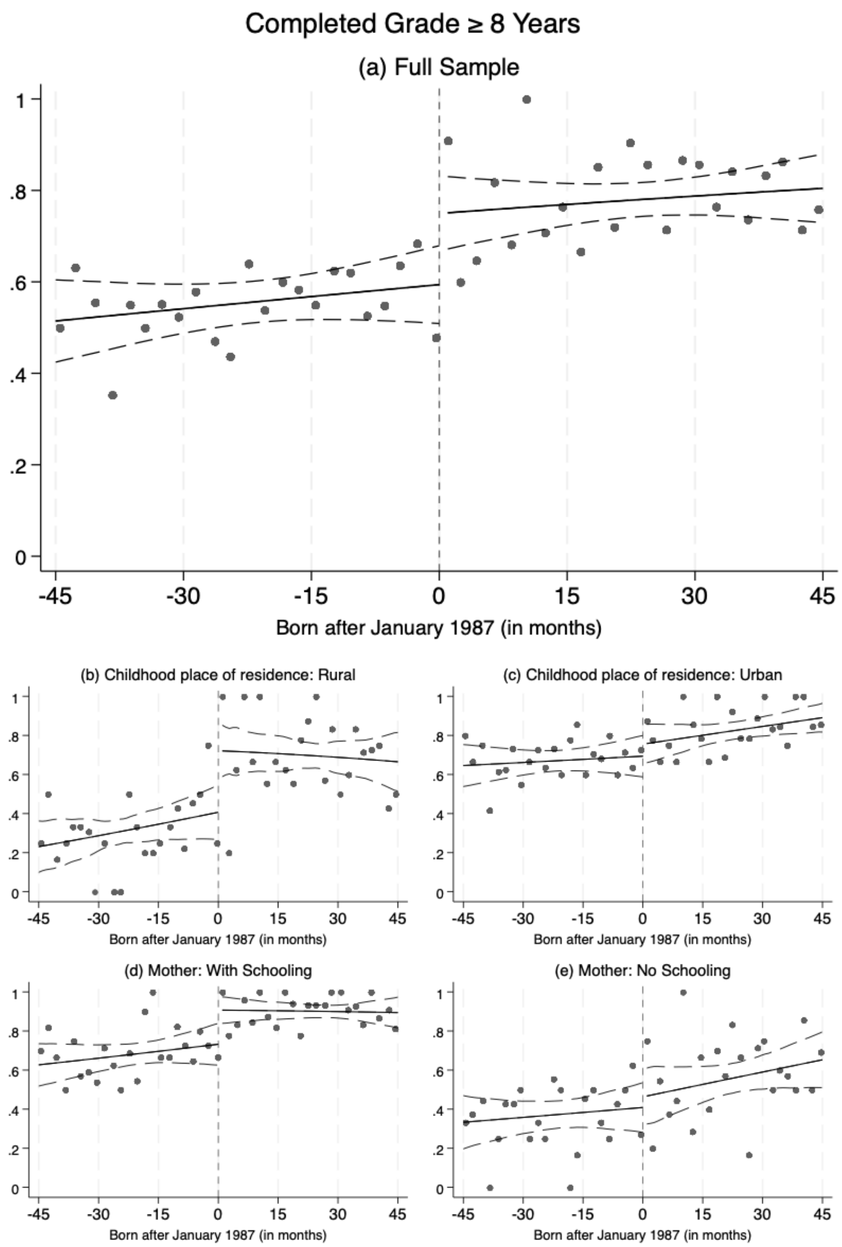

Figure 3: RD Treatment Effects on JHS Completion Rates

Note: The samples consist of all women in Panel A; women who grew up in rural areas in Panel B; women who grew up in urban areas in Panel C; women whose mother has no schooling in Panel D; and women whose mother has some schooling in Panel E. Each panel displays JHS completion rates within monthly bins, spanning 45 months before and after the cutoff point in January 1987. This 45-month bandwidth corresponds to the optimal bandwidth estimated using the Calonico et al. (2017) algorithm for JHS completion (defined as completing grade 8 or higher) in the full sample. The dashed lines represent 95 percent confidence intervals around the mean. All panels use the same 45-month bandwidth to ensure consistency across subsamples.

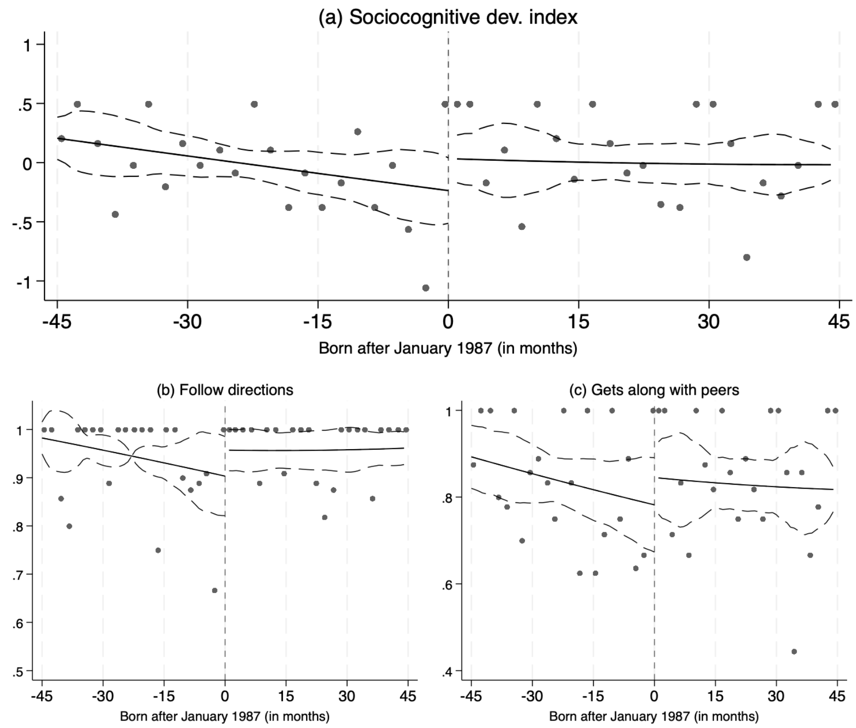

Figure 4: RD Treatment Effects on Child Sociocognitive Development

Note: Each panel displays child sociocognitive outcomes against the mother's month of birth, using a bandwidth of 45 months—consistent with the optimal bandwidth identified by the Calonico et al. (2017) algorithm for junior high school completion of mothers in the full sample. The dashed lines represent 95 percent confidence intervals around the mean. All panels use the same 45-month bandwidth to ensure consistency across subsamples.

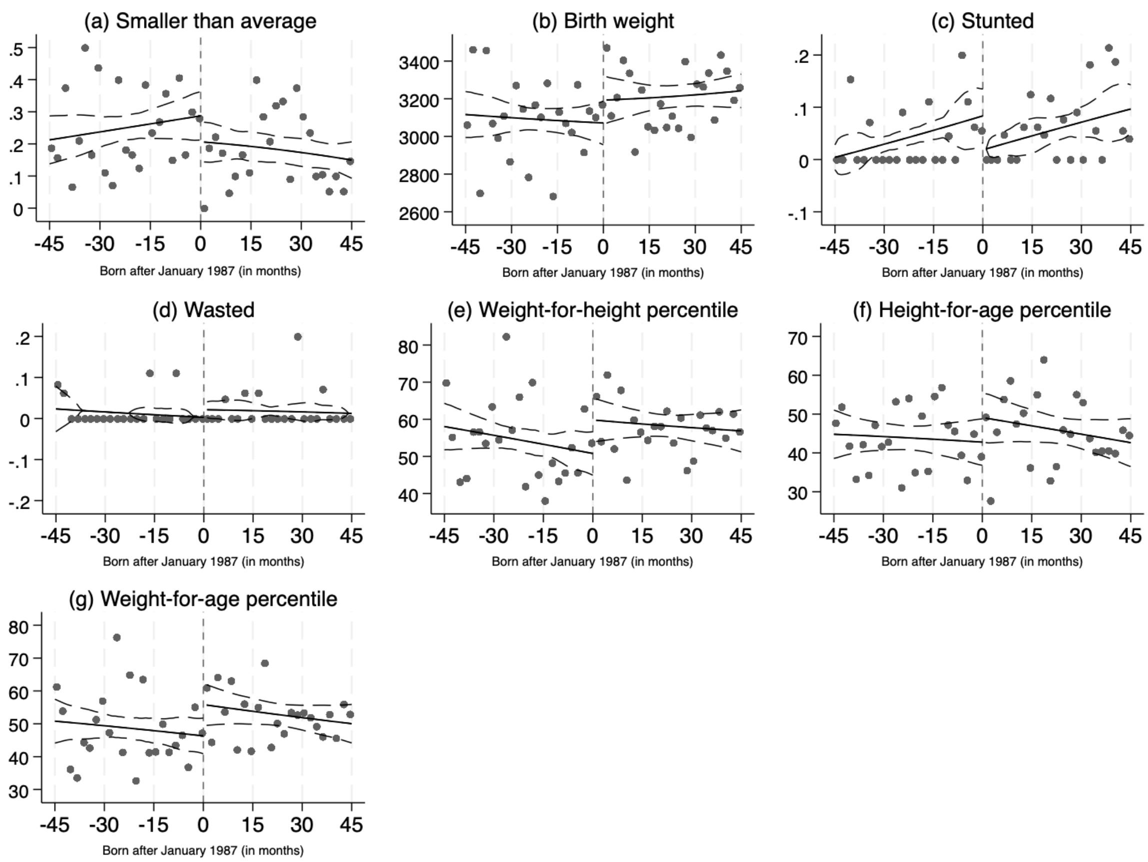

Figure 5: RD Treatment Effects on Child Physical Development

Note: Each panel displays child physical outcomes against the mother's month of birth, using a bandwidth of 45 months—consistent with the optimal bandwidth identified by the Calonico et al. (2017) algorithm for junior high school completion of mothers in the full sample. The dashed lines represent 95 percent confidence intervals around the mean. All panels use the same 45-month bandwidth to ensure consistency across subsamples.

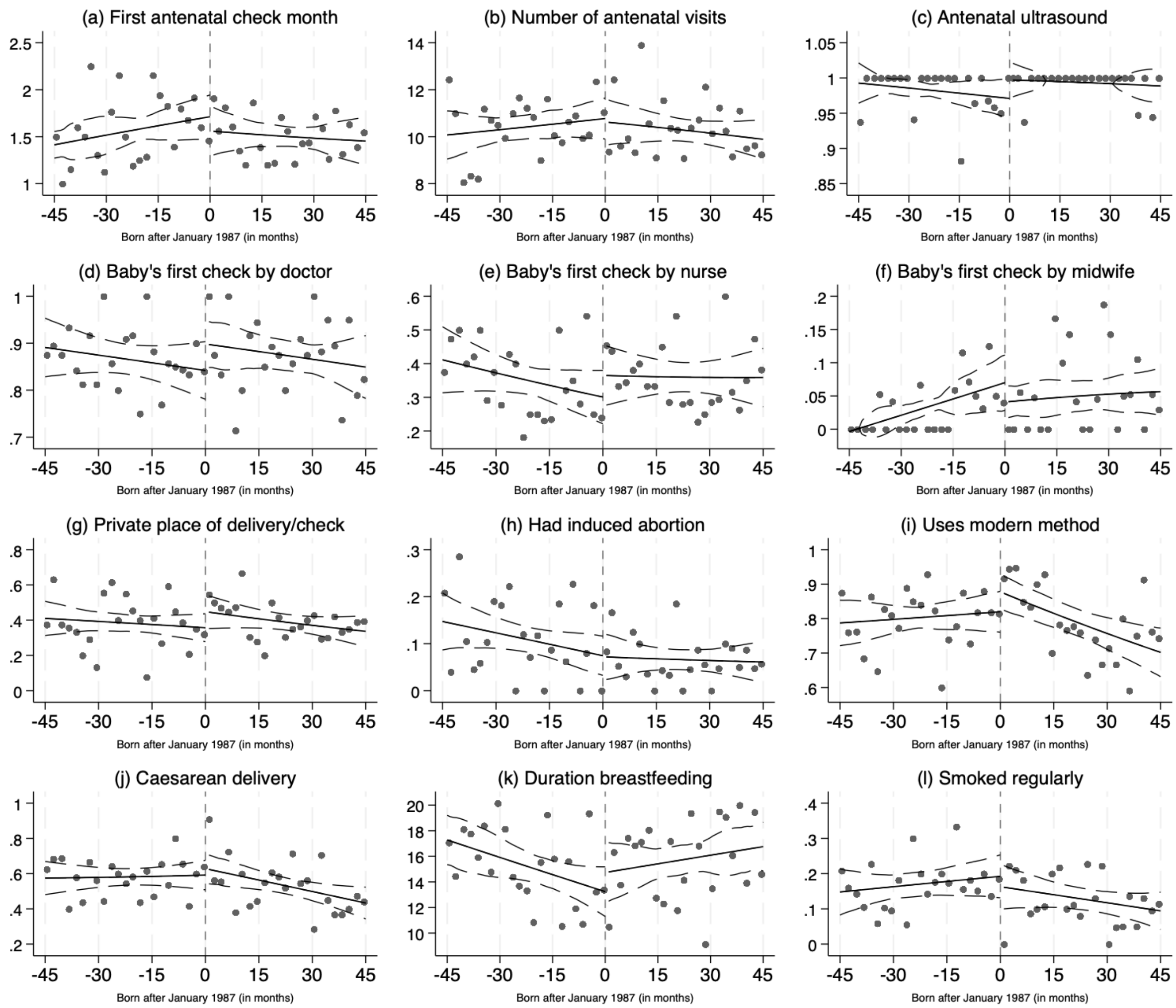

Figure 6: RD Treatment Effects on Maternal Health Behaviors

Note: Each panel displays maternal health outcomes against the mother's month of birth, using a bandwidth of 45 months—consistent with the optimal bandwidth identified by the Calonico et al. (2017) algorithm for junior high school completion of mothers in the full sample. The dashed lines represent 95 percent confidence intervals around the mean. All panels use the same 45-month bandwidth to ensure consistency across subsamples.

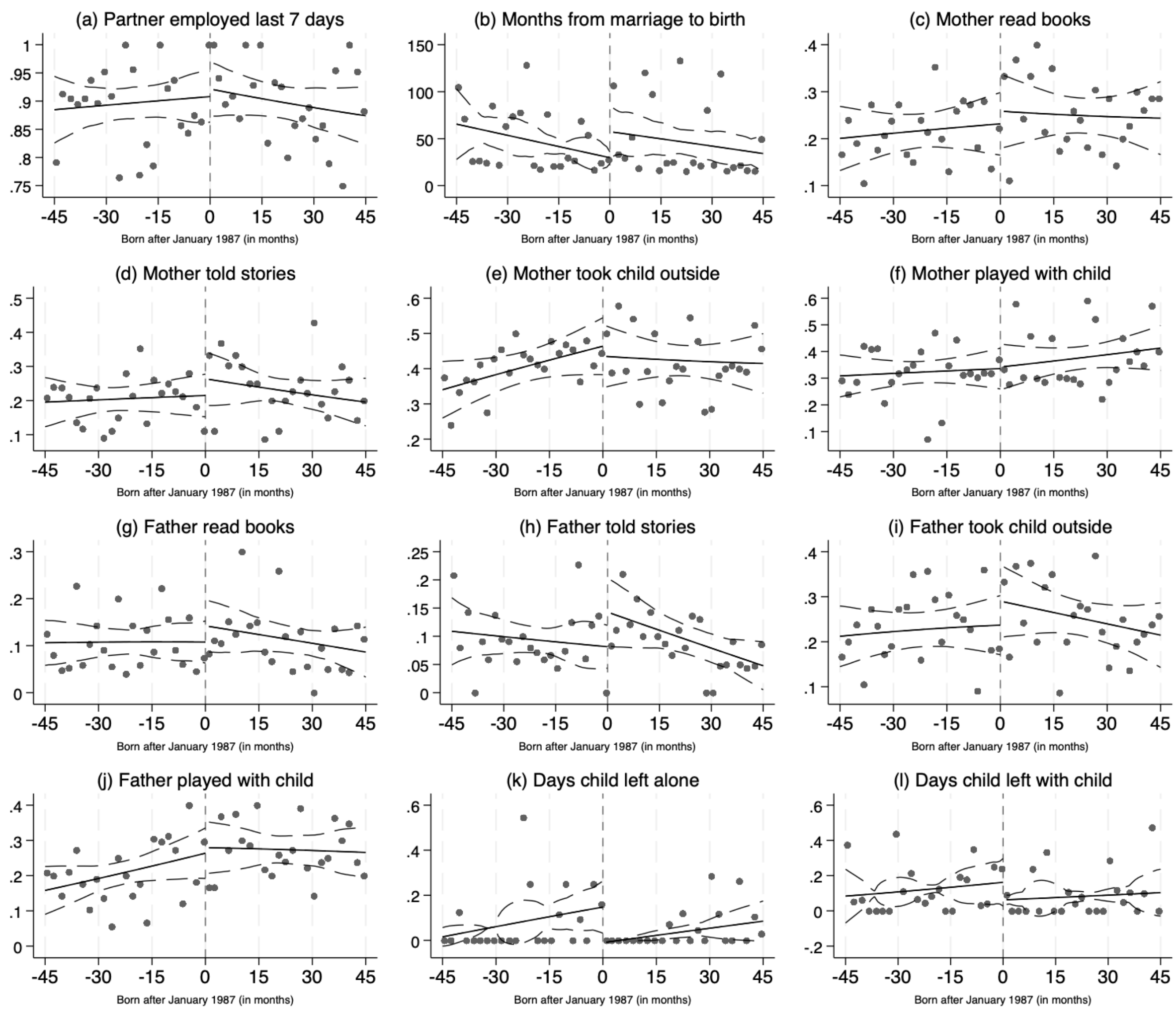

Figure 7: RD Treatment Effects on Parental Investment

Note: Each panel displays parental investment outcomes against the mother's month of birth, using a bandwidth of 45 months—consistent with the optimal bandwidth identified by the Calonico et al. (2017) algorithm for junior high school completion of mothers in the full sample. The dashed lines represent 95 percent confidence intervals around the mean. All panels use the same 45-month bandwidth to ensure consistency across subsamples.

9 Tables

Table 1: Descriptive Statistics

Child Development Outcomes and Covariates				Potential Mechanism Outcomes			
Variable	**Mean**	**S.D.**	**N**	**Variable**	**Mean**	**S.D.**	**N**
Sociocognitive Development				*Maternal Health Behaviors*			
Sociocognitive development index	-0.025	1.010	429	First antenatal check month	1.564	1.318	1133
Follows directions	0.949	0.220	431	Number of antenatal visits	10.40	5.224	1169
Gets along with peers	0.828	0.378	430	Antenatal ultrasound	0.984	0.125	1134
				Infant check by doctor	0.867	0.339	1177
Physical Development				Infant check by nurse	0.360	0.480	1177
Smaller than average size at birth	0.217	0.412	1175	Infant check by midwife	0.046	0.209	1177
Birth weight (grams)	3162	626	1148	Private place of delivery/check	0.379	0.485	1148
Stunted	0.059	0.235	903	Induced abortion	0.093	0.291	1338
Wasted	0.015	0.120	893	Modern contraceptive method	0.788	0.409	1338
Weight-for-height percentile	57.13	28.17	893	Duration of breastfeeding	15.16	9.879	803
Height-for-age percentile	45.34	30.37	890	Smoked regularly	0.149	0.356	1337
Weight-for-age percentile	51.46	30.24	890				
Covariates				*Parental Investment*			
Mother with no schooling	0.448	0.498	1334	Partner employed last 7 days	0.895	0.369	1310
Rural childhood	0.392	0.488	1318	Marriage to birth (months)	46.58	148.00	1338
West region	0.236	0.425	1338	Mother engagement (index)	0.071	1.026	1338
Central region	0.131	0.337	1338	Mother reads books	0.226	0.418	1338
South region	0.132	0.338	1338	Mother tells stories	0.203	0.403	1338
North region	0.149	0.357	1338	Mother took child outside	0.411	0.492	1338
East region	0.336	0.473	1338	Mother played with child	0.348	0.476	1338
				Father engagement (index)	0.067	1.053	1338
				Father reads books	0.112	0.316	1338
				Father tells stories	0.087	0.283	1338
				Father took child outside	0.226	0.419	1338
				Father played with child	0.230	0.421	1338
				Days left alone	0.075	0.521	1177
				Days left with another child	0.111	0.638	1177

Notes: The sample is based on the 2018 Turkey Demographic and Health Survey, women aged 26-36 whose last born child is 0-5 years old. Child sociocognitive development outcomes are reported for children aged 36–59 months. Other outcomes vary by availability of data. Sociocognitive development is a constructed index from responses on direction-following and peer interaction using unweighted averages. Anthropometric z-scores are calculated using WHO 2006 growth standards. The variable definitions are provided in online Appendix A.

Table 2: First Stage—Impact of the CSL on Women's JHS Completion Rates

Junior High School Completion	Uniform Kernel					Triangular Kernel				
	h	1.5h	Bw	N	Mean	h	1.5h	Bw	N	Mean
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
All Sample	0.087*	0.092**	45	785	0.666	0.058	0.101**	38	647	0.520
	(0.053)	(0.045)				(0.058)	(0.048)			
Rural Childhood	0.191**	0.214***	49	307	0.500	0.060	0.209**	32	195	0.516
	(0.106)	(0.084)				(0.124)	(0.107)			
Urban Childhood	0.001	0.067*	40	436	0.733	0.039	0.041	46	505	0.744
	(0.062)	(0.050)				(0.056)	(0.048)			
Mothers: No Schooling	0.003	-0.005	33	205	0.451	-0.007	0.039	37	234	0.455
	(0.135)	(0.108)				(0.127)	(0.099)			
Mothers: With Schooling	0.053	0.161***	30	335	0.806	0.166***	0.167***	54	571	0.790
	(0.069)	(0.058)				(0.053)	(0.045)			

Notes: The data are sourced from the 2018 TDHS. Columns 1–2 present local linear RD estimates using a uniform kernel and bandwidths of h (optimal) and 1.5h, respectively. The optimal bandwidth h is determined following the Calonico et al. (2017) algorithm. Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth.. Columns 6–10 replicate the same structure using a triangular kernel for bandwidth selection. Each row corresponds to a different subsample. The first row reports results for the full sample of women whose youngest child is aged 0 to 5. The second and third rows present results for women who lived in rural and urban areas, respectively, during childhood. The fourth row includes women whose mothers had no formal education, while the fifth row includes those whose mothers had at least some schooling. All specifications control for: a dummy for the mother having no education, a dummy for rural residence during childhood, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined up to age 12). Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 3: Placebo RD Treatment Effect: Using Fake Cutoffs for the CSL

	Fake cutoff year = 1980			Fake cutoff year = 1982		
	Coefficient	Bw	N	Coefficient	Bw	N
JHS Completion	-0.002	17	200	0.012	29	454
	(0.070)			(0.091)		

Notes: The data are sourced from the 2018 TDHS.This table reports placebo regression discontinuity (RD) estimates of maternal junior high school (JHS) completion using fake cutoff years preceding the actual January 1987 reform. Columns show the estimated treatment effect (coefficient) with standard errors in parentheses, the bandwidth (Bw) used, and the sample size (N). Estimates are obtained using the Calonico et al. (2017) optimal bandwidth selection with a uniform kernel. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 4: RD Treatment Effects on Child Development Outcomes

Outcome	Uniform Kernel					Triangular Kernel				
	h (1)	1.5h (2)	Mean (3)	Bw (4)	N (5)	h (6)	1.5h (7)	Mean (8)	Bw (9)	N (10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.596***	0.323*	-0.016	36	260	0.617***	0.540***	-0.035	29	220
	(0.210)	(0.173)				(0.197)	(0.180)			
Follows directions	0.126*	0.074	0.944	27	202	0.124*	0.107*	0.944	28	208
	(0.067)	(0.053)				(0.067)	(0.056)			
Gets along with peers	0.133*	0.136**	0.816	28	207	0.126**	0.093*	0.837	46	334
	(0.067)	(0.063)				(0.055)	(0.054)			
Panel B: Physical development										
Smaller than average	–0.235***	–0.112**	0.225	28	559	–0.186***	–0.135***	0.216	42	796
	(0.059)	(0.054)				(0.052)	(0.046)			
Birth weight (g)	184.597*	251.974***	3162.215	41	767	232.558**	239.697***	3155.591	44	840
	(97.969)	(80.278)				(94.470)	(82.402)			
Stunted	–0.149***	–0.102***	0.048	22	353	–0.137***	–0.103***	0.056	28	429
	(0.034)	(0.032)				(0.028)	(0.028)			
Wasted	–0.020	0.008	0.014	36	534	–0.014	–0.001	0.013	37	542
	(0.018)	(0.015)				(0.015)	(0.014)			
Weight-for-height percentile	9.957**	8.112**	57.209	38	556	10.740***	9.207***	56.477	47	680
	(4.485)	(3.920)				(3.784)	(3.543)			
Height-for-age percentile	7.215	9.391**	45.006	34	484	7.664*	7.797**	45.790	43	605
	(4.833)	(4.127)				(4.220)	(3.864)			
Weight-for-age percentile	9.754*	9.930**	51.346	42	605	12.050***	10.417**	51.234	46	678
	(5.065)	(4.380)				(4.441)	(4.237)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 5: Heterogeneity by Mother's Childhood Region: Rural vs Urban

Outcome	Rural Childhood					Urban Childhood				
	h	$1.5h$	Mean	Bw	N	h	$1.5h$	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.918***	0.633**	-0.121	26	83	0.515*	0.510*	0.031	23	100
	(0.352)	(0.340)				(0.356)	(0.312)			
Follows directions	0.045	0.045	0.940	22	67	0.207**	0.189***	0.944	25	107
	(0.127)	(0.090)				(0.123)	(0.070)			
Gets along with peers	0.377***	0.265***	0.788	27	85	0.052	0.063	0.859	31	135
	(0.112)	(0.098)				(0.126)	(0.095)			
Panel B: Physical development										
Smaller than average	–0.095	–0.078	0.246	38	289	–0.255***	–0.147**	0.226	29	364
	(0.089)	(0.078)				(0.093)	(0.079)			
Birth weight (g)	80.384	132.822	3135.727	45	319	267.921**	369.106***	3140.913	37	446
	(145.199)	(120.636)				(132.809)	(103.801)			
Stunted	–0.062	–0.001	0.057	25	159	–0.114***	–0.102***	0.044	27	248
	(0.063)	(0.052)				(0.040)	(0.032)			
Wasted	0.030*	0.018*	0.006	27	169	–0.052*	–0.011	0.018	39	338
	(0.020)	(0.013)				(0.033)	(0.023)			
Weight-for-height percentile	1.559	0.785	56.898	45	258	13.968**	13.106***	55.478	43	365
	(6.569)	(5.509)				(6.363)	(4.882)			
Height-for-age percentile	13.841**	8.876*	41.385	41	232	5.239	4.408	48.234	29	253
	(7.237)	(6.003)				(7.018)	(5.934)			
Weight-for-age percentile	4.470	1.507	48.912	45	256	20.820***	14.618***	52.382	34	295
	(8.380)	(6.848)				(5.826)	(5.416)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on rural chilgood region, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017) . Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using urban childhood region for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 6: Heterogeneity by Maternal Grandmother's Schooling

Outcome	No Schooling					Some Schooling				
	h	$1.5\,h$	Mean	Bw	N	h	$1.5\,h$	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.487	-0.035	-0.323	31	91	0.996**	1.000***	0.060	19	78
	(0.464)	(0.377)				(0.567)	(0.408)			
Follows directions	0.136	0.002	0.870	31	92	0.184**	0.134**	0.982	25	111
	(0.159)	(0.110)				(0.108)	(0.070)			
Gets along with peers	0.155	0.035	0.773	24	75	0.204	0.185*	0.854	21	87
	(0.134)	(0.106)				(0.168)	(0.135)			
Panel B: Physical development										
Smaller than average	-0.120*	-0.014	0.263	31	262	-0.354***	-0.253***	0.234	24	290
	(0.078)	(0.075)				(0.126)	(0.101)			
Birth weight (g)	342.196**	70.788	3100.285	29	228	324.869**	279.540**	3129.938	21	235
	(149.555)	(133.425)				(168.507)	(135.900)			
Stunted	-0.139***	-0.036	0.061	24	163	-0.078**	-0.076**	0.041	24	211
	(0.055)	(0.044)				(0.040)	(0.037)			
Wasted	-0.049*	-0.015	0.015	32	197	0.003	-0.006	0.009	27	227
	(0.036)	(0.019)				(0.030)	(0.027)			
Weight-for-height percentile	1.969	1.319	57.041	39	245	19.865***	13.880**	54.112	26	216
	(5.026)	(4.985)				(7.478)	(6.337)			
Height-for-age percentile	6.679	11.049**	42.971	33	198	3.262	5.603	48.352	34	280
	(8.298)	(6.476)				(8.330)	(6.358)			
Weight-for-age percentile	9.663*	9.707*	52.175	33	198	12.836**	9.634*	52.282	34	290
	(6.910)	(6.049)				(6.601)	(6.091)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on rural chilgood region, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using urban childhood region for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 7: Exploring Mechanisms Using RD Treatment Effect: Maternal Health Behaviors

Outcome	Uniform Kernel					Triangular Kernel				
	h (1)	1.5h (2)	Mean (3)	Bw (4)	N (5)	h (6)	1.5h (7)	Mean (8)	Bw (9)	N (10)
First antenatal check month	–0.102	–0.240**	1.540	31	595	–0.091	–0.172*	1.553	35	669
	(0.130)	(0.115)				(0.109)	(0.103)			
Number of antenatal visits	0.057	–0.006	10.397	42	792	0.260	0.217	10.404	41	781
	(0.568)	(0.525)				(0.540)	(0.514)			
Antenatal ultrasound	0.030**	0.036***	0.984	37	692	0.031**	0.029***	0.987	55	1014
	(0.014)	(0.014)				(0.012)	(0.011)			
Private place of delivery/check	0.104**	0.098**	0.381	38	709	0.146***	0.111***	0.379	40	765
	(0.051)	(0.049)				(0.042)	(0.043)			
Baby's first check by midwife	–0.099***	–0.068***	0.048	22	442	–0.086***	–0.063***	0.045	28	575
	(0.029)	(0.025)				(0.023)	(0.021)			
Baby's first check by nurse	–0.033	0.049	0.346	25	506	0.031	0.037	0.360	37	718
	(0.071)	(0.062)				(0.059)	(0.051)			
Baby's first check by doctor	0.047	0.039	0.869	31	603	0.042	0.048	0.862	56	1069
	(0.042)	(0.038)				(0.033)	(0.031)			
Duration breastfeeding (months)	1.918	1.235	15.429	32	430	1.284	1.273	15.215	42	559
	(1.347)	(1.160)				(1.115)	(1.018)			
Smoked regularly	–0.055	–0.054	0.150	29	660	–0.048	–0.040	0.147	51	1138
	(0.040)	(0.034)				(0.032)	(0.029)			
Uses modern method	0.110***	0.068*	0.790	35	775	0.100***	0.104***	0.794	29	661
	(0.042)	(0.038)				(0.037)	(0.034)			
Had induced abortion	–0.007	–0.016	0.089	29	661	–0.016	–0.022	0.094	45	974
	(0.034)	(0.031)				(0.029)	(0.026)			

Notes: The data come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to maternal health behaviors. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 8: Exploring Mechanisms Using RD Treatment Effect: Parental Investment

Outcome	Uniform Kernel					Triangular Kernel				
	h	1.5h	Mean	Bw	N	h	1.5h	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Partner employed last 7 days	0.129***	0.109**	0.907	29	623	0.147***	0.106***	0.897	39	835
	(0.048)	(0.044)				(0.039)	(0.038)			
Months from marriage to birth	34.612*	21.863	47.432	35	775	29.332*	23.231	45.898	43	915
	(19.696)	(16.640)				(16.465)	(14.968)			
Mother Engagement Index	0.114	0.148*	0.071	40	886	0.126	0.105	0.071	41	886
	(0.100)	(0.087)				(0.096)	(0.086)			
Father Engagement Index	0.086	0.164	0.082	34	738	0.080	0.103	0.090	33	711
	(0.153)	(0.127)				(0.160)	(0.139)			
Days child left alone	-0.155***	-0.113**	0.077	43	834	-0.117**	-0.142***	0.074	38	750
	(0.056)	(0.056)				(0.056)	(0.049)			
Days child left with child	-0.122	-0.088	0.097	26	524	-0.109	-0.089	0.114	39	750
	(0.082)	(0.078)				(0.074)	(0.068)			

Notes: The data come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to parental investment. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table 9: The Explanatory Power of Mechanisms

Outcome	**Baseline**	**+Maternal Health Behavior**	**+Parental Investment**	**+All Controls**
Sociocognitive development				
Sociocognitive development index	0.596***	0.431**	0.466**	0.330
	(0.210)	(0.200)	(0.216)	(0.200)
Follows directions	0.126*	0.092	0.109	0.099
	(0.067)	(0.071)	(0.067)	(0.070)
Gets along with peers	0.133*	0.082	0.100	0.024
	(0.067)	(0.063)	(0.065)	(0.064)
Physical development				
Smaller than average size at birth	-0.235***	-0.223***	-0.224***	-0.211***
	(0.059)	(0.070)	(0.060)	(0.071)
Birth weight (grams)	184.597*	154.773	173.410*	141.628
	(97.969)	(129.143)	(99.410)	(129.953)
Stunted	-0.149***	-0.105***	-0.132***	-0.071***
	(0.034)	(0.030)	(0.028)	(0.025)
Weight-for-height percentile	9.957**	9.528**	9.814**	9.592**
	(4.485)	(4.582)	(4.503)	4.574
Weight-for-age percentile	9.754*	6.355	9.272*	5.837
	(5.065)	(5.511)	(5.249)	(5.559)

Notes: The table reports RD estimates of the treatment effect on child outcomes using mechanism variables as control. Column (1) shows baseline estimates with only standard controls (month of birth, rural childhood, maternal education, and region). Column (2) adds maternal health-related controls, Column (3) adds parental investment measures, and Column (4) includes all applicable controls simultaneously. Coefficients are reported with standard errors in parentheses. The table reports only the outcomes that are statistically significant in the baseline specification. Significance stars indicate ***p<0.01, **p<0.05, *p<0.1. Results are based on optimal bandwidths selected for each outcome using Calonico et al. (2017) and standard errors are clustered at the month-year of birth level.

10 Online Appendix

Appendix A: Additional Figures and Tables

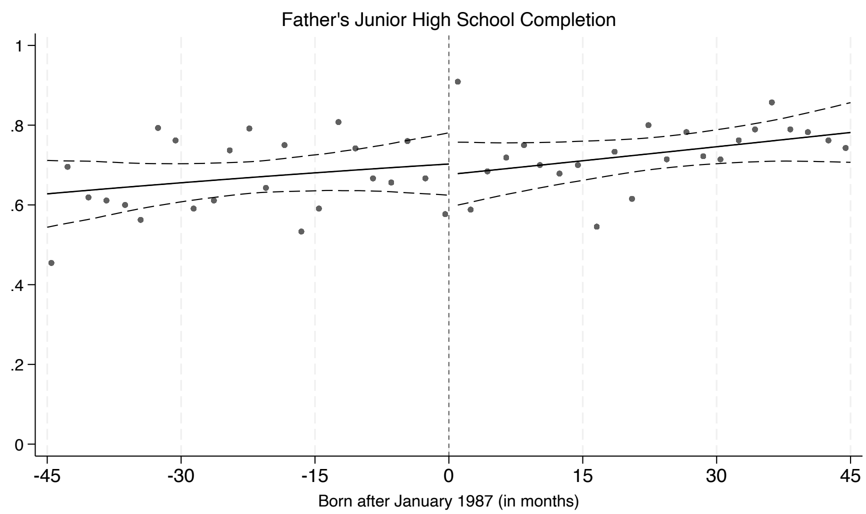

Figure A1: RD Treatment Effects on Father's JHS Completion Rates

Note: This figure displays JHS completion rates of fathers within monthly bins, spanning 45 months before and after the cutoff point in January 1987. The dashed lines represent 95 percent confidence intervals around the mean.

Table A1: Balance Table for Covariates

	Bandwidth = 60				Bandwidth = 48				Bandwidth = 36			
Covariate	Treated	Control	p-value	N	Treated	Control	p-value	N	Treated	Control	p-value	N
Mother: No schooling	0.44	0.46	0.40	1334	0.44	0.46	0.35	1101	0.42	0.44	0.64	820
Rural Childhood	0.41	0.37	0.19	1318	0.41	0.37	0.10	1088	0.39	0.35	0.26	810
West Region	0.23	0.24	0.72	1338	0.24	0.24	0.89	1104	0.25	0.24	0.95	823
Central Region	0.13	0.13	0.95	1338	0.13	0.13	0.97	1104	0.13	0.13	0.78	823
South Region	0.15	0.11	0.03	1338	0.14	0.11	0.09	1104	0.14	0.10	0.12	823
North Region	0.14	0.16	0.50	1338	0.14	0.16	0.47	1104	0.15	0.15	0.71	823
East Region	0.33	0.35	0.39	1338	0.34	0.35	0.64	1104	0.33	0.36	0.48	823

Notes: The data are sourced from the 2018 TDHS. This table presents balance statistics for key covariates between treated and control groups for three different bandwidths (60, 48, and 36 months) around the cutoff. Means for treated and control groups are reported, along with the p-values from two-sided t-tests and the total number of observations used for each covariate.

Table A2: RD Treatment Effects on Covariates

	Linear RD (1)	Mean (2)	N (3)
Mother: No Schooling	-0.047	0.45	1,334
	(0.057)		
Rural Childhood	0.044	0.39	1,318
	(0.052)		
Childhood Region:			
West	-0.017	0.24	1338
	(0.047)		
Central	0.010	0.13	1338
	(0.037)		
South	0.029	0.13	1338
	(0.029)		
North	-0.013	0.15	1338
	(0.038)		
East	-0.021	0.34	1338
	(0.046)		
Joint p-value:	0.890		

Notes: The data are sourced from the 2018 TDHS. Column 1 presents results from local RD analyses using linear polynomials in month-year of birth as the running variable, with a bandwidth of 60 months, i.e., including mothers aged 26 to 36. Column 2 reports the mean values, and Column 3 shows the corresponding number of observations. All variables are predetermined covariates. The first two rows include a dummy variable equal to 1 if the respondent's mother has no schooling and a dummy variable equal to 1 if the respondent lived in a rural area during childhood. The section labeled "Childhood Region" includes dummy variables equal to 1 if the respondent lived in western, southern, central, northern, or eastern Turkey until the age of 12, respectively. The final section contains dummy variables for the respondent's month of birth. The row labeled "Joint p-value" reports the p-value from a Seemingly Unrelated Regression (SUR) test assessing the joint significance of all covariates. The variable definitions are provided in online Appendix A. Standard errors, clustered at the month-year cohort level, are provided in parentheses. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A3: First-Stage Estimates Excluding 1986 and/or 1987 Cohorts

	Full Sample		No 1986		No 1987		No 1986 & 1987	
Bw	48	60	48	60	48	60	48	60
JHS Completion	0.080*	0.101**	0.136*	0.136**	0.090*	0.139***	0.128*	0.153**
	(0.052)	(0.047)	(0.084)	(0.066)	(0.056)	(0.050)	(0.090)	(0.072)
Mean	0.657	0.653	0.670	0.662	0.648	0.645	0.657	0.652
N	843	1018	697	872	738	913	605	780

Notes: Each cell reports the estimated effect of the 1997 CS) on maternal JHS completion using a local linear RD design with a uniform kernel. Baseline bandwidths are set at 48 and 60 months around the January 1987 cutoff. When excluding births from 1986 or 1987, the effective bandwidth is reduced by 12 months for each excluded year. Standard errors, clustered at the month-of-birth level, are reported in parentheses below the coefficients. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A4: RD Treatment Effects on Sociocognitive Development Index: Alternative Approaches

Outcome	Uniform Kernel					Triangular Kernel				
	h	1.5h	Mean	Bw	N	h	1.5h	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Baseline: Sociocognitive dev. index	0.596***	0.323*	-0.016	36	260	0.617***	0.540***	-0.035	29	220
	(0.210)	(0.173)				(0.197)	(0.180)			
Principal Component Analysis	0.689**	0.601***	-0.047	26	193	0.672***	0.595***	-0.059	28	207
	(0.274)	(0.214)				(0.237)	(0.210)			
Factor Analysis	0.689**	0.601***	-0.047	26	193	0.672***	0.595***	-0.059	28	207
	(0.274)	(0.214)				(0.237)	(0.210)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report quadratic polynomial RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents RD estimates for the sociocognitive development index using a different construction method: the first row reports the baseline index (the standardized average of the two component variables), the second row uses an index created via principal component analysis (PCA), and the third row uses an index constructed through factor analysis. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A5: RD Treatment Effects on Child Outcomes: Fixed Bandwidths

	Static Bandwidth (months)			
Outcome	24	36	48	60
Sociocognitive development				
Sociocognitive development index	0.565**	0.580***	0.327**	0.291**
	(0.280)	(0.205)	(0.193)	(0.169)
Follows directions	0.124*	0.121**	0.049	0.055*
	(0.087)	(0.058)	(0.047)	(0.043)
Gets along with peers	0.119*	0.128**	0.091*	0.070
	(0.087)	(0.067)	(0.066)	(0.062)
Physical development				
Smaller than average size at birth	-0.255***	-0.148***	-0.106**	-0.109**
	(0.081)	(0.062)	(0.054)	(0.050)
Birth weight (grams)	311.095**	202.435**	195.153**	251.974***
	(143.983)	(109.562)	(96.588)	(85.104)
Stunted	-0.098***	-0.058**	-0.046*	-0.020
	(0.036)	(0.030)	(0.029)	(0.027)
Wasted	0.002	-0.023	-0.005	0.003
	(0.024)	(0.022)	(0.016)	(0.014)
Weight-for-height percentile	11.174**	11.965***	8.496**	8.647**
	(6.074)	(4.605)	(4.169)	(3.802)
Height-for-age percentile	9.971*	7.150*	7.152*	7.314**
	(6.564)	(5.204)	(4.434)	(4.104)
Weight-for-age percentile	14.425**	12.502***	9.780**	9.776**
	(7.014)	(5.193)	(4.810)	(4.554)
N	573	823	1104	1338

Notes: Each cell reports the RD estimate of the effect of maternal education on child development outcomes using local linear regressions with uniform kernel. Bandwidths are fixed at 24, 36, 48, or 60 months. The variable definitions are provided in online Appendix A. Standard errors clustered at the month-of-birth level are in parentheses. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A6: RD Treatment Effects on Child Outcomes: Quadratic Specification

Outcome	**Uniform Kernel**					**Triangular Kernel**				
	h (1)	1.5*h* (2)	Mean (3)	Bw (4)	N (5)	*h* (6)	1.5*h* (7)	Mean (8)	Bw (9)	N (10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.572	0.648**	0	34	255	0.625**	0.640***	0	41	297
	(0.356)	(0.261)				(0.292)	(0.243)			
Follows directions	0.122	0.131*	1	34	256	0.139	0.127*	1	43	307
	(0.107)	(0.074)				(0.095)	(0.072)			
Gets along with peers	0.150*	0.145*	1	53	383	0.128	0.143**	1	43	316
	(0.085)	(0.079)				(0.078)	(0.072)			
Panel B: Physical development										
Smaller than average	-0.345***	-0.189***	0	37	717	-0.306***	-0.237***	0	39	749
	(0.076)	(0.067)				(0.063)	(0.062)			
Birth weight (g)	316.123**	247.019**	3156	44	840	356.627***	255.849**	3161	41	778
	(125.814)	(111.757)				(105.807)	(108.743)			
Stunted	-0.145***	-0.150***	0	39	565	-0.162***	-0.145***	0	46	674
	(0.045)	(0.041)				(0.037)	(0.035)			
Wasted	-0.026	0.002	0	42	595	-0.022	-0.005	0	53	780
	(0.019)	(0.017)				(0.016)	(0.015)			
Weight-for-height percentile	10.342*	8.260*	56	57	838	11.111**	9.904**	56	57	822
	(5.588)	(4.903)				(5.223)	(4.661)			
Height-for-age percentile	9.490*	6.332	45	37	541	9.583**	7.963*	45	41	585
	(5.668)	(5.477)				(4.483)	(4.825)			
Weight-for-age percentile	12.075*	11.767**	51	49	723	13.665**	12.818**	51	53	779
	(6.691)	(5.811)				(5.984)	(5.446)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report quadratic polynomial RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A7: RD Treatment Effects on Child Outcomes: Controlling for The Child's Age in Months and Birth Order

Outcome	Uniform Kernel					Triangular Kernel				
	h	1.5h	Mean	Bw	N	h	1.5h	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.609***	0.315*	0	35	260	0.633***	0.545***	0	30	220
	(0.211)	(0.173)				(0.198)	(0.180)			
Follows directions	0.111	0.119**	1	23	179	0.133**	0.116**	1	27	208
	(0.073)	(0.057)				(0.067)	(0.057)			
Gets along with peers	0.097	0.129*	1	26	193	0.129**	0.095*	1	45	331
	(0.070)	(0.066)				(0.056)	(0.055)			
Panel B: Physical development										
Smaller than average	–0.245***	–0.140**	0	27	540	–0.199***	–0.142***	0	41	796
	(0.061)	(0.055)				(0.053)	(0.047)			
Birth weight (g)	176.502*	265.179***	3161	42	778	241.969**	246.813***	3155	44	814
	(96.730)	(78.104)				(94.162)	(82.257)			
Stunted	–0.154***	–0.109***	0	22	353	–0.147***	–0.110***	0	28	417
	(0.033)	(0.031)				(0.026)	(0.027)			
Wasted	–0.014	0.009	0	31	447	–0.009	–0.000	0	36	517
	(0.020)	(0.015)				(0.014)	(0.014)			
Weight-for-height percentile	11.198**	8.170**	57	38	542	10.356***	8.895**	56	47	702
	(4.383)	(3.864)				(3.682)	(3.452)			
Height-for-age percentile	8.245*	9.928**	45	36	516	10.230**	9.547**	45	41	593
	(4.736)	(4.073)				(4.075)	(3.849)			
Weight-for-age percentile	10.879**	9.088**	51	48	700	14.138***	11.887***	51	43	605
	(4.729)	(4.204)				(4.507)	(4.351)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, fixed effects for the childhood region (defined as the place of residence up to age 12), as well as the child's age in months and birth order. The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A8: RD Treatment Effects on Child Outcomes: Controlling for Paternal Education

Outcome	Uniform Kernel					Triangular Kernel				
	h (1)	1.5 *h* (2)	Mean (3)	Bw (4)	N (5)	*h* (6)	1.5 *h* (7)	Mean (8)	Bw (9)	N (10)
Panel A: Sociocognitive development										
Sociocognitive dev. index	0.568**	0.497***	-0.068	27	198	0.595***	0.507***	-0.014	31	220
	(0.222)	(0.187)				(0.194)	(0.177)			
Follows directions	0.137**	0.111**	0.948	25	191	0.118*	0.109**	0.944	27	205
	(0.066)	(0.052)				(0.063)	(0.054)			
Gets along with peers	0.131*	0.138**	0.819	28	209	0.123**	0.089	0.833	45	329
	(0.070)	(0.065)				(0.056)	(0.055)			
Panel B: Physical development										
Smaller than average	–0.234***	–0.131**	0.229	26	510	–0.223***	–0.143***	0.214	35	663
	(0.063)	(0.056)				(0.054)	(0.050)			
Birth weight (g)	174.088*	223.554***	3157	43	776	217.245**	216.235***	3155	43	797
	(94.288)	(75.079)				(90.988)	(80.730)			
Stunted	–0.134***	–0.083***	0.047	24	364	–0.127***	–0.095***	0.054	31	442
	(0.034)	(0.032)				(0.028)	(0.028)			
Wasted	–0.005	0.009	0.015	43	592	–0.015	–0.001	0.015	39	544
	(0.016)	(0.014)				(0.015)	(0.014)			
Weight-for-height percentile	15.083***	10.697***	56.838	36	506	12.731***	10.918***	56.477	47	663
	(4.703)	(4.039)				(3.813)	(3.573)			
Height-for-age percentile	7.147	9.440**	45.006	34	474	7.582*	7.872**	45.790	43	591
	(4.677)	(4.070)				(4.047)	(3.790)			
Weight-for-age percentile	10.789**	11.261**	51.527	42	579	13.298***	11.607***	51.191	47	661
	(5.017)	(4.385)				(4.253)	(4.124)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to child development outcomes. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, fixed effects for the childhood region (defined as the place of residence up to age 12), and paternal education measured as the highest grade completed. The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A9: Romano-Wolf Multiple Hypotheses Tests for Child Outcomes

Outcome	Model p-value	Resample p-value	Romano-Wolf p-value
Sociocognitive development index	0.05	0.03	0.09
Follows directions	0.07	0.05	0.10
Gets along with peers	0.08	0.08	0.10
Smaller than average size at birth	0.00	0.00	0.00
Birth weight (grams)	0.10	0.02	0.05
Stunted	0.00	0.00	0.00
Weight-for-height percentile	0.03	0.01	0.02
Weight-for-age percentile	0.06	0.01	0.04

Notes: This table presents p-values from the Romano–Wolf stepdown procedure used to adjust for multiple hypothesis testing across child development outcomes. The data originate from the 2018 Turkish Demographic and Health Survey, with samples and model specifications consistent with those in Table 3. For each outcome, the bandwidth was determined using the Calonico et al. (2017)) optimal bandwidth selection method with a uniform kernel. The number of bootstrap replications was set to 500. Column 1 reports baseline model p-values, Column 2 shows resampled p-values obtained via repeated random reassignments of the treatment indicator to approximate the null distribution, and Column 3 provides Romano–Wolf adjusted p-values.

Table A15: Mechanism Heterogeneity by Mother's Childhood Region: Rural vs Urban

Outcome	Rural Childhood					Urban Childhood				
	h (1)	$1.5\,h$ (2)	Mean (3)	Bw (4)	N (5)	h (6)	$1.5\,h$ (7)	Mean (8)	Bw (9)	N (10)
Panel A: Maternal Health Behaviors										
First antenatal check month	-0.407	-0.437*	1.851	32	222	-0.043	-0.060	1.399	26	321
	(0.363)	(0.304)				(0.113)	(0.146)			
Number of antenatal visits	0.635	-0.026	9.509	28	220	0.167	0.254	11.064	46	542
	(1.080)	(0.960)				(0.676)	(0.614)			
Antenatal ultrasound	0.084***	0.078***	0.981	38	266	-0.016	0.001	0.993	35	410
	(0.031)	(0.031)				(0.014)	(0.015)			
Private place of delivery/check	0.213**	0.179**	0.288	24	191	0.085	0.079	0.453	40	467
	(0.106)	(0.079)				(0.077)	(0.064)			
Infant check by midwife	-0.092**	-0.060*	0.053	21	170	-0.095**	-0.044	0.056	28	353
	(0.053)	(0.041)				(0.049)	(0.037)			
Infant check by nurse	-0.062	0.007	0.391	31	230	0.051	0.124*	0.313	26	321
	(0.089)	(0.080)				(0.081)	(0.079)			
Infant check by doctor	0.228**	0.207***	0.811	23	190	-0.033	-0.029	0.902	29	364
	(0.097)	(0.065)				(0.058)	(0.053)			
Duration of breastfeeding	-0.354	0.152	15.495	38	190	1.329	1.568	14.368	30	256
	(2.396)	(2.033)				(2.335)	(1.939)			
Smoked regularly	0.114*	0.047	0.112	18	161	-0.079*	-0.086*	0.220	25	357
	(0.082)	(0.059)				(0.058)	(0.056)			
Modern contraceptive method	0.169**	0.124**	0.764	34	284	0.133**	0.068	0.832	23	332
	(0.079)	(0.070)				(0.065)	(0.053)			
Induced abortion	-0.103*	-0.091**	0.088	27	238	0.032	-0.009	0.079	37	506
	(0.070)	(0.053)				(0.046)	(0.037)			
Panel B: Parental Investment										
Partner employed last 7 days	0.218**	0.124	0.928	29	249	0.079**	0.107***	0.914	26	357
	(0.122)	(0.111)				(0.038)	(0.034)			
Marriage to birth (months)	41.854	30.921	53.116	25	224	39.144**	23.495	42.334	32	434
	(46.601)	(30.644)				(23.118)	(19.508)			
Mother Engagement Index	0.248*	0.157	-0.047	31	253	0.019	-0.039	0.195	29	409
	(0.176)	(0.143)				(0.147)	(0.125)			
Father Engagement Index	0.020	0.136	-0.056	28	245	0.089	0.130	0.202	49	670
	(0.204)	(0.157)				(0.186)	(0.150)			
Days left alone	-0.088	-0.154**	0.052	26	210	-0.103*	-0.090*	0.079	64	727
	(0.096)	(0.080)				(0.065)	(0.057)			
Days left with another child	-0.059	-0.020	0.153	27	216	-0.141*	-0.201**	0.088	36	429
	(0.181)	(0.148)				(0.103)	(0.100)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on rural chilgood region, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number

Table A10: RD Treatment Effects on Mechanism Outcomes: Fixed Bandwidths

	Static Bandwidth (months)			
Outcome	24	36	48	60
Maternal Health Behaviors				
First antenatal check month	-0.224*	-0.128	-0.187*	-0.155*
	(0.161)	(0.131)	(0.119)	(0.108)
Number of antenatal visits	0.539	0.286	0.248	0.056
	(0.711)	(0.635)	(0.565)	(0.536)
Antenatal ultrasound	0.029*	0.030**	0.027**	0.030**
	(0.018)	(0.014)	(0.013)	(0.014)
Infant check by doctor	0.062	0.036	0.041	0.043
	(0.054)	(0.042)	(0.039)	(0.036)
Infant check by nurse	-0.033	0.046	0.068	0.003
	(0.070)	(0.064)	(0.056)	(0.051)
Infant check by midwife	-0.089***	-0.051**	-0.030	-0.025
	(0.031)	(0.026)	(0.023)	(0.023)
Private place of delivery/check	0.197***	0.095*	0.087*	0.087**
	(0.066)	(0.057)	(0.055)	(0.050)
Induced abortion	-0.033	-0.017	-0.020	-0.017
	(0.042)	(0.035)	(0.031)	(0.029)
Modern contraceptive method	0.111**	0.120***	0.052*	0.059*
	(0.047)	(0.041)	(0.040)	(0.036)
Duration of breastfeeding	1.193	1.159	1.027	1.446
	(1.892)	(1.415)	(1.169)	(1.193)
Smoked regularly	-0.009	-0.054*	-0.044	-0.032
	(0.046)	(0.039)	(0.036)	(0.035)
Parental Investment				
Partner employed last 7 days	0.188**	0.129**	0.086*	0.070*
	(0.097)	(0.066)	(0.056)	(0.047)
Marriage to birth (months)	13.950	35.477**	23.760*	18.364
	(24.579)	(20.853)	(18.095)	(15.979)
Mother engagement	0.210*	0.053	0.007	0.148**
	(0.128)	(0.107)	(0.096)	(0.089)
Father Engagement	0.155	0.079	0.123	0.182*
	(0.209)	(0.160)	(0.131)	(0.033)
Days left alone	-0.050	-0.151***	-0.150***	-0.149***
	(0.098)	(0.059)	(0.061)	(0.059)
Days left with another child	-0.152*	-0.077	-0.080	-0.062
	(0.099)	(0.085)	(0.078)	(0.071)
N	573	823	1104	1338

Notes: Each cell reports the RD estimate of the effect of maternal education on mechanism outcomes using local linear regressions with uniform kernel. Bandwidths are fixed at 24, 36, 48, or 60 months. The variable definitions are provided in online Appendix A. Standard errors clustered at the month-of-birth level are in parentheses. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A11: RD Treatment Effects on Mechanism Outcomes: Quadratic Specification

Outcome	Uniform Kernel					Triangular Kernel				
	h (1)	1.5h (2)	Mean (3)	Bw (4)	N (5)	h (6)	1.5h (7)	Mean (8)	Bw (9)	N (10)
Panel A: Maternal Health Behaviors										
First antenatal check month	0.020	-0.038	2	44	826	-0.105	-0.160	2	57	1069
	(0.174)	(0.152)				(0.145)	(0.124)			
Number of antenatal visits	0.589	0.161	10	39	756	0.148	0.238	10	54	1027
	(0.849)	(0.765)				(0.710)	(0.637)			
Antenatal ultrasound	0.036**	0.034**	1	62	1139	0.022	0.032*	1	45	826
	(0.017)	(0.015)				(0.019)	(0.016)			
Private place of delivery/check	0.285***	0.162***	0	38	709	0.245***	0.183***	0	46	862
	(0.059)	(0.059)				(0.047)	(0.048)			
Infant check by midwife	-0.113***	-0.081***	0	41	786	-0.105***	-0.083***	0	46	884
	(0.031)	(0.028)				(0.028)	(0.025)			
Infant check by nurse	0.001	0.083	0	38	728	0.017	0.044	0	49	967
	(0.102)	(0.077)				(0.086)	(0.069)			
Infant check by doctor	0.097**	0.081	1	36	692	0.065	0.047	1	53	1034
	(0.048)	(0.050)				(0.043)	(0.042)			
Duration of breastfeeding	0.811	0.875	15	52	691	1.069	0.926	15	65	819
	(1.634)	(1.532)				(1.412)	(1.313)			
Smoked regularly	-0.032	-0.067	0	43	914	-0.034	-0.055	0	49	1100
	(0.049)	(0.044)				(0.043)	(0.039)			
Modern contraceptive method	0.169***	0.128**	1	38	843	0.120**	0.132***	1	42	899
	(0.062)	(0.051)				(0.055)	(0.047)			
Induced abortion	-0.055	-0.041	0	62	1331	-0.006	-0.021	0	55	1200
	(0.045)	(0.034)				(0.040)	(0.035)			
Panel B: Parental Investment										
Partner employed last 7 days	0.131***	0.125**	1	48	1027	0.139***	0.126***	1	60	1287
	(0.044)	(0.049)				(0.037)	(0.041)			
Marriage to birth (months)	46.307*	35.714*	47	40	886	36.301*	29.824	46	55	1219
	(24.777)	(20.683)				(21.482)	(18.249)			
Mother engagement	0.135	0.043	0.050	47	1023	0.064	0.100	0.020	67	1419
	(0.138)	(0.121)				(0.118)	(0.105)			
Father engagement	-0.046	0.204	0.033	50	1124	-0.000	0.061	0.038	49	1085
	(0.194)	(0.164)				(0.184)	(0.170)			
Days left alone	-0.109	-0.192***	0	46	884	-0.079	-0.139*	0	46	902
	(0.090)	(0.071)				(0.089)	(0.071)			
Days left with another child	-0.061	-0.042	0	48	954	-0.099	-0.057	0	58	1109
	(0.110)	(0.093)				(0.094)	(0.085)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report quadratic polynomial RD estimates based on a uniform kernel, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using a triangular kernel for the RD estimation. Each row presents estimates for a different dependent variable related to channel variables. All specifications include controls for: a dummy variable indicating whether the mother has no formal education, a dummy for rural childhood residence, fixed effects for the respondent's birth month, and fixed effects for the childhood region (defined as the place of residence up to age 12). The variable definitions are provided in online Appendix A. Standard errors are clustered at the month-year of birth level. Statistical significance is indicated by asterisks: *** for 1%, ** for 5%, and * for 10% levels.

Table A12: Romano-Wolf Multiple Hypotheses Tests for Mechanism Outcomes

Outcome	Model p-value	Resample p-value	Romano-Wolf p-value
Antenatal ultrasound	0.04	0.06	0.07
Private place of delivery/check	0.03	0.02	0.07
Baby's first check by midwife	0.00	0.00	0.03
Uses modern method	0.01	0.01	0.04
Partner worked last 7 days	0.07	0.05	0.10
Months from marriage to birth	0.08	0.08	0.10
Days child left alone	0.00	0.00	0.00

Notes: This table presents p-values from the Romano–Wolf stepdown procedure used to adjust for multiple hypothesis testing across mechanism outcomes. The data originate from the 2018 Turkish Demographic and Health Survey, with samples and model specifications consistent with those in Table 3. For each outcome, the bandwidth was determined using the Calonico et al. (2017)) optimal bandwidth selection method with a uniform kernel. The number of bootstrap replications was set to 500. Column 1 reports baseline model p-values, Column 2 shows resampled p-values obtained via repeated random reassignments of the treatment indicator to approximate the null distribution, and Column 3 provides Romano–Wolf adjusted p-values.

Table A16: Mechanism Heterogeneity by Maternal Grandmother's Schooling

Outcome	No Schooling					Some Schooling				
	h	$1.5\,h$	Mean	Bw	N	h	$1.5\,h$	Mean	Bw	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Maternal Health Behaviors										
First antenatal check month	-0.290	-0.180	1.885	28	234	0.143	0.097	1.372	18	189
	(0.301)	(0.252)				(0.220)	(0.196)			
Number of antenatal visits	-0.340	-0.137	9.158	35	292	0.664	0.331	11.533	36	395
	(0.869)	(0.735)				(1.057)	(0.838)			
Antenatal ultrasound	0.054**	0.052**	0.980	31	248	0.022*	0.019	0.992	34	378
	(0.031)	(0.024)				(0.017)	(0.016)			
Private place of delivery/check	0.191**	0.041	0.245	27	229	0.110*	0.115**	0.476	40	431
	(0.108)	(0.088)				(0.085)	(0.069)			
Infant check by midwife	-0.023	0.008	0.038	38	319	-0.103**	-0.078**	0.058	25	300
	(0.031)	(0.027)				(0.050)	(0.045)			
Infant check by nurse	-0.090	-0.138**	0.352	29	253	0.128	0.176**	0.324	30	340
	(0.094)	(0.079)				(0.115)	(0.090)			
Infant check by doctor	0.140**	0.152**	0.808	26	224	-0.016	-0.005	0.905	34	378
	(0.069)	(0.071)				(0.064)	(0.051)			
Duration of breastfeeding	1.943	1.458	16.301	30	183	1.980	1.119	13.620	29	229
	(2.388)	(1.918)				(2.125)	(1.828)			
Smoked regularly	-0.065	-0.038	0.123	35	332	-0.033	-0.052	0.190	31	374
	(0.058)	(0.053)				(0.081)	(0.065)			
Modern contraceptive method	0.132*	0.087	0.745	37	352	0.089*	0.101**	0.843	26	333
	(0.084)	(0.077)				(0.068)	(0.059)			
Induced abortion	-0.134***	-0.159***	0.087	31	298	0.096**	0.071*	0.082	30	368
	(0.052)	(0.046)				(0.047)	(0.044)			
Panel B: Parental Investment										
Partner employed last 7 days	0.183***	0.131**	0.871	26	263	0.099	0.099*	0.939	37	448
	(0.072)	(0.069)				(0.091)	(0.070)			
Marriage to birth (months)	68.281**	26.763	42.147	29	293	33.787*	19.145	46.593	49	601
	(34.698)	(21.943)				(25.658)	(23.854)			
Mother Engagement Index	0.159	0.163	-0.104	36	352	-0.090	0.113	0.242	39	483
	(0.167)	(0.144)				(0.185)	(0.147)			
Father Engagement Index	0.159	0.176*	-0.115	42	402	0.112	0.007	0.344	28	346
	(0.139)	(0.120)				(0.332)	(0.274)			
Days left alone	-0.103*	-0.115**	0.049	37	305	-0.186**	-0.104*	0.090	50	541
	(0.063)	(0.062)				(0.091)	(0.078)			
Days left with another child	-0.143	-0.095	0.164	39	323	-0.018	-0.026	0.066	23	266
	(0.197)	(0.165)				(0.085)	(0.068)			

Notes: The data used in the analysis come from the 2018 TDHS. Columns 1–2 report local linear RD estimates based on rural chilgood region, using two bandwidth choices: the optimal bandwidth h and 1.5h. The optimal bandwidth is selected using the procedure developed by Calonico et al. (2017). Columns 3–5 report the corresponding optimal bandwidth, number of observations, and sample means for the optimal bandwidth. Columns 6–10 replicate this structure using urban childhood

Table A13: Empirical Relevance of Mechanism Variables for Child Outcomes

Child Outcome	Mechanism	R^2	Inc. R^2	P-val
Sociocognitive Development				
Sociocognitive index	First antenatal check month	0.049	0.008	0.054
	Partner employed last 7 days	0.042	0.002	0.099
	Mother engagement	0.052	0.011	0.004
	Father engagement	0.045	0.004	0.046
	Days child left alone	0.042	0.001	0.070
Follows directions	Antenatal ultrasound	0.042	0.006	0.001
	Baby first check midwife	0.038	0.001	0.000
	Marriage to birth (months)	0.038	0.002	0.000
	Mother engagement	0.049	0.013	0.001
Gets along with peers	First antenatal check month	0.031	0.007	0.075
	Smoke regular	0.030	0.005	0.066
	Mother engagement	0.028	0.004	0.116
	Father engagement	0.028	0.003	0.132
	Days child left alone	0.026	0.001	0.092
Physical Development				
Smaller than average size at birth	Duration breastfeeding	0.050	0.021	0.000
	Smoke regular	0.034	0.005	0.001
Birth weight (grams)	Private place check	0.031	0.001	0.015
	Modern method	0.034	0.005	0.001
	Smoke regular	0.031	0.002	0.042
Stunted	First antenatal check month	0.022	0.006	0.021
	Number antenatal visit	0.019	0.003	0.013
	Private place check	0.034	0.018	0.000
	Days child left with child	0.020	0.004	0.125
Wasted	Baby first check midwife	0.015	0.001	0.000
	Mother engagement	0.020	0.006	0.003
	Father engagement	0.017	0.002	0.051
Weight-for-height percentile	Number antenatal visit	0.030	0.003	0.028
	Baby first check midwife	0.029	0.002	0.084
Height-for-age percentile	Number antenatal visit	0.031	0.005	0.023
	Private place check	0.045	0.019	0.000
	Modern method	0.028	0.002	0.078
	Days child left with child	0.031	0.005	0.001
Weight-for-age percentile	Number antenatal visit	0.040	0.009	0.000
	Private place check	0.043	0.012	0.000
	Modern method	0.036	0.005	0.005

Notes: The table presents results for the full sample, including both treatment and control groups. Each row corresponds to a regression of the child outcome on baseline controls (month of birth, rural childhood, maternal education, and region) plus one mechanism variable, with standard errors clustered at the month-of-birth level. R-squared reports the model fit including the mechanism variable, while Incremental R^2 indicates the additional explanatory power relative to the baseline specification. Only associations with p-values less than or equal to 0.1 are reported.

Table A14: Empirical Relevance of Mechanism Variables for Child Outcomes by Mechanism Blocks

Child Outcome	Mechanism Block	R-squared	Incremental R^2	Joint Significance p-val
Sociocognitive Development				
Sociocognitive development index	Maternal Health Behavior	0.066	0.025	0.308
Sociocognitive development index	Parental Investment	0.076	0.036	0.003
Follows directions	Maternal Health Behavior	0.052	0.016	0.032
Follows directions	Parental Investment	0.060	0.024	0.006
Gets along with peers	Maternal Health Behavior	0.043	0.018	0.535
Gets along with peers	Parental Investment	0.051	0.026	0.041
Physical Development				
Smaller than average size at birth	Maternal Health Behavior	0.096	0.067	0.000
Smaller than average size at birth	Parental Investment	0.040	0.010	0.058
Birth weight (grams)	Maternal Health Behavior	0.072	0.043	0.000
Birth weight (grams)	Parental Investment	0.036	0.006	0.684
Stunted	Maternal Health Behavior	0.055	0.039	0.001
Stunted	Parental Investment	0.027	0.011	0.471
Wasted	Maternal Health Behavior	0.017	0.003	0.784
Wasted	Parental Investment	0.023	0.009	0.011
Weight-for-height percentile	Maternal Health Behavior	0.074	0.047	0.007
Weight-for-height percentile	Parental Investment	0.035	0.008	0.445
Height-for-age percentile	Maternal Health Behavior	0.093	0.067	0.000
Height-for-age percentile	Parental Investment	0.040	0.014	0.005
Weight-for-age percentile	Maternal Health Behavior	0.113	0.082	0.000
Weight-for-age percentile	Parental Investment	0.040	0.009	0.402

Notes: The table presents results for the full sample, including both treatment and control groups. Each row corresponds to a regression of the child outcome on baseline controls (month of birth, rural childhood, maternal education, and region) plus one mechanism block, with standard errors clustered at the month-of-birth level. R-squared reports the model fit including the mechanism block, while Incremental R^2 indicates the additional explanatory power relative to the baseline specification. Joint Significance p-value reports the p-value for the joint significance of the mechanism block.

Appendix B: Variable Descriptions

This appendix section provides detailed descriptions of the variables used in the empirical analysis. All variables are derived from the 2018 wave of the Turkey Demographic and Health Survey, conducted by Hacettepe University Institute of Population Studies. Variables are categorized based on their role in the study.

1. Treatment, Running Variable, and Maternal Education

- Treatment Indicator (CSL exposure): A binary variable equal to 1 if the mother was born in January 1987 or later, and 0 otherwise. This reflects exposure to the 1997 Compulsory Schooling Law.
- Running Variable: Calculated as the number of months between the mother's birth date and January 1987 (positive if born after January 1987).
- Junior High School Completion: A binary indicator equal to 1 if the mother completed at least 8 years of schooling.

2. Child Development Outcomes

- Sociocognitive Development Index: Sociocognitive development is measured through a standardized index based on two key indicators of cognitive and social-emotional readiness: the child's ability to follow directions and to get along well with other children. The index is constructed as the unweighted average of these two binary variables and standardized to allow for comparability across groups.
- Child Follows Directions: A binary variable equal to 1 if the mother reports that the child can follow directions to do things correctly.
- Child Gets Along with Peers: A binary variable equal to 1 if the mother reports that the child gets along well with other children.

Physical Health Outcomes:

- Smaller than Average: A binary variable equal to 1 if the mother perceived the child's size at birth as smaller than average, derived from a five-point survey question ranging from "very large" to "very small." Responses coded as 4 ("smaller than average") or 5 ("very small") are grouped as 1; all other responses (1–3) are coded as 0.

- Birth Weight: Reported in grams.
- Stunting: Height-for-age z-score < -2 (HAZ).
- Wasting: Weight-for-height z-score < -2 (WHZ).
- Anthropometric Z-scores: Continuous HAZ and WHZ, derived from measured child height and weight using the 2006 WHO child growth standards for children aged 0–5 years, adjusted for sex.
- Anthropometric Percentiles: Continuous percentile scores for height-for-age, weight-for-age, and weight-for-height.

3. Mechanism Variables

(a) Maternal Health Behaviors

- First Antenatal Check Month: The month of pregnancy in which the mother had her first antenatal care checkup.
- Number of Antenatal Visits: The total number of antenatal care visits the mother had during her most recent pregnancy.
- Antenatal Ultrasound: A binary variable equal to 1 if the mother had at least one ultrasound during her most recent pregnancy, and 0 otherwise.
- Private Place of Delivery/Check: A binary variable equal to 1 if the child's delivery / first checkup occurred in a private health facility.
- Infant Check by Midwife/Nurse/Doctor: Binary variables equal to 1 if the infant's first checkup was performed by a midwife, nurse, or doctor, respectively.
- Duration of Breastfeeding: The number of months the mother breastfed the child.
- Smoked Regularly: A binary variable equal to 1 if the mother reported smoking regularly.
- Modern Contraceptive Method: A binary variable equal to 1 if the mother used a modern method of contraception.

- Induced Abortion: A binary variable equal to 1 if the mother reported having had an induced abortion.

(b) Parental Investment

- Partner Employed (Past 7 Days): A binary variable equal to 1 if the mother's partner was employed in the 7 days preceding the survey.
- Marriage to Birth (Months): The number of months between the mother's marriage and the birth of her first child.
- Mother Engagement Index: Standardized unweighted average of four binary indicators capturing whether the mother engaged in the following activities with the child during the previous three days: reading books, telling stories, playing, or taking the child outside.
- Father Engagement Index: Standardized unweighted average of four binary indicators capturing whether the father engaged in the following activities with the child during the previous three days: reading books, telling stories, playing, or taking the child outside.
- Days Left Alone / Left with Another Child: Number of days in the past week the child (under age 5) was left alone / in the care of another child younger than age 10 for more than 1 hour at least once in the last week.

4. Control Variables These variables are included to control for predetermined characteristics that may influence outcomes.

- Mother No Schooling: A binary variable equal to 1 if the respondent's mother had no formal schooling.
- Childhood Rural Area: A binary variable equal to 1 if the respondent lived in a rural area until age 12.
- Childhood Region: Dummy variables for the region where the respondent lived until age 12 (West, Central, South, North, East).
- Month of Birth: Dummy variables for the mother's month of birth.

Appendix C: Potential Mechanism Heterogeneity

This appendix section investigates whether the potential channels through which maternal education influences child outcomes vary across key background characteristics. The focus is on the same dimensions used for the child outcomes: the mother's childhood region and her mother's education.

Heterogeneous Effects by Mother's Childhood Region

The effect of CSL exposure on maternal health behaviors, as presented in Online Appendix Table A15, appears notably stronger for mothers with a rural childhood background. For example, the timing of the first antenatal check is advanced by approximately 0.4 months earlier among rural mothers (statistically significant at the 10% level under the 1.5 h bandwidth), while the urban subsample shows no meaningful change. Antenatal ultrasound utilization increases by roughly 8 pp for rural mothers, with high statistical significance, but urban mothers show close to zero effects, indicating the reform's positive influence on prenatal care is concentrated in rural areas.

Similarly, treated rural mothers are 17.9–21.3 pp more likely to deliver in private facilities compared to the untreated ones, and infant medical supervision shifts away from midwives toward doctors, with midwife check probabilities declining significantly by 6–9 pp and doctor check probabilities rising by 21-23 pp. These patterns are muted or absent for urban mothers. Moreover, the probability of using modern contraceptive methods increases significantly in both subsamples, with slightly larger effect sizes observed among rural mothers. This increased uptake of contraception may partly explain the statistically significant decline in induced abortion among treated rural women—a pattern not observed among their urban counterparts, where the effect is null.

In terms of household resources, CSL exposure significantly increases partner employment rates in both rural and urban subsamples, with somewhat larger gains for rural mothers (12–22 pp) compared to urban mothers (8–11 pp). Marriage-to-birth intervals display large but imprecise estimates: urban mothers experience a significant increase of roughly 39 months at the baseline bandwidth, while the corresponding effect for rural mothers is about 42 months, though not statistically significant.

The direct caregiving inputs reveal heterogeneous patterns across rural and urban backgrounds. Among the rural sample, mothers show statistically significant increases in the mother engagement index, 0.25 sd with optimal bandwith, suggesting that CSL exposure led to more frequent interactive activities such as reading, storytelling, playing, and outdoor engagement with children. In contrast, corresponding effects for urban mothers are small and statistically insignificant, indicating limited behavioral changes in more advantaged settings. For fathers, point estimates are positive in both contexts, with magnitudes around 0.02-0.14 sd, but none reach conventional significance levels, implying more modest responses.

Notably, measures of child supervision decline significantly in both rural and urban settings, suggesting that better-educated mothers enhance child safety regardless of their childhood region. The reduction in days left with another child is larger and more consistently statistically significant among urban mothers.

Taken together, the heterogeneity analysis reveals that the behavioral responses to increased maternal education vary meaningfully by childhood region. Mothers from rural backgrounds exhibit larger and more consistent improvements in health behaviors and parental investments—likely reflecting greater scope for gains in lower-resource environments. These behavioral changes may translate into substantial improvements in children's development. In contrast, urban-origin mothers show more muted changes in behaviors but generate stronger and broader gains in their children's physical development. This pattern suggests that access to healthcare and other services in urban settings may amplify the benefits of maternal education.

Heterogeneous Effects by Maternal Grandmother's Schooling

The effects of the CSL on potential mechanism outcomes also vary by the maternal grandmother's education—a proxy for intergenerational human capital. The results, as shown in Online Appendix Table A16, are mixed: in some cases, effects are more pronounced among women whose mothers had no formal schooling, while in others, the opposite pattern emerges or the differences are negligible.

For instance, the probability of receiving an antenatal ultrasound increases significantly (by 5.2–5.4 pp) among women with uneducated mothers, compared to smaller and only marginally significant effects (1.9–2.2 pp) in the more advantaged group. Likewise, infant checkups by a doctor rise by around 15 pp in the less-educated group, with no comparable effect among women whose mothers had some education.

In contrast, some indicators—such as delivery in private place—show a more consistent increase among the more advantaged group. Similarly, the likelihood of infant checkups by a midwife declines by 7.8–10.3 pp among women with more education, whereas no similar change is observed for those whose mothers lacked formal education.

Reproductive health choices also diverge. The probability of using modern contraceptives rises across both groups but slightly more so among the less advantaged. Induced abortion shows the starkest contrast: it declines sharply (–13.4 to –15.9 pp) among women with uneducated mothers, but slightly increases in the comparison group.

Household resources also reflect heterogeneity. Partner employment rise significantly among women with uneducated mothers, while effects are weaker or statistically insignificant in the more advantaged group. Marriage-to-birth intervals expand more substantially (27–68 months) in the disadvantaged group than in the comparison group.

The parental engagement indicators exhibit limited and imprecise differences. Finally, indicators of child supervision improve overall, with the reduction in days a child is left alone being somewhat more pronounced among women whose mothers are more educated.

Overall, these mixed findings suggest that while maternal education yields benefits across socioeconomic backgrounds, the potential mechanisms through which these gains manifest vary depending on intergenerational context. Some behaviors respond more strongly in disadvantaged households, while others improve more in advantaged households.