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Does Debt Relief Improve Child Health?

Evidence from Cross-Country Micro Data

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Abstract

This paper analyzes the effects of a multilateral debt relief program on child health. The International Monetary Fund and the World Bank launched the Heavily Indebted Poor Countries Initiative in the late 1990s to reduce the debt burdens of poor countries, and explicitly linked the initiative to the aim of poverty reduction and social targets. As a result, debt-servicing costs have gone down by an average 1.8 percentage points of gross domestic product in Heavily Indebted Poor Countries. However, the social effects of debt relief are not well known. The paper employs micro data on infant mortality from 56 country-specific Demographic and Health Surveys to investigate the effects of the Heavily Indebted Poor Countries Initiative on child health. The retrospective fertility structure of the data allows for analysis using the within-mother variation in the probability of survival of babies before and after different stages of the initiative. The results suggest that after a debt-ridden country enters the program, which is conditional on reform and pro-development policies, and receives interim debt relief, the probability of infant mortality goes down by about 0.5 percentage point. This translates into about 3,000 fewer infant deaths in an average Heavily Indebted Poor Country. The findings are particularly strong for infants born to poor mothers and mothers living in rural areas, and are driven by access to vaccines early in life and during pregnancy. There are no child health effects from graduating from the program and receiving full debt relief.

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Does Debt Relief Improve Child Health? Evidence from Cross-Country Micro Data*

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1 Introduction

In 1996 the International Monetary Fund (IMF) and the World Bank launched the Heavily Indebted Poor Countries (HIPC) Initiative to reduce the debt burdens of poor countries and to ensure that no poor country faces an unmanageable external debt burden. After a review of the initiative in 1999, an enhanced version was launched to broaden, deepen, and accelerate the debt relief efforts and directly link them to poverty reduction and social policies in recipient countries. The aim was to lower the debt-servicing costs in order to increase fiscal space and free up resources for pro-development policies. Additional multilateral debt relief with the Multilateral Debt Relief Initiative (MDRI) was introduced in 2005 to speed up the progress toward meeting the Millennium Development Goals (MDGs)[1] by 2015.

Debt relief as an instrument of development assistance is not new, but the enhanced HIPC Initiative (and the MDRI) include multilateral debt and measures for poverty reduction in all participating countries, which has previously not been the case (e.g., the Baker and Brady Plans introduced in the 1980s to bail out private creditors[2]). The enhanced HIPC Initiative includes country-specific poverty reduction strategies formulated in Poverty Reduction Strategy Papers (PRSPs) in which each country, in partnership with the IMF and the World Bank, presents strategies on how to utilize the freed-up resources from debt relief to reduce poverty and promote development. Health and education are crucial focus areas in these country-specific PRSPs.

In this paper, I analyze if debt relief under the HIPC Initiative has had an impact on child health measured by infant mortality. The effects on child health are of great interest since there was a strong emphasis on health in the country-specific development policies put forward along with the HIPC Initiative. Furthermore, improvements in health are not only ends in themselves, but also strongly linked to other measures on welfare both at the individual and national levels. Child health is of great relevance since poor health in childhood causes great damage to health and welfare later in life (Alderman, Hoddinott, & Kinsey, 2006; Maluccio et al., 2009). In addition, data availability on infant mortality enables reliable empirical analysis of the social targets of debt relief.

The HIPC Initiative comprises of two stages: Decision Point and Completion Point. A debt-ridden and poor country must show a track record of reform in accordance with agreements with the IMF and the World Bank, which includes plans for human development targets, to reach Decision Point where the path to debt sustainability is decided and the country benefits from interim debt relief. At Decision

[1] The MDGs were introduced in 2000 and are (i) Eradicate extreme poverty and hunger, (ii) Achieve universal primary education, (iii) Promote gender equality and empower women, (iv) Reduce child mortality, (v) Combat HIV/AIDS, Malaria, and other diseases, (vii) Ensure environmental stability, and (viii) Develop a global partnership for development (The UN, 2015).

[2] See Cassimon, Essers, and Verbeke (2015) for more on the history of debt relief.

Point, the country sets out to implement reforms and achieve social targets which are necessary to reach Completion Point where full debt relief in line with the settlements made at Decision Point is granted. In December 2014, the IMF reported that the enhanced HIPC Initiative and the MDRI had led to a 2.5 percentage point increase in poverty-reducing spending between 2001 and 2013 in recipient countries. This represents a total cost to creditors of US$116.1 billion (present values for both the enhanced HIPC Initiative and the MDRI at the end of 2013) (IMF, 2014), which equals approximately 20 percent of the total GDP in all HIPCs in 2013 (World Bank, 2015).

Debt relief may affect child health through various channels. There may be increases in health expenditures and improved efforts to strengthen health-service delivery as debt-servicing costs go down (e.g. Chauvin & Kraay, 2005; Cassimon, Van Campenhout, Ferry, & Raffinot, 2015). These effects may be strongest for the poor and vulnerable, for whom public expenditures and health-service delivery are less likely to merely substitute for private expenditures and delivery. If debt relief has an impact on other aid flows to debt-ridden and poor countries, we may see health effects in line with what is recorded in the literature on foreign aid and health (e.g. Powell, 2003; Gyimah-Brempong, 2015). Also, the debt overhang hypothesis, which stipulates that high debt may be seen as a high tax on investment and reform, (Krugman, 1988; Sachs, 1989) suggests that countries suffering from high debt may see increased investment and economic growth from debt relief, which, in turn, may have a positive impact on child health (e.g. Clement, Bhattacharya, & Nguyen, 2005; Johansson, 2010). Additionally, improvements in child health from HIPC debt relief through these channels may be linked to the emphasis on and strong oversight of pro-development policies in HIPCs at the different stages of the initiative.

The impacts of debt relief in general and the HIPC Initiative in particular on child health are not well known. Thomas and Giugale (2015) show that the general economic and social development in African HIPCs has been positive since the initiative was rolled out and Marcelino and Hakobyan (2014) argue that economic growth has gone up after HIPC debt relief. In a World Bank report on HIPC debt relief, Schmid (2009) finds that the infant mortality rate declines after a HIPC reaches Decision Point of the program. However, this study relies on country-level data on child health and was performed only a few years after the initiative came into effect. There may thus be problems with confounding factors which are difficult to account for in cross-country analyses. There are also drawbacks with the analysis in Schmid (2009) related to the relatively short time frame. In the same report Crespo Cuaresma and Vincelette (2009) find increases in educational attainment and expenditures after HIPC Decision and Completion Points. Again, however, there are concerns with regard to endogeneity and the short time frame of the analysis, and we currently lack reliable knowledge and evidence of the social effects of debt relief.

I investigate whether the enhanced HIPC Initiative has an impact on child health by applying micro data on infant mortality from country-specific Demographic and Health Surveys (DHS) from 56 low- and middle-income countries of which 31 are HIPCs. The retrospective fertility nature of the data from the DHS allows for panel data analysis using the within-mother variation in the probability of survival of babies born before and after the countries reach the Decision and Completion Points of the debt relief program. Within-mother estimation accounts for unobservable characteristics of the family and controls for effects that arise due to changes in the demographic composition. This reduces problems with cross-country confounding factors – say, if households in HIPCs, on average, are different from households in non-HIPCs – and facilitates a causal interpretation of the results. In addition, this approach allows for distributional analysis of the debt relief effects on child health and the detailed DHS data give indications of potential health mechanisms through which HIPC affects infant mortality.

To the best of my knowledge, this is the first paper which uses cross-country micro data to analyze the potential impacts of debt relief on child health. It aims to contribute to the vast empirical literature on the effects of development assistance in general and debt relief in particular on child health. My findings suggest that when a country qualifies for Decision Point, the probability of infant mortality goes down by approximately 0.5 percentage points or five infant deaths per 1,000 live births. This represents 7 percent of the sample mean and translates into approximately 3,000 fewer infant deaths in an average HIPC in the year of Decision Point. Results are stronger for infants born to mothers who are poor and mothers living in rural areas. Neonatal mortality is largely unaffected by debt relief, which indicates that the impacts of Decision Point on infant mortality go through interventions or policies which affect infant survival after the first month of life. Moreover, analysis of potential health mechanisms suggest that the improvements in infant mortality are driven by improved access to vaccines early in life and during mothers' pregnancies. Immunization rates against Tuberculosis and Polio among children born to poor, uneducated, and rural mothers go up 4 to 6 percent of the sample coverage rates in these groups and Tetanus immunization rates among poor, uneducated, and rural pregnant mothers increase with about 9 percent of the sample means. The improvement in infant mortality takes place at Decision Point with no additional effect at Completion Point where full debt relief is granted. Results are robust to various country-specific confounders and other sensitivity tests.

The rest of the paper is structured as follows. Section 2 gives a brief background of the HIPC Initiative. I present the data on child health and the empirical specification in Section 3 and the results and various sensitivity analyses in Section 4. Section 4 also includes health mechanisms analysis through which the HIPC Initiative may affect child health. Concluding remarks are given in Section 5.

2 The HIPC Initiative

The original HIPC Initiative was launched in 1996 by the IMF and the World Bank. The aim was to reduce the debt burdens of poor countries and to ensure sustainable debt accumulation in all HIPC countries. Only six countries[3] were included in the original program but after a review in 1999, the initiative was enhanced to include more countries and create stronger ties to poverty reduction and pro-development reforms. In this paper, I focus on the enhanced version of the HIPC Initiative, and it is hereafter referred to as the HIPC Initiative to avoid confusion with definitions.

Countries that qualify for concessional assistance from the World Bank's International Development Association (IDA) or the IMF's Poverty Reduction and Growth Facility (later replaced by the Extended Credit Facility) and face unsustainable external debts after traditional debt relief mechanisms are eligible for debt relief under the HIPC Initiative. Debt is considered unsustainable if debt in relation to exports exceeds 150 percent or if, in open (with exports exceeding 30 percent of GDP) and fiscally stable (with budget revenue exceeding 15 percent of GDP) economies, the debt in relation to budget revenue exceeds 250 percent (Birdsall & Williamson, 2002).

The HIPC Initiative is a two-step process: (1) Decision Point and (2) Completion Point. To reach Decision Point, a country must be eligible according to the above stated conditions and fulfill two additional criteria: (i) have established a track record of reform and sound policies with assistance from the IMF and the World Bank, and (ii) have developed a PRSP (or interim PRSP) through a participatory process including important members of civil society and policy makers in the country. The formal decision on whether a country is eligible for debt relief under the initiative is taken by the Executive Boards of the IMF and the World Bank. After an HIPC reaches Decision Point, the country benefits from interim debt relief, generally through canceled debt-service payments, with the aim for the country to successfully proceed to Completion Point and full and irrevocable debt relief. The total relief amounting to full debt relief at Completion Point is settled at Decision Point and is based on a projected path to future debt sustainability. The conditions for Completion Point are (i) establish a further track record of reform with the IMF and the World Bank, (ii) implement key reforms agreed at Decision Point, and (iii) adopt and implement its PRSP for at least one year (IMF, 2015a).

There are strong conditionalities attached to the HIPC Initiative through the PRSPs and the associated reforms and plans for development in the PRSPs primarily focus on social development and macroeconomic stability. Health measures brought forward in the PRSPs of HIPCs include increasing supply of basic medicines and vaccines, establishing a minimum health services package which covers

[3]The six countries are Bolivia, Burkina Faso, Guyana, Mali, Mozambique, and Uganda.

primary care, prenatal care, and vaccinations, educating mothers about nutrition and family planning methods, providing training programs for health staff, etc. (Gupta, Clement, Guin-Siu, & Leruth, 2002). Twenty-nine of the 31 HIPCs in the sample[4] explicitly target immunization as a necessary means to improve child health. Other important focus areas in social development include education and rural development. The PRSP approach, which encourages and promotes development, was also rolled out to other developing countries not considered for debt relief under the initiative by the IMF and the World Bank.

In December 2014, the IMF reported that the HIPC Initiative had secured US$75 billion in debt relief (present value at the end of 2013, equal to about 13 percent of total GDP in all HIPCs in 2013) and about 44 percent of the funding comes from the IMF and other multinational organizations. Bilateral and commercial creditors support the rest (IMF, 2014).

All HIPCs directly qualify for MDRI which was launched in 2005 and came into effect in 2006 (IMF, 2015a). The MDRI writes off 100 percent of the debt from the IMF, the World Bank, and the African Development Bank for countries participating in the HIPC Initiative. As of 2007, the Inter-American Development Bank also provides relief under the MDRI for the five Latin American HIPCs. HIPCs must reach Completion Point to get MDRI relief, and the MDRI also include two non-HIPCs: Cambodia and Tajikistan (IMF, 2015b).

As of April 2015, 39 countries are eligible for debt relief through the HIPC Initiative. Thirty-six of these have reached Completion Point and benefit from full debt relief, and three have not yet passed Decision Point (IMF, 2015a). Table 1 gives a complete list of country cases considered under the HIPC Initiative and information on the dates of Decision Point and Completion Point. The average time between the two dates is four years.

Figure 1 shows that the average nominal debt in relation to exports and GNI in the 31 HIPCs in the sample increases up until a few years prior to Decision Point when it starts to decrease. Interim debt relief at Decision Point thus has an immediate effect on debt. The costs of debt service in relation to exports and GNI begin to go down at the time of Decision Point. The reduction continues and at Completion Point the debt-servicing levels are much lower compared with a few years prior to Decision Point (Figure 2). This implies that the HIPC Initiative has a significant effect on debt levels and debt-servicing costs in participating countries. The reduction starts at Decision Point when interim debt relief through canceled debt payments comes into effect.

[4] See Section 3.1 for more details on the sample.

3 Data and Empirical Specification

3.1 Data on Child Health

I use micro data on infant and neonatal mortality from country-specific DHS (DHS Program, 2015). All other information on children and mothers is also obtained from the DHS. The survey questionnaires are standardized which allows for cross-country analysis and each survey consists of a nationally representable sample of women of childbearing age (15 to 49 years). The women answer detailed questions regarding their personal characteristics, family situation, the survival of their children, etc. In these surveys, mothers give detailed information on the birth dates and death dates, if applicable, of all their children ever born (up to 20 children) so that a panel of children's infant and neonatal mortality can be obtained. One country survey is thus enough to secure a panel of children. For the purpose of analyzing the effects of debt relief under the HIPC Initiative I select all 31 HIPCs for which there is at least one survey available between the country's Decision Point date and mid-2014 and all countries that participate in the IMF's PRSP approach to economic and social development or are Sub-Saharan African or Latin American countries where at least one survey has been conducted between 2004 and mid-2014. If there are more than one survey that fulfill these criteria, I choose the latest available survey to maximize the number of post-Completion Point observations. Table 2 presents a complete list of the 56 countries in the sample and information on the DHS used in the empirical analysis.[5]

The main child health outcomes in this paper, infant mortality and neonatal mortality, are defined as a baby dying before reaching his or her first birthday or month of life, respectively. Children born less than twelve months prior to their mother's interview are dropped since it is not possible to know whether they will survive their first birthday. Also, only children born after their country's year of independence are included in the sample. This gives a sample of 1,770,705 children born to 501,800 mothers between 1967 and 2013 in the 56 countries. The sample average infant mortality rate is 7 percent and the neonatal mortality rate is 3.5 percent, indicating that half of the children that die before turning one year in fact live less than one month. Figure 3 presents the yearly infant and neonatal mortality rates of the group of HIPCs and non-HIPCs. The differences between the groups are greater for infant mortality than for neonatal mortality and the general trend is decreasing for both mortality measures. Since there appears to be some differences in the trends between the two groups, I control for country-specific linear time trends in the model specification presented below.

Table 3 shows descriptive statistics on infant and neonatal mortality across different sub-groups of the sample as well as other variables in the analysis (see Section 3.2 for more information on the other

[5] I use the standard DHS unless stated otherwise.

variables included in the empirical specification). Infant and neonatal mortality are higher among boys and mothers who are poor, have no formal schooling, or reside in rural areas. Poverty is defined as having none of the following durable goods: radio, TV, refrigerator, bicycle, motorcycle/scooter, car/truck.[6]

When controlling for mother fixed effects the impact of debt relief is identified by the mothers who give birth both before and after the year of the debt relief settlement. In the sample, there are 115,837 such mothers (approximately 23 percent of all mothers) for Decision Point and 110,378 mothers (approximately 22 percent of all mothers) for Completion Point. I test if these women are significantly different from the women who only give birth before or after the different stages of debt relief in terms of age, poverty, educational status, and rural residency. The evidence on this is presented in Table 4. Since age is significant (first column in Table 4), the regressions on poverty, educational status, and rural residency in columns (2) to (4) apply country-age fixed effects to compare women of different countries at the same age. Compared with mothers who only give birth before or only after the different stages of debt relief, the mothers giving birth on both sides of debt relief are older, less educated (no formal schooling), more likely to reside in rural areas, and poorer. Thus, results on debt relief presented in Section 4 may be indicative of which effects the HIPC Initiative has on more vulnerable women who fulfill these criteria. The sensitivity analyses in Section 4.2 give further discussions and tests on how debt relief may affect the sample of women.

3.2 The Empirical Model

I apply a linear probability model to investigate the relationship between debt relief and infant mortality. Since the error terms are likely to be autocorrelated, the fixed effects logit model is not an appropriate alternative and the coefficient estimates of the linear model have a more straightforward interpretation (Cameron & Trivedi, 2005). The model is presented below,

$$Infant\ Mortality_{imacy} = \alpha_m + \beta_{ay} + \gamma Debt\ Relief_{cy} + \delta_c Trend_{cy} + \mathbf{x'_{imacy}}\theta + \varepsilon_{imacy} \quad (1)$$

where the dependent variable $Infant\ Mortality_{imacy}$ is a dummy which equals one if baby i, born in country c to mother m, born in mother's birth cohort (five-year) a, in year y, dies before reaching one year of age. In some specifications, this variable is replaced by $Neonatal\ Mortality_{imacy}$, which equals one in case of death before the baby reaches one month of age. $Debt\ Relief_{cy}$ is a dummy variable equal to one if country c has reached Decision Point or Completion Point of debt relief in year y. For example,

[6]The poverty, education, and residency indicators give the status at the time of the interview. Pairwise correlations between the variables suggest little overlap: Poor and No formal schooling: 14 percent, Poor and Rural: 19 percent, and No formal schooling and Rural: 23 percent.

if an HIPC passes Decision Point of the initiative in September 2001, the debt relief dummy equals one in 2001 and the years that follow. I also analyze the impacts of MDRI and the original HIPC Initiative as sensitivity tests (Section 4.2).

The mother fixed effect is given by α_m and β_{ay} is a mother's-birth-cohort by child's-birth-year dummy which together gives the differences in mortality within mothers over time and subsequently differences between mothers within birth cohorts across countries. This controls for the fact that the effect of a mother's age on infant mortality is likely to change over time due to cross-country improvements in the survival of babies. In some estimations, β_{ay} is substituted for a simple birth-year fixed effect, β_y. In order to compare the within-mother results with the results from a within-country model, the mother fixed effect, α_m, is replaced by a country fixed effect, α_c. I also take compositional changes among the mothers in different countries into account by including dummy variables for the following mother-specific socioeconomic characteristics: poverty, educational status, and residency in some within-country regressions.

The vector of exogenous controls, $\mathbf{x_{imacy}}$, includes a girl dummy, multiple-birth dummy, birth-order dummies (one for each birth order starting from two and upward, birth order one is the reference, with one dummy for birth order ten and higher), and dummies for which quarter of the year the birth takes place (quarter one is the reference). Country-specific linear time trends are included to account for trend differences in cross-country mortality.

To enable distributional analyses of reaching the different stages of HIPC, I interact $Debt\ Relief_{cy}$ with the following child- and mother-specific characteristics: girl infant and the socioeconomic status of mothers: poverty, educational status, and residency. I estimate the following specification,

$$\begin{aligned} Infant\ Mortality_{imacy} = &\alpha_m + \beta_{ay} + \gamma_1 Debt\ Relief_{cy} + \gamma_2 Debt\ Relief_{cy} \times Characteristic_i + \\ &\delta_c Trend_{cy} + \mathbf{x'_{imacy}}\theta + \varepsilon_{imacy} \end{aligned} \tag{2}$$

In all regressions, standard errors are clustered at the country level to account for within-country correlations of ε_{imacy}. This allows the standard errors to be correlated across siblings since siblings are assumed to be in the same country. The consistency of the empirical specification relies on ε_{imacy} being uncorrelated with the debt relief variables over time and other countries where mothers of the same cohort have children in the same year.

4 Results

This section presents the results of the estimations based on the main specifications in equations 1 and 2. The main findings in Section 4.1 are followed by various sensitivity analyses in Section 4.2, and an investigation into the potential health mechanisms through which debt relief under the HIPC Initiative may influence child health in Section 4.3.

4.1 Main Results

I present the results from the estimations based on the linear probability specification in Equation 1 with infant mortality as the dependent variable in Table 5. Panel A gives the results for when a country reaches Decision Point and Panel B the results for reaching Completion Point. All estimations include exogenous controls specified in Section 3.2 ($\mathbf{x_{imacy}}$). The first column gives the findings for the regressions using country-level fixed effects and cohort-birth-year dummies and in the second column I add the mother-specific characteristics (poverty, education, and residency). The third and forth columns both apply mother fixed effects along with mother-cohort-birth-year fixed effects and birth-year fixed effects, respectively. All estimations include country-specific linear time trends.

Most exogenous controls are significant (mainly at the five or one percent levels) and behave similarly in all regressions. Babies of multiple births are less likely to survive their first year compared with singletons, and girls are more likely to survive than boys. Firstborns tend to have a higher risk of dying in comparison with higher birth orders, and babies born in the second, third, or fourth quarters of the year are less likely to survive than babies born in the first quarter. In addition, the results on the country-specific time trends illustrate a general improvement in child health.

Looking at the effects of reaching the years of Decision Point and Completion Point of HIPC, the results suggest that there is an improvement in child health after reaching Decision Point but not Completion Point of the initiative. The within-country model in column (1) in Table 5 shows that the probability of a child dying before turning one year is reduced by 0.66 percentage points the year of Decision Point and the effect goes up to 0.73 percentage points when mother-specific characteristics (poverty, education, and residency) are accounted for. However, since columns (1) and (2) only give the within-country estimates, I turn to the within-mother estimations in columns (3) and (4) to see whether the effect stands. The size of the coefficient decreases by about 0.1-0.2 percentage points, but there is nevertheless a 0.52 percentage points reduction in the probability of infant death at Decision Point. In other words, 5.2 fewer infant deaths per 1,000 live births occur when a HIPC reaches Decision Point. The results from employing mother-cohort by birth-year fixed effects (column (3)) are almost identical to those with

the birth-year fixed effects (column (4)). The within-mother results translate into roughly 9,200 fewer deaths in the sample and represent about 7.5 percent of the sample mean. This equals approximately 3,000 fewer infant deaths in an average HIPC in the year of Decision Point.

Taking a closer look at the dynamics of the effect at Decision Point in Figure 4, it appears to arrive in the year a country reaches Decision Point. There are no such effects of reaching Completion Point, but something seems to be occurring two to five years prior to Completion Point. For most countries, this is the interim period between Decision Point and Completion Point dates. The important impact on infant mortality appears to be taking place starting at Decision Point and moving into the interim period. However, since Completion Point follows Decision Point by on average 4 years, these estimates may be the Decision Point effect showing up again. Also, note that pushing the year of Completion Point five years into the future greatly reduces the number of observations that contribute to the identification of the effect of debt relief.

In Table 6, I investigate whether reaching the two stages of the HIPC Initiative has heterogeneous effects across girl and boy infants and poor, uneducated, and rural mothers. The F statistics test $Debt\ Relief + Debt\ Relief \times Characteristic = 0$ (p value in parentheses). The findings here are in line with those in Table 5 in that reaching Decision Point reduces infant mortality whereas Completion Point effects are mainly insignificant and very close to zero.

More specifically, boy and girl infants are both less likely to die in the year of Decision Point, but there is no statistically significant difference between the estimates (-0.0048 among boys and -0.0056 among girls). A similar situation can be seen when looking at the probability of infant death across mothers' educational status. There is no statistically significant difference between children born to mothers with or without formal schooling (primary school or higher). However, the results in columns (2) and (4) suggest that the estimates vary depending on mothers' poverty and residential status. Children born to poor mothers are more affected by the country reaching Decision Point than those born to more affluent mothers. The probability of infant death drops by 0.9 percentage points among poor mothers and goes down by 0.4 percentage points among non-poor mothers. This difference is large and equals 5 fewer infant deaths per 1,000 live births for vulnerable, poor mothers. The effect on infants born to urban mothers is insignificant, whereas the reduction in the risk of infant death is significant and 0.68 percentage points or 6.8 fewer infant deaths per 1,000 live births among mothers living in rural areas.

Generally, the statistically insignificant estimates of reaching Completion Point of the initiative hold across the sub-samples. The results for reaching Completion Point are not heterogeneous across boy and girl infants or infants born to mothers with and without formal schooling. There is a significant difference between the results for infants born to poor and non-poor mothers, but none of the estimates

are significantly different from zero. Reaching Completion Point is however significantly related to an increase in infant mortality among urban mothers and an insignificant decrease among rural mothers.

The Decision Point results indicate that the positive effects from debt relief come when countries enter the program and receives interim debt relief (usually in the form of partly or fully canceled debt-service payments). At Decision Point, the country's commitment to reform and pro-development policies in exchange for promised assistance out of a heavy debt burden from the IMF, the World Bank, and other multi- and bilateral creditors is finalized. However, there are no positive effects from reaching Completion Point where creditors agree to deliver full, irrevocable debt relief. This may suggest that the external scrutiny and focus on pro-development reforms play an important role for child health in HIPCs.

These heterogeneous effects indicate that policies introduced in relation to Decision Point are effective in improving infant health among poor and rural mothers. The results are in accordance with intentions of the health and rural development policies introduced in the country-specific PRSPs which to various degrees emphasize these groups as beneficiaries of pro-development policies in connection with debt relief under the HIPC Initiative.

My findings are in line with the few earlier results on debt relief at Decision Point under the HIPC Initiative and infant mortality (see Schmid, 2009). The negative relationship between debt relief at Decision Point and infant mortality from the within-mother estimations (and to some extent also the within-country with mother-specific characteristics) suggests that problems with confounding factors, demographic composition, and unobservables are less likely to be driving the results in this analysis in contrast to earlier findings. I look further into problems with potential confounding factors in the sensitivity analyses in the next section (Section 4.2).

4.2 Sensitivity Analyses

The DHS data and the information on HIPC status (which month debt relief at Decision Point and Completion Point is granted, see Table 1) allow for a more detailed analysis of the relationship between debt relief and infant mortality. In a sensitivity test, I thus exploit this monthly variation and the results that are presented in column (2) in Table 9 show that the month of Decision Point is associated with a 0.57 percentage point reduction in infant mortality. This is in line with the baseline findings in Section 4.

Columns (3), (4), and (5) in Table 9 show that the findings on debt relief at Decision Point are stable to including the two main debt relief variables in the same regression, a variable for the MDRI[7], and

[7]The MDRI dummy equals one in the year 2006 for non-HIPCs Cambodia and Tajikistan and HIPCs which reached

the original HIPC Initiative. Neither the MDRI nor the original HIPC Initiative is associated with any change in infant mortality.

The results in Section 4 are robust to including a dummy variable for birth intervals less than 24 months (which increases the probability of infant death (WHO, 2005)), a variable for mother's age, and age squared (columns (6), (7), and (8), respectively). Additionally, the within-country results (including mother-specific characteristics) in column (2) in Table 5 are identical to the those in column (1) in Table 9, which applies country fixed effects that vary by birth cohorts of the mothers.

There may be concerns with the validity of the data on infants obtained from the DHS. First, mothers may not accurately remember the birth and death (if applicable) dates of their children. If so, there may be problems with recall bias in the sample employed in this paper. This is not deemed to be a serious problem since the DHS apply rigorous tests to ensure the accuracy of the mortality data and mothers tend to remember important events such as the death of a child. Nevertheless, because there is a peak in the distribution of infant deaths at 12 months of age, I redefine the infant mortality variable as babies dying before of or in their twelfth month of age. The estimation result is presented in column (3) in Table 9. I observe no changes in the baseline findings because of this. Estimates are also robust to dropping the babies born before 1985 (column (4) in Table 9). Although the average effect and the significance level (the p value is 0.058) go down a little, the effects on the different sub-samples are stable to this change (results not shown).

I test if reported infant mortality is connected with debt relief at Decision Point of the HIPC Initiative by using DHS data on infant mortality from earlier surveys.[8] Here, I apply a test developed by Kudamatsu (2012) in which the average infant mortality rate of mothers born in the same year, in the same country, and who give birth in the same year is compared between the used DHS and an earlier DHS. If recall bias is a serious problem, the infant mortality rate would change systematically in relation to HIPC at Decision Point. Judging from the results in Table 7, this does not appear to be the case.

Second, if fertility choices vary by women's socioeconomic status and if this is systematically related to HIPC, one concern may be that the results on debt relief at Decision Point are driven by differences in fertility rather than infant mortality since the women who identify the effect of debt relief in the within-mother estimations are different from other mothers in terms of age, poverty levels, formal schooling, and residency. The comparison of infant mortality between women in HIPCs and non-HIPCs giving birth in the same years in the within-mother estimations would consequently be less credible. Again, I follow Kudamatsu (2012) to investigate if fertility of mothers changes depending on socioeconomic

Completion Point before or in 2006 and in the year of Completion Point for HIPCs which reached Completion Point after 2006.

[8] Earlier surveys available for 44 countries in the sample.

status as a result of debt relief at Decision Point. The share of women of the same status, birth year, and country giving birth in the same year is not affected by HIPC at Decision Point and this effect does not seem to differ systematically depending on mothers' socioeconomic status, as can be seen in Table 8.

In an additional set of sensitivity tests, I analyze if a number of country-level potential confounding factors influence the overall findings in this paper. Table 10 presents the results. In column (1), I control for logged GDP per capita (Feenstra, Inklaar, & Timmer, 2015) which may be an important factor determining child health, as well as a channel through which debt relief affects the same variable. The estimation suggests that income plays a statistically significant role in determining infant mortality, but it does not change the conclusions on debt relief at Decision Point. In fact, the point estimate of Decision Point goes up a little. Aid flows, net aid transfers (NAT) (% of GDP, logged) (Roodman, 2012), and overall government expenditures (% of GDP, logged) (Feenstra et al., 2015) are potential confounders or channels, but neither affect infant mortality or influence the role of debt relief at Decision Point (columns (2) and (3) in Table 10). Furthermore, logged investments (% of GDP) and trade flows (% of GDP) (Feenstra et al., 2015), along with changes in the political and democratic institutions (Polity2 (Marshall, Jaggers, & Gurr, 2011), civil liberties (Freedom House, 2014)), and political corruption (Coppedge et al., 2015) may influence the findings on debt relief. However, columns (4), (5), (6), (7), and (8) do not show any signs of this and there are no changes in the Decision Point variable. Finally, country-level changes in the fertility rate (births per woman, logged) (World Bank, 2015) may be related to changes in infant mortality, but this does not appear to be the case in this sample (column (9)).

4.3 Health Mechanisms

To analyze the potential health mechanisms through which reaching Decision Point of the HICP Initiative influences infant mortality I first test the impact of HIPC on neonatal mortality since the causes of death before one month are often different from those later in the first year of life (For The Million Death Study Collaborators, 2010). The results in Table 11 indicate that reaching Decision Point of the HIPC Initiative does not have any influence on overall neonatal mortality. There does however appear to be some heterogeneity across different sub-samples as there is a 0.33 percentage points decrease in neonatal mortality among poor mothers and 0.25 percentage points reduction among mothers without formal schooling. Both coefficients are statistically significant at the 10 percent level. This represents 8.3 and 5.7 percent of the sample means, respectively. In general, however, the reductions in neonatal mortality do not explain most improvements in infant health from reaching Decision Point. There does thus appear to be implications from reaching Decision Point which affect mortality after the first month of life.

To get more detailed information on how reaching Decision Point of the HIPC Initiative affects child health, I examine how a number of individual-level health measures other than mortality are associated with HIPC. The country-specific PRSPs and Decision Point documents more or less exhaustively describe which areas in the health sector are targeted for improvements in relation to HIPC and interim debt relief. The areas include health care provision for children, mothers, and disadvantaged group (rural, poor, uneducated) and sanitation measures. In some cases particular diseases are identified for prevention and treatment measures, e.g. Measles and Tuberculosis, and most countries aim for better provision of vaccines. A number of these measures are known to reduce child mortality (death before reaching five years of age) (Jones et al., 2003) and vaccines which are often given to babies before they turn one year of age, most notably Bacillus Calmette-Gurin (BCG) (against Tuberculosis), Measles, Diarrhea, and Polio, are associated with non-specific health effects and linked to reduced infant and neonatal mortality from causes other than specific diseases they are aimed at preventing (Cooper, Boyce, Wright, & Griffin, 2003).

In the individual-level health measure analysis I make use of older DHS data for the countries in the sample. Because mothers report on various health measures of their babies born within five years of the survey date, combining the newest survey data with the older surveys enables analysis of how health variables relate to debt relief through HIPC. I pool all available surveys from the countries in the sample[9] to obtain a panel of the following health measures: BCG vaccine, the first shot of Diphtheria, Pertussis and Tetanus (DPT) vaccine, Measles vaccine, the first shot of Polio vaccine, Tetanus vaccine for pregnant mothers, access to skilled assistance[10] at delivery, prenatal care by skilled health worker, oral rehydration solution for treating Diarrhea, and access to improved sanitation facilities (flush toilets and drinking water from piped water sources). The Tetanus vaccine for pregnant mothers and skilled prenatal care variables are measured 4.5 months prior to the baby's birth. The two sanitation variables are measured at the time of the interview and the same value is given to all births in the past five years. Restricting this to a lower number than five does not influence the conclusions. Vaccination rates, skilled delivery and prenatal care, and oral rehydration solution variables not only measure the specific health care delivery channels, but may also give indications of any general progress in the health care sector which may be associated with Decision Point of the initiative.

Since mothers only report on their latest births, mother fixed effects cannot be applied in the same way as in the main analysis. Instead, I create groups of mothers for within-mother-group estimations,

[9] Surveys from Angola and Laos do not include these health measures and are thus excluded from this analysis on health mechanisms.

[10] Skilled assistance is defined as assistance from a doctor, nurse or midwife, or other health professional (see the DHS Recode Manuals at `http://www.dhsprogram.com/publications/publication-dhsg4-dhs-questionnaires-and-manuals.cfm` for more information).

where group status is defined by country, rural or urban residency, educational status, and poverty status in order to compare health measures for babies born to mothers who are similar based on observable characteristics. Also, HIPC at Decision Point is interacted with child and mother characteristics to investigate distributional differences in line with the findings on infant mortality at Decision Point. I estimate the following specification,

$$\begin{aligned} Health\ Measure_{igacy} = & \alpha_g + \beta_{ay} + \gamma_1 Decision\ Point_{cy} + \gamma_2 Decision\ Point_{cy} \times Characteristic_i + \\ & + \delta_c Trend_{cy} + \mathbf{x'_{igacy}}\theta + \varepsilon_{igacy} \end{aligned} \tag{3}$$

where the dependent variable, $Health\ Measure_{igacy}$, equals one if a baby (or mother) has received or has access to any of the above-mentioned health variables. The mother-group fixed effect is α_g, and all estimations include country-specific time trends, mother's-birth-cohort (five-year) by child's-birth-year dummy, and exogenous controls for girl infant, birth-order dummies, and dummies for quarters of birth.

As can be seen in Table 13, the probability of a baby born to a poor mother, a mother with no formal schooling, or a mother residing in rural areas receiving the BCG vaccine goes up by 4.2-5.0 percentage points at Decision Point. The pattern is similar but the effect is slightly smaller in size for the first shot of Polio vaccine (3.5-4.2 percentage points). Furthermore, poor, uneducated, or rural mothers are more likely to have access to the Tetanus vaccine during their pregnancies after Decision Point. The effect sizes vary between 5.4 to 6.2 percentage points. These point estimates among the babies translate into four to six percent of the sample means and about nine percent among the pregnant mothers. The results on BCG, Polio1, and Tetanus for pregnant mothers for babies born to mothers who are non-poor, educated, or live in urban areas and the mothers themselves are statistically insignificant.

Table 14 shows that Decision Point increases the likelihood of babies with diarrhea getting oral rehydration solution treatment with 6.3 percentage points if they are born to poor mothers. This effect is large (77.9 percent of the sample mean) partly due to the very low coverage in the sample. Only four percent of the children born to poor mothers have access to flush toilets.

At Decision Point, the probability of receiving the DPT1 vaccine goes down with about 4.9 percentage points for babies born to urban mothers (5.5 percent of the sample mean), whereas the effect on babies born to rural mothers is insignificant. Similarly, the likelihood of urban mothers having access to drinking water from a piped water source drops by about 4.3 percentage points at Decision Point (ten percent of the sample mean). Babies born to urban mothers are thus the only group which experience any significant declines in the health measures examined in this exercise. However, it does not seem to translate into higher infant or neonatal mortality in this group. There do not appear to be any large

differences between the health-mechanism impacts on girls and boys. Overall, the effects on the health mechanisms investigated here are in line with the reductions in infant and neonatal mortality seen in Tables 6 and 12.

Although the health-mechanism results are not perfectly comparable to the main findings, they indicate that health care delivery through immunization programs, and to some degree also simple diarrhea treatment (among poor mothers), improve after a country reaches Decision Point of the HIPC Initiative. These measures are possibly more straightforward and uncomplicated to implement, partly with assistance from debt relief partners (mainly the World Bank and IMF), compared with advancements in child delivery and prenatal care, which are more likely to take longer and be more intricate to achieve. Furthermore, the heterogeneous effects across different groups of mothers suggest that the aims to target vulnerable population groups set out in the PRSPs and Decision Point documents have been successful.

5 Conclusion

In this paper I analyze if debt relief under the HIPC Initiative is associated with better child health. The initiative was introduced by the IMF and the World Bank in the late 1990s to reduce the debt burdens of poor countries and secure focus on and resources for pro-development policies. It consists of two stages, Decision Point and Completion Point. A debt-ridden and poor country may reach Decision Point if it shows a track record of reform in accordance with agreements with the IMF and the World Bank. At Decision Point, a path to debt sustainability is decided and the country benefits from interim debt relief. Further reforms are necessary to reach full debt relief at Completion Point. In December 2014, the IMF reported that the enhanced HIPC Initiative and the MDRI had led to a 2.5 percentage point increase in poverty-reducing spending between 2001 and 2013 in recipient countries (IMF, 2014).

I apply micro data on infant mortality from country-specific DHS from 56 low- and middle-income countries of which 31 are HIPCs to make use of mother- and family-specific effects. My findings suggest that when a country reaches Decision Point, the probability of infant mortality goes down with approximately 0.5 percentage point or 5 infant deaths per 1,000 live births. This represents approximately 3,000 fewer infant deaths in an average HIPC in the year of Decision Point. Results are stronger for infants born to poor mothers and mothers residing in rural areas. This indicates that Decision Point policies are favorable to vulnerable women and infants who are poor and/or reside in the countryside. There are no such effects when a country reaches Completion Point. Neonatal mortality is largely unaffected by debt relief under the HIPC Initiative, which indicates that the impact of HIPC at Decision Point on infant mortality does not originate from children dying within their first month of life. An important health

mechanism appears to be access to vaccines, in particular against Tuberculosis, Polio, and Tetanus (given to pregnant mothers), as improvements in all these indicator come at Decision Point. Results are robust to various country-specific confounders and other sensitivity tests.

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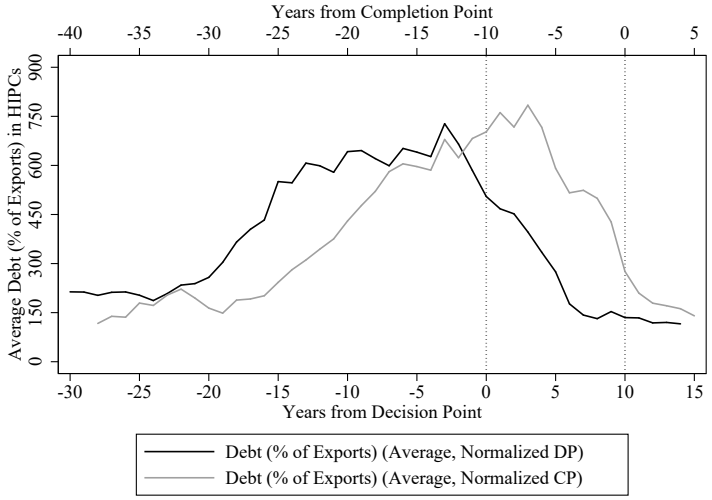
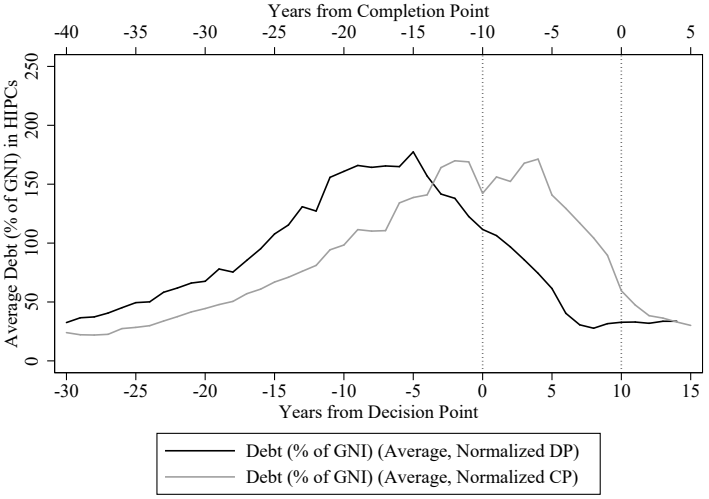
Figure 1: *Average HIPC Debt as a Share of Exports and GNI.* Average debt is normalized at Decision Point (grey line) and Completion Point (black line). The vertical lines mark the years of Decision Point and Completion Point, respectively. Source: World Bank (2015).

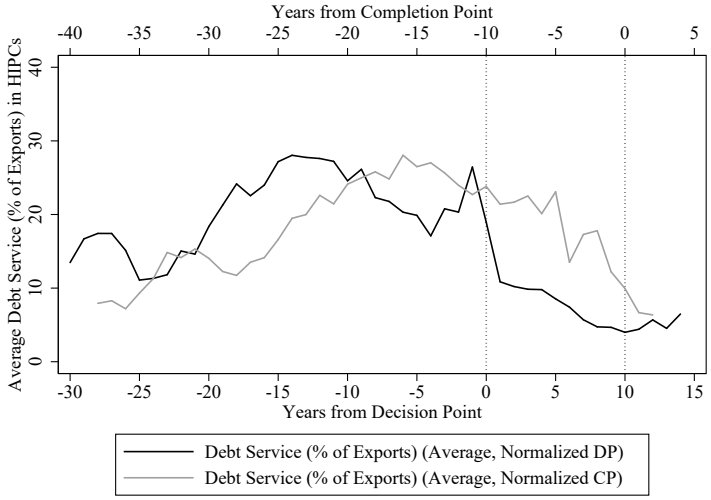


(a) *Debt (% of Exports).*

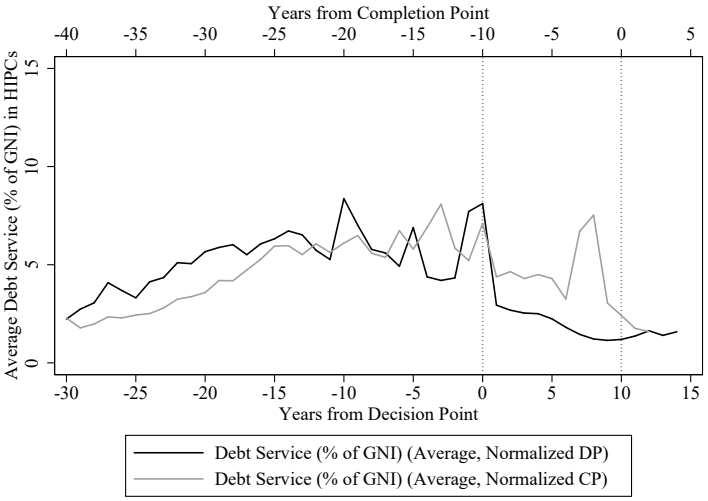


(b) *Debt (% of GNI).*

Figure 2: *Average HIPC Debt Service Payments as a Share of Exports and GNI.* Average debt service costs are normalized at Decision Point (grey line) and Completion Point (black line). The vertical lines mark the years of Decision Point and Completion Point, respectively. Source: World Bank (2015).

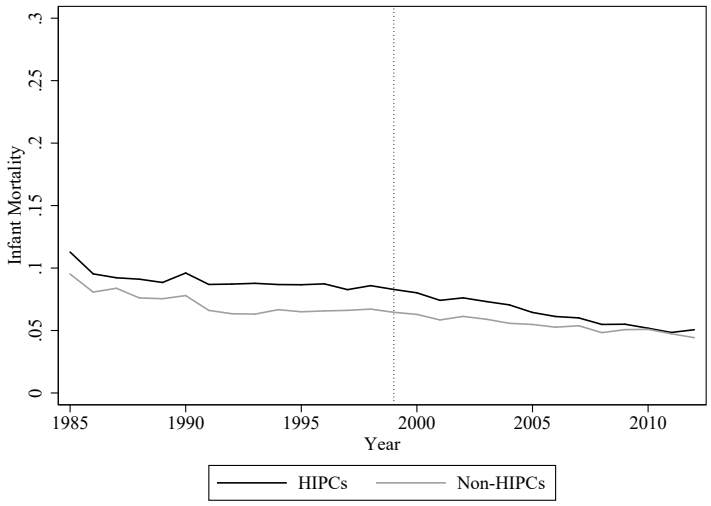


(a) *Debt Service (% of Exports).*

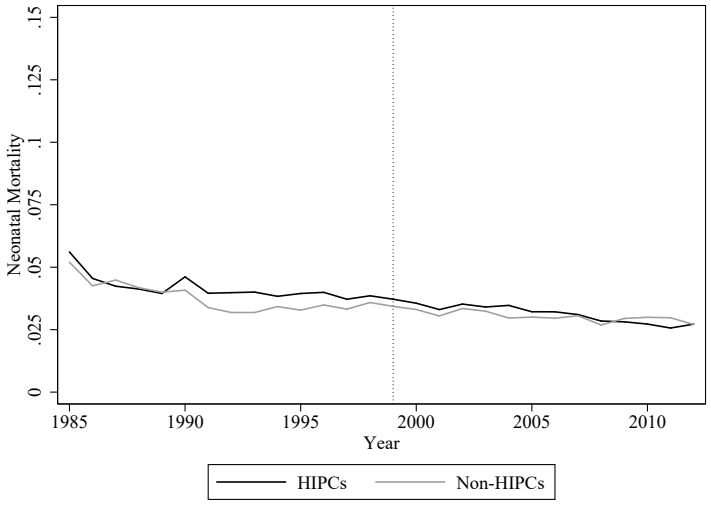


(b) *Debt Service (% of GNI).*

Figure 3: *Yearly Infant and Neonatal Mortality in percent.* The dashed line mark the introduction of the HIPC Initiative in 1999. The year 1985 includes all babies born in the 1960's, 1970's and 1980's up until 1985 and 2012 includes the roughly 1,400 babies born in 2013.

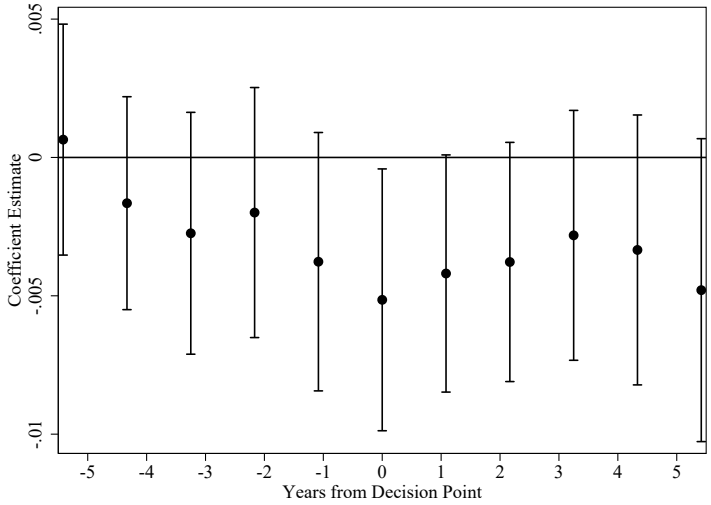


(a) *Infant Mortality*

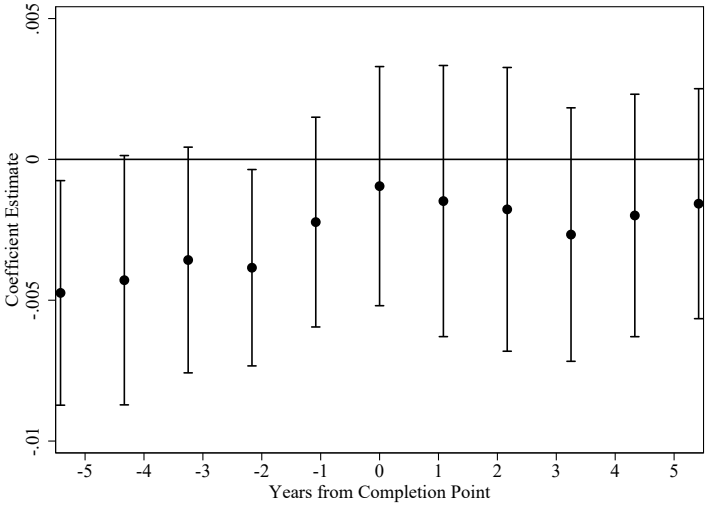


(b) *Neonatal Mortality*

Figure 4: *Effect of Debt Relief Before and After Decision and Completion Points on Infant Mortality.* The figures give the point estimates of the debt relief variables along with their 95 percent confidence intervals. All regressions include mother fixed effects, cohort-year fixed effects, country-specific time trends, and exogenous controls.



(a) *Decision Point*



(b) *Completion Point*

Table 1: *Country Cases Considered under the HIPC Initiative*

Country	Decision Point	Completion Point
Afghanistan	July 2007	January 2010
Benin	July 2000	March 2003
Bolivia*	February 2000	June 2001
Burkina Faso*	July 2000	April 2002
Burundi	August 2005	January 2009
Cameroon	October 2000	April 2006
Central African Republic	September 2007	June 2009
Chad	May 2001	April 2015
Comoros	June 2010	December 2012
Democratic Republic of Congo	July 2003	July 2010
Republic of Congo	March 2006	January 2010
Côte d'Ivoire	March 2009	July 2012
Eritrea	Pre-Decision Point	
Ethiopia	November 2001	April 2004
The Gambia	December 2000	December 2007
Ghana	February 2002	July 2004
Guinea	December 2000	September 2012
Guinea-Bissau	December 2000	December 2010
Guyana*	November 2000	December 2003
Haiti	November 2006	June 2009
Honduras	July 2000	March 2005
Liberia	March 2008	June 2010
Madagascar	December 2000	October 2004
Malawi	December 2000	August 2006
Mali*	September 2000	March 2003
Mauritania	February 2000	June 2002
Mozambique*	April 2000	September 2001
Nicaragua	December 2000	January 2004
Niger	December 2000	April 2004
Rwanda	December 2000	April 2005
São Tomé and Príncipe	December 2000	March 2007
Senegal	June 2000	April 2004
Sierra Leone	March 2002	December 2006
Somalia	Pre-Decision Point	
Sudan	Pre-Decision Point	
Tanzania	April 2000	November 2001
Togo	November 2008	December 2010
Uganda*	February 2000	May 2000
Zambia	December 2000	April 2005

*Part of the original HIPC Initiative. Original Decision Point and Completion Point dates: Bolivia September 1997 and September 1998, Burkina Faso September 1997 and July 2000, Guyana December 1997 and May 1999, Mali September 1998 and September 2000, Mozambique April 1998 and June 1999, Uganda April 1997 and April 1998
Source: IMF (2014, 2015a)

Table 2: *List of Countries in the Sample and Information on DHS Data*

HIPCs	DHS	Non-HIPCs	DHS
Benin	2011-2012	Albania	2008-2009
Bolivia	2008	Angola	2011*
Burkina Faso	2010	Armenia	2010
Burundi	2010	Azerbaijan	2006
Cameroon	2011	Bangladesh	2011
Chad	2004	Cambodia	2010
Comoros	2012	Colombia	2010
Democratic Republic of Congo	2013-2014	Dominican Republic	2013
Republic of Congo	2011-2012	Gabon	2012
Côte d'Ivoire	2011-2012	Kenya	2008-2009
Ethiopia	2011	Kyrgyz Republic	2012
The Gambia	2013	Laos	2011-2012[†]
Ghana	2014	Lesotho	2009
Guinea	2012	Maldives	2009
Guyana	2009	Moldova	2005
Haiti	2012	Namibia	2013
Honduras	2011-2012	Nepal	2011
Liberia	2013	Nigeria	2013
Madagascar	2008-2009	Pakistan	2012-2013
Malawi	2010	Peru	2012[#]
Mali	2012-2013	Swaziland	2006-2007
Mozambique	2011	Tajikistan	2012
Niger	2012	Timor-Leste	2009-2010
Rwanda	2010	Yemen	2013
São Tomé and Príncipe	2008-2009	Zimbabwe	2010-2011
Senegal	2014[#]		
Sierra Leone	2013		
Tanzania	2010		
Togo	2013-2014		
Uganda	2011		
Zambia	2013-2014		

*Malaria Indicator Survey (MIS) from the DHS Program

[#]Continuous DHS

[†]Joint Unicef Multiple Indicator Cluster Survey (MICS) and DHS. Published by UNICEF (2015).

Table 3: *Descriptive Statistics of Main Variables*

	(1)	(2)	(3)	(4)	(5)
Variable	Obs.	Mean	Std. Dev.	Max	Min
Infant Mortality					
All	1,770,705	0.0701	0.2553	0	1
Girl Infant	868,108	0.0648	0.2462	0	1
Boy Infant	902,597	0.0752	0.2637	0	1
T test (p value)		(0.0000)			
Poor Mother	378,183	0.0836	0.2767	0	1
Non-Poor Mother	1,314,517	0.0646	0.2458	0	1
T test (p value)		(0.0000)			
Mother with No Formal Schooling	684,226	0.0894	0.2853	0	1
Mother with Primary School or More	1,028,914	0.0579	0.2336	0	1
T test (p value)		(0.0000)			
Rural Mother	1,206,894	0.0774	0.2672	0	1
Urban Mother	563,811	0.0545	0.2270	0	1
T test (p value)		(0.0000)			
Neonatal Mortality					
All	1,770,705	0.0350	0.1837	0	1
Girl Infant	868,108	0.0308	0.1729	0	1
Boy Infant	902,597	0.0389	0.1935	0	1
T test (p value)		(0.0000)			
Poor Mother	378,183	0.0396	0.1950	0	1
Non-Poor Mother	1,314,517	0.0328	0.1781	0	1
T test (p value)		(0.0000)			
Mother with No Formal Schooling	684,226	0.0440	0.2052	0	1
Mother with Primary School or More	1,028,914	0.0291	0.1682	0	1
T test (p value)		(0.0000)			
Rural Mother	1,206,894	0.0379	0.1910	0	1
Urban Mother	563,811	0.0287	0.1667	0	1
T test (p value)		(0.0000)			
Decision Point	1,770,705	0.2983	0.4575	0	1
Completion Point	1,770,705	0.1741	0.3792	0	1
Girl Infant	1,770,705	0.4903	0.4999	0	1
Multiple Birth	1,770,705	0.0271	0.1624	0	1
Birth Order	1,770,705	3.0994	2.1431	1	20
Quarter of Birth	1,770,705	2.4277	1.1013	1	4

Table 4: *Results on Mothers Giving Birth Before and After Debt Relief*

	(1)	(2)	(3)	(4)
Dependent Variable:	Age	Poor	No Formal Schooling	Rural Resident
A. Decision Point				
Mothers giving birth before and after DP	3.6689***	0.0221***	0.0929***	0.0872***
	(0.1789)	(0.0023)	(0.0030)	(0.0031)
Number of Observations	266,993	262,452	266,986	266,993
Country FE	Yes	No	No	No
Country-Age FE	No	Yes	Yes	Yes
B. Completion Point				
Mothers giving birth before and after CP	2.4877***	0.0313***	0.0817***	0.1040***
	(0.2382)	(0.0026)	(0.0037)	(0.0030)
Number of Observations	266,993	262,452	266,986	266,993
Country FE	Yes	No	No	No
Country-Age FE	No	Yes	Yes	Yes

Notes: Robust standard errors clustered at the country level in parentheses.
***p<0.01, **p<0.05, *p<0.1.

Table 5: *Results on Infant Mortality from Reaching Decision Point and Completion Point*

Dependent Variable: Infant Mortality	(1)	(2)	(3)	(4)
		A. Decision Point		
Debt Relief	-0.0066**	-0.0073***	-0.0052**	-0.0051**
	(0.0025)	(0.0026)	(0.0024)	(0.0023)
Number of Observations	1,770,705	1,635,743	1,770,705	1,770,705
Number of Mothers	501,800	463,836	501,800	501,800
Number of Countries	56	54	56	56
Country FE	Yes	Yes	No	No
Mother FE	No	No	Yes	Yes
Cohort-Birth-Year FE	Yes	Yes	Yes	No
Birth-Year FE	No	No	No	Yes
		B. Completion Point		
Debt Relief	-0.0022	-0.0017	-0.0001	-0.0001
	(0.0023)	(0.0023)	(0.0021)	(0.0021)
Number of Observations	1,770,705	1,635,743	1,770,705	1,770,705
Number of Mothers	501,800	463,836	501,800	501,800
Number of Countries	56	54	56	56
Country FE	Yes	Yes	No	No
Mother FE	No	No	Yes	Yes
Cohort-Birth-Year FE	Yes	Yes	Yes	No
Birth-Year FE	No	No	No	Yes

Notes: All estimations include exogenous controls and linear country-specific time trends. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 6: *Heterogeneous Effects on Infant Mortality from reaching Decision Point and Completion Point*

Dependent Variable: Infant Mortality	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
		A. Decision Point		
Debt Relief	-0.0048*	-0.0040*	-0.0054**	-0.0003
	(0.0027)	(0.0022)	(0.0027)	(0.0025)
Debt Relief×Characteristic	-0.0010	-0.0030*	-0.0011	-0.0094***
	(0.0018)	(0.0015)	(0.0031)	(0.0025)
F stat (p value)	(0.0268)	(0.0080)	(0.0310)	(0.0118)
Number of Observations	1,770,705	1,692,700	1,713,140	1,770,705
Number of Mothers	501,800	477,539	487,870	501,800
Number of Countries	56	55	55	56
		B. Completion Point		
Debt Relief	-0.0005	-0.0003	-0.0009	0.0061***
	(0.0023)	(0.0021)	(0.0024)	(0.0021)
Debt Relief×Characteristic	-0.0008	-0.0050**	-0.0003	-0.0065***
	(0.0020)	(0.0020)	(0.0023)	(0.0024)
F stat (p value)	(0.5476)	(0.2030)	(0.6748)	(0.1882)
Number of Observations	1,770,705	1,692,700	1,713,140	1,770,705
Number of Mothers	501,800	477,539	487,870	501,800
Number of Countries	56	55	55	56

Notes: All estimations include mother fixed effects, cohort-birth-year fixed effects, exogenous controls and linear country-specific time trends. F stat (p value) tests Debt Relief +Debt Relief×Characteristic=0. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 7: *Sensitivity Analysis: Recall Bias*

Dependent Variable: Infant Mortality (sample)	(1)	(2)
Used Survey	-0.0049**	-0.0050**
	(0.0024)	(0.0025)
Used Survey×Decision Point		0.0006
		(0.0030)
F stat (p value)		(0.2147)
Number of Observations	37,850	37,382
Number of Countries	44	44

Notes: All estimations include country by mothers'-birth-year by babies'-birth-year fixed effects. F stat(p value) tests Used Survey+Used Survey×Decision Point=0. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: *Sensitivity Analysis: Fertility Bias*

	(1)	(2)	(3)
Mother Characteristic:	Poor	No Formal Schooling	Rural Resident
Decision Point	0.2657	0.1403	-0.0185
	(0.4650)	(0.4298)	(0.3784)
Decision Point×Characteristic	0.0282	0.3730	0.3179
	(0.3693)	(0.4360)	(0.3880)
F stat (p value)	(0.5526)	(0.3913)	(0.5938)
Number of Observations	66,103	64,833	67,748

Notes: All estimations include country-mothers'-birth-year-status fixed effects, mothers'-birth-year-babies'-birth-year-status fixed effects, country-specific quadratic trends in mothers' age by status. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: *Sensitivity Analyses with Additional Variables: Results on Infant Mortality from Reaching Decision Point*

Dependent Variable: Infant Mortality	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Decision Point	-0.0074***	-0.0057**	-0.0053**	-0.0045*	-0.0051**	-0.0056**	-0.0050**	-0.0049**	-0.0052**	-0.0052**
	(0.0025)	(0.0022)	(0.0025)	(0.0023)	(0.0024)	(0.0024)	(0.0024)	(0.0023)	(0.0024)	(0.0024)
Completion Point					-0.0005					
					(0.0021)					
MDRI						-0.0040				
						(0.0024)				
Original Decision Point							-0.0027			
							(0.0038)			
Short Birth Interval								0.0331***		
								(0.0021)		
Age									0.0013**	-0.0116***
									(0.0006)	(0.0013)
Age^2										0.0002***
										(0.0001)
Number of Observations	1,635,743	1,770,705	1,770,705	1,704,061	1,770,705	1,770,705	1,770,705	1,770,705	1,770,705	1,770,705
Number of Mothers	463,836	501,800	501,800	499,950	501,800	501,800	501,800	501,800	501,800	501,800
Number of Countries	54	56	56	56	56	56	56	56	56	56
Mother FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes (see notes)	No	No	No	No	No	No	No	No	No

Notes: All estimations include exogenous controls, cohort-birth-year fixed effects, and linear country-specific time trends. Column (1) includes country-specific mother's-birth-cohort fixed effects and mother-specific characteristics. In column (3), the dependent variable, infant mortality, is redefined as death at 12 months or earlier. The p value of the F statistic testing if the Decision Point and Completion Point dummies are equal is 0.16. Robust standard errors clustered at the country level in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 10: *Sensitivity Analyses with Macro Control Variables: Results on Infant Mortality from Reaching Decision Point*

Dependent Variable: Infant Mortality	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Decision Point	-0.0060**	-0.0051**	-0.0056**	-0.0053**	-0.0051**	-0.0050**	-0.0054**	-0.0054**	-0.0052**
	(0.0024)	(0.0024)	(0.0023)	(0.0025)	(0.0024)	(0.0023)	(0.0024)	(0.0025)	(0.0024)
GDP per capita	-0.0085**								
	(0.0032)								
NAT (% of GDP)		0.0002							
		(0.0011)							
Government Expenditures			-0.0009						
(% of GDP)			(0.0015)						
Investments (% of GDP)				-0.0022					
				(0.0015)					
Trade (% of GDP)					-0.0002				
					(0.0022)				
Polity2						-0.0001			
						(0.0001)			
Civil Liberties							0.0008		
							(0.0006)		
Political Corruption								0.0011	
								(0.0009)	
Fertility Rate									0.0220
									(0.0232)
Number of Observations	1,699,235	1,770,705	1,738,729	1,699,235	1,698,527	1,740,651	1,745,997	1,699,235	1,768,213
Number of Mothers	479,372	501,800	499,423	479,372	479,190	494,070	495,368	479,372	501,119
Number of Countries	53	56	56	53	53	54	55	53	56

Notes: All estimations include mother fixed effects, exogenous controls, cohort-birth-year fixed effects, and linear country-specific time trends. Column (1) includes country-specific mother's-birth-cohort fixed effects. Robust standard errors clustered at the country level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: *Results on Neonatal Mortality from Reaching Decision Point under the HIPC Initiative*

Dependent Variable: Neonatal Mortality	(1)	(2)	(3)	(4)
Decision Point	-0.0022	-0.0024*	-0.0015	-0.0014
	(0.0014)	(0.0014)	(0.0012)	(0.0012)
Number of Observations	1,770,705	1,635,743	1,770,705	1,770,705
Number of Mothers	501,800	463,836	501,800	501,800
Number of Countries	56	54	56	56
Country FE	Yes	Yes	No	No
Mother FE	No	No	Yes	Yes
Cohort-Birth-Year FE	Yes	Yes	Yes	No
Birth-Year FE	No	No	No	Yes

Notes: All estimations include exogenous controls and linear country-specific time trends. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 12: *Heterogeneous Effects on Neonatal Mortality from reaching Decision Point*

Dependent Variable: Neonatal Mortality	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
Decision Point	-0.0014	-0.0008	-0.0010	-0.0001
	(0.0014)	(0.0012)	(0.0014)	(0.0014)
Decision Point×Characteristic	-0.0003	-0.0026*	-0.0015	-0.0019
	(0.0014)	(0.0014)	(0.0012)	(0.0012)
F stat (p value)	(0.2626)	(0.0581)	(0.0781)	(0.1321)
Number of Observations	1,770,705	1,692,700	1,713,140	1,770,705
Number of Mothers	501,800	477,539	487,870	501,800
Number of Countries	56	55	55	56

Notes: All estimations include mother fixed effects, cohort-birth-year fixed effects, exogenous controls and linear country-specific time trends. F stat (p value) tests Debt Relief +Debt Relief×Characteristic=0. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 13: *Heterogeneous Effects on Vaccines from reaching Decision Point*

	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
Dependent Variable: BCG Vaccine				
Decision Point	0.0238	0.0162	0.0108	-0.0133
	(0.0155)	(0.0146)	(0.0153)	(0.0170)
Decision Point×Characteristic	0.0033	0.0333***	0.0310***	0.0563***
	(0.0020)	(0.0089)	(0.0076)	(0.0130)
F stat (p value)	(0.0843)	(0.0088)	(0.0166)	(0.0115)
Mean (Characteristic=1)	0.8397	0.7732	0.7340	0.8057
Mean (Characteristic=0)	0.8419	0.8662	0.9126	0.9123
Number of Observations	867,342	839,803	855,169	867,342
Number of Mother Groups	19,484	15,614	19,253	19,484
Number of Countries	54	54	54	54
Dependent Variable: DPT1 Vaccine				
Decision Point	-0.0238	-0.0291	-0.0569	-0.0491*
	(0.0316)	(0.0318)	(0.0367)	(0.0282)
Decision Point×Characteristic	0.0041*	0.0258***	0.0741***	0.0396**
	(0.0022)	(0.0086)	(0.0201)	(0.0156)
F stat (p value)	(0.5341)	(0.9201)	(0.4983)	(0.7833)
Mean (Characteristic=1)	0.8220	0.7578	0.7111	0.7883
Mean (Characteristic=0)	0.8244	0.8479	0.8962	0.8943
Number of Observations	863,512	836,152	851,365	863,512
Number of Mother Groups	19,461	15,603	19,230	19,461
Number of Countries	54	54	54	54
Dependent Variable: Measles Vaccine				
Decision Point	-0.0065	-0.0146	-0.0185	-0.0431
	(0.0336)	(0.0344)	(0.0341)	(0.0329)
Decision Point×Characteristic	0.0042	0.0344***	0.0297***	0.0560**
	(0.0026)	(0.0099)	(0.0097)	(0.0111)
F stat (p value)	(0.9440)	(0.5500)	(0.7447)	(0.7123)
Mean (Characteristic=1)	0.7522	0.6770	0.6281	0.7190
Mean (Characteristic=0)	0.7547	0.7825	0.8347	0.8236
Number of Observations	865,299	837,862	853,141	865,299
Number of Mother Groups	19,473	15,605	19,242	19,473
Number of Countries	54	54	54	54

Table 13: *Heterogeneous Effects on Vaccines from reaching Decision Point, continued.*

	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
Dependent Variable: Polio1 Vaccine				
Decision Point	0.0153	0.0072	-0.0029	-0.0231
	(0.0133)	(0.0131)	(0.0129)	(0.0152)
Decision Point×Characteristic	0.0030	0.0351***	0.0413***	0.0576***
	(0.0020)	(0.0100)	(0.0091)	(0.0150)
F stat (p value)	(0.1603)	(0.0069)	(0.0136)	(0.0229)
Mean (Characteristic=1)	0.8734	0.8209	0.8000	0.8532
Mean (Characteristic=0)	0.8735	0.8915	0.9238	0.9148
Number of Observations	865,527	838,045	853,368	865,527
Number of Mother Groups	19,481	15,613	19,250	19,481
Number of Countries	54	54	54	54
Dependent Variable: Tetanus Vaccine for Pregnant Mothers				
Decision Point	0.0269	0.0133	0.0054	-0.0374
	(0.0266)	(0.0268)	(0.0269)	(0.0310)
Decision Point×Characteristic	0.0012	0.0484***	0.0483***	0.0973***
	(0.0024)	(0.0097)	(0.0100)	(0.0226)
F stat (p value)	(0.2858)	(0.0310)	(0.0512)	(0.0314)
Mean (Characteristic=1)	0.7081	0.6374	0.5975	0.6651
Mean (Characteristic=0)	0.7087	0.7360	0.7880	0.7910
Number of Observations	668,018	646,817	660,821	668,018
Number of Mother Groups	18,773	15,154	18,552	18,773
Number of Countries	54	54	54	54

Notes: All estimations include mother-group fixed effects, cohort-birth-year fixed effects, exogenous controls and linear country-specific time trends. F stat (p value) tests Decision Point+Decision Point×Characteristic=0. Tetanus for pregnant mothers is measured 4.5 months prior to birth. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.

Table 14: *Heterogeneous Effects on Health Care and Improved Sanitation from reaching Decision Point*

	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
Dependent Variable: Delivery with Skilled Health Worker				
Decision Point	0.0025	-0.0019	0.0027	-0.0169
	(0.0241)	(0.0261)	(0.0207)	(0.0253)
Decision Point×Characteristic	-0.0036*	0.0055	-0.0042	0.02511*
	(0.0020)	(0.0131)	(0.0175)	(0.0138)
F stat (p value)	(0.9640)	(0.8744)	(0.9604)	(0.7434)
Mean (Characteristic=1)	0.5416	0.3838	0.3388	0.4209
Mean (Characteristic=0)	0.5514	0.6094	0.6842	0.8065
Number of Observations	946,085	914,874	933,469	946,085
Number of Mother Groups	19,767	15,772	19,530	19,767
Number of Countries	54	54	54	54
Dependent Variable: Prenatal Care by Skilled Health Worker				
Decision Point	-0.0141	-0.0204	-0.0197	-0.0508*
	(0.0291)	(0.0307)	(0.0251)	(0.0292)
Decision Point×Characteristic	0.0020	0.0265**	0.0139	0.0564***
	(0.0017)	(0.0107)	(0.0209)	(0.0176)
F stat (p value)	(0.6807)	(0.8239)	(0.8754)	(0.8590)
Mean (Characteristic=1)	0.7920	0.7025	0.6373	0.7304
Mean (Characteristic=0)	0.7927	0.8317	0.8892	0.9072
Number of Observations	675,334	653,574	668,164	675,334
Number of Mother Groups	19,592	15,769	19,371	19,592
Number of Countries	54	54	54	54
Dependent Variable: Treated Diarrhea with Oral Rehydration Solution				
Decision Point	0.0324	0.0210	0.0345	0.0108
	(0.0267)	(0.0287)	(0.0285)	(0.0293)
Decision Point×Characteristic	0.0014	0.0425***	-0.0029	0.0309**
	(0.0074)	(0.0148)	(0.0150)	(0.0141)
F stat (p value)	(0.2423)	(0.0255)	(0.2671)	(0.1372)
Mean (Characteristic=1)	0.3578	0.3377	0.2929	0.3373
Mean (Characteristic=0)	0.3625	0.3709	0.4121	0.4111
Number of Observations	136,200	131,730	132,647	136,200
Number of Mother Groups	13,992	12,319	13,844	13,992
Number of Countries	54	54	54	54

Table 14: *Heterogeneous Effects on Health Care and Improved Sanitation from reaching Decision Point, continued*

	(1)	(2)	(3)	(4)
Child/Mother Characteristic:	Girl Infant	Poor	No Formal Schooling	Rural Resident
Dependent Variable: Access to Flush Toilet				
Decision Point	0.0004	0.0056	0.0113	0.0266
	(0.0102)	(0.0119)	(0.0105)	(0.0178)
Decision Point×Characteristic	0.0041*	0.0258***	0.0741***	0.0396**
	(0.0022)	(0.0086)	(0.0201)	(0.0156)
F stat (p value)	(0.9822)	(0.0831)	(0.3212)	(0.2177)
Mean (Characteristic=1)	0.1572	0.0403	0.0484	0.0591
Mean (Characteristic=0)	0.1601	0.2045	0.2285	0.3720
Number of Observations	1,129,440	1,110,360	1,114,504	1,129,440
Number of Mother Groups	17,319	16,244	17,117	17,319
Number of Countries	54	54	54	54
Dependent Variable: Access to Piped Water				
Decision Point	-0.0104	-0.0109	-0.0127	-0.0432***
	(0.0114)	(0.0120)	(0.0116)	(0.0147)
Decision Point×Characteristic	0.0005	0.0023	0.0051	0.0471**
	(0.0016)	(0.0090)	(0.0137)	(0.0216)
F stat (p value)	(0.3847)	(0.4809)	(0.6153)	(0.8014)
Mean (Characteristic=1)	0.3332	0.2133	0.2149	0.1893
Mean (Characteristic=0)	0.3364	0.3845	0.4223	0.4223
Number of Observations	1,121,610	1,102,470	1,106,657	1,121,610
Number of Mother Groups	17,297	16,194	17,095	17,297
Number of Countries	54	54	54	54

Notes: All estimations include mother-group fixed effects, cohort-birth-year fixed effects, exogenous controls and linear country-specific time trends. F stat (p value) tests Decision Point+Decision Point×Characteristic=0. Prenatal care is measured 4.5 month prior to birth. Robust standard errors clustered at the country level in parentheses. ***p<0.01, **p<0.05, *p<0.1.