Children Characteristics and Intra-household Allocation of Conditional Cash Transfers

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1 Introduction

In the last two decades, conditional cash transfer (CCT) programs have come to the forefront of poverty mitigation policy in many developing countries. These programs grant poor households a specific amount of cash transfers conditional on these households satisfying certain required health and education behaviors (usually involving child immunization, health check ups and school attendance). Several studies have shown that CCT Programs can improve child health status and education outcomes (Alderman and Gertler, 1997; Parker et al., 2007). Following the apparent success of CCTs in other countries, in 2007 the Government of Indonesia (GoI) joined the growing number of developing countries that have adopted such programs. Surprisingly, the initial impact assessment of the Indonesian pilot CCT program shows relatively small impacts on both health and education outcomes (World Bank, 2011). That evaluation suggests several possible reasons for these results, such as the low quality of health facilities and the small amount of the transfers. Nevertheless, despite these disappointing impacts, the GoI continues to expand the program throughout the whole country (Figure 1).

There are several possible reasons why a CCT program could have disappointingly small impacts on children's health outcomes. First, lack of enforcement of the required health behaviors reduces the program's impact on children's health outcomes. Second, the program might be reinforcing a behavior that was already part of most households' behavioral decisions. And third, households may allocate the transfer in such a way that diverts most of the benefit from the beneficiary children.

This research here will try to test two different hypotheses explaining the disappointing results from Indonesia's CCT Program. The first hypothesis corresponds to the first reason: the lack of enforcement of health behaviors may reduce the overall health impacts of the program on the beneficiary children. The second hypothesis corresponds to the third reason: intra-household spillovers may cause the allocation of health investments away from the beneficiary child. To clarify the nature of these two hypotheses, a model of intra-household allocation of investments in children's health will be developed. In contrast to the existing extensive literature on CCTs, which mostly focuses on the impact evaluation results, this proposed study will concentrate on household behavioral decisions that might affect the magnitude of the health impacts of Indonesia's CCT program. The proposed research is particularly relevant for a country such as Indonesia, where CCT programs are being implemented as an important tool to reduce poverty, which affects 12 percent of its population.[1]

The rest of this paper is organized as follows. The next section reviews the existing literature on both intra-household allocation of child health investments and CCT programs. This is followed by a brief historical examination of Indonesia's public policy, focusing on child health programs, to provide a context for the implementation of the CCT program. The next section describes the Indonesian CCT Program, and the results of the initial impact evaluation that was conducted by The World Bank. This is followed by a theoretical framework that will be used to guide the estimation procedure; followed by an identification strategy for empirical estimation. The last section outlines a research plan that will be

[1]The World Bank estimates that in 2014 there are more than 28 million Indonesians who live below poverty line.

conducted to address the research question proposed in this proposal.

2 Literature Review

Human capital accumulation has been a subject of research in economics since the early 1960s. The development of health economics as a distinct sub-discipline within economics is due to the work of Arrow (2000) on the subject of medical care. This sub-discipline has also benefited from the work of Schultz (1960, 1961) and Becker (1964) on human capital theory, which has been used for various applications beyond those studies' initial focus on education. Since these seminal works the study of health issues has progressed significantly.

However, as in many areas of empirical economics, a persistent theme in health economics is the difficulty of establishing causality using the observational survey data (Strauss and Thomas, 1998) . This is because health outcomes are frequently interrelated with other types of human capital, such as the intricate relationship between health status and both school performance and labor productivity (Fuchs, 1996, 2004; Glewwe et al., 2001; Miguel and Kremer, 2004). Furthermore, human capital is also related to other unobservable factors such as genetic endowments, parental preferences and the social environment (e.g. tacit norms and rules). The relationships between these observable and unobservable factors are oftentimes difficult to tease out to confirm the direction of causality. These difficulties are part of the reason for the flourishing use of the randomized control trial (RCT) methodology to evaluate the impact of government social welfare policies. One such policy that is related to child health and education is the popular CCT programs that were initially started in Mexico and Brazil, under the name PROGRESA and *Bolsa Familia*, respectively.

Aside from its intrinsic value, the issue of child health is particularly important because currently around 6.3 million children under five died in 2013 (UNICEF, 2014); 50 percent of whom died due to infectious disease. The issue of child health is even more critical for developing countries, where child health problems persist, despite improvements in the developing countries' economies (Black et al., 2008) . As a developing country, Indonesia faces these problems regarding child health investment and outcomes. Furthermore, although the maternal and infant mortality rate has continued to fall in Indonesia, they are still high compared to other East Asia and Pacific (EAP) countries (World Bank, 2012). Indonesia also faces problem of disparities in the accessibility of health services between regions and across socioeconomic groups. Thus, it is no surprise that the GoI decided to implement a CCT program that provides cash transfers and incentives for human capital investment in health and education simultaneously.

Another appeal of CCT programs in terms of their health behavior requirements is related to the research that has shown that there is a critical and sensitive period in child development that influences their development later in life. This notion has been supported by many research studies. For example, a study by Knudsen et al. (2006) showed that some skills are more productively acquired at a certain period of childhood. One example is the ability to learn a second language, which will be higher if the child started at an early age (Newport, 1990) . This implies that inequality of cognitive and non-cognitive skills across socioeconomic groups starts in early childhood citepheckman2003, blau2006, cunha2007, blau. Thus, another appeal of CCT programs is that they are targeted to young children in poor households, which the research on early childhood development suggests is the most effective approach to increase children's human capital.

Thus, although the initial endowment (e.g. genetic and family traits) of children is an important determinant of their skills, disadvantaged groups in society might need external support (either from the government or their communities) to help them close the gap in child development. In developing countries, where various market and institutional failures (e.g. credit constraints and weak infrastructure development) frequently exist, the need for external support, especially from government, is more pronounced. Without public investment in child health, household's investment in child health will be prone to various array of shocks that frequently befall the poor households. This might further widen the gap of child development between poor households and their wealthier counterparts. Given this context, CCT programs can influence households decisions on child health investments directly through the conditionality requirements and indirectly through the expansion of households' budget constraint brought about by the cash transfer.

Ever since they were first launched in Mexico and Brazil in the 1990s, CCTs have become one of the main policies in developing countries to reduce poverty. Such programs are designed to respond to the immediate needs of the poorest segments of communities by increasing their incomes. Even more ambitiously, the main goal of CCT programs is to break the inter-generational cycle of poverty by increasing investments in human capital accumulation among the poor at a young age.

The evaluations of the PROGRESA program in Mexico and *Bolsa Familia* in Brazil, and of their subsequent replications in other countries, have shown positive impacts on child education and health outcomes. One study that examined the impact of the PROGRESA program on child health was that of Gertler (2004) , who found a significant child health improvements due to PROGRESA on three measures of child health: child morbidity, height for age, and anemia. Evaluations of the same type of programs in other countries have shown similar results, such as studies by **?** for Nicaragua; Behrman and Hoddinott (2005) and Attanasio et al. (2005) for Colombia. However, a research by Morris et al. (2004) for the CCT program in Brazil (PETI-Bolsa Alimentacio) shows no significant impacts on height-for-age of children, and even finds a decrease in the weight of children under three years old.

Given the mostly positive impacts of CCT programs in other developing countries, the small health impacts found in the Indonesian PKH Pilot program raise several concerns about the quality of the program and its efficacy in improving child health status. In addition, CCTs programs have been the subject of various criticism, such as the high implementation costs, the paternalistic nature of the program, and unknown mechanisms behind the results (Baird et al., 2011; De Janvry and Sadoulet, 2006). Given these two reasons, the GoI decision to continue with the expansion of its CCT program throughout Indonesia is quite puzzling.

The first study of the proposed research will examine the underlying factors that drive the unexpectedly small health impacts of Indonesia's CCT program by testing two possible hypotheses. The first hypothesis posits that the small impacts of CCT might be because of within-household spillovers, i.e. parents of beneficiary households might allocate the health investments away from beneficiary child. And the second hypothesis examine whether weak enforcement of health behaviors results the small impacts on health. The proposed research is expected to provide policy insights on within-household spillover effect of the program that is expected to help to help future program improvement. Thus, this proposed research differs from World Bank's impact evaluation report as it will focus on within-household spillover effects. Such spillovers have has not been examined yet for the Indonesia's CCT Program.

This proposed research will use the rich literature on intra-household allocation of health investments to guide its empirical strategy. These allocative decisions will influence the amount and quality of children's nutrients, which will then influence their health status. Research has shown that children from the same household do not necessarily received a uniform amount of health investments, instead, these allocative decisions may be influenced, by among others, female bargaining power within households (Pitt et al., 2003; Thomas, 1997) or children characteristics (Alderman and Gertler, 1997; Datar et al., 2010; Del Bono et al., 2008; Garg and Morduch, 1998; Harris-White, 1997). This research will focus on impacts of child characteristics, such as gender composition and birth order, on parental decisions to allocate health investments among their children.

3 A Brief History of Indonesia's Public Health Policies

The origins of the current national health care system in Indonesia started as early as 1949, just three years after Indonesia obtained independence from more than three centuries of Dutch colonial rule. In that year, the government implemented a pension program for civil servants. In 1963, the government expanded their benefits to government workers by providing health insurance for civil servants. During the 1960s, this health insurance was mostly covered government workers and only minimally covered other formal sector workers (Aspinall, 2014) .

The 1965 coup by General Suharto brought about a regime change that shifted the focus of Indonesia's economic policies. In the early years of his presidency, Suharto was advised by a group of economic advisers (famously called the "Berkeley Mafia") who urged him to focus more on economic development. In the 1970s, the government initiated a widereaching effort to broaden the reach of its social welfare policies. Taking advantage of the oil boom windfalls in the 1970s, the Indonesian government implemented massive construction of education and health care infrastructure. One such program was a nation-wide family planning program, which included: a comprehensive program of targeted advertisements in national and local media; development of community health centers; and outreach to local and national religious figures. In 1968, the government implemented a new system of community level health centers (*puskesmas*) that provided health services at a low price. Within twenty years, the government managed to achieve full national coverage, with one centre for every 30,000 people.

Although the infant mortality rate, life expectancy and other health indicators improved, the quality of health care at community health centers and other government-run health facilities was frequently poor due to limited funding for training and provision of medical equipment. The quality of health services became so low that financially able government employees often opted to pay for medical services from the private health facilities or even from abroad. This created a two-tiered system in which the rich received the best health care, while the poor were consigned to the public health care system, which could effectively provide only basic health care. One indicator of this disparity is from a study conducted in 1995, which concluded that the richest 10 percent of the population was 10 times more likely to be hospitalized than the poorest 10 percent of the population (Kristiansen and Santoso, 2006).

In 1992, the government consolidated the existing health insurance systems spread accross different government agencies into one centralized insurance system, called Jamsostek (*Jaminan Social Tenaga Kerja* - Social Security Scheme). The program provides various insurance schemes, such as occupational injury insurance, health insurance and life insurance, for workers in the formal sector. Towards the end of Suharto era, the program experienced rampant noncompliance on the part of many employers, so that only about one third of formal workers were covered by the system in 2003 (Thabrany, 2011).

In 1998, Suharto resigned from the presidency due to the economic collapse and social unrest that arose from the 1997 Asian Financial Crisis. The crisis increased the national poverty rate from 15 percent in mid–1997 to 33 percent by the end of 1998 (Sumarto et al., 2008). To address this severe economic downturn, the transitional government launched a major social safety net program, called JPS (*Jaringan Pengaman Sosial* - Social Protection Safety Net). Different from Jamsostek, JPS was created with a specific aim to protect the chronic poor from the crisis and to reduce their vulnerability to risk. The program includes various initiatives on education, health, employment and food security. The health component covered a wide range of health care services, from subsidies for medical equipment provision to free family planning services (Sumarto et al., 2010). Although the scale of the program eclipsed any previous social welfare program (Sumarto et al., 2008), rampant leakages due to inadequate targeting and corruption led to severe criticisms from the population.

In 2003, under President Megawati Soekarnoputri's leadership, a free health care initiative with wider coverage was introduced. The new program was built directly on the existing JPS program. Unlike the JPS, however, this program was managed at the district level; which allowed more involvement of local governments in the national program. Yet, in 2004, the new President, Susilo Bambang Yudhoyono, re-centralized the health insurance system under the name Askeskin (*Asuransi Kesehatan untuk Masyarakat Miskin* - Health Insurance for the Poor) which provides health insurance mainly for the poor. This program was later called Jamkesmas (*Jaminan Kesehatan Masyarakat* - Community Health Insurance).

Despite the name change, the basis of the protection scheme was still the same. The program was still targeted towards the poor population, even though it still retained its initial flavor in that it included insurance for workers in the public and formal private sectors. The main difference is that the formal workers had to pay an insurance contribution, while the poor was fully funded by government fund (Sparrow et al., 2013). Furthermore, similar to previous social protection programs, this national system continues to be plagued by various inefficiencies and corruption, which affected the quality of services received by the poor.

On top of the central health insurance system, the decentralization that began in 1998 has also enabled some local governments to initiate a local health insurance schemes targeted towards their local constituencies. One such example was the famous initiative created by the *Bupati* (head of district) of Jembrana District in Bali (Rosser et al., 2011), who provided universal health care for the residents of Jembrana District funded by the district budget. [2] Such local health initiatives have spread to other wealthy districts in various provinces. Unlike the national program, access to health services requires proof of residence and usually is limited to local health facilities. As many districts could not afford to adopt such health care programs, the national health policy has remained intact to this day, with several new additional program in the last decade.

The national social welfare programs, including the health insurance system, were alleged to have poor targeting by citizens and the media. The media and public criticism became very severe when the government launched an *unconditional* cash transfer program (*Bantuan Tunai Langsung* -BLT) in 2005, which was initially intended to compensate poor and near poor citizens from the impact of the government's decision to reduce subsidies on gasoline, diesel and kerosene. The BLT program was accused by the media of having chronic inefficiencies and leakages in its targeting. Although no rigorous research has provided evidence corroborating these allegations, the government nevertheless decided to focus on improving its beneficiary targeting methodology for their subsequent social welfare programs, which includes the household CCT program (*Program Keluarga Harapan* - PKH) and community CCT program (PNPM *Generasi*) . Both programs included major health components and involved intensive efforts to improve their targeting quality and distribution systems.

4 The Indonesian CCT Program and Data

Despite the economic growth in the last four decades, the provision and outcomes of health and education services in Indonesia are still low compared to its neighboring countries (World Bank, 2011) . Because the program is aimed to address the issue of low human capital investments for young children, GoI decided to launch a CCT program in Indonesia. This decision was also motivated by perceived success of CCT programs in other developing countries.

[2]the district budget consists of district own revenue (*Pendapatan Asli Daerah*)and equality grant (*Dana Perimbangan*) allocated by the national government

Indonesia's CCT program consists of two parallel but independent programs, the community CCT program (PNPM *Generasi*) and the household CCT program (*Program Keluarga Harapan* - PKH). Although both programs created to address health and education investments issues, the programs differ in terms of design, implementation and executing agency.

The PNPM *Generasi* program is an extension of government's sub-districts infrastructure development program, Kecamatan Development Program (KDP), which aimed at improving infrastructure in underdeveloped sub-districts. –> Building up from KDP, The PNPM *Generasi* program provides a block grant to communities conditional of commitment on health and education investments. The type of health and education investments will be decided communally and can include investments such as procurement of health equipments for integrated health posts to contracting additional teachers for school in the communities.

Different from the PNPM *Generasi* program, the PKH program is targeted to provide cash transfer directly to poor households. The program is designed to substitute for the heavily criticized UCT program launched by the GoI in 2005 (BLT 2005). Similar to other countries' CCT programs, the cash transfers to poor households are conditional on health and education services utilization. Thus, the PNPM *Generasi* program and the PKH program are aimed to address the supply side and demand side of health and education services, respectively. Aside from this differences, the government executing agency for the two programs are also different. The Ministry of Home Affairs (MOHA) is responsible for PNPM *Generasi* program implementation, whereas The Ministry of Social Affairs (MOSA) is responsible for PKH program implementation.

The pilots for both CCT programs were conducted in the second half of 2007 and in the same six provinces and the Special Capital City District of Jakarta (*Daerah Khusus Ibukota* (DKI) Jakarta). Initially, the pilots covered five provinces (West Java, East Java, North Sulawesi, Gorontalo and East Nusa Tenggara (NTT)), but soon after West Sumatra and DKI Jakarta were added. These provinces were selected due to their local government's willingness to participate in the program and because they represent Indonesia's diversity. Although both programs were piloted at the same period and in the same provinces, each program targets different villages because of differences in implementation focus. Given this, the research will consider only the household CCT program, PKH. Thus the following sections will mostly focus on the PKH program.

Similar to CCT programs in other countries, the cash transfers of the PKH program were given to the children's mothers in treatment area. The Indonesian Post Office is responsible for distributing these transfers due to its wide coverage. There are no specific rules that households are expected to follow regarding the use of the cash transfers. The amount of the transfer is around 15 to 20 percent of poor households' consumption and disbursed quarterly. Table (1) describes the cash disbursement rule for different types of beneficiaries. As can be seen from Table (1), the transfers has a value of Rp 600,000 to Rp 2.2 million annually depending on the number of children and their ages. For example, a mother who has children aged 0–6 years old, regardless the number of children, will receive Rp 1,000,000 per year. While a mother who has three primary aged children (6–12 years) attending school will receive Rp 1,400,000. Or if a mother has a child 0–5 years old and three primary school-aged children, she will receive the maximum amount of transfer (Rp 2,200,000 per year).

Health behaviors are required of pregnant women, lactating women and children age 0–5 years old to receive cash transfers. The health behaviors are as follows. Pregnant women must complete four antenatal care visits, take iron tablets during their pregnancy, and have a professionally assisted birth. Lactating mothers must complete two postnatal care visits. Children aged 0 - 6 years old must have completed all childhood immunizations, take vitamin A capsules twice per year and participate in growth monitoring: monthly for infants 0 - 11 months old and quarterly for children aged 1–6 years old.

Education conditionality applies to households with children aged 6 - 15 years (or aged 16–18 years but who have not yet completed grade 9). The education conditionality requirements are: enrollment and a minimum 85 percent attendance rate for children age 6–15 years old; or enrollment in school or an equivalent education program for children aged 16–18 years old who have not finished grade 9 [3].

[3] The basic equivalency education program (the Equivalent Primary-*Paket A* and Lower Secondary Schools-*Paket B* Program) is a non-formal education system provided by the GoI for children aged older than 15 years old or adults who have not completed grade 9. The students can then participate in primary and lower secondary school equivalency exams that will allow them to continue their education further to

PKH facilitators were responsible for providing information to the beneficiaries, in particular on the importance of conditionality fulfillment and the consequences of failing to fulfill the conditionality. The enforcement rule is stated as follows. The first time that conditionality is not met, the beneficiaries households will receive a warning letter from a PKH facilitator. The second breach results in 10 percent deduction of the transfer. After the third breach, the beneficiaries households are permanently expelled from the program. The verification process relies on health and education service providers, who were expected to input compliance verification data online before the initiation of payments.

4.1 The PKH Pilot Program Design

To enable impact evaluation of both PNPM *Generasi* and PKH programs, the pilot beneficiaries were chosen using Randomized Control Trial (RCT) method. The selection process for both program were conducted simultaneously. It started by excluding from both programs the richest 20 percent of districts in each of the seven pilot provinces.[4] From the remaining 80 percent of districts in each province, only districts that were not eligible for PNPM *Generasi* in these seven provinces were considered for the PKH program. This left around 48 districts and cities to be considered for the PKH program.

The selection process for PKH eligible households in these 48 districts and cities consisted of two steps: (1) selection of PKH sub-districts; and (2) selection of eligible households in the selected PKH sub-districts. Of the 48 districts and cities, 588 sub-districts that were considered "supply side ready" were randomly selected to participate in the PKH program.[5] These 588 sub-districts were then randomly assigned to either the treatment group (329 sub-districts) or the control group (259 sub-districts). Figure (2) summarizes the randomization process of the pilot PKH programs.

The selection of CCT eligible households from these 588 PKH-eligible subdistricts also

either lower secondary or upper secondary school, respectively.

[4]The criteria used were poverty rates, incidence of malnutrition and the transition rate from primary to secondary school.

[5]Supply-side readiness was determined by a statistical analysis of the available health and education facilities in the sub-districts. The threshold for sub-district in non-Java provinces was set to be lower to ensure greater inclusion of areas outside of Java, despite their relative limited supply of health and education facilities. The data used is Village Potential (PODES) 2005 data

consisted of several steps. First, an initial roster of potential CCT beneficiaries was developed from the beneficiaries list of the 2005 UCT program (the data came from Statistics Indonesia - BPS).[6] . A proxy-means test (PMT) was then applied to the households on the UCT beneficiaries list, and the households that were classified as poor or extremely poor were included in the initial CCT roster.[7] This initial screening excluded around 30–40 percent of the UCT beneficiaries. To minimize possible exclusion errors, Statistics Indonesia conducted an on-the-ground verification process in these PKH eligible sub-districts. During the verification period, any poor households that were not in the UCT list but were considered to be extremely poor by Statistics Indonesia were added into the roster. However, the verification exercise was conservative in that it added only around 5 percent more households to the initial CCT roster.

Statistics Indonesia then conducted a similar proxy-means test for all of the households in this pool of households to identify the extremely poor among them, as only these were to be considered for PKH program. These extremely poor households were then further screened to identify eligible households based on the program criteria: households with pregnant/ lactating women, with children aged 0–15 years and with children aged between 16–18 years who have not yet finished 9 years of compulsory basic education.

This list was then given by Statistics Indonesia to the implementing agency, MOSA, for final approval of the beneficiary list. Due to additional funding availability, the PKH Implementation Unit (UPPKH) established at MOSA revised the list proposed by Statistics Indonesia by adding several households that are poor but not extremely poor back into the household CCT roster (using the data supplied by Statistics Indonesia). However, both agencies, Statistics Indonesia and UPPKH, agreed to limit the number of additional households. Thus, only those poor households that were closer to the bottom end of the consumption distribution were re-included into the final CCT rosters. In the end, around 430,000 eligible households were identified in seven pilot provinces, DKI Jakarta, West Java,

[6]The 2005 UCT program provided cash transfer with no conditionality requirements for all poor and near poor households to compensate for the reduction in national subsidies for gasoline. GoI decides the poor and near poor households based on survey data from Statistics Indonesia collected specifically for the UCT program

[7]The PMT was based on 29 variables, including housing characteristics, education attainment, fuel sources, type of employment and access to health and education services

East Java, West Sumatra, North Sulawesi, Gorontalo and NTT .

4.2 PKH Program Survey Design and Data

A baseline survey was conducted between June and August 2007, before the first PKH transfers were distributed. The survey randomly sampled households in both PKH treatment and control sub-districts. The first stage of the sampling plan for the baseline survey was to choose a sample of eight villages/urban precincts from each of the 588 sub-districts. In the second stage, one ward would then be randomly selected from each village/urban precinct. Lastly, in the third stage, five households would be sampled from each ward. This would yield 23,520 households in baseline.

The survey covered six of the seven PKH provinces (excluding West Sumatra), which covered 44 districts of the 48 districts included in the pilot. From these districts (329 in the treatment group and 259 in the control group), data were collected from 180 randomly selected PKH treatment sub-districts and 180 randomly selected control sub-districts, resulting in a sample of 360 sub-districts for PKH evaluation. This selection of 360 sub-districts was stratified by the urban/rural classification of the sub-districts.[8]

Eight villages/urban precincts in each of these 360 sub-districts were then randomly selected, conditional on whether the village/precinct has at least five UCT eligible households per ward. If the UCT eligibility per ward criteria caused less than eight villages/precincts to be sampled in some sub-districts, additional wards for these sub-districts would be randomly selected from the remaining villages/urban precincts to balance out the number of sampled wards across sub-districts.

Lastly, within each ward, the UCT eligible households were classified into three groups: (1) households with pregnant/lactating mothers or married women who were pregnant in the last two years, (2) households with children age 6–15 years and (3) remaining households. Then from each ward, five households were randomly selected from group (1) and group (2) only: two from group (1) and three from group (2). This sampling method resulted in 14,326 surveyed households (7195 treated and 7131 control). The non-response rate was

[8] A sub-district is defined as rural if the share of urban precincts is less than 30 percent of all precincts and villages in the sub-districts, according the Village Potential 2005 data.

very low, below one percent, for individual household members. These same households were re-contacted for a follow-up survey in October to December 2009. The follow-up survey used a modified version of the baseline questionnaire and respondent lists to locate baseline households. The attrition rate is relatively low, at approximately 2.5 percent, reducing the panel sample by 350 households. Figure (3) describes the PKH baseline sample selection and Table (2) provides the complete distribution of PKH samples across baseline and follow-up survey.

In addition to the two household surveys mentioned above, this study also uses an administrative data on PKH program implementation status. Similar to other household surveys for CCT Program evaluation, the PKH program surveys collect information on socioeconomic and demographic characteristics of PKH households and communities. The survey was conducted by the University of Gadjah Mada (UGM), which is independent of the program implementation agency. The survey was conducted between June - August 2007 and October -December 2009 for baseline and follow-up survey, respectively. This means that the follow-up survey was conducted after around 26 - 30 months of PKH pilot implementation. Figure (4) provides the timeline of the surveys and PKH program implementation.

The following Table (3) provides information on baseline survey sample. The distribution of beneficiaries in the treatment and control group are relatively balanced. Due to delayed transfer and expansion of the program in the middle of pilot implementation, some sub-districts does not stay within its initial randomization status. Table (4) provides the change in the distribution of sub-districts, villages and households in the follow-up survey. To address this issue in the empirical estimation, each sub-districts will be assigned its initial randomization status at baseline. Note that Table (4) only includes the sample distribution of child age 0–5 years old who are the focus of this research.

4.3 Program Implementation

During the implementation of the PKH program, several studies were conducted to assess the quality of the program implementation. Two such studies are those conducted by The Center for Health Research (2010) and SMERU Research Institute (Febriany et al., 2011) .

The Center for Health Research conducted random checks on program implementation in nine districts across PKH provinces between October 2009 until February 2010, while SMERU provided a qualitative assessment of the program performances in 2 of PKH provinces, West Java and East Nusa Tenggara. These two studies provide a general picture of the operational challenges of PKH program implementation.

The Center for Health Research study found that socialization of the program is limited only to beneficiaries. This has caused many village officials and service providers (which are supposedly responsible for conditionality compliance verification) to be unaware of the existence of the program. In addition to this, many PKH program officers have limited understanding about the program, and thus failed to provide clear information about the mechanism and goals of the program. This has caused many beneficiaries and relevant stakeholders to perceive PKH program as an unconditional cash transfer. Study by SMERU also shows similar results where many midwives reported that they have no knowledge about the existence of PKH program.

Aside from socialization issues, the management information system (MIS) to verify program's conditionality compliance was not yet functioning during the whole PKH pilot period. This is due to several reasons such as unavailability and ambiguity of verification forms, lack of adequate local human resources and failure to entry information from the forms into MIS. Due to this problems, in the first two years of program implementation verification of benefits was generally not functioning. Therefore, only a few, if any, households were subjected to penalties for non-compliance to the conditionality of the program. Study by SMERU shows that beneficiaries in the areas where the PKH program facilitators made an effort on program socialization, there is more knowledge about penalties for non-compliance among beneficiaries households. Consequently, beneficiaries in remote areas have less awareness on the conditionality aspect of the program as the facilitators focused more on completing administrative tasks due to the length of time needed to reach these areas.

4.4 The Pilot Impact Evaluation Results

The results of the World Bank's impact evaluation of the pilot program are summarized in Table (5). They show a significantly positive impact of the program on household welfare measured in terms of increase in household expenditures. CCT beneficiaries had significantly higher levels of food, non-food and health expenditures compared to non-CCT households. The evaluation also found significantly positive impacts on the usage of primary health care services, such as a nine percentage point increase in the number of women who have four or more pre-natal visits. The share of assisted deliveries by professional medical personnel also increased, by five percentage points. However, there was no change in iron tablet consumption among pregnant women.

The evaluation also found that beneficiary households were more likely to complete their children's vaccinations, weighed their children more frequently and increased their usage of health services. There was, however, no significant change in children's vitamin A consumption. There is also evidence of spill-over effects that influence the health behavior of non-CCT households in the treatment area. The evaluation also found increased usage of health care facilities among beneficiaries' family members, such as the father. Those increases, however, were quite small.

Despite these changes in health behaviors, there is no evidence that they led to better long-term health outcomes. The World Bank report argues that malnutrition and child mortality rates were not expected to change within the short period of three years of the pilot project. Also, contrary to expectations, reports of infant diarrhea and fever among 0 to 3 years old among beneficiary households increased by 3 and 4 percentage points, respectively. The World Bank attributes this increase in these households's use of primary health care services, so that it mainly represents an increase in reporting, not an increase in the incidence of diarrhea and fever among young children.

5 Theoretical Framework

The proposed research will examine intra-household allocation of child health investment among siblings in the households. Within the context of the CCT program, this research will focus on within-household spillovers of the cash transfer. The basic theoretical set-up follows the work by Alderman and Gertler (1997) that examines health investment allocation between children of different gender. This research however will focus not only in gender, but also on other prior child characteristics (such as birth weight). The partial equilibrium model set-up follows Ferreira et al. (2009), who provide partial equilibrium analysis of a model of intra-household allocation of child educational investment due to CCT. The framework developed here borrows heavily from these two studies but differ in terms of focus (prior child characteristics instead of only gender, and health instead of education).

Consider a simple partial equilibrium model where all decisions regarding investments in children's health are made jointly by the child's parents. For simplicity, assume also that each household has only two children, and that the preferences of the two parents regarding the decisions on children health investments are identical. Assuming additively separable utility, the utility function of parents is defined as:

$$W(C_p, H_1, H_2) = U(C_p) + \beta[V(H_1) + V(H_2)] \tag{1}$$

where C_p denotes parents' consumption and $H_i (i = 1, 2)$ denotes the health outcomes (e.g. weight and height) of child i. Assume also that $U(.)$ and $V(.)$ are convex, i.e. $U' \geq 0, U'' \leq 0, U(0) = 0, \lim_{c \to 0} U'(C) = \infty$ and $\lim_{c \to \infty} = 0$; and similarly for V' and V''.

The child health production function is defined as:

$$H_i = \theta_i log(C_i) \;\; i = 1, 2 \tag{2}$$

where $0 \leq \theta_i \leq 1$ denotes child i's health productivity coefficient, which can be influenced by various factors (e.g. genetic endowment and birth weight) and C_i is child i's health-related consumption.

Parents are assumed to earn exogenous income Y and decide the amount of consumption (i.e. health investment) for each child. The budget constraint for parents is defined as:

$$C_p = Y - P_1C_1 - P_2C_2 \tag{3}$$

where P_1 and P_2 are the prices associated with each child's consumption of health goods and services. Initially, assume that $P_1 = P_2$.

Substitution of equations (2) and (3) into equation (1) gives the following optimization problem faced by parents:

$$\max_{C_1,C_2} W(C_1,C_2) = U(\underbrace{Y - P_1C_1 - P_2C_2}_{C_p}]) + \beta[V(\underbrace{\theta_1 log(C_1)}_{H_1} + \underbrace{\theta_2 log(C_2)}_{H_2})] \tag{4}$$

This optimization yields the following first order conditions:

$$\beta\frac{\theta_1}{C_1}\underbrace{V'(H_1)}_{\frac{\partial V(H_1)}{\partial H_1}} = P_1\underbrace{U'(C_p)}_{\frac{\partial U(Cp)}{\partial C_p}} \tag{5}$$

$$\beta\frac{\theta_2}{C_2}\underbrace{V'(H_2)}_{\frac{\partial V(H_2)}{\partial H_2}} = P_2U'(C_p) \tag{6}$$

The interpretation of these first order conditions is that parents will invest in their children's health until the marginal cost in terms of forgone parental consumption is equal to the marginal benefit to parents in terms of their children's health. This marginal benefit consists of the marginal product of each child's consumption on that child's health multiplied by the marginal utility derived from each unit of child health.

Combining these two first order conditions yields (assuming ($P_1 = P_2$):

$$\frac{\theta_1}{C_1}V'(H_1) = \frac{\theta_2}{C_2}U'(C_p) \tag{7}$$

or stated differently:

$$\frac{\theta_1}{e^{H_1/\theta_1}}V'(H_1) = \frac{\theta_2}{e^{H_2/\theta_2}}V'(H_2) \tag{8}$$

where $e^{H_i/\theta_i} = C_i$ follows from equation (2)

As the marginal utility for a unit of child health is decreasing in H, if $\theta_1 = \theta_2$,equation (8) implies that the optimal allocation is achieved when $H_1 = H_2$. If instead $\theta_1 > \theta_2$, the equilibrium will be satisfied only when $H_1 > H_2$, i.e. parents will invest more in the child with higher health productivity coefficient, θ (complete proof for these two results are in the Appendix A).

Suppose now that the price of health consumption for child 1 suddenly decreases, so that $P_1 < P_2$, which would occur if child 1 is eligible for the CCT and child 2 is not eligible. The comparative statics (the derivation in Appendix B) shows that the decrease in P_1 increase consumption of child 1, but decreases the consumption of parents and the other child.

If instead conditional behavior is not enforced, the cash transfer is akin to unconditional cash transfer. Thus the impact of cash transfer is similar to the impact of an expansion of income which will increase the consumption of all children.

6 Identification Strategy

Because the CCT program is a randomized control trial, the identification will be quite straightforward. The estimation equation is:

$$Y_{ihs} = \alpha_s + \beta_1 X_{hs} + \beta_2 V_s + \delta_1 P + \delta_2 B + \delta_3 PxB + \epsilon_{ihs} \tag{9}$$

where: Y_{ihs} = outcome variable (e.g. weight for age, malnutrition) for child i in household h in village s; X_{hs} = household h characteristics; V_s = village s characteristics; $B = 1$ if beneficiary child, 0 if otherwise; and $P = 1$ if beneficiary household, 0 if otherwise.

7 Results

Table (6) summarizes the household characteristics of children age 0–5 years old. The table shows these children come from large households with more than 2 children in a households. Only a very small percentage of the households have female household head. Almost all of household heads are employed, although a significant percentage of them works in farming sector. Comparing the treatment and control sub-districts, it can be seen that there is not much differences between the treatment and control sub-districts in both surveys. The households characteristics does not seem to change much either between the two period of surveys, except for a relatively noticeable change in food and non-food expenditure.

Table (7) summarizes children 0–5 years old health characteristics. The table shows that most children visited the integrated health posts more than twice in the baseline. The number of visits decline in 2009 in both treatment and control group which is surprising. Only a very small percentage of children who were reported by the medical staffs to be undernourished or have not completed vaccination. The change between baseline and follow-up survey is more noticeable in the percentage of children born with the help of professional medical attendants. We can see the disparity between treatment and control group to be more noticeable in 2009. Another differences between baseline and follow-up survey that can be noted are the consumption of Vitamin A and months of breastfeeding. There has been an increase in days of protein consumption, but the consumption of instant or processed food has also increased.

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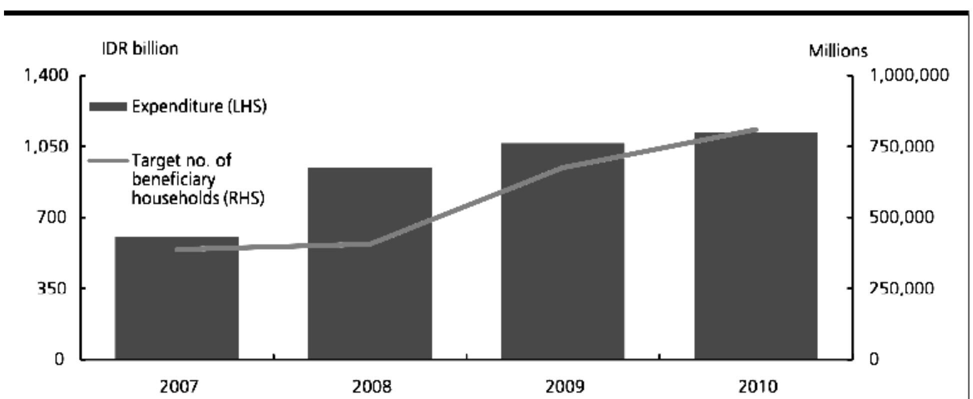
Table 1: *Calculation of Annual Cash Transfer Amounts (Rp/household)*

Support scenario	Amount of transfer per household per year (Rupiah)
Fixed cash transfer	200,000
Cash transfer for per household with	
a. Child age less than 6 years	800,000
b. Pregnant or lactating mother	800,000
c. Children of primary-school age	400,000
d. Children of secondary-school-age	800,000
Minimum transfer per household	600,000
Maximum transfer per household	2,200,000

Source: World Bank, 2011

Figure 1: *Expenditure and Coverage of Indonesian CCT Program, 2007 - 2010*



Source: World Bank, 2012

Table 2: *Evaluation Sample Size*

	Survey Baseline 2007			Survey Follow-up 2009			Survey Panel 2007-2009		
	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total
Sub-districts	180	180	360	180	180	360	180	180	360
Villages	1369	1354	2723	1369	1352	2721	1369	1352	2721
Households	7195	7131	14326	7196	7142	14338	7028	6948	13976
Individuals	36801	36762	73563	39880	39740	79620	36041	35934	71975
Conditionality Groups									
Children under 3 years	3076	3077	6153	4369	4335	8704	2814	2802	5616
Children age 6-15	9396	9550	18946	9429	9572	19001	7199	7099	14298
Married women (16-49)	7516	7471	14987	7485	7437	14922	6807	6795	13602
Health Service Providers									
Puskesmas	178	180	358	178	180	358	177	180	357
Midwife	702	705	1407	701	696	1397	464	458	922
Education Service Providers									
Junior high schools	507	507	1014	712	712	1424	348	346	694
Primary schools	N/A	N/A	N/A	526	522	1048	N/A	N/A	N/A

Source: World Bank, 2011

Table 3: *Baseline Survey Sample*

	Treatment	Control
Sub-districts	180	180
Villages	1369	1354
Households	7195	7131
Individuals	36801	36762
Children under 3 years	3081	3097
Children age 6-15	9455	9648
Married women age 16-49	6998	6972

Table 4: *PKH Program Implementation Status*

	Initial randomization in 2007		Implementation Status in 2009			
	Treatment	Control	Treatment 1	Treatment 2	Control 1	Control 2
Sub-district	180	180	174	6	141	39
Villages	1369	1352	1324	45	1064	288
Households	7068	7057	6831	237	5507	1550
Children age 0-5	2960	2966	2404	102	1963	541

Treatment 1 : Treatment sub-districts in 2007-2009

Treatment 2 : Delayed implementation

Control 1 : Control sub-districts in 2007-2009

Control 2 : Control sub-districts in 2007, treatment sub-districts in 2009

Table 5: *The World Bank's Evaluation Results*

	Outcomes	Results
WELFARE:		
Beneficiary households expenditure	Mean monthly per capita expenditure	10 percentage points increase
	Food expenditure	Increase
	Non-food expenditure	Increase
	Health expenditure	Increase
	Education expenditure	No change
Non-beneficiary households expenditure	Health expenditure	Increase
HEALTH BEHAVIORS:		
Pregnant women	Four pre-natal visits	9 percentage points increase
	Professionally assisted deliveries	5 percentage points increase
	Do 2 post-natal visits	10 percentage points increase
	Consumption of iron tablets	No change
Children aged 0 – 5 years old	Do monthly weighting	22 percentage points increase
	Completed immunization	3 percentage points increase
	Malnutrition rates	No change
	Child mortality rates	No change
	Vitamin A consumption	No change
	Reports of child illness (fever and diarrhea)	Increase (4 and 3 percentage points respectively)
Spillovers for other members of beneficiary households	Usage of public health facilities	0.5 percentage points increase
	Usage of private health facilities	0.2 percentage points increase
Spillovers for non-beneficiary households	Child weighting	7 percentage points increase
	Pre-natal visits	4 percentage points increase
DISAGGREGATED RESULTS		
Public services availability	Area with higher health services supply	Stronger positive impacts
Parental education	Mothers with formal education	More health behavior improvements
	Children with father who have no education	More likely to be weighted monthly
Relative income levels	Richer households	Larger positive impacts on health behavior
Gender analysis	Households with female head	Stronger positive health impacts
	Boys compared to girls	More likely to complete immunization

Source: World Bank, 2011

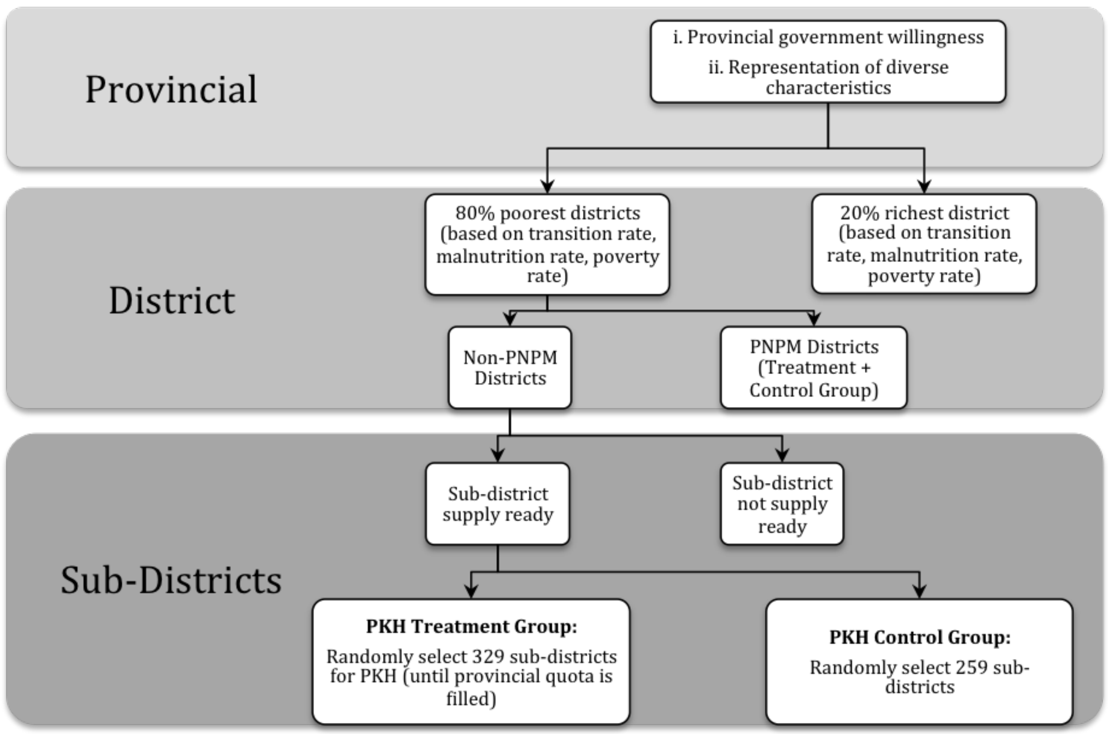
Table 6: *Household Characteristics*

	Baseline Survey 2007		Follow-up Survey 2009	
	Treatment Sub-districs	Control sub-districts	Treatment sub-districts	Control sub-districts
Household Characteristics				
Household size	5.80 (1.94)	5.80 (1.89)	6.18 (1.17)	6.20 (2.13)
Female housheold head (=1)	7.90%	7.19%	7.00%	6.24%
Household head age	41.07 (11.21)	40.75 (10.69)	42.6 (10.54)	42.22 (10.10)
Household head finished elementary school (=1)	49.14%	49.27%	45.78%	46.06%
Household head is employed (=1)	94.53%	94.80%	94.59%	94.26%
Farming household (=1)	68.00%	65.78%	63.68%	62.63%
Food expenditure (Rp/week)	154141.1 (80818)	160056.1(92239.23)	206421 (111554)	205621.2 (110390)
Non-food expenditure (Rp/annual)	2219596 (2267736)	2352651	3491170 (3149858)	3545656 (3294732)

Table 7: *Child Health Charasteristics*

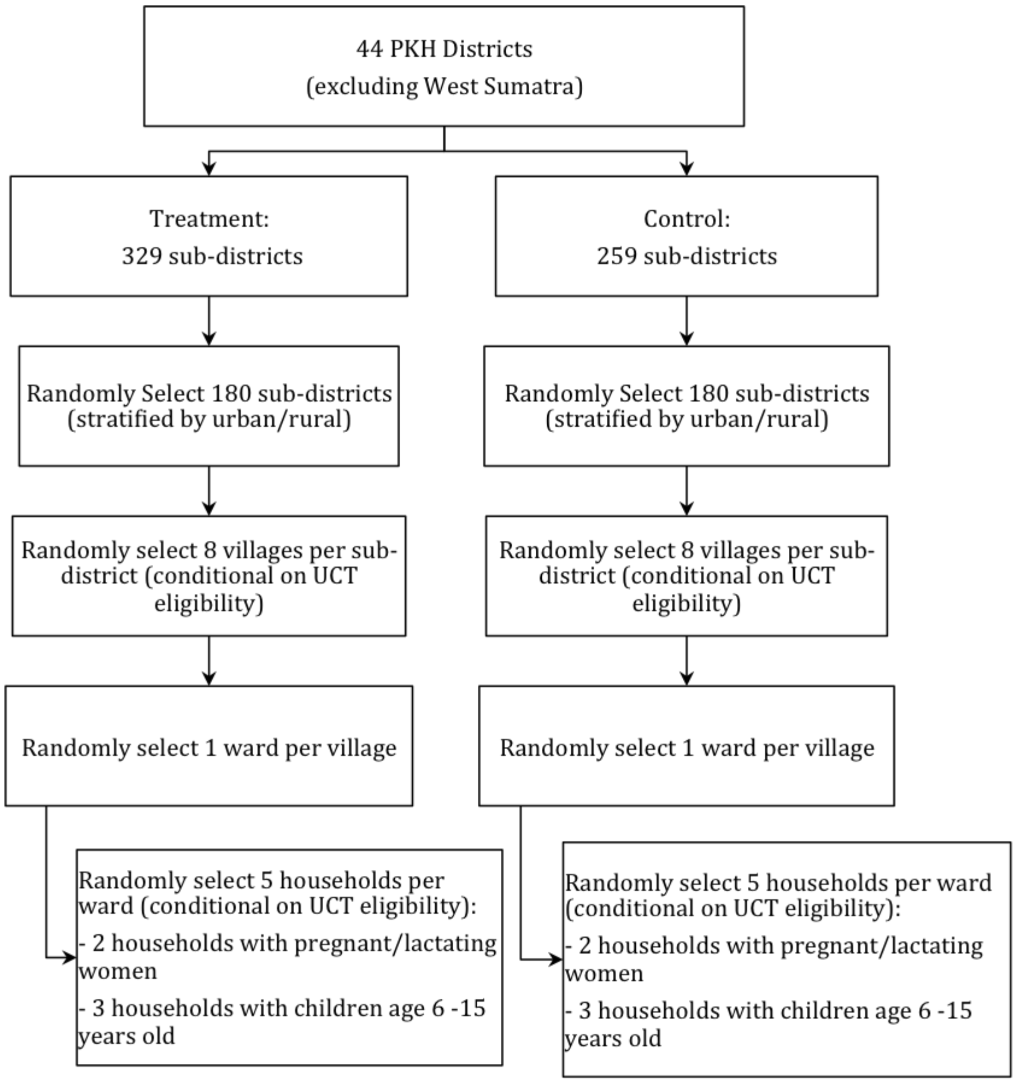
	Baseline survey 2007		Follow-up survey 2009	
	Treatment sub-districts	Control sub-districts	Treatment sub-districts	Control sub-districts
Child Health				
Number of visits to integrated health post in the last 3 months	2.18 (2.23)	2.10 (1.88)	2.07 (2.18)	1.65 (2.1))
Child is undernourished (=1)	2.35%	1.79%	1.56%	1.48%
Child has not completed vaccination (=1)	1%	0.81%	0.25%	0.78%
Weight in the 3rd weighing (kg)	8.45 (2.41)	8.42 (2.32)	12.3 (2.58)	12.08 (2.51)
Birth is helped by professional medical attendants (=1)	43.13%	44.55%	51.45%	45.44%
Child birth weight (gr)	3156 (571)	3187 (546)	3156 (571)	3187 (545)
Days child had diarrhea last month	0.96 (2.2)	0.98 (2.28)	0.59 (1.91)	0.511 (1.72)
Vitamin A consumption (frequency since birth)	1.68 (1.66)	1.74 (1.80)	3.68 (2.47)	3.51 (2.40)
Months of breastfeeding	27. 4 (20.92)	27.06 (20.20)	32.55 (30.25)	31.76 (29.69)
Total days consuming protein last week	3.33 (1.81)	3.48 (1.78)	3.51 (1.73)	3.57 (1.76)
Total days consuming carbohydrate last week	4.50 (1.60)	5.62 (1.56)	5.50 (1.60)	5.61 (1.56)
Total days consuming fibers last week	4.50 (1.82)	4.92 (1.87)	4.90 (1.82)	4.92 (1.87)
Total days consuming processed/instant food last week	4.30 (1.96)	4.55 (2.01)	4.80 (1.87)	4.82 (1.844)

Figure 2: *PKH selection and randomization procedure*



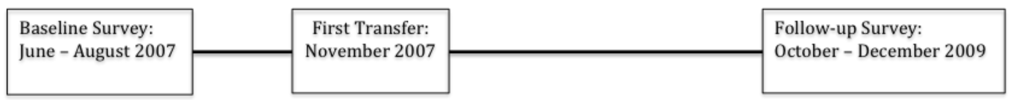
Source: World Bank, 2010

Figure 3: *Baseline Sample Selection for Pilot PKH*



Source: World Bank, 2012

Figure 4: *PKH Survey and Program Implementation Timeline*



Source: World Bank, 2011

Appendix A: Implications of the First Order Conditions

From the first order conditions (equation (8)):

$$\frac{\theta_1}{e^{H_1/\theta_1}} \frac{\partial V(H_1)}{\partial H_1} = \frac{\theta_2}{e^{H_2/\theta_2}} \frac{\partial V(H_2)}{\partial H_2} \tag{10}$$

Case 1: $\theta_1 = \theta_2$

Implications: when $\theta_1 = \theta_2$, the equilibrium is satisfied when $H_1 = H_2$.

Proof. Suppose $H_1 > H_2$. Then $\frac{\theta_1}{e^{H_1/\theta_1}} < \frac{\theta_2}{e^{H_2/\theta_2}}$ because $\theta_1 = \theta_2$; and $V'(H-1) < V'(H_2)$ because of the concavity of $V(H_i)$. Thus, we have $\frac{\theta_1}{e^{H_1/\theta_1}} V'(H_1) < \frac{\theta_2}{e^{H_2/\theta_2}} V'(H_2)$ which contradicts equation(10). $\square$

Case 2: $\theta_1 > \theta_2$

Implications: when $\theta_1 > \theta_2$, the equilibrium is satisfied when $H_1 > H_2$.

Proof. Suppose $H_1 = H_2$. Then $V'(H-1) = V'(H_2)$; and $\frac{\theta_1}{e^{H_1/\theta_1}} > \frac{\theta_2}{e^{H_2/\theta_2}}$ because $\theta_1 > \theta_2$. Thus, we have $\frac{\theta_1}{e^{H_1/\theta_1}} V'(H_1) > \frac{\theta_2}{e^{H_2/\theta_2}} V'(H_2)$ which contradicts equation (10).
If now suppose, $H_1 < H_2$. Then $V'(H_1) > V'(H_2)$ by concavity of $V(H)$; and similarly $\frac{\theta_1}{e^{H_1/\theta_1}} > \frac{\theta_2}{e^{H_2/\theta_2}}$ because $\theta_1 > \theta_2$. Thus, we have $\frac{\theta_1}{e^{H_1/\theta_1}} V'(H_1) > \frac{\theta_2}{e^{H_2/\theta_2}} V'(H_2)$ which contradicts equation (10). $\square$