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Impact Evaluation of Program Keluarga Harapan on Child Health, Labor & Intelligence in Indonesia

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Contents

Abstract

This study examines the impact of Indonesia's Program Keluarga Harapan (PKH), a conditional cash transfer initiative, on child health, intelligence, and labor. It is crucial for Indonesia that this program is successful as it navigates a demographic bonus wave which insists that Indonesia's productive age population is at an optimal ratio compared to the non-productive population. The outcomes are evaluated using data from the Indonesian Family Life Survey, we applied Coarsened Exact Matching and the Difference-in-Difference method for the evaluation. The findings indicate little to no effects on child labor, a negative on the child's health and a positive impact on the intelligence of the child. Also there are indications for heterogeneity in the effectiveness of the program mainly based on gender and age of the child. Thus, we conclude that the PKH program has varying effects on the evaluated outcomes. Since effects of the PKH program might show greater effects in later life, future research could establish different and bigger impacts by using larger datasets and extended time frames in the future.

Keywords: CCT, PKH, Health, Education, Intelligence, Labor, Child, CEM, DID, Indonesia

Chapter 1 Introduction

1.1 Background

Social safety nets have become one of the main strategies to protect poor and vulnerable people against times of economic crises. The implementation of these programs around the world has seen a significant increase. These programs are divided into conditional and unconditional cash transfers and have been adopted by over 130 developing countries as of 2015. The number of countries implementing conditional cash transfer (CCT) programs has risen from two in 1997 to 63 in 2015 (Honorati et al., 2015).

The main difference between conditional cash transfer programs (CCT) and unconditional cash transfer programs (UCT) is the conditionality aspect. In CCT programs individuals, families or households receive cash transfers contingent upon fulfilling various health, nutrition and educational requirements. In UCT programs, there are no conditions on how, when and where eligible individuals, families and households should spend their money and time in order to receive the cash transfer. The idea of households not having to do anything to receive cash transfer is hard to sell to the general public and in politics which led to the shift from implementing UCT programs to implementing mostly CCT programs.

Given their significance and widespread adoption, cash transfer programs are frequently evaluated. Various studies have reported positive results on the conditional aspects of CCT programs with positive effects on schooling, health and nutrition ((Lagarda et al., 2009), (Dewi et al. 2017), (Attanasio & Mesnard, 2006)). Still, methodological challenges in long-term evaluations often hinder obtaining significant estimates (Millán et al., 2019). While most studies concentrate on the conditionalities, this research explores broader objectives, such as long-term poverty reduction and improvements in education and enhancing health. For instance, increased educational attendance may not effectively alleviate poverty unless accompanied by improvements in cognitive abilities, which in turn leads to higher attained education and better employment opportunities (Handa & Davis, 2006).

In response to the rise in global oil prices in 2005, the Indonesian government introduced an Unconditional Cash Transfer (UCT) program as an alternative policy measure to mitigate the rising fuel costs (Khomaini, 2019). Although the UCT scheme was discontinued after nearly a year, a rise in domestic rice prices in January 2008 necessitated the reintroduction of the UCT program. Despite the effectiveness of UCT's in addressing social emergencies, their long-term sustainability is limited due to financial constraints (Khomaini, 2019). Consequently, the Program Keluarga Harapan (PKH) also known as the Family Hope program, a Conditional Cash Transfer (CCT) and poverty alleviation program, was

implemented by the Indonesian Ministry of Social Affairs in 2007 and is running in 13 provinces as of 2024.

When PKH was launched in 2007, the target were the extremely poor defined as those who were below 80 percent of the official poverty line at that time. As the program continued more people were included over time. The targeting for PKH was conducted by the Indonesian Statistics Agency (Badan Pusat Statistik – BPS). The BPS conducted a basic health and education survey to identify extremely poor households as well as education and health facilities (Nazara & Rahayu, 2013).

Previous studies on the impact of Conditional Cash Transfer (CCT) programs in Indonesia have predominantly focused on the immediate outcomes related to the Program Keluarga Harapan conditionalities. This study aims to explore the broader objectives of these conditionalities. Specifically, it examines the effects of CCT programs on children's intelligence, health levels, and labor participation. Furthermore, the research employs novel methodologies that have not yet been utilized in evaluating these outcomes within the Indonesian context.

The outcomes are evaluated using data from the Indonesian Family Life Survey's 4 and 5 from 2007 and 2014, respectively. The surveys were conducted by Rand corporation in cooperation with local research centers and is representative of around 83% of the total Indonesian population. The methodologies used are Coarsened Exact matching and for the intelligence outcome also the Difference-in-Difference method is used. The findings indicate little to no effects on child labor, a negative effect on child health and a positive effect on intelligence. Also there are indications for heterogeneity in the effectiveness of the program mainly based on gender and age of the child.

1.2 Research Question

This study evaluates the impact of the Program Keluarga Harapan on children's intelligence, health levels, and labor participation. The research question guiding this evaluation is:

"To what extent does the Program Keluarga Harapan effect the intelligence, health levels and labor participation of the child?"

Chapter 2 Literature review

Conditional Cash transfers are social safety nets with the goal of improving human capital by providing cash transfers on the condition of school attendance and regular health check-ups. Typically cash transfer are directed to mothers, who are expected to allocate resources for family and children's benefits (Handa & Davis, 2007). CCT programs have grown popular and are implemented in an increasingly amount of developing countries following the successes of Brazil's Bolsa Escola and Mexico's Progresa (which was renamed to Oportunidades in 2001). Institutions as the Inter American Development Bank and World Bank are supporting these projects due to their demonstrated effectiveness in developing human capital (Handa & Davis, 2007).

CCT programs generally are successful in accomplishing their goals, yet significant estimates are difficult to obtain due to the methodological challenges inherent in long-term evaluations (Millán et al., 2019). Additionally disregarding general equilibrium effects may lead to an underestimation of the distributional effects of these programs, a common issue in program evaluation (Debowicz & Golan, 2014). In their research on the Oportunidades program Debowicz & Golan (2014) demonstrate that a partial equilibrium analysis suggests extending the program would lead to a reduction in poverty of 1.8% while accounting for a general equilibrium effect increases this estimate to 2.7%. Their findings indicate that the Oportunidades program was successful in reducing child labor and increasing school attendance.

Lagarde et al. (2009) reviewed ten studies on the effects of CCT programs on health impacts. The programs had several requirements, most were conditional on health check-ups and school attendance for young children and some had an additional health education component for the parents. Gertler (2000), as cited in Lagarde et al. (2009), reported a rise of 2.09 daily outpatient visits to health facilities in regions where cash transfers were provided. In Nicaragua, a study observed a 19.5 percentage point increase in the proportion of children aged 0-3 years taken to health centers after one year of program implementation, and an 11 percentage point increase after two years (Malicuo, 2004, as cited in Lagarde et al., 2009). Additionally, children under the age of three enrolled in the Progresa program were 22% less likely to have been ill in the past month, with the benefits increasing the longer they were enrolled (Gertler, 2004).

Attanasio & Mesnard (2006) analysed Colombia's Familias en Accíon CCT program on household expenditures and its components. Findings using a difference-in-difference methodology show that the program increased total consumption, and mainly food consumption. The quality of food consumed also improved, contributing to better health outcomes. Additionally spendings on children's education

and clothing increased. Total household consumption increased with 15% compared to baseline and expenditures on protein rich foods increased with 22,000 Colombian pesos (€5,15) monthly.

Previous research on education primarily focused on attendance and educational attainment. Dewi et al. (2017) utilizing data from IFLS 4 in 2007 demonstrated that the school attendance level of participants in the PKH program increased. On the contrary analysis using IFLS 5 data from 2014 revealed no difference in attendance between the control and treatment groups. A prior study by Bappenas (2009) found average effects on education since attendance increased by 0.2 percentage points. The impact evaluation did not indicate significant differences in educational status between PKH and non-PKH areas, across all levels of the Indonesian nine-year compulsory education. One reason for this lack of difference is that enrolment and participation rates in Indonesian elementary schools are quite high, at more than 95%. For junior high, the enrolment rates are lower, thus the PKH program was expected to show a bigger impact. The fact that the evaluation from Bappenas (2009) did not show any differences suggests that there are some problems that need to be addressed in the PKH program. There are two main problems with the Program Keluarga Harapan (PKH). First, the payment schedule is delayed since whether the conditions are satisfied has to be verified, resulting in a lag before recipients receive the cash. Second, the amount of received cash transfer is insufficient, both of which contribute to the possibility of students being unable to enroll in junior high school.

This research examines the impact on intelligence, a crucial factor for long-term poverty reduction. Although intelligence is not directly linked to the conditions of the PKH program, as it also depends on school quality, the broader objectives of the conditionalities aim to enhance children's intelligence levels. Improved intelligence can enable children to secure better-paying employment opportunities in the future. Researching intelligence is also an addition to existing literature due to the limited data available where in intelligence is measured in combination with CCT data. The interviewers of the Indonesian Family Life Survey conducted a shortened version of the Raven's test which is an respected method to assess intelligence levels (Carpenter et al., 1990). This allows for an evaluation of the PKH program's effect on intelligence. The following hypothesis is used to test this outcome:

H_0: The PKH program does not change intelligence levels (1)

Bappenes (2009) reported average effects on various health indicators. *Posyandu* or health clinic visits increased by 3 percentage points, child growth monitoring by 5 percentage points, and immunization activities by 0.3 percentage points. The number of children weighed below 5 years of age in health facilities was 15-22 percentage points higher in PHK areas. These types of outcomes regarding CCT's have been researched extensively. Nevertheless, it is important to also evaluate outcomes that could indicate health conditions rather than whether the conditions of the program are fulfilled. This is a

broader objective of the program since beneficiaries attending check-ups but not actually improving their health does not satisfy the greater goal. The importance of increasing health levels lies in the fact that improved health results in fewer sick day. Being sick means that you won't be able to work as often and therefore missed chances to increase consumption and boosting the economy of the country. It is proven that an improvement of one-year in a population's life expectancy contributes to an increase of 4% in output (Bloom et al., 2001). Which partly justifies the expenditures on CCT programs with the goal of improving health. Outcomes that indicate health levels and that are not researched yet in other CCT papers are the lung capacity and hemoglobin (HB) levels of the child. Therefore in this study these outcomes will be evaluated and the IFLS data allows for this. In the IFLS data lung capacity is measured from age 9 and HB levels is measured from age 1 which is "the protein contained in red blood cells that is responsible for delivery of oxygen to the tissues" (Billet, 1990). These two measurements are used since HB levels can effect lung capacity and too low or too high HB levels could lead to: increasing and severe fatigue, shortness of breath, dizziness, heart palpitations, swollen feet, ringing in the ears and chest pain (Máxima Medisch Centrum, n.d.). The following hypothesis is used to test the effect if the PKH program on health outcomes:

H_0: The PKH program does not change health levels (2)

Previous research by Woo Lee and Hwang (2016) on the effects of the Program Keluarga Harapan (PKH) on child labor suggests that the subsidy amount and duration of participation in the Conditional Cash Transfer (CCT) program were insufficient for children to attend school, resulting in increased child labor. Woo Lee & Hwang (2016) utilized IFLS 4 data and other sources. This study re-evaluates these effects using IFLS 5 data, considering significantly increased government spending on PKH from 2007 to 2014 (Susastro, 2017) the effects might have changed. Evaluating child labor is crucial as it is closely related to the education and health outcomes. Child labor impacts education and health levels because it keeps the child from being at school and spending time on studying and engagement in physical jobs is detrimental to the health at that age (Wolff & Maliki, 2008) (Zabaleta, 2011). Susastro (2017) reported that the government expenditures on the PKH program rose from 508 million Rupiah in 2007 to 5.548 million Rupah in 2014, with the conditional cash transfer amount per person increasing by approximately 640%. Given that this amount has risen substantially the subsidy might have become a sufficient incentive for the kids to attend junior high school or higher and potentially reducing child labor. Hence this study investigates if this increase in cash transfer amount led to different results for the effects on child labor. The following hypothesis is used to test this outcome:

H_0: The PKH program does not change child labor participation (3)

CCT programs are also known to have heterogeneous effects depending on various aspects. Kabeer et al. (2012) evaluated various programs on heterogeneity and found that their impacts differ by age, gender, ethnicity and location. Older and male children were more likely to be working which made the programs more effective for them. The impact on enrolment in education is in general higher for girls since they are less likely to be enrolled in school at the start of the program. Son (2008) research confirmed this in evaluating the Progresa program which showed an increase in enrollment rates by 6 and 9 percentage points for boys and girls, respectively. Child labor participation decreased more by age and greater in rural area's due to the fact that opportunity costs of school is lower in those locations since wages are lower. The effects were also larger along the poorer children which could indicate that receiving higher cash transfers increases the effectiveness (Kabeer et al. 2012).

Therefore in this research heterogeneous treatments will be tested for all three outcomes health, education and child labor. Heterogeneous treatment effects refers to the idea that the effect of a treatment can vary across different subgroups of a population. So not everyone may respond to a treatment in the same way. This is tested by the living area, the total amount of cash transfer received, age and gender of the child. The four sub hypothesis are:

H_0: The PKH program has no different effects depending on living area (4)

H_0: The PKH program has no different if the total amount of cash transfer received is higher (5)

H_0: The PKH program does not have different effects by age (6)

H_0: The PKH program does not have different effects by gender (7)

Chapter 3 The Program Keluarga Harapan

The Program Keluarga Harapan (PKH), or Family Hope Program, is a conditional cash transfer (CCT) and poverty alleviation initiative launched by the Indonesian Ministry of Social Affairs in 2007. As of 2024, it operates across 13 provinces. The primary mission of PKH is to reduce poverty, a significant concern given that as of March 2016, 10.86% of the Indonesian population, or approximately 28.01 million people, were living in poverty (BPS, 2016, as cited in Kementerian Sosial Republik Indonesia, 2019).

The conditionalities for receiving PKH benefits include expectant mothers to attend prenatal check-ups, newborns and toddlers to attend post-natal care and health check-ups, and children aged 6 to 18 to attend nine-year compulsory education with a minimum of 85% attendance (Nazara & Rahayu, 2013; Japanese Ministry of Health, Labor and Wealth, n.d.). If all previous conditions are fulfilled the following cash transfers are received and the exact amount of those transfers are reported in Table 1.

Table 1: Cash transfer amount by eligibility

Transfer requirements	Cash transfer amount in Rp for period 2007-2012	Cash transfer amount in € for period 2007-2012	Cash transfer amount in RP for period 2013 and onward	Cash transfer amount in € for period 2013 and onward
Fixed cash transfer	200,000	15.73	300,000	23.60
Variable transfer for each beneficiary:				
a. Child up to 5 years old	800,000	62.92	1,000,000	78.65
b. Pregnant or lactating mother	800,000	62.92	1,000,000	78.65
c. Children of elementary school	400,000	31.46	500,000	31.46
d. Children of junior-high-school	800,000	62.92	1,000,000	78.65
Minimum transfer per year	600,000	47.19	800,000	62.92
Maximum transfer per year	2,200,000	173.04	2,800,000	220.23
Average transfer per family per year	1,390,000	109.33	1,800,000	141.51

Table 1 contains the cash transfer amounts per category in Indonesian Rupees and in euro's using the exchange rate as of 31-12-2012 which is 12713.97 Rp per €1.
Source: PKH Guidelines, n.d. as cited Nazara & Rahayu, 2013.

The very poor families should meet the requirement of (Dewi et al, 2017.):

1. Families with pregnant or toddler (under five years old).
2. Families with children aged 5-7 years (pre-school age).
3. Families with children who are in primary school or equivalent (age 7-12 years).
4. Families with children who are in secondary school or equivalent (age 12-15 years old).

5. Families with children aged 15-18 years but have not completed basic education, including children with disabilities.

Eligible families can receive PKH benefits for up to six years, provided they continue to meet the specified requirements.

The PKH program being successful is extremely important for Indonesia since they have entered their first demographic bonus wave from 2017-2019 and are currently in their second demographic bonus wave that is running from 2020-2030. This means that there productive age population (which are 14 years and older and not the elderly) reaches a maximal point compared to the non-productive population (which are the elderly and less than 14 year olds). There will be around a 5 to 2 ratio of productive vs non-productive population (Jati, 2015, as cited in Dewi et al, 2017). To make optimal use of this demographic bonus the productive age population should be able to work in quality jobs, allowing them to earn more and consume more which could boost the economy of Indonesia.

This research takes place in 2024 which means that Indonesia is already almost halfway of their second demographic bonus wave which could lead to the thought that it's already too late if the PKH turns out not to be effective in the evaluated outcomes. Even if the program's impact is suboptimal, adjustments can still be made post-2030, as the productive-age population is projected to remain significant, with an estimated 195 million people by 2040 (Secretariat of the Cabinet of the Republic of Indonesia). Furthermore, the findings from this research could inform other countries with similar demographics about effective program implementation strategies, thereby holding significant social relevance. International organizations such as the World Health Organization and the World Bank, along with investing countries like the Dutch government, could benefit from these insights on their poverty alleviation efforts.

Chapter 4 Data and Methodology

4.1 Data

The datasets that are used to evaluate the impact of the PKH program are the Indonesian Family Life Survey's 4 and 5 which originate from 2007 and 2014, respectively. These surveys are conducted by RAND corporation in cooperation with local research centers. This is a longitudinal survey in Indonesia which represents around 83% of the total population and it contains 30,000 individuals that live in 13 out of the 27 provinces in Indonesia.

This study examines three outcomes: health levels, child labor participation and intelligence levels. For health levels and child labor participation solely ILFS 5 is used and for intelligence levels both IFLS 4 and 5 are used. The reason why there is a difference between the two is due to the methods used to evaluate each outcome in combination with the given data in the two periods. The dataset can be accessed by everyone by registering on the IFLS website and it consists of multiple books which contains the data corresponding to the survey of each book. The specific books used in this research are book K, book 1, book 2, book 5, book US and book EK type 1. The datasets of these books were merged and corrected for missing data. For all outcomes the data was modified to assure the control and treatment group were similar.

Modifying the data is done by using the official poverty line of March 2014 which is Rp 302,375 per month per person (Aji, 2015). The poverty line at this time period is chosen since it is when the IFLS 5 survey was conducted so that it also corresponds to the reported income of the households in the survey. In the child labor & health levels dataset outliers were removed with regards to hours worked in labor. Since it contained an outlier with more hours worked than there are hours in a week. Also one observation which contained over 40 household members was deleted since it was too big of an outlier compared to the second highest of 25 which was more frequent. After the modification of both datasets there were 204 PKH participants in the intelligence dataset and 198 in the health & child labor dataset.

4.1.1 Dependent variables

The dependent variables, derived from several IFLS survey books, include indicators of health, child labor, and intelligence levels. Table 2 provides a detailed overview of each variable used in this study.

Table 2: Dependent variables description

Health indicators	
HB levels	Continuous variable that gives the HB levels as measured in BOOK US. Hemoglobin is "the

	protein contained in red blood cells that is responsible for delivery of oxygen to the tissues" (Billet, 1990).
Healthy HB levels	Contains value 1 if the HB levels are healthy and value 0 if HB levels are unhealthy
Lung capacity	Continuous variable where a higher capacity indicates higher health
Child Labor	
Hours of labor	Continuous variable that reports the hours worked by the child in the last week before the survey was conducted
Child Labor	Contains value 1 if child meets the child labor requirements and value 0 if the child does not meet these requirements
Intelligence	
Raven's test score IFLS 4	Continuous variable which represents the score on the Raven's test in IFLS 4 where a higher score indicates a higher level of intelligence
Raven's test score IFLS 5	Continuous variable which represents the score on the Raven's test in IFLS 5 where a higher score indicates a higher level of intelligence

Two indicators are used to measure health levels: hemoglobin (HB) levels and lung capacity. HB levels, recorded in BOOK US, are measured starting from the age of one. To assess the healthiness of HB levels, a dummy variable was created where a value of 1 indicates healthy HB levels (between 11 and 13) and 0 indicates unhealthy levels (Stöppler, 2024). Lung capacity is measured from the age of nine and is measured three times. The average of those is used as the indicator of lung capacity. A higher lung capacity indicates a higher level of health.

Child labor is assessed using a single indicator based on whether the child meets the criteria for child labor as defined by Statistics Indonesia & the International Labour Organization (2009). No distinction is made between household chores and other types of work. The information on the hours worked by the child in the week prior to the survey are taken from BOOK 5. The criteria for child labor are:

- For aged 5 - 12: working hours not permitted (not even 1 hour)
- For aged 13 – 14: working hours more than 15 hours

The child labor dummy variable takes the value 1 if the requirements for child labor are fulfilled and otherwise it takes the value 0.

The indicator that is used for intelligence is the Raven's test score in both IFLS 4 and IFLS 5. The Raven's test score is made by everyone that is between age 7 and 14 at the time of conducting the survey and by everyone that has previously made the Raven's test in an earlier survey. Hence, everyone that was between the age of 7 and 14 in IFLS 4 made it again in IFLS 5. The Raven's test consists of 17 questions and the percentage that is made correct is used as an indicator of intelligence in this research where a higher percentage indicates a higher level of intelligence.

Table 3: Descriptive statistics dependent variables IFLS 5 child health & child labor

Variable	Mean	Standard deviation	Min	Max	Median	Interquartile Range
HB levels	12.612	1.282	12.600	7.100	17.300	1.600
HB levels good	0.542	0.498	1	0	1	1
Lung capacity	235.921	65.194	230	53.333	610	83.333
Hours of labor in the last week	3.352	7.500	0	0	66	3
Child labor	0.292	0.455	0	0	1	1

Note. Descriptive statistics of the dependent variables in the modified IFLS 5 dataset for outcome variables child labor and child health.

Table 4: Descriptive statistics dependent variables IFLS 4 & 5 intelligence

Variable	Mean	Standard deviation	Min	Max	Median	Interquartile Range
Raven's test score IFLS 4	0.692	0.202	0	1	0.706	0.235
Raven's test score IFLS 5	0.672	0.246	0	1	0.765	0.235

Note. Descriptive statistics of the dependent variables in the modified IFLS 4 & 5 dataset for outcome variables intelligence.

4.1.2 Independent variables

This paper uses independent variables to capture basic household and personal characteristics like enrollment in the PKH program, gender, age, living area, income per household member, household members, province of living, highest education in the household and total amount of cash transfer received. Tables 5 and 6 detail the descriptive statistics of the sample of both the child health & labor sample and the intelligence sample.

Table 5: Descriptive statistics independent variables IFLS 5 child health & child labor

Variable	Mean	Standard deviation	Median	Min	Max	Interquartile range
PKH	0.075	0.263	0	0	1	0
Male	0.509	0.500	1	0	1	1
Age	11.451	1.717	11	8	14	3
Urban	0.473	0.499	0	0	1	1
Income per household member (in 100,000 RP)	15.149	11.823	14.444	0	36.250	21.667
Household members	7.267	3.446	6	1	25	4
Province	35.329	16.929	33	12	76	32
Kindergarten	0.058	0.234	0	0	1	0
Elementary	0.111	0.314	0	0	1	0
Junior high school	0.292	0.455	0	0	1	1
Senior high school	0.333	0.471	0	0	1	1
College or Uni	0.114	0.318	0	0	1	0
Education unknown	0.092	0.289	0	0	1	0
Total amount of cash received in RP	648,922.200 (€38.71)	438,592.500 (€26.18)	600,000 (€35.79)	20,000 (€1.19)	700,000 (€41.75)	500,000 (€29.82)

Note. Descriptive statistics of the independent variables in the modified IFLS 5 dataset for outcome variables child labor and child health. Also providing the equivalent amount of the total cash received in euro's, using the exchange rate as of 01-01-2014 which is 16764.9459 Indonesian Rp per €1.

Table 6: Descriptive statistics independent variables IFLS 5 intelligence

Variable	Mean	Standard deviation	Median	Min	Max	Interquartile range
PKH	0.046	0.209	0	0	1	0

Male	0.485	0.500	0	0	1	1
Age	12.714	4.326	12	7	25	7
Urban	0.559	0.497	1	0	1	1
Income per household member (in 100,000 RP)	14.620	11.790	14	0	36.15	22.13
Household members	7.577	3.819	7	1	25	5
Province	34.552	15.706	33	12	76	5
Kindergarten	0.043	0.203	0	0	1	0
Elementary	0.066	0.247	0	0	1	0
Junior high school	0.222	0.416	0	0	1	0
Senior high school	0.367	0.482	0	0	1	1
College or Uni	0.192	0.394	0	0	1	0
Education unknown	0.110	0.313	0	0	1	0
Total amount of cash received in RP	617279 (€36.82)	444535.4 (€26.52)	450000 (€26.84)	40000 (€2.39)	700000 (€41.75)	400000 (€23.86)

Note. Descriptive statistics of the independent variables in the modified IFLS 4 & 5 dataset for outcome variables intelligence. Also providing the equivalent amount of the total cash received in euro's, using the exchange rate as of 01-01-2014 which is 16764.9459 Indonesian Rp per €1.

4.1.2.1 PKH

This is a binomial variable that indicates whether the individual's household is a recipient of the PKH program or not. PKH contains the value 1 if they are a recipient (treatment group) and 0 if they are a non-recipient (control group). Out of 2,651 respondents in the health & child labor dataset 7.5% were enrolled in the PKH program. Out of 3,360 respondents in the intelligence dataset 4.6% were enrolled in the PKH program.

4.1.2.2 Male

This is a binomial variable that indicates the gender of the individual. It contains value 1 if the individual is a male and 0 if the individual is a female. Out of 2,651 respondents in the health & child labor dataset 1,349 were male. Out of 3,360 respondents in the intelligence dataset 1,629 were male.

4.1.2.3 Age

This is a continuous variable that indicates the age of the individual. The mean age in the health & child labor dataset is 11.45 years old and the age ranges between 8 and 14 years old. The mean age in the intelligence dataset is 12.71 years old and the age ranges between 7 and 25 years old.

4.1.2.4 Urban

This is a binomial variable that indicates whether the individual lives in a rural or urban household. It contains value 1 if the household is located in an urban area and value 0 if the household is located in a rural area. In the health & child labor dataset 47.3% of the households were located in an urban area. In the intelligence dataset 55.9% of the households were located in an urban area.

4.1.2.5 Income per household member

This is a continuous variable that indicates the income per household member in 100,000 Indonesian Rp. It is computed by dividing the total household income by the total amount of household members. The mean income per household member in the health & child labor dataset is 1,514,900 Indonesian Rp. The mean income per household member in the intelligence dataset is 1,462,000 Indonesian Rp.

4.1.2.6 Household members

This is a continuous variables that indicates the total amount of members in the household. The average amount of members per household in the health & child labor dataset is 7.249 with the highest amount of household members being 25. The average amount of members per household in the intelligence dataset is 7.577 with the highest amount of household members being 25.

4.1.2.7 Province

This is a categorical variable that indicates in which province a household is located. The IFLS survey assigned several numbers to the province so it cannot be interpretated in this context. Nevertheless, in the balance test it can be interpretated.

4.1.2.8 Highest education in the household

This is a categorical variable that indicates the highest level of education that is obtained within the household. For the dataset of health & child labor the proportion per education level are as follows. In 5.8% of the households kindergarten was the highest obtained education level. In 11.1% elementary was the highest obtained education level. In 29.2% households junior high school was the highest obtained education level. In 33.3% households senior high school was the highest obtained education level. In 11.4% college or university was the highest obtained education level. In 9.2% the highest obtained education level was unknown.

For the dataset of intelligence the proportion per education level are as follows. In 4.3% of the households kindergarten was the highest obtained education level. In 6.6% elementary was the highest obtained education level. In 22.2% households junior high school was the highest obtained education level. In 36.7% households senior high school was the highest obtained education level. In 19.2% college or university was the highest obtained education level. In 11% the highest obtained education level was unknown.

4.1.2.9 Total amount of cash transfer received

This is a continuous variable that indicates the total amount of cash transfer a household received during their enrollment in the PKH program. The mean amount received in the health & child labor dataset is 648,922.200 Indonesian Rp. The mean amount received in the intelligence dataset is 617,279 Indonesian Rp.

4.2 Methodology

The empirical model that is used to investigate child health, labor and intelligence is widely found in the literature. Pavão (2016) used Coarsened Exact Matching (CEM) to evaluate the effects of CCT programs on political attitudes. Coarsened Exact Matching eliminates significant differences between beneficiaries and non-beneficiaries of CCT programs (Blackwell et al., 2009). The algorithm of matching identifies two groups of the IFLS survey who have the same values across all covariates with their sole difference being a PKH participant or being a PKH non-participant. Essentially matching tries to find the perfect clone for every treated. CEM aims to approximate the condition as if participation in the PKH program were randomly assigned, it cannot address potential bias caused by unobserved confounders. With the available data it seems like the best method in reducing the bias caused by the observed variables. Finding sufficient matches works because of the way the PKH program is distributed. Village heads distribute the cash directly to poor households causing possible misallocation due to errors in the reporting of household conditions which could lead to eligible households not receiving the PKH program. Therefore there could be highly comparable households between the treatment and control groups.

In this research the three steps Pavão (2016) used in his analysis are utilized. Firstly CEM generates the weight to balance the data. Secondly the balance of the data is examined and lastly a weighted regression model is ran to estimate the effects on child health, labor and intelligence of the PKH program. The variables that are used for matching are: gender, age, household income, household members, highest obtained education level in the household, living area, province of living. These are sufficient to find quality matches while minimizing the risk of overfitting. To asses the robustness of our findings under varying matching requirements a sensitivity analysis will be conducted. The matching requirements for the sensitivity analysis are less strict which allows for more matches with the consequence of possible increased differences between the control and treatment groups.

After the matching process the difference-in-difference (DID) method is implemented when evaluating the intelligence outcomes. DID has been used by Edo et al. (2017) in evaluating the impact on secondary school attendance by a CCT program. In which they compared the probability of attending

secondary school of the treatment and control groups, before and after the inception of the program. In this research the score at the Raven's test in IFLS 4 when the PKH program was not active yet and in IFLS 5 when the PKH program was active are compared. One year after IFLS 4 was conducted, the PKH program launched which allows a before and after comparison since everyone that made the Raven's test in IFLS 4 remade it in IFLS 5. The identification assumptions of difference-in-difference is that the change in intelligence of the treatment and control group would have evolved similarly in the absence of the program and that there was no other contemporaneous event to the implementation of the PKH program that could have caused differences in evolution of intelligence between the treatment and control group. This assumption is likely to be fulfilled since both the individuals in the control and treatment group are living in poverty and the matching procedure creates matches that are similar. Therefore it is likely that their intelligence would have evolved similar over time in absence of the PKH program.

To ensure robust and reliable statistical inference when dealing with grouped data which can arise due to matching on certain characteristics we utilize clustered standard errors. As mentioned in Abadie et al. (2023) "clustered standard errors adjust for the correlations induced by sampling the outcome variable from a data-generating process with unobserved cluster-level components". Therefore it will be clustered at the group level of being a beneficiary of the PKH program or non-beneficiary. This approach provides more accurate estimates of standard errors, leading to more reliable confidence intervals and hypothesis tests.

The confidence level that is used to evaluate the causality of the models is at the 95% level. The model equation for each outcome in this study is as follows:

$$HB\ Healthy_i = \beta_0 + \beta_1 * PKH_i + \beta_2 * Male_i + \beta_3 * Age_i + \beta_4 * Urban_i + \beta_5 * Income\ per\ household\ member_i + \beta_6 * Household\ members_i + \beta_7 * Province_i + \beta_8 * Highest\ education\ level_i + \beta_9 * Interaction_{ix} + \varepsilon_i \quad (1)$$

$$Lung\ Capacity_i = \beta_0 + \beta_1 * PKH_i + \beta_2 * Male_i + \beta_3 * Age_i + \beta_4 * Urban_i + \beta_5 * Income\ per\ household\ member_i + \beta_6 * Household\ members_i + \beta_7 * Province_i + \beta_8 * Highest\ education\ level_i + \beta_9 * Interaction_{ix} + \varepsilon_i \quad (2)$$

$$Child\ Labor_i = \beta_0 + \beta_1 * PKH_i + \beta_2 * Male_i + \beta_3 * Age_i + \beta_4 * Urban_i + \beta_5 * Income\ per\ household\ member_i + \beta_6 * Household\ members_i + \beta_7 * Province_i + \beta_8 * Highest\ education\ level_i + \beta_9 * Interaction_{ix} + \varepsilon_i \quad (3)$$

$$Raven's\ test\ score_i = \beta_0 + \beta_1 * PKH_i + \beta_2 * Period_i + \beta_3 * Treatment_i + \beta_4 * Male_i + \beta_5 * Age_i + \beta_6 * Urban_i + \beta_7 * Income\ per\ household\ member_i + \beta_8 * Household\ members_i + \beta_9 * Province_i + \beta_{10} * Highest\ education\ level_i + \beta_{11} * Interaction_{ix} + \varepsilon_i \quad (4)$$

Where:

PKH : respondents participation status in the PKH program

Male : respondents gender status

Age : respondents age

Urban : respondents living location (Urban or Rural)

Income per household member : Respondents household average income per member

Household members : respondents household members

Province : respondents province of living

Highest education level : respondents household highest level of education

Interaction : interaction term between the PKH program and age, gender, urban and total cash transfer received

Period : period in which the Raven's test is made

Treatment : respondents indicator whether they are in the PKH program in combination with the period they made the Raven's test

ε : error term

Chapter 5 Analysis and Results

5.1.1 Child health & Child labor matching

The coarsened exact matching for the child labor and child health outcomes relies on the following variables to balance the data: gender, age, area, income per household member, amount of household members, province and the education level of the household. This technique turns out to be successful in balancing the data since there are no significant differences between PKH participants and non-participants due to the generated weights that are implemented in the hierarchical models presented here. The relevant balance tests can be seen in Table 1. Before balancing there were significant differences in gender, age and highest education level in the household. After matching these significant differences were eliminated which assures balance between the control and treatment group. The matching led to 367 matches which are enough to find relevant effects. For the sensitivity analysis the balance test can be found in the appendix in which Table A1 shows that significant differences in age and household members remained between the control and treatment groups.

Table 7: Balance test child labor and child health outcomes

	Before matching			After matching		
Covariates	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference
Male	0.515	0.434	0.081**	0.405	0.405	0
Age	11.467	11.247	0.220*	11.600	11.345	-0.255
Urban	0.477	0.434	0.042	0.388	0.388	-0.000
Income per household member (In 100,000 RP)	15.146	15.186	-0.040	16.031	15.440	-0.591
Household members	7.239	7.621	-0.382	6.526	6.526	0.000
Province	35.300	35.692	-0.392	37.793	37.793	-0.000
Education level	3.086	2.722	0.364***	3.121	3.121	0
Observations	2,453	198		251	116	

*Note. *** p<.01, ** p<.05, * p<.1*

5.1.2 Child health & Child labor regressions

Table 8: CEM regression on health & child labor outcomes

Variable	HB Healthy (1)	HB Healthy (2)	Lung capacity (3)	Lung capacity (4)	Child labor (5)	Child labor (6)
PKH	-0.043***	-0.046**	-17.480***	-12.991**	-0.020***	-0.030
	(0.000)	(0.002)	(0.000)	(0.372)	(0.000)	(0.007)
Male		-0.068		19.238*		-0.105
		(0.018)		(2.564)		(0.033)
Age		-0.015**		16.948*		-0.040
		(0.000)		(1.912)		(0.019)
Urban		-0.016		7.817		-0.088
		(0.011)		(1.363)		(0.088)
Income per household member		0.002		0.292		-0.001
		(0.003)		(0.194)		(0.003)
Education level		-0.010		-4.280		0.033*
		(0.009)		(2.355)		(0.005)
Household members		0.014		-1.270		-0.016
		(0.006)		(2.129)		(0.003)
Province		0.000		0.005		-0.002
		(0.002)		(0.070)		(0.002)
Constant	0.586***	0.686**	239.359***	48.743	0.278***	0.920
	(0.000)	(0.030)	(0.000)	(21.420)	(0.000)	(0.297)
Observations	367	367	367	367	367	367

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

To recap, hypothesis 2 stated that the PKH program does not change health levels which is measured based on HB levels and lung capacity. Models 1 and 2 indicate that participation in the Program Keluarga Harapan has a small significant negative effect on HB levels in both the simplified model and in the model with the covariates. Which shows that there is a significant effect on being in the healthy range of HB levels due to being in the PKH program. The control variables apart from age seem to have no significant effect on being in the healthy range of HB levels. Both models suggest that participants and non-participants significantly differ in whether their HB levels are healthy or not. Therefore, both models offer evidence of HB levels being affected by participation in the PKH program.

Since PKH participants and non-participants statistically differ in being in the healthy range of HB levels there might be a significant difference in their lung capacities as well. In model 3 and 4 the coefficient of participation in the Program Keluarga Harapan is significantly negative at the 95% confidence level in both the simplified model and in the model with control variables. Which shows that participants in

the PKH program have significantly lower lung capacity compared to non-participants. That a significant negative effect is established on lung capacity is not unexpected since too low or too high HB levels can effect lung capacity (Máxima Medisch Centrum, n.d.).

Models 5 and 6 test hypothesis 3 which stated that the PKH program does not change child labor participation. The coefficient of participation in the Program Keluarga Harapan is small but significantly negative in the simplified model. Controlling for other variables the coefficient remains small and negative but turns insignificant. Which shows that there is probably no significant effect on being enrolled in child labor due to being in the PKH program. The control variables apart from the highest education level in the household all seem to have no significant effect on being enrolled in child labor. A higher highest education level in the household seems to significantly increase the chance of being enrolled in child labor which is surprising since a higher education level is in general correlated with having a higher wage making it less necessary for the child to work. The model with the covariates offers no evidence of child labor being affected by participation in the PKH program.

Table 9: Regression on heterogeneous treatment effect of living area

Variable	HB Healthy (7)	Lung capacity (8)	Child labor (9)
PKH	-0.025	-15.168***	0.026
	(0.006)	(0.006)	(0.012)
PKH*Urban	-0.053	5.604	-0.146*
	(0.112)	(0.983)	(0.013)
Male	-0.068	19.249*	-0.105**
	(0.019)	(2.573)	(0.033)
Age	-0.015**	16.955*	-0.040***
	(0.000)	(1.911)	(0.019)
Urban	0.001	6.074*	-0.043
	(0.008)	(0.749)	(0.021)
Income per household	0.003	0.282	-0.001
member	(0.003)	(0.190)	(0.004)
Education level	-0.010	-4.270	0.033
	(0.009)	(2.364)	(0.005)
Household members	0.014	-1.267	-0.017
	(0.006)	(2.135)	(0.003)
Province	0.000	0.006	-0.002
	(0.002)	(0.071)	(0.002)
Constant	0.680**	49.402	0.903
	(0.037)	(22.249)	(0.323)

Observations	367	367	367

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Models 7, 8 and 9 contain interaction terms for the area of living that allows to test hypothesis 4 that stated that the effects of the PKH program are not different for children living an urban area. In line to what these hypothesis states, the PKH program does not have a stronger effect on children living in an urban area for the outcomes of HB levels being healthy and the lung capacity. However, living in an urban area and being enrolled in the PKH does significantly reduce the chance of engagement in child labor. More specifically, the interaction term was not significant the models 7 and 8, which suggests that-controlling for gender, age, living area, income per household member, highest education level in the household, household members, and province-living in an urban area will not lead to different outcomes with regards to healthy HB levels and lung capacity, but it does lead to difference effects on participation in child labor.

Table 10: Regression on heterogeneous treatment effect of total amount of cash transfer received

Variable	HB Healthy (10)	Lung capacity (11)	Child labor (12)
PKH	-0.053**	-9.950*	-0.064***
	(0.004)	(0.885)	(0.001)
PKH*Total amount	0.000	-0.000	0.000
received	(0.000)	(0.000)	(0.000)
Male	-0.068	19.390*	-0.106
	(0.019)	(2.740)	(0.030)
Age	-0.015**	17.003*	-0.040
	(0.001)	(1.861)	(0.018)
Urban	-0.016	7.973	-0.090
	(0.012)	(1.560)	(0.091)
Income per household	0.002	0.289	-0.001
member	(0.003)	(0.194)	(0.003)
Education level	-0.011	-4.094	0.031
	(0.009)	(2.569)	(0.008)
Household members	0.014	-1.183	-0.017
	(0.006)	(2.027)	(0.004)
Province	0.000	-0.008	-0.002
	(0.002)	(0.054)	(0.002)
Constant	0.689**	47.373	0.936
	(0.025)	(19.941)	(0.276)

Observations	367	367	367

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Models 10, 11 and 12 contain interaction terms for the total amount of cash transfer received by the household that allows to test hypothesis 5 that stated that the effects of the PKH program are not different for children from who the household received more cash. The interaction term was not significant in model 10, 11 and 12, which suggests that-controlling for gender, age, living area, income per household member, highest education level in the household, household members, and province-living in a household that received a higher total amount of cash transfer does not lead to different outcomes with regards to healthy HB levels, lung capacity and engagement in child labor. Interestingly enough in model 12 the coefficient of the PKH program turned significant at the 99% confidence level which was not the case in the basic model controlling for covariates. This might give an indication that there is indeed a correlation between the effect of the PKH program and the total amount of cash received with regards to engagement in child labor. This is expected based on the research from Woo Lee & Hwang (2016). They showed that a too low received CCT subsidy led children to engage in child labor over attending school. It would be expected that a higher cash transfer gives a higher incentive to attend school over working.

Table 11: Regression on heterogeneous treatment effect of age

Variable	HB Healthy(13)	Lung capacity (14)	Child labor (15)
PKH	-0.103	47.978*	-0.384**
	(0.018)	(5.796)	(0.012)
PKH*Age	0.005	-5.335*	0.031**
	(0.001)	(0.488)	(0.001)
Male	-0.068	19.298*	-0.105
	(0.018)	(2.588)	(0.033)
Age	-0.017	18.634**	-0.050*
	(0.003)	(0.571)	(0.006)
Urban	-0.016	7.587	-0.087
	(0.011)	(1.201)	(0.087)
Income per household	0.002	0.295	-0.001
member	(0.003)	(0.196)	(0.003)
Education level	-0.011	-3.745	0.030
	(0.009)	(2.790)	(0.007)
Household members	0.014	-1.312	-0.016
	(0.006)	(2.161)	(0.003)

Province	0.000	0.008	-0.002
	(0.002)	(0.073)	(0.002)
Constant	0.706***	27.089	1.046*
	(0.002)	(8.612)	(0.138)
Observations	367	367	367

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Models 13, 14 and 15 contain interaction terms for the age of the child that allows to test hypothesis 6 that states that the effects of the PKH program are not different by age. In line with what these hypothesis stated, the models suggested no age-related differences in PKH program effects on having healthy HB levels and lung capacity, but there is a significant positive effect on child labor. More specifically, the interaction term was significant in model 14 at the 90% confidence level and in model 15 at the 95% confidence level, which suggests that-controlling for gender, age, living area, income per household member, highest education level in the household, household members, and province-being a PKH participant at different ages will lead to different outcomes with regards to participation in child labor and that there is a strong indication that there also might be a negative effect by age on lung capacity. For lung capacity it is logical that the age variable has a significant positive effect on lung capacity. This is due to the fact that the children grow with age so also their lungs are still in a growth process hence their lung capacity increases with age. Therefore, it is consistent with physiological growth.

Table 12: Regression on heterogeneous treatment effect of gender

Variable	HB Healthy (16)	Lung capacity (17)	Child labor (18)
PKH	-0.029*	-17.466***	-0.055*
	(0.003)	(0.211)	(0.008)
PKH*male	-0.041*	11.049**	0.061**
	(0.003)	(0.397)	(0.002)
Male	-0.055**	15.760*	-0.124**
	(0.002)	(2.135)	(0.007)
Age	-0.015**	16.965*	-0.039
	(0.000)	(1.903)	(0.019)
Urban	-0.016	7.825	-0.088
	(0.011)	(1.379)	(0.088)
Income per household	0.003	0.286	-0.001
member	(0.003)	(0.191)	(0.003)
Education level	-0.010	-4.272	0.033*

	(0.009)	(2.361)	(0.005)
Household members	0.014	-1.269	-0.016
	(0.006)	(2.134)	(0.003)
Province	0.000	0.005	-0.002
	(0.002)	(0.070)	(0.002)
Constant	0.681**	49.990	0.927
	(0.037)	(23.243)	(0.288)
Observations	367	367	367

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Models 16, 17 and 18 contain interaction terms for the gender of the child that allows to test hypothesis 7 that stated that the effects of the PKH program do not differ by gender. In contrast to what these hypothesis states, the PKH program does have a different effect by gender. More specifically, the interaction term was significant at the 90% confidence level in model 16 and at the 95% confidence level in model 17 and 18, which suggests that-controlling for gender, age, living area, income per household member, highest education level in the household, household members, and province-being male will lead to increased lung capacity and participation in child labor. For healthy HB levels there is a strong indication that is negatively impacted by being male.

Overall, using the Coarsened Exact Matching method showed significant effect of enrollment in the PKH program was found with regards to having healthy HB levels and lung capacity. Being enrolled in the PKH program does not seem to have a big significant negative effect on child labor. However, there is a strong indication that there is a correlation since in some models it was significant and others it was not significant. Testing for heterogeneous treatment effects did not show any differences based on total amount of cash transfer received. There was heterogeneity on child labor by age and gender and on lung capacity by gender. There are strong indication for heterogeneity given the significancy at the 90% confidence level on child labor by living area, on lung capacity by age and on healthy HB levels by gender.

5.1.2.1 Sensitivity analysis child health & child labor

Despite the variations in matching requirements, the core results remained broadly consistent. Yet, when examining heterogeneity more changes in significancy were observed. The effects of the program varied significantly by living area and the total amount received, particularly in terms of having healthy HB levels and lung capacity. Age significantly influenced lung capacity outcomes, while gender differences were significant for having healthy HB levels. This suggests that our primary findings are robust and not overly dependent on the specific matching criteria used.

While the overall trends were consistent there were some variations in the results. In the core result the effect on having healthy HB levels of being a beneficiary turned positive and significant in the basic model; however, after adding control variables it turned insignificant again. In terms of heterogeneity living in an urban area had a positive effect on child labor with these matching requirements. The total amount received turned into a positive effect on lung capacity. Being male turned into a negative effect on lung capacity, but when combining the effect of the PKH program with the interaction effect the same net effect was found. Being male turned into a insignificant and negative effect on child labor.

In the main results the effect on having healthy HB levels of being a program beneficiary turned positive and significant in the basic model but became insignificant after adding control variables. Living in an urban area showed a positive effect on child labor while the total amount received by beneficiaries positively affected lung capacity. Being male negatively impacted lung capacity although when considering the interaction effect with the PKH program, the net effect remained similar. Gender also showed an insignificant and negative effect on child labor. These variations are important to note as they indicate that the results can fluctuate depending on the stringency of the matching criteria, particularly in terms of heterogeneity.

5.2.1 Child intelligence matching

The coarsened exact matching for the intelligence outcome relies on the following variables to balance the data: gender, age, area, income per household member, amount of household members, province and the education level of the household. This technique turns out to be successful in balancing the data since there are no significant differences between PKH participants and non-participants and generated weights that are implemented in the hierarchical models presented here. The relevant balance tests can be seen in Table 7. Before balancing there were significant differences in age, urban income per household member and highest education level in the household. After matching there was still a significant difference for age and for the other variables there was no difference anymore. Due to the fact that there is a still difference in age balance cannot be assured. The age of PKH participants is on average 0.858 years younger and in model 1 and in model 20 it is shown that age does not have a significant effect on the Raven's test score. The matching led to 726 matches which is sufficient to evaluate the effects of enrollment in the PKH program. For the sensitivity analysis the balance test can be found in the appendix in which Table A7 shows that significant differences in age and household members remained between the control and treatment groups.

Table 13: Balance test intelligence outcomes

	Before matching			After matching		
Covariates	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference
Male	0.487	0.444	0.042	0.402	0.402	-0.000
Age	12.753	11.895	0.858***	12.537	11.598	-0.939***
Urban	0.562	0.503	0.058**	0.480	0.480	0.000
Income per household member (In 100,000 RP)	14.538	16.353	-1.815***	15.098	15.832	0.734
Household members	7.570	7.706	-0.136	7.284	7.284	0.000
Province	34.494	35.765	-1.271	36.284	36.284	0.000
Education level	3.288	2.837	0.452***	3.196	3.196	0.000
Observations	6,414	306		522	204	

*Note. *** p<.01, ** p<.05, * p<.1*

5.2.2 Child intelligence regressions

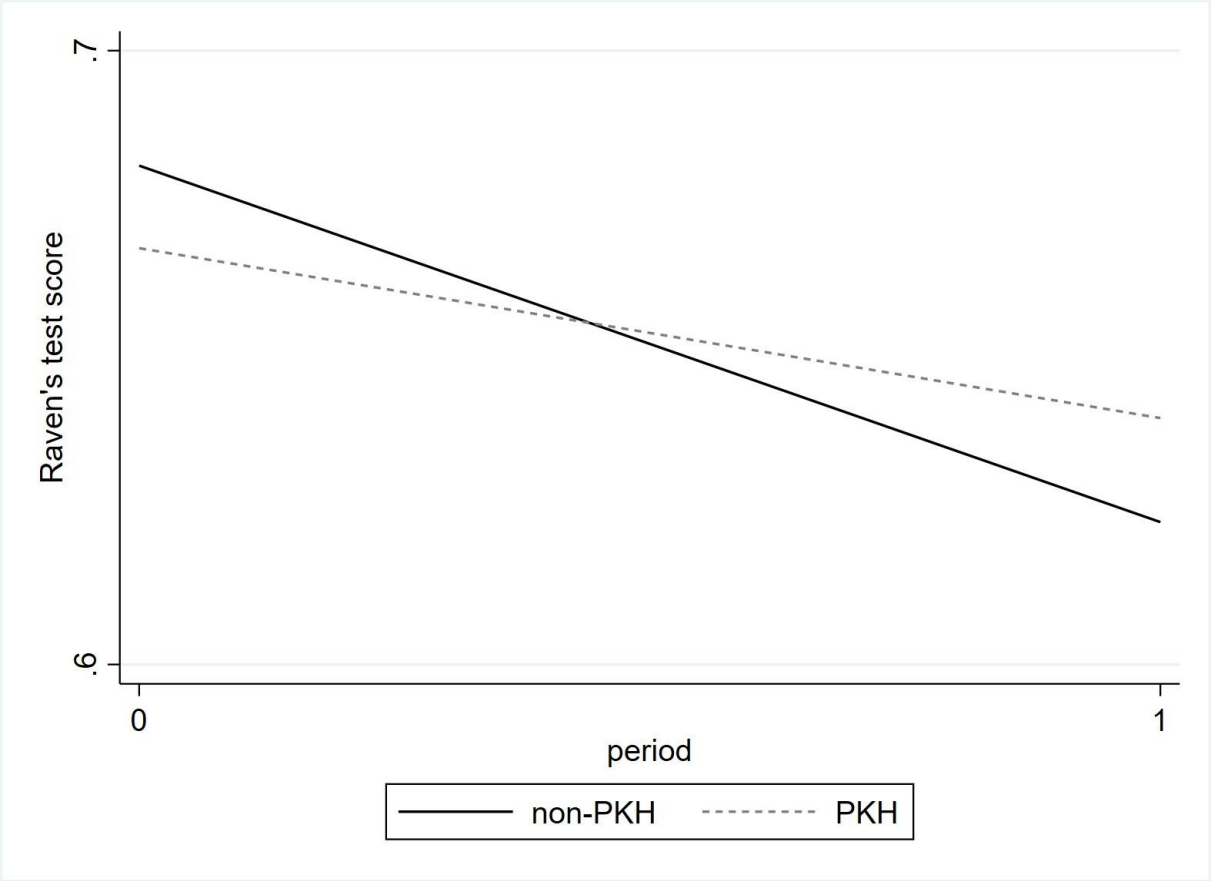

Figure 1: Difference in Difference Raven's test score between PKH participants and PKH non-participants.

The difference-in-difference figure which can be observed in Figure 1 gives the impression that being in the PKH program has a positive effect on the score achieved in the Raven's test relative to not being enrolled in the PKH program. In period 0 PKH participants had an average score of 66.78% and PKH non-participants had an average score of 68.13%. In period 1 PKH participants had an average score of 64.01% and PKH non-participants had an average score of 62.32%. The score of PKH participants decreased by 4.15% and the score of PKH non-participants decreased by 8.53%. Which gives an indication that being in the PKH program is beneficial compared to not being in the program in terms of intelligence level.

Table 14: Regression intelligence outcomes and heterogeneity

Variable	Raven's test score (19)	Raven's test score (20)	Raven's test score (21)	Raven's test score (22)	Raven's test score (23)	Raven's test score (24)
PKH	-0.376***	-0.013*	-0.013*	-0.013*	-0.010	-0.013*
	(0.000)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)
Period	-0.149***	-0.058***	-0.058***	-0.058***	-0.058***	-0.058***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Treatment	0.122***	0.030***	0.070**	0.026*	0.306	0.077*
	(0.000)	(0.000)	(0.003)	(0.003)	(0.053)	(0.006)
Treatment*Urban			-0.083**			
			(0.003)			
Treatment*Total amount received				0.000		
				(0.000)		
Treatment*Age					-0.024***	
					(0.005)	
Treatment*Male						-0.115*
						(0.015)
Male		0.007	0.007	0.007	0.010	0.023
		(0.008)	(0.008)	(0.008)	(0.005)	(0.017)
Age		-0.001	-0.001	-0.001	0.003	-0.001
		(0.001)	(0.001)	(0.001)	(0.004)	(0.001)
Urban		0.037	0.049**	0.037	0.039	0.037**
		(0.022)	(0.006)	(0.023)	(0.021)	(0.023)
Income per household member		-0.001	-0.001	-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Highest Education level		0.010	0.010	0.010	0.008	0.010
		(0.012)	(0.012)	(0.013)	(0.014)	(0.012)
Household members		-0.007*	-0.007**	-0.007*	-0.007*	-0.007*
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Province		-0.002*	-0.002*	-0.002*	-0.002*	-0.002*
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.044***	0.759**	0.751**	0.759**	0.720**	0.749**
	(0.000)	(0.050)	(0.041)	(0.050)	(0.015)	(0.036)
Observations	726	726	726	726	726	726

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Figure 1 gives an impression about the effect of the PKH program on intelligence. To evaluate hypothesis 1 which states that the enrollment in the PKH program has no effect on intelligence, several regressions were ran. Model 19 is the corresponding regression to Figure 1 and although from Figure 1 enrollment in the PKH program seemed to be beneficial, model 19 shows that there is a significant negative effect of being in the treatment group. It is important to note that to estimate the effect the coefficient of both the PKH and treatment variable should be combined. Model 20 uses the control variables that were used for the matching process and the coefficient of being in the treatment group remained significant. Nonetheless, the effect is net positive after controlling for other variables which indicates that being a PKH beneficiary has a positive impact on the intelligence of the child relative to non-beneficiary. Model 21, 22, 23 and 24 contain interaction effects for living area, total cash transfer received, age and gender which allow us to test hypothesis 4, 5, 6 and 7 respectively. Living in an urban area while being a PKH participants has a significant negative effect and decreases the Raven's test score by 8.30%. The total amount of cash transfer received does not show a significant effect on the Raven's test score. Model 23 shows that being in the treatment group and being on year older significantly decreases intelligence with 2.4%. Model 24 shows a strong indication due to the significancy at the 90% confidence level of a positive effect of 7.7% of being in the treatment group on the Raven's test score, however the interaction effect shows that for males being in the treatment also decreases the Raven's test score by 11.5%.

5.2.2.1 Sensitivity Analysis Intelligence

Figure A1 which can be seen in the appendix and Figure 1 shown above have a similar trend in the aspect that the non-beneficiaries score seemed to decrease more than the beneficiaries score. Despite the variations in matching requirements, the core results remained broadly consistent. The combined effect of the PKH program and the treatment variable remained net negative in the basic model and net positive after controlling for other variables. In terms of heterogeneity, the effects remained significant, and the magnitudes were roughly the same, suggesting that our primary findings are robust and not excessively influenced by the specific matching criteria used.

While the overall trends were consistent, some differences in the magnitude of effects were observed in both the basic model and the model with the covariates. The effects sizes were considerably larger in the sensitivity analysis as can be seen in Table A8 which is in the appendix. These variations are important to note, as they indicate that the results can very based on the stringency of the matching criteria.

Chapter 6 Discussion & Conclusion

The findings of this study provided insights into the research question:

"To what extent does the Program Keluarga Harapan effect the intelligence, health levels and labor participation of the child?"

The Program Keluarga Harapan seems to have a negative impact on the health of the child relatively to non-participants and a positive impact on the intelligence of the child. Which means that hypothesis 1 and 2 can be rejected. The extended model showed no effect on child labor by the program which insists that hypothesis 3 cannot be rejected. Regarding heterogeneity, minimal significant effects were found on health apart from being a male beneficiary improving lung capacity. Both being male and becoming older increased the chance of being engaged in child labor for a beneficiary. Heterogeneous treatment effects do play a larger role in the effect of the PKH program on intelligence. Living in an urban area and being older while being enrolled in the PKH program had a significant negative effect on the intelligence of the child. Being male also showed a strong indication of having a negative effect on the intelligence of the child. The total amount of cash transfer received did not have any effect on the intelligence of the child.

The results might be somewhat biased due to several reasons. Firstly, households are not targeted properly which can lead to misallocation (this also leads to the possibility of finding better matches). Therefore eligible households might not receive the program and households are ineligible might receive it and thereby possibly influencing the data. Second, not all households completed the full survey. Some omitted the HB test or lung capacity test because they were not healthy enough to do these test or because they refused to take it. Also some households failed to report or remember how much cash they received or how many hours their child. This potentially introduced attrition bias indicating that the effects are more indicative of intention-to-treat effects, given the selective dropout of participants who might systematically differ from those who remain in the study.

The study found few significant results on heterogeneity, possibly due to the sample in which the group of PKH participants was small compared to the non-PKH participants, limiting the number of possible matches. Although there were over 100 matches in the evaluation of all outcomes, more matches would allow for a better evaluation of the differences between the control and treatment group. It was possible to have more matches; however, increasing matches would risk overfitting, as very similar observed variables could indicate substantial differences in unobserved variables between the two groups which would have meant that there were still significant differences between the two groups. Additionally a problem with the difference-in-difference analysis was the limited availability of

intelligence data at only two time periods, whereas effects might arise later in life. Data over a longer period of time would allow for better evaluations of the effects of the PKH program.

The results suggest no significant effects on children's labor participation, and only small effects in terms of heterogeneity. In an ideal research individuals would be randomly assigned to be in the PKH program which would ensure balance in the covariates between the treatment and control groups. However, since the PKH program targets poor people, it is difficult to isolate the effects of benefiting from a CCT program. The effects of CCT programs are hard to evaluate due to the methodological challenges inherent in long-term evaluations (Millán et al., 2019). Despite the significant effects observed there might still be undetected effects. Future research should utilize larger datasets and longitudinal data to better assess the PKH program's impact. The potential production of IFLS 6 by the Rand Corporation could provide more PKH participants and extend the evaluation period by another seven years, enhancing the chances of detecting significant effects. Future research will need these improvements to increase their chances of establishing effects.

Even though the results were not in favor of the PKH program it does not necessarily mean the program is not effective. There are two explanations for this. First of all the control and treatment groups could differ too much in unobservable characteristics due to the fact that one group is a beneficiary for a reason and the other group is not. Therefore the treatment group is disadvantaged and possibly has lower levels of child intelligence, health & labor at baseline. Nevertheless beneficiaries significantly improved there intelligence more than non-beneficiaries. This could be the same for child health & labor; however, a difference-in-difference methodology for those outcomes was not possible with the available data. Therefore for future research possible evaluating these outcomes in this manner could show different effects of the program. The second explanation is that it is not due to the program that the results are insignificant but that it is due to a lack in supply of improving these outcomes (Handa & Davis, 2007). The quality of schools and health facilities might not be sufficient to improve child intelligence, health & labor levels. Previous research showed that the program is successful in accomplishing the conditions of the program (Bappenas, 2009), (Dewi et al., 2017). For this reason policy makers should ask themselves the question if they are satisfied with accomplishing this or if they are willing to invest more into the supply side to actually reap the bigger benefits of the children attending school and health check-ups. In conclusion, there are two requirements to evaluate the effectiveness of the PKH program for these outcomes in a finer way. Which is larger datasets over an extended period of time to evaluate the outcomes with various econometrical models and investments into the supply side to asses where the problem lies in improving the tested outcomes in this study.

Appendix

Table A1: Balance test child labor and child health outcomes

	Before matching			After matching		
Covariates	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference
Male	0.515	0.434	0.081**	0.421	0.421	0.000
Age	11.467	11.247	0.220*	11.579	11.222	-0.357**
Urban	0.477	0.434	0.042	0.426	0.426	0.000
Income per household member (In 100,000 RP)	15.146	15.186	-0.040	14.162	14.882	0.720
Household members	7.239	7.621	-0.382	6.502	7.580	1.077***
Province	35.300	35.692	-0.392	35.773	35.773	0.000
Education level	3.086	2.722	0.364***	2.909	2.909	0.000
Observations	2,453	198		880	176	

*Note. *** p<.01, ** p<.05, * p<.1.*

Table A2: Sensitivity analysis CEM regression on health & child labor outcomes

Variable	HB Healthy (1)	HB Healthy (2)	Lung capacity (3)	Lung capacity (4)	Child labor (5)	Child labor (6)
PKH	0.054***	0.039	-11.388***	-3.590**	-0.019***	-0.042**
	(0.000)	(0.007)	(0.000)	(0.144)	(0.000)	(0.003)
Male		0.000		28.547**		-0.181***
		(0.031)		(1.540)		(0.001)
Age		-0.032**		19.344**		-0.051*
		(0.001)		(0.792)		(0.007)
Urban		0.013		-2.581		-0.098*
		(0.005)		(6.061)		(0.008)
Income per household member		0.001		0.096		0.001
		(0.001)		(0.074)		(0.001)

Education level		-0.003		2.149		0.025
		(0.003)		(0.810)		(0.020)
Household		0.003		-0.885		0.004
members		(0.007)		(0.446)		(0.001)
Province		0.002**		0.450		-0.003**
		(0.000)		(0.122)		(0.000)
Constant	0.543***	0.811***	234.343***	-18.513	0.309***	1.010**
	(0.000)	(0.009)	(0.000)	(15.825)	(0.000)	(0.033
Observations	1,056	1,056	1,056	1,056	1,056	1,056

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Table A3: Sensitivity analysis regression on heterogeneous treatment effect of living area

Variable	HB Healthy (7)	Lung capacity (8)	Child labor (9)
PKH	0.051*	-12.880***	-0.067**
	(0.008)	(0.025)	(0.004)
PKH*Urban	-0.028**	21.680***	0.059**
	(0.002)	(0.239)	(0.003)
Male	0.000	28.519**	-0.181***
	(0.031)	(1.581)	(0.001)
Age	-0.032***	19.250**	-0.051*
	(0.000)	(0.920)	(0.007)
Urban	0.017*	-6.166***	-0.108**
	(0.003)	(0.025)	(0.008)
Income per household	0.001	0.095	0.001
member	(0.001)	(0.073)	(0.001)
Education level	-0.003	2.159	0.025
	(0.003)	(0.796)	(0.020)
Household members	0.003	-0.869	0.004
	(0.007)	(0.425)	(0.001)
Province	0.002**	0.451	-0.003**
	(0.000)	(0.121)	(0.000)
Constant	0.808**	-16.039	1.016**
	(0.014)	(19.685)	(0.023)
Observations	1,056	1,056	1,056

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Table A4: Sensitivity analysis regression on heterogeneous treatment effect of total amount of cash transfer received

Variable	HB Healthy (10)	Lung capacity (11)	Child labor (12)
PKH	-0.004	-4.995**	-0.060**
	(0.006)	(0.078)	(0.001)
PKH*Total amount	0.000**	0.000**	0.000*
received	(0.000)	(0.000)	(0.000)
Male	0.000	28.542**	-0.181***
	(0.032)	(1.549)	(0.001)
Age	-0.033**	19.333**	-0.051*
	(0.001)	(0.812)	(0.007)
Urban	0.011	-2.630	-0.099**
	(0.008)	(5.981)	(0.007)
Income per household	0.001	0.096	0.001
member	(0.001)	(0.073)	(0.001)
Education level	-0.004	2.112	0.025
	(0.005)	(0.876)	(0.020)
Household members	0.002	-0.898	0.004
	(0.006)	(0.468)	(0.001)
Province	0.002*	0.452	-0.003**
	(0.000)	(0.119)	(0.000)
Constant	0.820***	-18.235	1.013**
	(0.005)	(16.313)	(0.027)
Observations	1,056	1,056	1,056

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Table A5: Sensitivity analysis regression on heterogeneous treatment effect of age

Variable	HB Healthy(13)	Lung capacity (14)	Child labor (15)
PKH	0.062	23.706*	-0.326**
	(0.013)	(1.982)	(0.007)
PKH*Age	-0.002	-2.419**	0.025**
	(0.001)	(0.140)	(0.001)
Male	0.000	28.527**	-0.180***
	(0.031)	(1.568)	(0.001)

Age	-0.032***	19.742***	-0.055***
	(0.000)	(0.104)	(0.000)
Urban	0.013	-2.446	-0.100**
	(0.005)	(6.255)	(0.006)
Income per household	0.001	0.093	0.001
member	(0.001)	(0.069)	(0.001)
Education level	-0.003	2.169	0.025
	(0.003)	(0.783)	(0.020)
Household members	0.003	-0.894	0.004
	(0.007)	(0.458)	(0.001)
Province	0.002**	0.453	-0.003*
	(0.000)	(0.119)	(0.000)
Constant	0.807***	-23.214	1.058**
	(0.015)	(7.728)	(0.050)
Observations	1,056	1,056	1,056

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Table A6: Regression on heterogeneous treatment effect of gender

Variable	HB Healthy (16)	Lung capacity (17)	Child labor (18)
PKH	0.083*	-1.191	-0.039*
	(0.007)	(0.190)	(0.003)
PKH*male	-0.105***	-5.721**	-0.007*
	(0.000)	(0.128)	(0.001)
Male	0.018*	29.502***	-0.179***
	(0.002)	(0.077)	(0.001)
Age	-0.032**	19.340**	-0.051*
	(0.001)	(0.797)	(0.007)
Urban	0.013	-2.591	-0.098*
	(0.005)	(6.051)	(0.008)
Income per household	0.001	0.099	0.001
member	(0.001)	(0.077)	(0.001)
Education level	-0.003	2.150	0.025
	(0.003)	(0.810)	(0.020)
Household members	0.003	-0.883	0.004
	(0.007)	(0.443)	(0.001)

Province	0.002**	0.450	-0.003**
	(0.000)	(0.123)	(0.001
Constant	0.804**	-18.908	1.009**
	(0.022)	(15.153)	(0.034)
Observations	1,056	1,056	1,056

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

Table A7: Sensitivity analysis balance test intelligence outcomes

	Before matching			After matching		
Covariates	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference	Mean in untreated (non-PKH)	Mean in treated (PKH)	Difference
Male	0.487	0.444	0.042	0.442	0.442	0.000
Age	12.753	11.895	0.858***	12.845	11.878	0.858***
Urban	0.562	0.503	0.058**	0.490	0.490	0.000
Income per household member (In 100,000 RP)	14.538	16.353	-1.815***	16.282	16.060	-0.222
Household members	7.570	7.706	-0.136	7.139	7.674	0.535***
Province	34.494	35.765	-1.271	36.469	36.469	0.000
Education level	3.288	2.837	0.452***	2.905	2.905	0.000
Observations	6,414	306		1,958	294	

*Note. *** p<.01, ** p<.05, * p<.1*

Table A8: Sensitivity analysis regression intelligence outcomes and heterogeneity

Variable	Raven's test score (19)	Raven's test score (20)	Raven's test score (21)	Raven's test score (22)	Raven's test score (23)	Raven's test score (24)
PKH	-0.004***	0.002	0.002	0.002	0.003	0.002
	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)
Period	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Treatment	0.001***	0.001***	0.027**	0.001	0.240**	0.036***
	(0.000)	(0.000)	(0.000)	(0.002)	(0.014)	(0.000)
Treatment*Urban			-0.058***			
			(0.001)			
Treatment*Total amount received				-0.000		
				(0.000)		
Treatment*Age					-0.020**	
					(0.001)	
Treatment*Male						-0.084***
						(0.001)
Male		0.030	0.030	0.030	0.031	0.035***
		(0.009)	(0.009)	(0.009)	(0.008)	(0.001)
Age		0.006	0.006	0.006	0.007*	0.006
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Urban		0.033	0.037**	0.033	0.034	0.033
		(0.009)	(0.002)	(0.009)	(0.008)	(0.009)
Income per household member		0.000	0.000	0.000	0.000	0.000
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Highest Education level		0.012	0.012	0.012	0.011	0.012
		(0.008)	(0.008)	(0.008)	(0.009)	(0.008)
Household members		-0.001*	-0.001	-0.001	-0.001*	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Province		-0.001	-0.001*	-0.001	-0.001*	-0.001
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.675***	0.569*	0.567**	0.569*	0.557**	0.567**
	(0.000)	(0.045)	(0.041)	(0.045)	(0.020)	(0.040)
Observations	2,252	2,252	2,252	2,252	2,252	2,252

*Note. *** p<.01, ** p<.05, * p<.1. Std. err. adjusted for 2 clusters in PKH.*

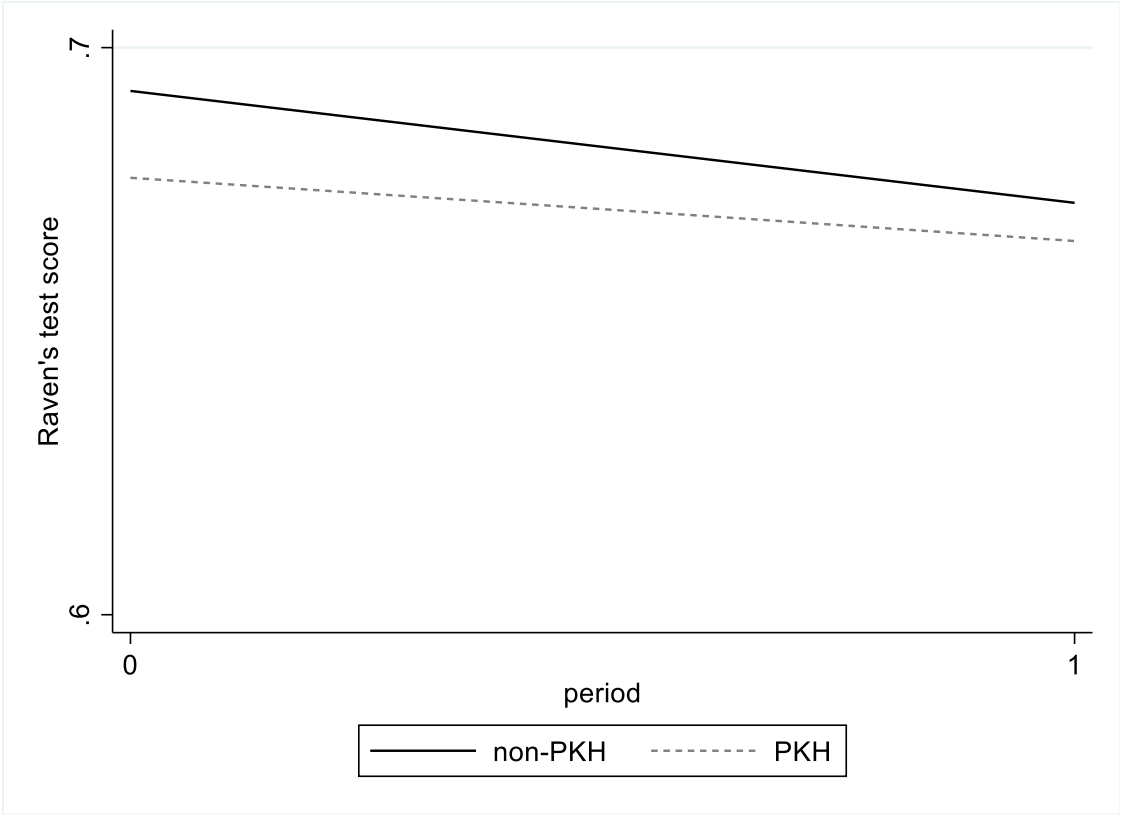

Figure A1: Sensitivity analysis Difference in Difference Raven's test score between PKH participants and PKH non-participants.

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