Unintended spillovers of targeted health insurance programs on intra-household resource allocations

Anaka Aiyar*

*Tata-Cornell Institute, Cornell University

The last three decades have seen an increase in the number of targeted health insurance programs being implemented in developing countries. However little is known about the intra-household impacts of these programs on household members who are not their intended beneficiaries. Using variation introduced by a health insurance program targeted to children below the age of six, I identify the program's effects on expenditures and labor supply of ineligible children by comparing allocations made in beneficiary and non-beneficiary households. I find that households in Vietnam exhibit preference for reinforcing investment strategies when health insurance is targeted to younger children. My results show that beneficiary households decrease spending on health and education and decrease leisure time for ineligible children relative to non-beneficiary households after the program is introduced. These results contribute to the overall understanding that accounting for program impacts on ineligible members is important in policy design.

Key words: Intra-household spillovers, Child health insurance, Vietnam

1 Introduction

Theoretical and empirical literature on intra household allocations of resources has established that rational utility maximizing households do not share their resources equally across all members. Even if households are inequality averse, income constraints may lead to them to consider efficiency in resource allocations over equity concerns with regards to allocations. Rejecting the homogenous household model with a benevolent dictator & complete insurance against shocks, intra-household models have argued that preferences of parents, welfare weights assigned to the child, parameters in home production, time spent on labor supply, control over unearned incomes and income earning capabilities of members can determine differences in household allocations of goods and expenditures (Becker, 1960; Rosenzweig and Schultz, 1982; Behrman, 1988; Pitt and Rosenzweig, 1990; Chiappori, 1992; Behrman and Deolalikar, 1993; Chiappori, 1997; Browning and Chiappori, 1998; Strauss et al., 2000). For example a mother's education level (Thomas et al., 1991), her control over labor incomes (Maggs and Hoddinott, 1999), having a first born male child (Ejrnæs and Pörtner, 2004), her relative bargaining power (Zimmermann, 2012) and her access to and control over unearned incomes (& assets) (Thomas, 1990; Braido et al., 2012) are known to impact human capital outcomes of children. Rainfall shocks that affect crop productivity when household members farm different crops have been found to translate into different expenditures outcomes across budgets within households as well (Duflo and Udry, 2004; Udry et al., 1995). Households have been also known to invest differently based on child related observables such as health status (Yi et al., 2015; Leight, 2017; Adhvaryu and Nyshadham, 2016), gender (Garg and Morduch, 1998; Li and Wu, 2011) and even birth order (Ejrnæs and Pörtner, 2004; Jayachandran and Pande, 2017). Islam and Hoddinott (2009) & Jacoby (2002) has shown that when public interventions target some children for school meal programs, this can lead to a partial substitution of private consumption allocations during school feeding days. These differences in resource allocations are often reflected in the differences in health, education and labor outcomes between children and between adults from the same

household. Jacobson (2000) argues that external shocks faced by households members can change marginal benefit to cost ratios of one group of individuals vis a vis others (within the household) thus impacting household allocations. Households can respond with reinforcing or compensatory investment strategies to these changes. On the one hand, if the shock had negative repercussions on a particular group, parents can exhibit compensatory behaviors by increasing private human capital investments on all members in response to the shock. In Yi et al. (2015), authors create a comprehensive model of intra-household bargaining that captures these behaviors of households when children are affected by a post-natal health shock. They show that for twins in China, in the presence of a health shock of one sibling, parents allocate more health investment towards the healthier sibling. On the other hand, households can engage in reinforcing behaviors that exacerbate the effects of shocks. In this case, households would reduce expenditures on the healthier group in favor of the group with the shock (Fitzpatrick and Thornton, 2017).

Many government interventions that are implemented in developing countries are often targeted to certain members within the household. By implementing strategies to reduce the shadow cost of access to health care, for example, government programs seek to improve health outcomes of individuals who are vulnerable to intra-household dynamics in resource allocations. In addition, children under the ages of five are considered as one of the most important groups on which interventions are targeted. This group is considered to be the most vulnerable in the short term to health shocks and health shocks in early life are known to lead to large productivity losses in adult life. Hence returns to public investments made to protect them against early life health shocks are higher than returns on investments made on other members (Almond and Currie, 2011). However, in line with the theoretical implications from the intra-household literature, it is possible that households respond to these targeted programs by allocating resources differently across members. If households are efficiency focused, this would lead to parents engaging in reinforcing behaviors that exacerbate the effects of public investments in favor of targeted members. Thus it is entirely possible that a well intentioned government interventions that seeks to improve the position of one

group of individuals, say children under five, may entrench intra-household disparities in outcomes across children within the household Alderman et al. (1995).

In this paper I evaluate the impact of one such intervention, the introduction of a health insurance program that made only children under the ages of six eligible for free health insurance in Vietnam in 2005. Prior to 2005, coverage of children in this age group was around 20 % and came from privately purchased health insurance or through a program that covered only poor households. In 2008, households reported that nearly 90 % of children in target age group were covered by this child health insurance program (CHI/CU6). Evaluations of the direct benefits of the program suggest that the program increased access to both outpatient and inpatient health services, increased health spending and increased access to complementary health services (Nguyen and Wang, 2013; Palmer et al., 2014; Nguyen, 2014; Aiyar and Venugopal, 2017). Thus the program was effective in increasing access to health services for the eligible group. In this paper, I use the timing of the program and specific age of the targeted beneficiaries to estimate the impact of health insurance on the various resource allocations within the household. Since the insurance program covered only one set of children within the household, I hypothesize that the introduction of the program changed the relative price of health care between eligible and ineligible children. In response to this change, one would expect households to engage in compensatory investments behaviors or reinforcing behaviors in their resource allocation strategies. In order to measure the program's impact on household investment strategies, I compare allocations made on ineligible children living in beneficiary households with outcomes of ineligible children living in non beneficiary households. First, I find that beneficiary households increase health spending, for ineligible children, by less than non-beneficiary households after the program is introduced (Effect Size (ES): -32 %). This change cannot be explained by difference in health across the groups. In non-beneficiary households, ineligible children are not more unhealthy than same aged children from beneficiary households. Two, I find that ineligible children from beneficiary households are less likely to receive education spending from their parents compared to their peers in non-beneficiary households (ES: -14 %). Much of this effect is driven by reduction in private educa-

tion spending (extra classes) for these students (ES: -89 %) and not by the reduction in their schooling outcomes. There seems to be no difference in the probability that ineligible children are more likely to dropout from school from beneficiary households. Three, I find even though leisure hours of ineligible children are decreasing over time, children from beneficiary households are working more compared to their peers in non-beneficiary households. This effect is largely driven by the relative increase in reported hours spent working as well as an increase in house work hours (ES: 15 % , 6 %). I rule out that these changes are driven by changing labor market conditions that maybe changing the returns for work for these ineligible children.

The three major contributions of the paper are the following. First, my results argue for the idea that changing relative prices of goods through external interventions can sometimes lead to unexpected changes in resource allocations within households. While one would expect that income effects related to a decrease in prices dictate that demand for normal goods increase, if the cross price effect of programs outweighs the benefit from these income effects, then allocations of goods may be impacted. In line with these results and the results of the theoretical model proposed by Chiappori (1992), I too find evidence that a government intervention that sought to increase access to health care for children under six may have led to reinforcing behaviors in intra-household resource allocations. Second, the quasi experimental nature of the methodology helps capture the dynamics of changing relative prices of one group of members vis a vis others. By comparing allocations made on similar groups of individuals from beneficiary and non-beneficiary households across a pre and post period, I am able to rule out some of alternative explanations that might be intrinsic to household unobservables that are fixed over time. Finally, impact evaluations of health insurance have shown that it can be effective in increasing access to health services, reducing catastrophic health spending & helping children stay in school in developing countries (Wagstaff and Doorslaer, 2003; Wagstaff and Pradhan, 2005; Wagstaff, 2007; Finkelstein and McKnight, 2008; Axelson et al., 2009; Wagstaff, 2010; Nguyen and Wang, 2013; Sepehri et al., 2011; Saksena et al., 2011; Baicker et al., 2013; Palmer et al., 2014; Nguyen, 2014; Liu, 2016). Spillover effects on insurance take up of non members (Busch and Duchovny, 2005;

Sommers, 2006; Koch, 2015), labor supply decisions for adult (Gruber and Madrian, 2002; Cherchye et al., 2012; Kaestner et al., 2017) and mortality(Basu and Meltzer, 2005) reduction for ineligible spouses have been noted in the literature . I add an additional voice to this literature by showing that these effects may spillover to human capital decisions and labor supply choices for ineligible children in the household.

The remainder of this paper is organized as follows. Section 2 provides the conceptual model that can explain why these results exist. Section 3 provides a background to the insurance program in Vietnam on which this experiment is constructed. Section 4 provides an overview of the data used in the analysis. Section 5 provides an illustration of the methodology used and the empirical strategy of the paper. Section 6 presents and discusses the main results of the paper. Section 7 concludes with discussions and implications for policy moving forward.

2 Conceptual Model

In this section, I build on the intrahousehold model introduced by Yi et al 2015. This model allows me to develop testable hypotheses on intra-household allocations by type of human capital inputs. Yi et al 2005, found using this model, that intra-household strategies in households can be reinforcing in some investments but compensatory in others within the same household. The former is reflected in lower education expenditures on twins with no health shocks and the latter is reflected in their finding that households can increase expenditures on healthy siblings. I use their framework to provide intuition on reallocations as well as develop a method to account for labor supply effects on ineligible children.

Consider a household h with 2 children i & j, each child has a health endowment of H and socio emotional skill of C. Let the parental investment in the child be $I^k_{i,j}$ Let the child human capital function be $\theta^k_{i,j}$, where k = (H or C).

The human capital production function of the child i from household h in this model

is represented as -

$$\theta_{i,j}^{k} = f^{k}(w_{i,j}^{H}, w_{i,j}^{C}, I_{i,j}^{k}, e_{i,j}^{H}, \epsilon_{i,j}^{H}, h) \tag{1}$$

where $e_{i,j}^{H}$ = post natal health and $E_{i,j}^{H}$ = random unobserved variation that impacts child health In this model, all the production inputs are twice differentiable and continuous. Also, the shock of child i can enter into the child j's production function only through parental investment $I_{i,j}^{k}$.

Consider the parental utility function

$$U = u(c, L, N_c H_c q_{i,j}) \tag{2}$$

Where, L = leisure of parents, q is the quality of the child in the household, Hc is the time they spend working on school work or other productive activities for the long run, Nc – time spent on household chores which improve household welfare in the short run. Parents in this model maximize their utility based on their consumption, the quality of their child, children's contribution to household work (since it means they will have more leisure) as well as the amount of time children spend on their human capital investments (as they know there are long term benefits for the household). The quality function is define as $q_{i,j} = q(\theta_{i,j}^{H}, \theta_{i,j}^{C})$.

Hc = h(H, C) is the time spent by the child in working on long term human capital development. For example, a healthier and smarter child will have more human capital etc to work on these long term productive activities. An example of this would be time spent studying at home. Nc = n(H,C,Z) is the amount of time spent by the child on house work or other household related work. Children that are more likely to be working on household chores if they are weaker in long term human capital production. In addition, other factors such as dowry or female labor force participation in the surrounding areas can influence whether the child will be assigned to more home related work.

Household Constraints in this model include

$$L_c + H_c + N_c = 1 \tag{3}$$

Where Lc = child's leisure and total time spent is normalized to 1.

$$L + T = 1 \tag{4}$$

L = leisure of the adult and T = time spent on work. The household Budget Constraint in this model is represented as

$$Y + wT = P^I_{i,j} \sum_l \sum_k I^k_{i,j} + c \tag{5}$$

Where $P_(i,j)^I$ is the price of human capital investment that is independent of type of investment but depends on the individual, wT is the labor income, Y is the non labor income. In this model, I assume that the child does work but the household does not incorporate the child's shadow income in their calculation of total household income since this work is not valued by the market. Under the assumptions of strict concavity and continuously twice differentiable functions, the solution with intra-household allocations for parental investment is

$$I_(i,j)^{k*} = f^k(w^H_i, w^C_i, e^H_i, \epsilon^H_i, w^H_j, w^C_j, e^H_j, \epsilon^H_j, ; h, P^I_{i,j}, w, Y) \tag{6}$$

2.1 Resource Allocations

In order to model the process of intra-household resource allocations, I first identify the various effects of the health insurance program on the first order conditions within the household optimizing process. In this model, the effects of the health insurance eligibility for child i leads to prices of health care declining only for child i. This increases the households incomes and the income effect on health and education spending for both eligible and ineligible children will be positive. However, the change in price also

creates a change in the relative price of health between child i and child j. Thus, the total effect of the change in the relative prices, net of the income effect, can be thus divided up into 2 effects -

$(dI_i^{k*})/(dP_i^I)$ which is the effect of the health insurance shock on investments decisions of parents for child i. Assuming the households production function are increasing in investments, this is positive.

$(dI_j^{k*})/(dP_i^I)$ is the effect of the insurance on the other child j. If households exhibit substitution behaviors between children, then this is negative and if they view investments as complements, then it positive.

Under the condition that

Households exhibit reinforcing behaviors, that is they increase their investments on the child that benefited from the program at the expense of the other child. This outcomes is represented as -

$$(dI_i^{k*})/(dP_i^I) - (dI_j^{k*})/(dP_i^I) >= 0, \tag{7}$$

Alternatively, if,

$$(dI_i^{k*})/(dP_i^I) - (dI_j^{k*})/(dP_i^I) <= 0, \tag{8}$$

Then households exhibit compensatory behaviors, that is they increase their investments on the child that did not benefit from the program. Behrman (1982) show that households behaviors on intra household depend on preference parameters but Almond & Currie (2011) say this depends on the production parameters of the health production function of the child. In my model, I assume that the price change from health insurance impacts the child through their human capital production function.

2.2 Effect on Leisure

The impact of a price shock on the human capital production function on the child j through parental investments can then be modeled as

$$(D\theta_j^k)/(DP_i^I) = (\delta\theta_j^k)/(\delta P_i^I) + (\delta\theta_j^k)/(\delta I_j^k) * (\delta I_j^k)/(\delta P_i^I) \tag{9}$$

$(D\theta_i^k)/(DP_i^I)$ = human capital production function effect of the insurance price change on child j,

$(\delta\theta_j^k)/(\delta P_i^I)$ = The biological effect of the price change. Given that there is no reason to assume that child j's biological health if affected directly through the price change in health, we can assume this to be 0.

$(\delta\theta_j^k)/(\delta I_i^I)$ = Any productivity effect of the investment made by the parent which we continue to assume is positive.

$(\delta I_j^k)/(\delta P_i^I)$ = Intra-household effect. If this is negative, then households view children as substitutes and exhibit reinforcing behaviors (RB). If this positive, the households view children as complements and households exhibit compensatory behaviors (CB). In the case of the former, households need not fully substitute all investments away from child i if they don't believe children are perfect substitutes for each other.

Changes in the price of health care increases the MRS between children. If households view children as partial substitutes even, this leads to a decrease in production of health and education along the human capital production function of child j. Given its stated relationship between housework and home-work, this change of the health production function decreases Hc and increases Nc for child j. This can happen only if there is an increase in Hc for child i. In this case, households maybe at worst moving along the welfare maximizing production frontier maintaining their pareto optimality. When households have CB, this leads to an increase along the human capital production function of child j. As long as the total increase in utility from additional Hc compensates utility lost in Nc reductions, households may find this strategy beneficial. Here too

households maybe moving at worst along their utility welfare maximizing frontiers.

3 Background

Government sponsored or mandated health insurance is not new to Vietnam. Between 1990 and 2000, the government of Vietnam instituted a compulsory health insurance program for government employees, a voluntary health insurance program (VHI) for their families, a student health insurance policy for school aged children (SHI) and a free health certificate (FHC) program that provided subsidized health services for the poor. The first three programs had to be purchased out of pocket[1] and members could access covered health services at local hospitals[2]. The FHC, a health card given to targeted poor families, gave members access to highly subsidized health services in hospitals & health centers. In striving to achieve universal health coverage by 2014, the government of Vietnam took steps to consolidate some of these programs and introduce new ones. With regards to the former three, the eligibility criteria, administration or the generosity of the privately purchased programs did not change during the period of this study (2002 to 2008). However, in 2003, the government of Vietnam consolidated all insurance programs targeted to the poor and the free health certificate into a single program called the Health Care Fund for the Poor (HCFP). Under the HCFP, households previously covered by the free health certificate, ethnic minorities that lived in the provinces of Thai Nguyen, Cao Bang, Bac Kan, Lao Kai, Ha Giang, Son La, Lai Chau and households that belong to the Decision 135 provinces[3] received free health insurance. Part of the reason the HCFP was considered a success was it's successful targeting. Nearly 99 % of the intended beneficiaries reported being covered after the first year of implementation (Lieberman and Wagstaff, 2009).

[1]The compulsory health insurance was part subsidized by the government. Employees paid 30 % of the premium and government employers paid the rest.

[2]Qualitative interviews revealed that members still paid out of pocket for uncovered services such as drugs and labs and for 'special' treatment by doctors. However there is no information in the data set about the type of service paid for or out of pocket spending on special services ordered by patients.

[3]These provinces were identified as high poverty areas that required special developmental assistance from the federal government. http://www.un.org/esa/socdev/egms/docs/2009/Ghana/Quan.pdf

Evaluations of the program showed that it increased access to health services for the targeted group but evidence on its impact on reducing health expenditures is mixed (Wagstaff, 2007, 2010).

Prior to 2005, children under six were covered by privately purchased VHI or through the HCFP program. Even though a law to provide children under six free health services was instituted in 1991 (Nguyen and Wang, 2013), the law remained unfunded until 2005. In 2005, the law was brought back into focus and the government of Vietnam mandated that health services be provided for free for children under six through the fully subsidized child health insurance (CU6/CHI) program. Under this insurance program, all children eligible were automatically enrolled and would receive health benefits at public hospitals regardless of economic class. Figure 1 presents the proportion of children between the ages of 0 to 8 reported (by their households) as covered by the CHI program is reported. The red line in the graph shows that prior to 2005, no household is covered by the child health insurance program. By 2008, nearly 90 % of the households reported that their children under six covered by CHI. The graph also shows that no household reported that their children aged seven and above were covered by the CHI[4].

In both the HCFP and CHI programs, premiums allocated by the government was around 50,000VND ($2.27 per person) (Lieberman and Wagstaff, 2009). The household / beneficiary did not receive the premiums as cash in hand but were covered for up to $350 per year (Lieberman and Wagstaff, 2009)[5]. The benefit package covered all outpatient (OP) and inpatient (IP) services at government hospitals[6]. Some testing services and generic medicines approved by the ministry of health were covered. How-

[4]In the survey, health information for inpatient services is collected with an annual recall. It is possible that children at the age threshold received benefits from CHI during the survey recall period but their families were interviewed after they turned six. This could explain why certain households report that children aged 6 are covered by the program.

[5]The newer papers report a cap of $35 per episode(Palmer et al., 2014). From the data, one sees that the average health spending per household for children who reported at least one inpatient or outpatient visit is around $18.68 for children under six and $21.23 for older children in the non-program years.

[6] Interventions related to HIV prevention and treatment, luxury interventions such as cosmetic care, dental care, self-inflicted injuries and drug addiction care were not covered by the program (Lieberman and Wagstaff, 2009).

ever, a common criticism was that the rate of reimbursement for diagnostic procedures and practices in benefit packages were not updated regularly. Extra costs from this inefficiency were passed on to the consumer (Lieberman and Wagstaff, 2009; Nguyen and Wang, 2013; Sepehri et al., 2011) who paid for them out of pocket.

4 Data

Data from the analysis comes from Vietnam Household Living Standard Surveys (VHLSS) of 2002, 2004, 2006 and 2008. The VHLSS is a biennial, nationally representative, repeated cross section survey[7]. Each survey consists of information on the socio demographic positions of *all* family members in households. This includes information on age, gender, education, education spending, ethnicity, health[8], health spending[9], employment and health insurance status of individuals[10]. At the household level, identifiers such as its urban location and the province to which it belongs were also available.

For the expenditure outcomes, I used health and education spending reported for each child within a household. After deflating the expenditures and calculating their per month real values (in '000 DNG), I aggregated the spending by cohort (Eligible vs Ineligible children) for each household. Eligible children were those who are under the ages of six and ineligible children were between the ages of six to seventeen. For time use outcomes, I aggregated the total hours reported per day for any work and house work separately for all ineligible children in the household[11]. I used individual identifiers and household identifiers in order to construct various household level controls.

[7]The VHLSS is collected by the Vietnam Statistical Organization and is available for purchase.

[8]Sick days for individuals are collected only from the 2004 surveys.

[9]Health spending information for outpatient services is collected for individuals who report being sick in the last 4 weeks and spending on inpatient services is collected for those who report an illness within the last year. To maintain comparability, I calculate total health spending per month by adding the outpatient spending with the per month inpatient spending.

[10]In 2002, the survey asked if the individuals visiting the doctor were covered by FHC or 'other' health insurance only. Additionally, health insurance information was only collected for those who reported ever falling ill. Detailed individual specific information, regardless of their health status, on the enrollment in the SHI, VHI or other insurance programs was available in the datasets only after 2002.

[11]Eligible children had no hours reported as work or house work hours in the survey.

For mothers and fathers education of the household, I assigned the education years of the highest educated female and male adult within the household. Ethnic dummies captured households who were part of the ethnic majority. Household size by cohort was calculated by aggregating the number of individuals within a household and a specific age cohort. Agriculture & self-employed households were defined as those where the household head reported working full time in the agriculture sector and was self-employed, respectively. Female headed households were those households where a female was reported as the household head. Age of the household head was captured by assigning the age of the head of household from the individual data to the household data. Finally, for the log income control variable, I use a scaled[12] and deflated per month income value that was available in the data.

5 Methodology

In the methodology, I restricted the sample to all households with children below the ages of seventeen[13]. *Beneficiary* households were those who had at least one child under the age of six and *Non Beneficiary* households are those who did not. The latter were households with children between the ages of six to seventeen in the sample. Survey data from the VHLSS 2002 and 2004 contribute information on households in the pre period while 2006 & 2008 surveys contribute to information from the post program period. The main identifying assumption for the methodology is that changes in outcomes measured in the beneficiary households is driven by changes in access to the CHI coverage. The non-beneficiary households however, do not receive the program since their children are older than the age cut off and hence be a suitable control group to compare these changes against. As a falsification test I assign the 2004 data as a

[12] The income variable is calculated by aggregating all sources of earned and unearned incomes within the household after subtracting any expenditures made on running businesses or spending on agriculture. Some of these values are negative and hence I scaled them to a positive value greater than 0 to calculate the log values.

[13] This is built on the premise that households with children who are older may have different needs, may face difference labor market opportunities and hence a different development pathway than households with younger children (Deaton, 1997).

post period data set [14], acting as if the program was implemented in 2003. There is no evidence that there were pre-period trends in resource allocations that are different between beneficiary households and non-beneficiary households. Hence, by comparing the outcomes between these groups between the pre and post period, the methodology is able to tease out the additional effects of having targeted insurance on the outcomes of interest.

A second concern for the empirical methodology is that it may be capturing differential changes between health insurance status of households between 2002 and 2008 that did not come from the CHI program. Because poor households become eligible for HCFP insurance in 2003, children who belong to HCFP eligible households may not have experienced a net gain in their health insurance coverage post 2005. To eliminate the experience of these children and hence their households, I used the eligibility criteria of the HCFP program in order identify and eliminate households that may have been eligible[15]. I first created a variable called HCFP that captured whether the household targeted is covered by a health insurance program for the poor, had access to a free health certificate or is identified as a poor household within their commune. Households from ethnic minorities that lived in the provinces of Thai Nguyen, Cao Bang, Bac Kan, Lao Kai, Ha Giang, Son La, Lai Chau are also included as they were eligible for the program. Other household from these communes too received access to the HCFP program. Using a probit estimation strategy, I determined a predicted probability of being a HCFP household in any given year. In the main results, households who had a greater than 50 % predicted probability of being covered by the HCFP program are excluded from the final sample (See Appendix A for more details on the estimation procedure.). In the main results tables, falsification tests on the HCFP program's impact are provided. These results show that households who received both CHI and were eligible for the HCFP program did not see a change in their outcomes, which is to be expected. In the robustness check sections, I show that my results are robust to using alternative criteria that may determine HCFP coverage.

[14] All post period data sets are removed from the analysis in this part.

[15] The HCFP is an umbrella program that merged insurance programs for the poor into a single program.

6 Estimation Strategy

The estimating equation for the analysis is as follows.

$$Y_{ht} = \beta_0 + \beta_1 * B_{ht} + \beta_2 * Post05_t + \beta_3 * B_{ht} * Post05_t + \beta_4^k * X_{ht}^k + \epsilon_{it} \qquad (10)$$

Where, h –represents all households, and t the survey period. The outcome variables (Y_{ht}) used in the analysis are health and expenditures made on eligible and ineligible. Time use outcomes are measured in hours per day and results are reported for ineligible children within households only. The beneficiary households (B_{ht}), have at least one child under the age of six. The Post_05 dummy takes a value equal to one if the household is identified in a survey post 2005. (X_{ht}^k) is a vector of controls that are added to account for differences in health insurance take up or usage and households reallocation decisions that maybe based on household level observable characteristics. For example, more educated households maybe more altruistic in their allocations and make use more health care once their children are covered. Female headed households have been found to allocate more incomes towards child care and hence become an important control in the regressions. Older households may have more labor market experience and hence be more able to better use health care services once children are covered. They may also allocate labor and spending differently than younger households who have younger children. Agriculture households and self-employed household heads control for differences that arise from uncertainties in their income sources that affect the outcomes of choice and the variable of interest. Various measures of location of the household, such as their urban location and their province level fixed effects control for within location factors that may impact health insurance access and access to markets. Survey year fixed effects control for effects that are common to households that belong to the same survey year, such as prices of health care, access to infrastructure and markets, schools etc. In order to rule out potential distributional effects that come from differences in household structure, all the regressions include number of children who are under six, number of children who are pre teenagers, number of

children who are teenagers and number of adults who are less than sixty. All specifications are clustered at the level of the province to account for heterogeneity within the province.

The identifying assumption in this model is that post 2005, after controlling for observables, any changes experienced by the beneficiary households relative to non-beneficiary households is due to the child health insurance program. The coefficient of interest β_3 can be interpreted as the difference between the changes in the outcome measures for households who benefit from the program in relation to households who did not between the pre and post period. Since the age criteria of eligible children is used to identify beneficiary households and not the actual use of the insurance program, the estimate represents the gains from being beneficiaries of the CHI or the intent to treat estimate. Table 1 & Table 2 provide the summary statistics of the controls and simple difference in difference for the outcomes of choice in the analysis. In Table 1, one can see that beneficiary and non-beneficiary households differ on their location, ethnicity, the age of the household head, and some of the compositional controls on household size. Beneficiary households are less likely to come from urban areas, are younger, have more adults and are more likely to come from ethnic majorities. Non beneficiary households are more likely to have older children, but this is to be expected. Thus while the methodology cannot fully eliminate the possibility that households in these two groups were different from each other in the pre period due to their different compositions, the pre period regressions suggest that households were at least no different from each other when it came to allocations for their ineligible children before the program was implemented. In Table 2, we see the simple difference in difference estimates for the outcome variables used in the analysis. Here we see that between the pre and post period, households are increase spending on ineligible children in beneficiary households. This effect can be explained by the additional income that comes from relaxing the household budget constraint as price of health care falls. Overall, one can see that gaining CHI leads households to reduce health and education spending on ineligible children, while also increasing the time they spend working relative to the non-beneficiary households.

Results

In the outcome Table 3 & Table 4 the first column represents the simple difference in difference without any controls. The preferred specification for the analysis is column 2. In this model, all observables and time invariant controls were accounted for. Columns 3 & 4 present the main robustness checks for the methodology. Column 3 presents results for those households who are eligible for HCFP and hence eliminated from the estimation strategy in the previous columns. In these columns, one would expect to see no impact of the program on ineligible children since the entire household is eligible for the program. Since there was no differential coverage across members one cannot expect any new effects to emerge. In column 4, results from the pre period falsification tests are presented for the final sample used in columns 1 & 2. Here too one would not expect to see differences between similar members within the households when households did not have access to the CHI.

6.1 Impact on Household Spending

In Table 3, the results from the allocations of spending for ineligible children are presented. Overall it can be seen that households with eligible children spend relatively less on health and education for ineligible children in households[16]. As evident from the Post05 variable, health spending is increasing over time possibly due to the income effect of the price decrease. The main coefficient of interest is, however, β_3 from Equation 10, or the Post05*HHCU6 variable in the table. This coefficient represents the changes in spending for these children between beneficiary and non-beneficiary households after the program has been implemented. Overall, we see that households who receive health insurance reduce spending on their ineligible children by \$1.64, a 32 % reduction compared to expenditures made on the control households in the pre period. The robustness check in columns 3 suggests that there is no statistical differences between households health spending on these ineligible children in either the HCFP

[16]This would be expected since beneficiary households have lower number of ineligible children than non-beneficiary households.

households during the same time. Thus households where all members are covered do not seem to be changing their behaviors towards older children. In column 4, the lack of pre period trends further strengthens the argument that households treated ineligible children no differently before the program was implemented. One possible explanation to this would be that households are reducing spending not because of changing relative prices of health care between groups, but because children from covered households are visiting doctors less or are less sick since their younger siblings are healthier and hence their disease exposure is lower. In Table 5, results from a regressions that estimates the impact of the program on sick days for individuals and the total health visits for the ineligible children is reported. Here we see that the number of sick days reported by household members, aggregated by cohort, is not statistically different between the beneficiary and non-beneficiary households. Hence we can lay aside the explanation that differences in health bteween groups is impacting the results. In many health insurance evaluations from developing countries, the health enhancing effect of health insurance is often less evident. The success of the program is measured instead in its ability to induce households to access more health care or spend more on their child's health (Dupas, 2011).

An alternative explanation to these results is that the outcomes are driven by the changing marginal effects between siblings within households. Here, having access to free health insurance for young siblings changes the relative prices between these household members. If this is the case, one would expect to see spillover effects of allocations across other outcomes as well. In Table 3 (II), we see households are overall increase education spending over time. However, beneficiary households reduce education spending on older children by 1.12 (14.6 %) relative to non-beneficiary households. Column 3 indicates that households who were not eligible for the HCFP program did not change their behaviors over time. In column 4, the results show there are no pre period trends that indicate households allocate education spending differently between younger and older children. In Table 6, we see that households are decreasing spending on private education (tuitions etc) by close to 75 % in response to the program. Private education makes up around 3.3 % of total education spending and would be

considered the less essential expenditure. Hence this figure is decreasing by much more than education spending on school related activities, which is also decreasing by 12 % during this time. From the column on drop outs, we see that children are not being pulled out of school, but rather households seem to be decreasing spending on some goods that they may consider as less important [17].

6.2 Impact on Leisure

A final result in this paper is the impact of the program on households preferences for allocation of leisure time for older children [18]. The main hypothesis driving the results here is that in the absence of any external labor market changes that change the opportunity costs of labor or leisure, the price effect of insurance, relaxes the budget constraint of the households. Since leisure is a normal good, children should report higher leisure or labor time. However, when health insurance programs change the marginal benefit to cost ratios of one group of individuals vis a vis others, this

[17]Other potential explanations on the spending patterns could include the role that outliers play in driving results. Given that most households spend close to nothing in developing countries, due to access to free health or education services, while a few households may spend a lot, the distribution of spending creates a right skewed distribution in outcomes. To account for this, I first winsorize the data up to the 99th & 95th percentile. As expected, we see that both spending types decrease, but the estimates still maintain their sign and significance (Tables can be shared on request). However, winsorizing the data makes us loose important information on catastrophic spending episodes, that impact health for example, and thus introduces the bias in the estimates. For education as well, given that households who are not the poorest (HCFP are not included) are part of the sample, high education spending may reflect spending choices. The pre program trends suggest that education spending between beneficiary households and non beneficiary households are increasing at the same rate but in the post period households change their spending patterns. Thus any outliers driving the results may actually reflect changes in household decisions. I also run quantile regressions at different percentiles of the distribution. In line with intuition, I find that the results on education and health are driven changes in spending conditional on higher percentiles in the distribution (>50%). This would imply that these allocation effects are stronger in households that were spending more on their older children to start with compared to similar households in the spending distribution. These results are not driven by treated or control households having less children who are older. In fact between the pre and the post period, beneficiary households see a slight increase in the number of older children compared to the control group. Thus the price effect of insurance on ineligible members is more acutely experienced when parents are spending more to begin with (All results can be presented on request).

[18]It is not uncommon in these contexts that households and parents determine what types of household activities their older children should be involved in. Older girls working on child care and older boys helping as unpaid labor in households based on their parents needs is not an uncommon expectation in developing countries.

can have unintended spillovers into these marginal effects of the labor-leisure trade off between household members as well. If households value younger children more, then they may choose to invest more time and household resources into their care. Older children may be expected to step in to these situations and help adults. In line with this argument, in Table 4, one can see that households are reducing the amount of time spent on work related goods for ineligible children. However, for beneficiary households with health insurance, ineligible children report working more both inside and outside the home by around 1.5 hours per week and 45 minutes per week, respectively compared to their peers in non-beneficiary households. Even though the income effects of the program indicate that children are working less overall, older children in beneficiary households are working around 14.5 % more outside the home and around 5.5 % more within the house compared to their peers in non-beneficiary households. Column 4 in Table 4 shows that are no pre period trends to suggest that households with younger children make their older child work prior to the program. Column 3 shows that even though older sibings are working more at home in the post period in HCFP households, they are not being expected to work more outside their home during the same time. In order to eliminate the possibility that households are responding to labor market changes rather than program changes, in Table 7, we add different types of fixed effects. In columns 1 & 5, we add a changing time trend for urban areas. If urban markets are growing faster and this encourages more young people to quit school and enter market, this fixed effect can absorb the variation from such events. In columns 2 & 6, we see province* time fixed effects to control to changing labor markets between provinces that may affect the results. In columns 3 & 7, urban*time and province*time fixed effects are included for accounting for changing labor market returns both within urban areas and within provides. Columns 4 & 8, account for changing labor market returns to agriculture households over time. If supply of child labor from agriculture households is more elastic, one would expect to see these changes impact labor force participation by more rather than the insurance program. In all the columns, we see that the coefficient of interest is stable and robust, thus eliminating these alternative explanations as to why older children are working more. Hence our results seem to

indicate that households with older children, respond to the insurance program by allocating less leisure time for their older children who are not beneficiaries of the program. In Table 8, we provide some suggestive evidence that the increase in work hours is largely driven by girl children within the households. 65 % of the additional hours per day outside the home and 71 % of the extra hours worked at home is explained by the hours worked by older girl children.

Robustness checks

The main threat to identification comes from pre period trends in the outcomes that were unrelated to the implementation of the health insurance program. If such was the case, this would have implied that households who became beneficiaries of the health insurance program treated ineligible children differently from non-beneficiary households to begin with. Hence comparing outcomes across these groups may not have provided us an accurate picture of what happens when governments inadvertently change allocation decisions at the margins. In Table 3 & Table 4, column 4 reveals that one need not be worried about this threat to identification. Since we have discussed the implications of these regressions in the results section, we do not summarize the results here and proceed on to other potential issues assuming that this issue has been sufficiently accounted for.

Given that one of the major criteria for beneficiary household selection is the age of the child, we run into a new potential issues with regards to household selection that can affect our results. For one, households with children age six, were reporting being covered by the insurance program, when they were not eligible. If the program did allow some children of this age group to enter the program, then households in the control group may have benefited from the program and the control group may have been impacted by the 2005 law. In order to eliminate this possibility, we remove all households from the control group with children who were the age of six and re run the regressions. In Figure 3, comparing column 1 & 2 we see that our results are not

sensitive to this selection bias works in our favor. From Figure 1 it is clear that only 40% of the households were aware of the program in 2006. Even if there was full compliance, it would be hard to argue that households had enough time to change their spending and employment behavior so quickly in response to the program. In the robustness check –Longterm Effects (Figure 3), we estimate the program's impacts using only 2008 data. As per intuition, we find that the absolute value of the magnitudes of all expenditures increase, showing that over the long term effects the program has a greater impact on resource allocations. Three, using the age of the child to determine if a household is treated or not poses a problem when the households have children between the ages of six to eight. It is possible six year olds in 2006 may have received some treatment in 2005 and hence their households may have changed their resource allocations in response to the same. Six to eight year olds in 2008, were 3-5 years in 2005 and may have received some treatment between 2005 and 2008. Hence, households with children in these age groups may be on a different development pathway having received CHI in the past. To account for the impact of past treatment, we set up two robustness checks –Past Treated and Without Past Treated. For the former, we interact a (past treatment) dummy for having any children between six to eight in 2008 and six years in 2006 with the post dummy. For the latter, we drop households with these children. This provides us a control group which never received the program. In the former case, the estimated coefficient of β_3 remains unchanged but in the latter case, the absolute value of all coefficients increase, showing that the results presented in the main section may be underestimating, at best, the true impact of the program. Finally, a concerned readers could argue households with children who much older spend less on human capital since children can fend for themselves in the labor market. Hence the results from the main specifications would over-state the impact of the program. To show that the results are not sensitive to this choice, we reduce the number of control households to those with children up to a maximum of 15 years, 14 years and up to 12 years and rerun our results. The results of these regressions are presented in Table 9. Here we see that as the age of the oldest child in the household becomes smaller, coefficients increase in magnitude.

The last robustness check for the analysis involves the HCFP selection criteria used in this paper. Even though the HCFP cutoff is constructed by carefully using information of the program gleaned from multiple sources, this selection may still lead to arbitrary results if too many HCFP households found their way into the final sample. In Figure 4 & Table 10, I also use alternate criteria to select whether a household was eligible for the HCFP program or not and show that this preferred criteria does as well as any other. First, in Table 10 I exclude households with different cut offs and show both the results are robust. I also include falsification tests where I run the regressions for only households who are assumed to be covered by HCFP and find that HCFP household behave differently than my sample. In addition, in Figure 4, I drop all households where the highest educated male has no education since their households are more likely to be poor and hence covered by the HCFP program. In almost all the cases, the criteria for choosing the non HCFP household is robust and the estimated coefficients reflect the criteria chosen in the preferred specification.

7 Discussion & Conclusions

While most economic theory surmises that households simply aggregate their preferences over individuals who co-locate in their premises that share resources using a benevolent principle of distribution, the intra household theories have a more realistic description of the process of resource allocation. Income constrained households are known to allocate resources to members whom they consider to be the most successful in increasing household welfare both in the short and the long run. As a result, it is not uncommon to see women or girl children from the same households have worse nutrition or education outcomes compared to their male counterparts. Government interventions that do not account for these rational and efficient but inequitable decision making processes within households, may thus find that their desired outcomes will be skewed in favor of one group of individuals over another.

In this paper, I set out to show that having a targeted health insurance program for

children under the ages of five, can lead to households exhibiting reinforcing investment strategies. This results in allocation of resources in ways that may be undesirable for members not eligible for government programs. In developing countries, government subsidized health insurance is implemented with the goals of increasing access, reducing out of pocket spending during health visits and providing financial protection to households against catastrophic health expenditures that arise from major health shocks. Overall the empirical evidence provided in the paper suggests that beneficiary households allocate less human capital expenditures on ineligible (older) children. Older siblings see a (relative) reduction in their educational and health expenditures when their younger siblings have access to the free health insurance program compared to peers who live in households who do not receive the health insurance. The decrease in health spending cannot be explained by the children in the beneficiary households getting healthier. The decrease in education spending does not come from parents pulling their children out of school either. Instead, it would seem that households reduce non essential expenditures, such as private spending by more. Of course, a caveat here is that if private spending is essential in human capital development in Vietnam, this may affect the older child in the long term. Alternatively, if education spending has been allocated inefficiently to start with, this would lead to households responding by reallocating spending towards other household goods. The final effect that we see is that beneficiary households also make their ineligible children work more, both outside and inside the home. Changing returns in the labor market over time cannot account for these difference.

The analysis above presents a new challenge on health insurance allocations. Evidence from the literature that suggested that the indirect income effects of health insurance programs can be beneficial if it increases non-medical consumption and reduces job lock . However, there could be unintended consequences of these programs if the cross price effects across household goods and individuals outweigh the income effects that come from lowering the price of health care. If households are optimizing publically provided resources based on some internally determined allocation strategy, the net developmental benefit for family members not covered by health insurance may not

always be positive. Alternatively, if the cross price effect increases intra-household resource allocation efficiency, then there maybe a positive impacts on welfare. Thus, this paper re-iterates the need for quantifying the intra-household repercussions of these intra-household decisions as part of policy evaluations.

8 Tables

Summary Statistics

Table 1: Summary Statistics for Controls

	All mean/sd	Pre Period TreatedHH mean/sd	Pre Period ControlHH mean/sd	Difference T-C	Difference Pre-post
Urban	0.25	0.22	0.24	-0.03**	0.01
	(0.43)	(0.41)	(0.42)		
Ethnic Majority	0.93	0.89	0.92	-0.02*	0.03***
	(0.26)	(0.31)	(0.28)		
Female Education (Yrs)	7.54	7.21	7.26	-0.10	0.58***
	(3.48)	(3.40)	(3.54)		
Male Education (Yrs)	7.82	7.46	7.49	-0.06	0.057***
	(3.67)	(3.57)	(3.81)		
log income	10.56	10.30	10.26	-0.00	-0.62***
	(1.27)	(0.85)	(0.87)		
No. CU6	0.45	1.23	0.00	1.23***	0.00
	(0.64)	(0.47)	(0.00)		
No. 6 to 12	0.76	0.76	0.99	-0.26***	-0.34***
	(0.81)	(0.85)	(0.87)		
No. 12 to 17	0.91	0.40	1.24	-0.85***	-0.03
	(0.94)	(0.76)	(0.98)		
No. 18 to 60	2.25	2.34	2.16	0.17***	0.01
	(0.93)	(0.97)	(0.87)		
Agriculture Household	0.66	0.70	0.70	0.00	-0.07***
	(0.47)	(0.46)	(0.46)		
Self Employed Head	0.83	0.84	0.84	0.00	-0.01*
	(0.38)	(0.36)	(0.36)		
Female Head	0.21	0.20	0.21	-0.01	-0.02***
	(0.40)	(0.40)	(0.41)		
Age Head (Yrs)	45.68	43.22	45.85	-2.67***	0.76***
	(12.24)	(14.90)	(11.12)		
Observations	56417	9644	16321		

Pre - pre period, Post - Post Period; TreatHH: Households with Children Under six
ControlHH: Households with children six to seventeen
T - C = TreatHH - ControlHH (Pre-period), Post - Pre = Post Period - Pre Period (Control group)
p values (* 0.10 ** 0.05 *** .01),(controlling for province FE, year FE and clustering by province)

Table 2: Summary Statistics: Child Spending ('000 DNG per month)

	All mean/sd	Pre TreatedHH mean/sd	Pre ControlHH mean/sd	Post TreatHH mean/sd	Post ControlHH mean/sd	DID
Ineligible Child per month exp ('000 DNG)						
Health	80.09	39.37	79.81	53.58	116.25	-22.66**
	(459.22)	(282.23)	(426.02)	(380.51)	(581.20)	
Education	102.80	47.69	121.87	59.07	139.82	-6.56**
	(165.10)	(97.63)	(143.48)	(140.93)	(204.52)	
Ineligible Children Work Hours per day						
Work Outside Home	1.27	0.86	1.99	0.46	1.33	0.26**
	(3.21)	(2.81)	(3.89)	(2.01)	(3.17)	
Housework	0.93	0.50	1.27	0.44	1.13	0.08*
	(1.42)	(1.18)	(1.67)	(0.98)	(1.39)	
labels('"Observations"')	56417	9644	16321	11233	19219	

Pre - pre period, Post - Post Period, TreatHH: Households with children under six, ControlHH: Households with older children only
DID = Post Treat - Post Control - (Pre Treat - Pre control), star(* 0.10 ** 0.05 *** .01)

Outcomes

Table 3: Spending For Ineligible Chhildre ('000 DNG per month)

	Reg1	Reg2	HCFPHH	Falsification
	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)
	Health Related Spending			
HH with CU6	-40.44***	2.47	-16.47*	-9.30
	(4.49)	(8.75)	(6.34)	(8.75)
Post05	36.44***	104.20***	48.92**	
	(6.08)	(12.33)	(15.34)	
Post05 * HHCU6	-22.22**	-25.77***	-11.90	
	(7.16)	(6.65)	(8.03)	
Post03				228.25***
				(54.26)
Post03 * HHCU6				-17.70
				(13.99)
r2	0.00	0.02	0.02	0.02
Sample Mean	79.81	79.81	79.81	79.81
	Education Related Spending			
HH with CU6	-74.18***	-18.89***	-25.77***	-32.01***
	(5.39)	(2.63)	(3.55)	(3.91)
Post 2005	17.95***	88.11***	-8.27	
	(4.43)	(19.57)	(13.72)	
Post05 * HHCU6	-6.56**	-17.84***	-1.11	
	(2.62)	(3.64)	(2.30)	
Post 2003				156.93***
				(17.30)
Post03 * HHCU6				-5.08
				(3.48)
r2	0.05	0.27	0.31	0.35
Sample Mean	121.87	121.87	121.87	121.87
Obs	56417	56417	11662	25965
Controls		Y	Y	Y
ProvinceFE		Y	Y	Y
SurveyYearFE		Y	Y	Y
Cluster1	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), ^{MPre} - Mean of pre period treated household
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head
HCFPHH - households above the cutouff, Falsification - Pre period trends

Table 4: Work by Ineligible Children (Hours per Day)

	Reg1	Reg2	HCFPHH	Falsification
	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)
		Work outside Home		
HH with CU6	-1.13***	0.11	0.51*	0.40***
	(0.08)	(0.06)	(0.22)	(0.07)
Post05	-0.66***	-0.53***	-0.18	
	(0.08)	(0.10)	(0.19)	
Post05 * HHCU6	0.27**	0.29***	0.10	
	(0.09)	(0.07)	(0.18)	
Post03				-0.29
				(0.24)
Post03 * HHCU6				-0.12
				(0.09)
r2	0.03	0.24	0.39	0.28
Sample Mean	1.99	1.99	1.99	1.99
		Housework		
HH with CU6	-0.77***	-0.12***	-0.33***	-0.07*
	(0.04)	(0.03)	(0.06)	(0.03)
Post05	-0.13**	-0.04	-0.24*	
	(0.04)	(0.05)	(0.11)	
Post05 * HHCU6	0.07*	0.07*	0.29***	
	(0.03)	(0.03)	(0.07)	
Post03				-0.24*
				(0.11)
Post03 * HHCU6				-0.02
				(0.04)
r2	0.06	0.25	0.34	0.26
Sample Mean	1.27	1.27	1.27	1.27
Obs	56417	56417	11662	25965
Controls		Y	Y	Y
ProvinceFE		Y	Y	Y
SurveyYearFE		Y	Y	Y
Cluster1	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), ^{MPre} - Mean of pre period treated household
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head
HCFPHH - households above the cutouff, Falsification - Pre period trends

Mechanisms

Table 5: M1: Sick Days

	EligibleChild DaysSick b/se (1)	IneligibleChild - DaysSick b/se (2)	HealthVisits b/se (3)	StudentHI b/se (4)
HH with CU6	1.74***	-0.41	0.00	-0.00
	(0.57)	(0.50)	(0.02)	(0.02)
Post 2005	0.46	0.81	0.40***	-0.17***
	(0.41)	(0.67)	(0.03)	(0.03)
Post05 * HHCU6	-1.28***	0.52	-0.12***	-0.07***
	(0.41)	(0.42)	(0.02)	(0.02)
r2	0.08	0.03	0.16	0.22
Obs	36323	36323	56417	36323
Sample Mean	0	4.66	1.12	.58
Controls	Y	Y	Y	Y
ProvinceFE	Y	Y	Y	Y
SurveyYearFE	Y	Y	Y	Y
Cluster1	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01)
Controls include urban dummy, ethnicity dummy,
mother_education in yrs, father_education in yrs, log income,
Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head
Data for sick days for 2002 is not available in the VLSS surveys

Table 6: M2: Education Spending

	School Fee b/se (1)	Private Educ Fee b/se (2)	Prob of Dropout b/se (3)
HH with CU6	-18.61***	-0.28	-0.03
	(2.50)	(0.64)	(0.05)
Post 2005	66.43***	21.68***	-0.15***
	(12.33)	(8.06)	(0.04)
Post05 * HHCU6	-14.16***	-3.69**	-0.11***
	(2.96)	(1.68)	(0.04)
r2	0.26	0.04	
Obs	56417	56417	56417
Sample Mean	117.75	4.12	.24
Controls	Y	Y	Y
ProvinceFE	Y	Y	Y
SurveyYearFE	Y	Y	Y
Cluster1	Y	Y	Y

Fees are reported in '000 DNG per month

Prob of dropout = 1 if any child 6 to 7 reports dropping out of school

OLS estimates (Cols 1 & 2), Probit estimates (Col 3: Log odds ratios in table)

p values (* 0.10 ** 0.05 *** .01), ^{P} - Pseudo R square for Col 3

Controls include urban dummy, ethnicity dummy,
mother_education in yrs, father_education in yrs, log income,
Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head

Table 7: M3A: Ineligible Child Labor Market (Hours per day)

	OH Reg1	OH Reg2	OH Reg3	OH Reg4	HW Reg1	HW Reg2	HW Reg3	HW Reg4
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
HH with CU6	0.11*	0.11*	0.10*	0.11*	-0.12***	-0.12***	-0.13***	-0.12***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.03)	(0.03)	(0.03)	(0.03)
Post 2005	-0.58***	-1.02***	-1.12***	-0.35***	-0.04	-0.32***	-0.34***	0.01
	(0.10)	(0.09)	(0.09)	(0.10)	(0.05)	(0.03)	(0.04)	(0.04)
Post05 * HHCU6	0.29***	0.29***	0.30***	0.29***	0.07**	0.08***	0.08***	0.07**
	(0.07)	(0.06)	(0.06)	(0.07)	(0.03)	(0.03)	(0.03)	(0.03)
r2	0.24	0.24	0.24	0.24	0.25	0.26	0.26	0.25
Obs	56417	56417	56417	56417	56417	56417	56417	56417
Sample Mean	1.99	1.99	1.99	1.99	1.27	1.27	1.27	1.27
Controls	Y	Y	Y	Y	Y	Y	Y	Y
SurveyYearFE	Y	Y	Y	Y	Y	Y	Y	Y
Cluster1	Y	Y	Y	Y	Y	Y	Y	Y
ProvinceFE	Y			Y	Y			Y
UrbanxTime	Y		Y		Y		Y	
ProvincexTime		Y	Y			Y	Y	
AgHHxTime				Y				Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), OH - Work Outside Home, HW - housework
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head
UbranxTime, ProvincexTime, AgricultureHH x Time control flexibly for difference across years

Table 8: M4A: Ineligible Child Labor Hours per Day (by Gender)

	Boy_OH	Boy_HW	Girl_OH	Girl_HW
	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)
HH with CU6	0.04	-0.10***	0.07**	-0.02
	(0.05)	(0.02)	(0.03)	(0.02)
Post 2005	-0.12**	-0.02	-0.40***	-0.02
	(0.06)	(0.02)	(0.05)	(0.03)
Post05 * HHCU6	0.10**	0.02	0.19***	0.05**
	(0.05)	(0.02)	(0.04)	(0.02)
r2	0.13	0.12	0.13	0.15
Obs	56417	56417	56417	56417
Sample Mean	1.02	.53	.96	.74
Controls	Y	Y	Y	Y
ProvinceFE	Y	Y	Y	Y
SurveyYearFE	Y	Y	Y	Y
Cluster1	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), OH - Work Outside Home, HW - Housework
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head

Robustness Checks

Table 9: Robustness Check: Changing Max Age of Child in Household

	Under16	Under15	Under14	Under13	Under12
	b/se	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)	(5)
Health Spending ('000DNG)					
Post05 * HHCU6	-28.52***	-31.67***	-35.83***	-39.67***	-41.57***
	(6.90)	(7.46)	(8.01)	(8.92)	(9.20)
r2	0.02	0.02	0.02	0.02	0.02
Sample Mean	79.81	79.81	79.81	79.81	79.81
Education Spending ('000DNG)					
Post05 * HHCU6	-17.41***	-17.52***	-17.90***	-18.72***	-20.28***
	(3.66)	(3.77)	(4.03)	(4.35)	(4.58)
r2	0.27	0.27	0.28	0.28	0.27
Sample Mean	121.87	121.87	121.87	121.87	121.87
Work outside Home (hours per day)					
Post05 * HHCU6	0.29***	0.33***	0.35***	0.34***	0.31***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
r2	0.24	0.25	0.26	0.27	0.28
Sample Mean	1.99	1.99	1.99	1.99	1.99
Housework (Hours per Day)					
Post05 * HHCU6	0.07**	0.07**	0.07**	0.07**	0.06*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
r2	0.26	0.27	0.28	0.28	0.29
Sample Mean	1.27	1.27	1.27	1.27	1.27
Obs	53847	51257	48333	45333	42277
Controls	Y	Y	Y	Y	Y
ProvinceFE	Y	Y	Y	Y	Y
SurveyYearFE	Y	Y	Y	Y	Y
Cluster1	Y	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), ^{MPre} - Mean of pre period treated household
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head

Table 10: Robustness Check: Changing Cutoffs for HCFP Selection

	non HCFP HH			Cutoff Falsification		
	<50%	<60%	<70%	>=50%	>=60%	>=70%
	b/se	b/se	b/se	b/se	b/se	b/se
	(1)	(2)	(3)	(4)	(5)	(6)
Post05 * HHCU6	-25.77***	-25.47***	-24.80***	-11.90	-10.92	-10.89
	(6.65)	(6.63)	(6.59)	(8.03)	(8.85)	(8.03)
r2	0.02	0.02	0.02	0.02	0.02	0.02
Sample Mean	79.81	79.81	79.81	79.81	79.81	79.81
Post05 * HHCU6	-17.84***	-15.95***	-14.76***	-1.11	-0.85	-2.71
	(3.64)	(3.37)	(3.25)	(2.30)	(2.12)	(1.90)
r2	0.27	0.27	0.27	0.31	0.31	0.33
Sample Mean	121.87	121.87	121.87	121.87	121.87	121.87
Post05 * HHCU6	0.29***	0.26***	0.26***	0.10	0.05	-0.00
	(0.07)	(0.07)	(0.07)	(0.18)	(0.18)	(0.18)
r2	0.24	0.24	0.24	0.39	0.40	0.41
Sample Mean	1.99	1.99	1.99	1.99	1.99	1.99
Post05 * HHCU6	0.07**	0.06*	0.06*	0.29***	0.31***	0.29***
	(0.03)	(0.03)	(0.03)	(0.07)	(0.07)	(0.07)
r2	0.25	0.25	0.25	0.34	0.34	0.35
Sample Mean	1.27	1.27	1.27	1.27	1.27	1.27
Obs	56417	57740	58471	11662	10339	9608
Controls	Y	Y	Y	Y	Y	Y
ProvinceFE	Y	Y	Y	Y	Y	Y
SurveyYearFE	Y	Y	Y	Y	Y	Y
Cluster1	Y	Y	Y	Y	Y	Y

OLS estimates, p values (* 0.10 ** 0.05 *** .01), ^{MPre} - Mean of pre period treated household
Controls include urban dummy, ethnicity dummymother_education in yrs,
father_education in yrs, log income, Number of children under six, number of children 6 to 17,
number of adults, agriculture hh dummy, self employed dummy,
female head of household, age of household head

9 Figures

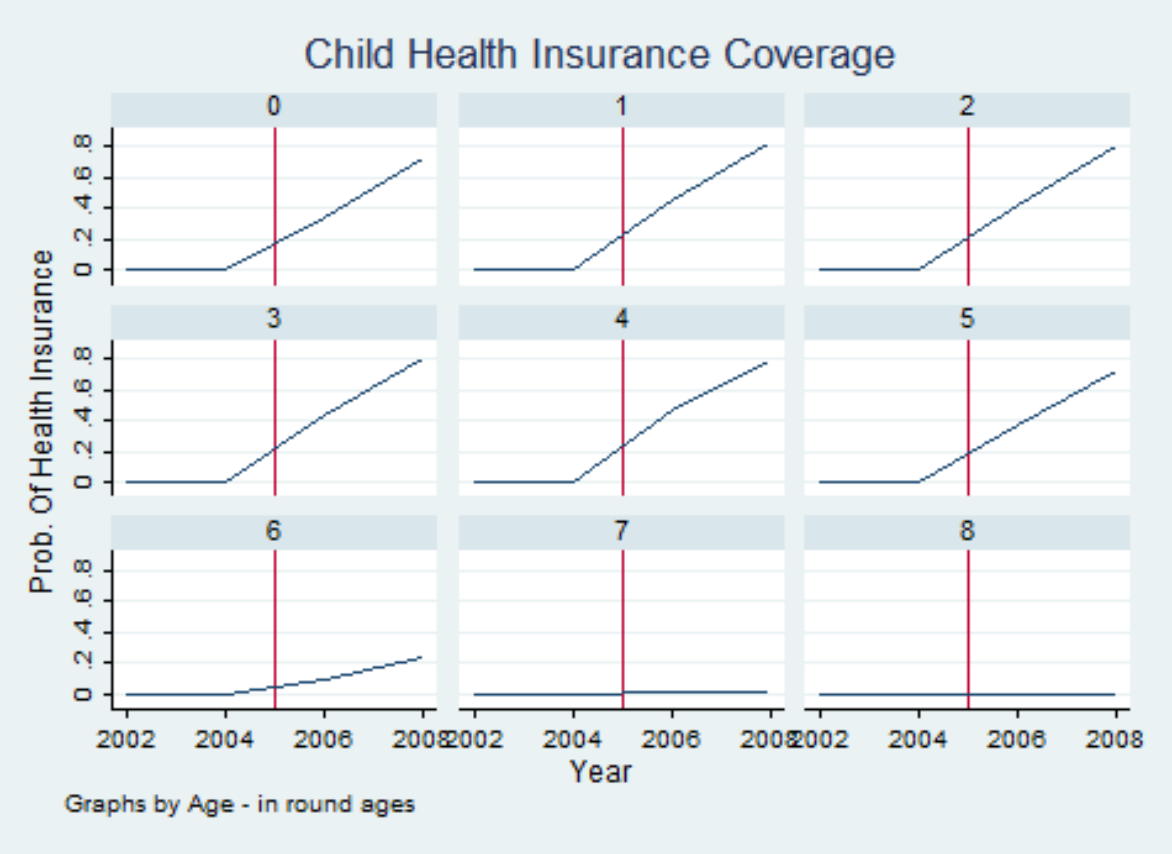
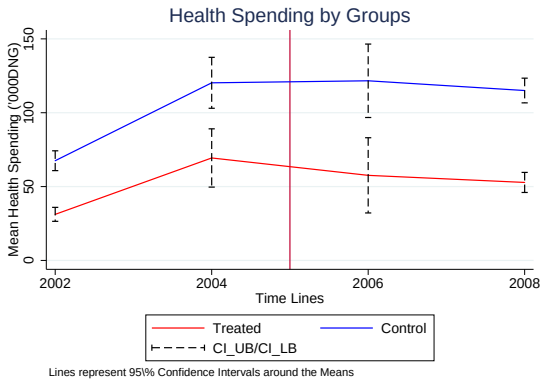
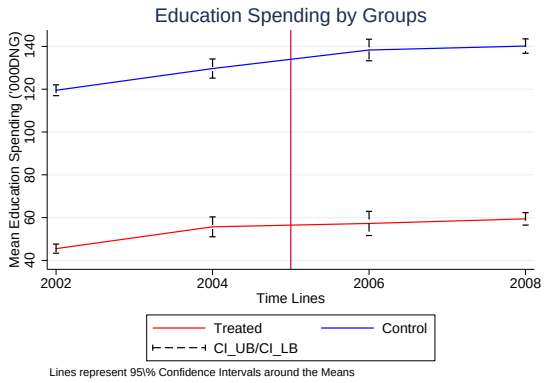


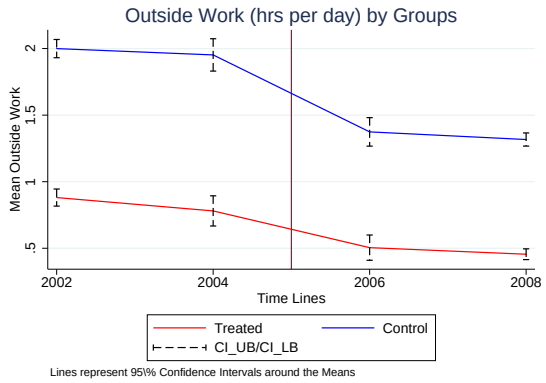
Figure 1: CHI take up



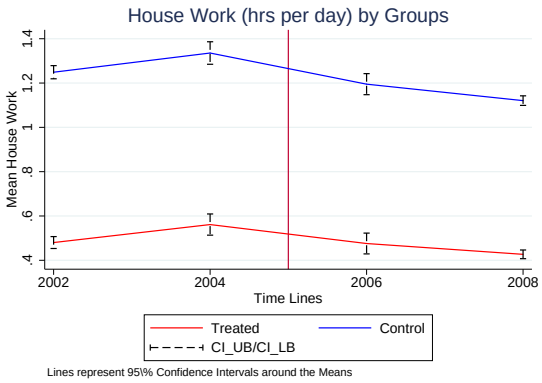
(a) Health Spending



(b) Education Spending

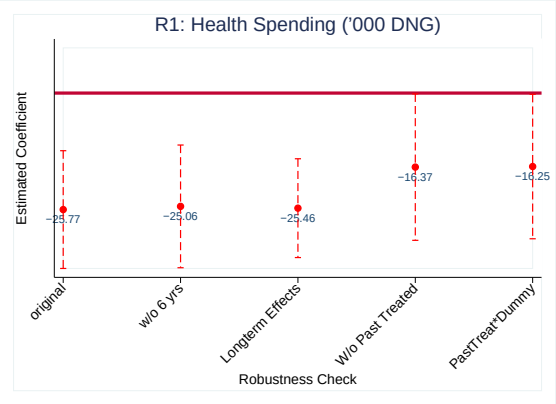


(c) Work Outside Home

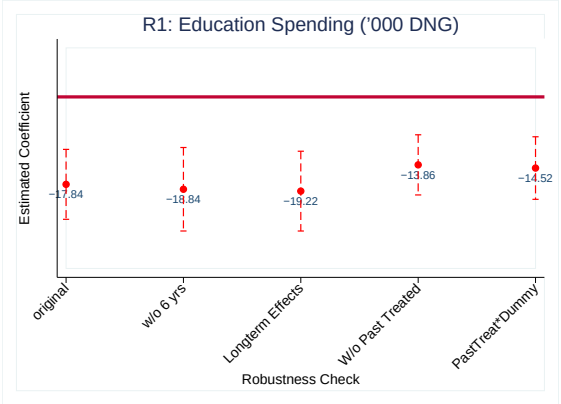


(d) Housework

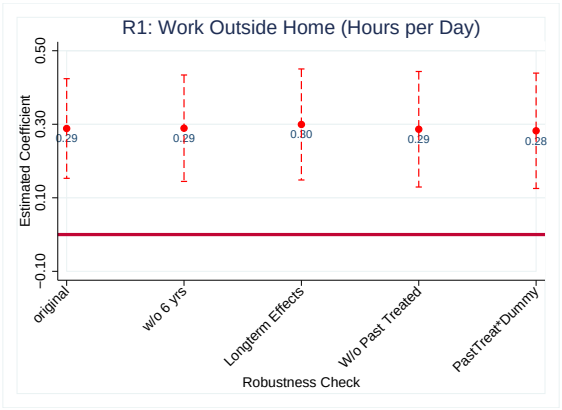
Figure 2: Outcomes Trends by Years



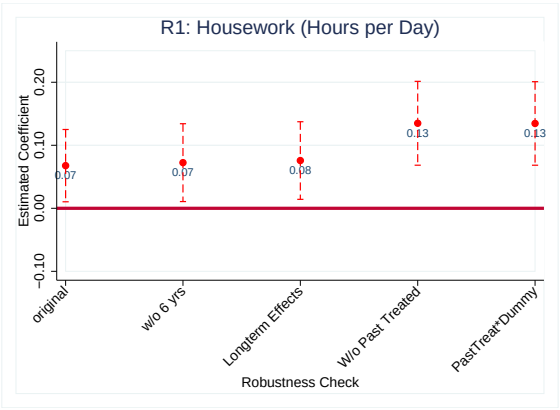
(a) Health Spending



(b) Education Spending

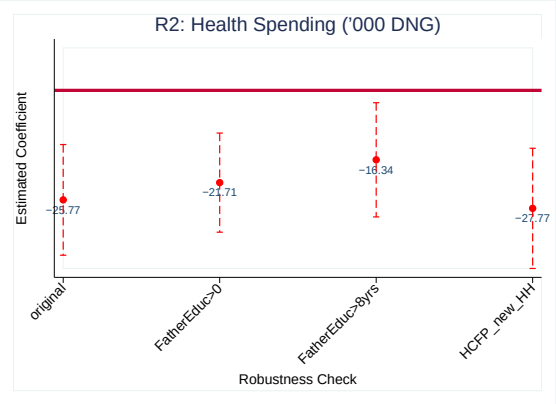


(c) Work Outside Home

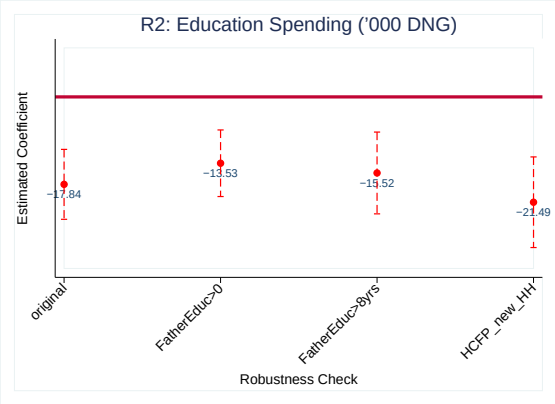


(d) Housework

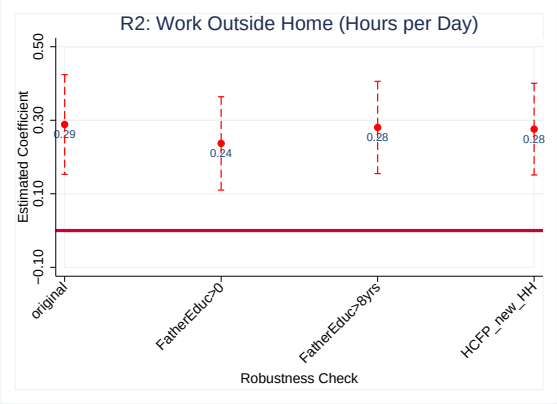
Figure 3: Robustness Check on Age Eligibility



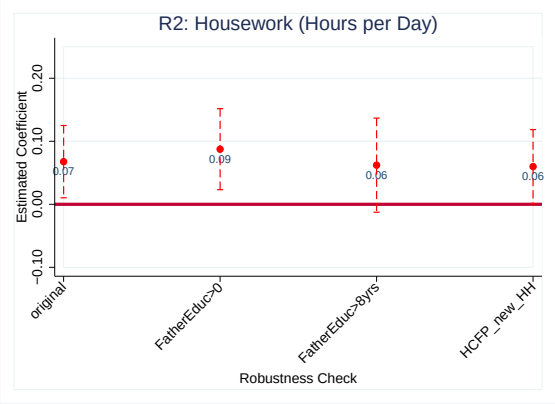
(a) Health Spending



(b) Education Spending



(c) Work Outside Home



(d) Housework

Figure 4: Robustness Check on Alternative HCFP Criteria

References

Adhvaryu, A. and A. Nyshadham (2016). Endowments at birth and parents' investments in children. *The Economic Journal 126*(593), 781–820.

Aiyar, A. and S. Venugopal (2017). A macromarketing approach to addressing the ethical challenge of market inclusion in base of the pyramid markets. Working paper.

Alderman, H., P.-A. Chiappori, L. Haddad, J. Hoddinott, and R. Kanbur (1995). Unitary versus collective models of the household: is it time to shift the burden of proof? *The World Bank Research Observer 10*(1), 1–19.

Almond, D. and J. Currie (2011). Killing me softly: The fetal origins hypothesis. *Journal of economic perspectives 25*(3), 153–72.

Axelson, H., S. Bales, P. D. Minh, B. Ekman, and U.-G. Gerdtham (2009). Health financing for the poor produces promising short-term effects on utilization and out-of-pocket expenditure: evidence from vietnam. *International Journal for Equity in Health 8*, 20.

Baicker, K., S. L. Taubman, H. L. Allen, M. Bernstein, J. H. Gruber, J. P. Newhouse, E. C. Schneider, B. J. Wright, A. M. Zaslavsky, and A. N. Finkelstein (2013). The oregon experiment—effects of medicaid on clinical outcomes. *New England Journal of Medicine 368*(18), 1713–1722.

Basu, A. and D. Meltzer (2005). Implications of spillover effects within the family for medical cost-effectiveness analysis. *Journal of health economics 24*(4), 751–773.

Becker, G. S. (1960). An economic analysis of fertility. In *Demographic and economic change in developed countries*, pp. 209–240. Columbia University Press.

Behrman, J. R. (1988). Intrahousehold allocation of nutrients in rural india: Are boys favored? do parents exhibit inequality aversion? *Oxford Economic Papers 40*(1), 32–54.

Behrman, J. R. and A. B. Deolalikar (1993). The intrahousehold distribution of market labour supply in rural south india. *Oxford Bulletin of Economics and Statistics 55*(4), 409–420.

Braido, L. H., P. Olinto, and H. Perrone (2012). Gender bias in intrahousehold allocation: Evidence from an unintentional experiment. *Review of Economics and Statistics 94*(2), 552–565.

Browning, M. and P.-A. Chiappori (1998). Efficient intra-household allocations: A general characterization and empirical tests. *Econometrica*, 1241–1278.

Busch, S. H. and N. Duchovny (2005). Family coverage expansions: impact on insurance coverage and health care utilization of parents. *Journal of health economics 24*(5), 876–890.

Cherchye, L., B. De Rock, and F. Vermeulen (2012). Married with children: A collective labor supply model with detailed time use and intrahousehold expenditure information. *American Economic Review 102*(7), 3377–3405.

Chiappori, P.-A. (1992). Collective labor supply and welfare. *Journal of political Economy 100*(3), 437–467.

Chiappori, P.-A. (1997). Introducing household production in collective models of labor supply. *Journal of Political Economy 105*(1), 191–209.

Deaton, A. (1997). *The analysis of household surveys: a microeconometric approach to development policy*. World Bank Publications.

Duflo, E. and C. Udry (2004). Intrahousehold resource allocation in cote d'ivoire: Social norms, separate accounts and consumption choices. Technical report, National Bureau of Economic Research.

Dupas, P. (2011). Health behavior in developing countries. *Annu. Rev. Econ. 3*(1), 425–449.

Ejrnæs, M. and C. C. Pörtner (2004). Birth order and the intrahousehold allocation of time and education. *Review of Economics and Statistics 86*(4), 1008–1019.

Finkelstein, A. and R. McKnight (2008). What did medicare do? the initial impact of medicare on mortality and out of pocket medical spending. *Journal of public economics 92*(7), 1644–1668.

Fitzpatrick, A. and R. Thornton (2017). *The effects of health insurance within families: experimental evidence from Nicaragua*. The World Bank.

Garg, A. and J. Morduch (1998). Sibling rivalry and the gender gap: Evidence from child health outcomes in ghana. *Journal of Population Economics 11*(4), 471–493.

Gruber, J. and B. C. Madrian (2002). Health insurance, labor supply, and job mobility: a critical review of the literature. Technical report, National Bureau of Economic Research.

Islam, M. and J. Hoddinott (2009). Evidence of intrahousehold flypaper effects from a nutrition intervention in rural guatemala. *Economic development and cultural change 57*(2), 215–238.

Jacobson, L. (2000). The family as producer of health—an extended grossman model. *Journal of Health Economics 19*(5), 611–637.

Jacoby, H. G. (2002). Is there an intrahousehold 'flypaper effect'? evidence from a school feeding programme. *The Economic Journal 112*(476), 196–221.

Jayachandran, S. and R. Pande (2017). Why are indian children so short? the role of birth order and son preference. *American Economic Review 107*(9), 2600–2629.

Kaestner, R., B. Garrett, J. Chen, A. Gangopadhyaya, and C. Fleming (2017). Effects of aca medicaid expansions on health insurance coverage and labor supply. *Journal of Policy Analysis and Management 36*(3), 608–642.

Koch, T. G. (2015). All internal in the family? measuring spillovers from public health insurance. *Journal of Human Resources 50*(4), 959–979.

Leight, J. (2017). Sibling rivalry: Endowment and intrahousehold allocation in gansu province, china. *Economic Development and Cultural Change 65*(3), 457–493.

Li, L. and X. Wu (2011). Gender of children, bargaining power, and intrahousehold resource allocation in china. *Journal of Human Resources 46*(2), 295–316.

Lieberman, S. S. and A. Wagstaff (2009). *Health financing and delivery in Vietnam: looking forward*. World Bank Publications.

Liu, K. (2016). Insuring against health shocks: Health insurance and household choices. *Journal of Health Economics*.

Maggs, P. and J. Hoddinott (1999). The impact of changes in common property resource management on intrahousehold allocation. *Journal of Public Economics 72*(2), 317–324.

Nguyen, B. T. (2014, Feb). *Two Essays on Health Care in Vietnam*. Ph. D. thesis, University of Illinois, Chicago.

Nguyen, H. and W. Wang (2013). The effects of free government health insurance among small children—evidence from the free care for children under six policy in vietnam. *The International journal of health planning and management 28*(1), 3–15.

Palmer, M., S. Mitra, D. Mont, and N. Groce (2014). The impact of health insurance for children under age 6 in vietnam: A regression discontinuity approach. *Social Science & Medicine*.

Pitt, M. M. and M. R. Rosenzweig (1990). Estimating the intrahousehold incidence of illness: Child health and gender-inequality in the allocation of time. *International Economic Review*, 969–989.

Rosenzweig, M. R. and T. P. Schultz (1982). Market opportunities, genetic endowments, and intrafamily resource distribution: Child survival in rural india. *The American Economic Review 72*(4), 803–815.

Saksena, P., A. F. Antunes, K. Xu, L. Musango, and G. Carrin (2011). Mutual health insurance in rwanda: evidence on access to care and financial risk protection. *Health policy 99*(3), 203–209.

Sepehri, A., S. Sarma, and U. Oguzoglu (2011). Does the financial protection of health insurance vary across providers? vietnam's experience. *Social Science & Medicine 73*(4), 559–567.

Sommers, B. D. (2006). Insuring children or insuring families: Do parental and sibling coverage lead to improved retention of children in medicaid and chip? *Journal of Health Economics 25*(6), 1154 – 1169.

Strauss, J., G. Mwabu, and K. Beegle (2000). Intrahousehold allocations: a review of theories and empirical evidence. *Journal of African Economies 9*(Supplement_1), 83–143.

Thomas, D. (1990). Intra-household resource allocation: An inferential approach. *Journal of human resources*, 635–664.

Thomas, D., J. Strauss, and M.-H. Henriques (1991). How does mother's education affect child height? *Journal of human resources*, 183–211.

Udry, C., J. Hoddinott, H. Alderman, and L. Haddad (1995). Gender differentials in farm productivity: implications for household efficiency and agricultural policy. *Food policy 20*(5), 407–423.

Wagstaff, A. (2007). Health insurance for the poor: initial impacts of vietnam's health care fund for the poor. *World Bank Policy Research Working Paper* (4134).

Wagstaff, A. (2010). Estimating health insurance impacts under unobserved heterogeneity: the case of vietnam's health care fund for the poor. *Health economics 19*(2), 189–208.

Wagstaff, A. and E. v. Doorslaer (2003). Catastrophe and impoverishment in paying for health care: with applications to vietnam 1993-1998. *Health economics 12*(11), 921–933.

Wagstaff, A. and M. Pradhan (2005). *Health insurance impacts on health and nonmedical consumption in a developing country*, Volume 3563. World Bank Publications.

Yi, J., J. J. Heckman, J. Zhang, and G. Conti (2015). Early health shocks, intrahousehold resource allocation and child outcomes. *The Economic Journal 125*(588), F347–F371.

Zimmermann, L. (2012). Reconsidering gender bias in intrahousehold allocation in india. *Journal of Development Studies 48*(1), 151–163.

A Appendix: HCFP households identification procedure

For identifying households eligible for the HCFP program, the paper uses the following methodology –

$$Y_{ht} = \beta_0 + \sigma_k \beta_k X^k + E_{ht} \tag{11}$$

Where h is the household with children between the ages of zero to seventeen and t is the survey year. The outcome variable is a binary variable that takes the value 1 or 0 where Yht = 1 if the households reported themselves eligible for the poor health certificate, poor health insurance program and if household belonged to the provinces of Thai Nguyen, Cao Bang, Bac Kan, Lao Kai, Ha Giang, Son La, Lai Chau, Dien Bien, Son La, Hoa Binh, Kon Tum and Soc Trang. In these provinces more than 50% of the communes were selected for the decision 135 programs of the Government of Vietnam [19]. The controls (Xk) included the following - gender of head of household, education highest educated male and female in the household, ethnicity of the household, log of income, a dummy for an agriculture household, a dummy if the head of household was self employed, household compositional variables such as number of eligible children, number of ineligible children, number of adults, dummy for urban households, and survey year fixed effects and province fixed effects. Probit regressions were clustered at the level of the province. The results from the probit regression are used to estimate a predicted probability of being covered by the HCFP program after conditioning on covariates. In the main regression results households who received the cutoff of less than 50% were included in the final sample. In Table A1, we provide the marginal

[19]The reason we choose this cutoff of 50% comes from the following explanation. Information on individual communes covered by federal funding under the Decision 135 provisions can be found online but information to commune numbers across data sets is not available. This makes it hard to reconcile information from the decision 135 provisions on those commune covered with the commune numbers from the VHLSS. There is also no information from external sources that we have identified that can match the commune names and their numbers. The only information that can be reconciled is information on the province names and province numbers from the Decision 135 provision and the survey's province numbers. To take care of this issue, we tally up information on the percentage of communes that were covered in each province and identify those provinces where more than 50% of the communes have been covered by the Decision 135 program. If this is the case, we consider the entire province to be covered by the HCFP program.

effects of 2 different models and their predicted probabilities to show how the chosen model works relative to others. Column 1: uses information from those who reported having HCFP or not as the outcome of interest. Column 2: is our preferred specification as it uses information from the program to construct the probability of being covered thus avoiding any misreporting by households who were not eligible but received the program.

Table 11: HCFP HH

	(1) HCFP1 b/se	(2) HCFP2 b/se
Urban	-0.170***	-0.130***
	(0.0344)	(0.0351)
Ethnic Majority	-0.594***	-0.599***
	(0.0650)	(0.0713)
Female Education (Yrs)	-0.032***	-0.031***
	(0.0030)	(0.0031)
Male Education (Yrs)	-0.032***	-0.033***
	(0.0027)	(0.0028)
No. CU6	0.091***	0.105***
	(0.0127)	(0.0126)
No. 6 to 12	0.073***	0.086***
	(0.0116)	(0.0118)
No. 12 to 17	0.035***	0.043***
	(0.0113)	(0.0119)
No. 18 to 60	-0.005	-0.014*
	(0.0070)	(0.0076)
Agriculture Household	0.302***	0.271***
	(0.0344)	(0.0348)
Self Employed Head	-0.273***	-0.288***
	(0.0434)	(0.0424)
Female Head	0.119***	0.112***
	(0.0201)	(0.0216)
Age Head (Yrs)	0.012***	0.013***
	(0.0010)	(0.0011)
Pseudor2	0.224	0.448
Obs	68079	68079
ProvinceFE	Y	Y
SurveyFE	Y	Y
Cluster	Y	Y

Probit Estimates