Do Moms Matter More?
The Relative Returns to Maternal Health

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Abstract

This paper investigates the effects of paternal and maternal health on child health and human capital outcomes. We demonstrate that both paternal and maternal health matter importantly, even when employing child fixed effects and controlling for parental education and family. However, we find that maternal health is a more important determinant of child health – poor maternal health increases the likelihood of poor child health by approximately fifty percent. The long-run effect of maternal health extends to adulthood – children whose mothers suffered health shocks are less likely to complete high school. These results suggest that policy makers need to take into account substantial and complex spillover effects when designing health interventions aimed at the family.

JEL classifications: I12, J130, J160

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I. Introduction

There is increasing recognition among scholars and policy makers alike that health is important not only for its own sake, but also for human capital development and economic well-being. In addition, there may be spillover effects of an individual's health onto his or family. In this paper, we investigate the economic returns to parental health. Since the primary income earner tends to be the father, some have surmised that paternal health may be the main determinant of family well-being. Indeed, previous literature has shown health shocks to the household head could lead to dire consequences for the family (Gertler and Gruber 2002). However, since mothers tend to be the primary care-giver in the family, maternal health could arguably play an equally, if not more, important role. The in-utero environment has also been shown to be influential on later life outcomes of the child (Almond and Currie 2011). In addition, mothers tend to allocate more household resources towards investment in human capital outcomes of their children relative to fathers (Thomas 1990). There is also mounting evidence of widespread intergenerational transmission of health from mothers to children (Bhalotra and Rawlings 2011).

This paper attempts to paint a more comprehensive picture of how maternal and paternal health affects household welfare. The challenge of identifying the impact of parental health is the issue of endogeneity, i.e., parents who invest less in their own health may also invest less in their children's human capital outcomes. In other words, there could be unobserved factors influencing both parental health and children's outcomes, such as high discount rates or genetic factors. Disentangling the impact of education is also difficult – numerous studies have shown that schooling leads to better own health and child health (Breierova and Duflo, 2005; Lleras-Muney, 2005).

To tackle the issue of endogeneity, we use detailed longitudinal data from Indonesia which allows us to employ child fixed effects. Our empirical strategy hence exploits variation in parental health and "differences out" the impact of unobserved time-invariant factors that could affect both health and schooling outcomes. Maternal health matters importantly – poor maternal health increases the likelihood her child is in poor health by as much as 50 percent. Paternal health, on the other hand, does not appear to matter significantly for child health, and we are able to rule out that the impact of paternal and maternal health are the same. School enrollment is affected only when both parents are sick, but the effect is large. Because the dataset we use follows individuals over time and even after they have split from their nucleus households, we are also able to explore long term effects of parental health. The results demonstrate that poor maternal health is associated with 10 percent reduction in the likelihood of high school completion as an adult, suggesting that the effect of parental health extends beyond childhood. We investigate possible mechanisms through which parental health matters, and find that negative health shocks to the father reduces aggregate household consumption, particularly on food and education expenditures.

To our knowledge, this paper is the first to demonstrate both the short- and long-term consequences of both maternal and paternal health on a host of important human capital outcomes. In sum, the results show that the relative returns to maternal health are high, although paternal health matters as well, especially for household consumption. From a public health perspective, the findings of this paper suggest that policy makers should consider these spillover effects when designing health interventions.

The rest of the paper proceeds as follow. Section II briefly surveys the related literature. Section III describes the data and identification strategy. Section IV reports and discusses the

findings. Section V and VI offer alternative health measures and econometric specifications as robustness checks. Section VII concludes.

II. Related literature

In developing countries where insurance and access to credit are limited, unexpected health shocks may be devastating. A broad literature examines the extent to which households are able to manage these risks ex-ante and consumption smooth ex-post. Gertler and Gruber (2002) focus on understanding households' ability to insure their consumption against illness (rather than general income shocks) in a developing country context. Using data from Indonesian Resource Mobilization Study (IRMS), the authors find that labor supply, earnings, as well as consumption are significantly and negatively associated with illness, and hence reject the hypothesis of full insurance. Subsequent papers have demonstrated more or less similar conclusions using data from other countries ranging from Ethiopia (Asfaw and von Braun, 2004; Dercon and Krishnan, 2000) to Vietnam (Wagstaff 2007) to the Western Balkans (Bredenkamp et al., 2010).

These papers that reject the notion of consumption smoothing have in turn inspired another branch of literature that delves into the subsequent impact of such shocks on the household. Within this literature, a number of papers have investigated the impact of parental death. Gertler et al. (2004) use three repeated cross-sections of household data from Indonesia find that a parent's recent death has a large negative effect on the child's school enrollment, irrespective of the gender of the child and of the parent who dies. Case and Ardington (2006) and Chen et al. (2009) show that maternal death has a much larger impact on child education using data from sub-Saharan Africa and Taiwan, respectively. A related vein of literature examines the impact of the prenatal environment on child outcomes. Drawing from the "fetal origins

hypothesis" (Barker 1995) – which posits that fetal malnutrition could lead to poor adult health outcomes – this literature investigates the long-run consequences of the in-utero environment. Almond (2006) shows that children who were exposed in-utero to the influenza pandemic of 1918 grew up to achieve fewer years of schooling. Natural experiments utilizing in-utero exposure to famines also find that poor nutrition in utero is associated with worse adult health and human capital outcomes (Almond et al., 2007; Chen and Zhou, 2007; Neelson and Stratmann, 2011).

Fewer papers have focused on the impact of morbidity, in part due to the endogenous nature of illness. In other words, it is not clear whether any observed correlations between parental health and child outcomes are causal or due to some other factor that affect both variables, such as education or high discount rates. In the context of morbidity, the impact of poor parental health could be multi-pronged. First, there are direct out-of-pocket medical expenditures to treat the ill. Second, there are indirect costs due to potential lost wages from fewer days at work and/or lower productivity. In addition, there could be spillover effects on the other members of the household, who may have to take time off from work or school to care of the sick. Household resources may be diverted away from other expenditures (such as schooling) towards medical expenses as a response to the negative income shock (Frankenberg, Smith, and Duncan, 2003; Jacoby & Skoufias, 1997). There could be psychological costs borne by children from having a sick parent, and the quantity and quality of time spent by the ill parent with the children could be compromised.

Our paper further explores the impact of both parents' health on the family. To combat the issue of endogeneity, we utilize individual fixed effects and exploit changes in health status of parents over survey waves. A similar strategy is used in Bratti and Mendola (2014), who

utilize panel data from Bosnia and Herzegovina to investigate the effect of parental morbidity on child school enrollment. They show having a young adult (age 15-24) with a mother in ill-health, but not father, is significantly less likely to be enrolled in school. However, because the IFLS contains a rich amount of information, we are able to explore multiple important human capital outcomes beyond education and also the outcomes of younger children. Furthermore, because the IFLS follows families over time, even including children after they are grown and split from their original family, we examine both short-term outcomes such as school enrollment and child health, as well as longer-term outcomes, such as labor market outcomes and educational attainment. As the results demonstrate, interventions that improve the health of a single generation could potentially produce multigenerational effects.

III. Data Description and Identification strategy

III.A. IFLS

We use data from the Indonesian Family Life Survey (IFLS), a nationally representative longitudinal survey covering both rural and urban areas. This dataset gives a nation-wide sample of households spreading across 13 of 26 provinces, and is representative of about 80 percent of the country's population. The IFLS contains a wealth of socioeconomic and demographic information about each household, and also detailed individual level information on health status, education, labor market behavior. The first wave of the survey was conducted in 1993 (IFLS1) with three more waves conducted in 1997 (IFLS2), 2000 (IFLS3) and 2007 (IFLS4). Importantly, the survey not only re-interviews original households sampled in the previous wave, but also all households split off from the original households. This allows us to identify health status of parents, contemporaneous or short-run effects on their children within the same wave, as well as longer term effects such as children's income and schooling even after they become

adults and split off into separate households. Further, there are very high tracking rates across waves, which alleviate attenuation bias due to nonrandom attrition: 94% of IFLS1 households were re-contacted in IFLS2, 95.3% in the IFLS3, and 81.7% in the IFLS4 14 years later.

As of 2014, Indonesia has begun rolling out an ambitious universal health care program, with the goal for all citizens to be covered by 2019.[1] Before 2014, there are limited social safety nets and formal health insurance, and high out-of-pocket health expenditures are common, hence providing an ideal setting to study the impact of morbidity on the household in a lower middle income country (World Bank 2005).

We measure health throughout the paper in two ways. First, we use self-reported health status. Respondents above age 15 were asked to self-assess their health, in response to the following question, "Generally, how is your health?", and choosing among the following four categories: very healthy, somewhat healthy, somewhat unhealthy, and unhealthy. Parents were asked to choose among the same categories regarding their children's health if the children were under the age of 15. We define an individual to be in ill health if she chooses in poor health or very sick. The IFLS also asked questions regarding the physical functioning abilities to perform activities of daily living (ADLs), which have been demonstrated as more reliable measures of health. The second definition of ill health we use is if the respondent finds it difficult or impossible to walk 5 km.[2]

[1] http://www.eiu.com/industry/article/1071418091/indonesia-launches-universal-healthcare/2014-01-13

[2] We also experimented with measuring health using the RAND ADL index. This index is composed of the ability of the respondent to do five intermediate activities of daily living, including: walking 5 km; bow, squat or kneel; sweep house floor yard; draw pail of water from well. The ADL index is then normalized to 100 using the following formula, (Max Score – Sum(Score))/(Max Score-Min Score) x 100. In the case of the IFLS, responses can take a value of 1if the respondent can achieve the task with easily, 3 if she can do it with difficulty, and 5 if she cannot do it at all. Hence the max score is 25 (if the respondent cannot do any of the activities) and the minimum score is 5 (if the respondent can do all 5 tasks easily). When translated into the ADL index, a score of 100 would imply the individual can complete all tasks easily, and a score of 0 would mean the individual cannot carry out any of the tasks. Results are qualitatively similar and are available upon request.

Table 1 reports the summary statistics of the key variables we use. In the entire sample, self-reported poor health is observed in around 13 percent of respondents. 26 percent of the sample report that they have difficulty in walking 5 km. Note that while we have basic demographic data for around 177,000 individuals over the 4 survey waves, the number of observations available for the different regression models varies greatly depending on the specification. For example, we have 51,479 matched observations where we have non-missing values of spousal health, and close to 80,000 observations where the mother's health can be matched to the individual. For many regressions we further restrict by age (e.g. if the dependent variable is child health). Within these restricted samples, more observations may be dropped due to lack of other missing information of dependent variables or other key control variables. The number of observations used in each model is reported in the results tables.

III.B. Econometric specification

The primary challenge of identifying the impact of parental health on child outcomes is the issue of endogeneity, or in other words, how to rule out spurious correlation from causality. Health of children and their parents may be correlated due to unobserved factors that lead parents to engage in health-damaging behaviors (for example, smoking), resulting in poor health, and also invest less in their children's health and human capital. Because the IFLS follows individuals and families over time, we can employ child fixed effects, which will then take advantage of changes in parental health status, which we interpret has health shocks, to identify the impact. As a robustness check, we also use propensity score matching techniques to create synthetic control groups in Section VI.

More formally, we estimate the following model for our baseline scenario:

$$S_{it} = \beta_0 + \beta_1 Mother\_HS_{it} + \beta_2 Father\_HS_{it} + \boldsymbol{M'}_{it}\boldsymbol{\theta}_1 + \boldsymbol{F'}_{it}\boldsymbol{\theta}_2 + \boldsymbol{H'}_{it}\boldsymbol{\theta}_3 + \rho_i + \gamma_t + \varepsilon_{it}$$

where S_{it} is the outcome of interest, such as school enrollment or health, of child *i* at time *t*. $Mother\_HS_{it}$ and $Father\_HS_{it}$ represent the mother and father's health status at time *t*. We also include a vector of maternal, paternal, household characteristics. γ_t are survey year fixed effects, which helps absorb any overall changes in such outcomes over time; for example, overall child health may have improved in Indonesia between 1993 and 2007 due to nationwide improvement in health care, or the Indonesian economic crisis in 1997 could have led to disruptions in household income across the country. ρ_i represents child fixed effects and ε_{it} represents the idiosyncratic error term. Any time-invariant factors, such as child genetic endowments or parental attitudes towards health, will hence be differenced out in our fixed effects estimation. Our fixed effects estimation therefore exploits changes in parental health status, which we interpret as health shocks, to identify the impact.[3] To examine longer-term outcomes, we lag parental health so that it is parental health status in the last survey wave that is the independent variable.

IV. Results

IV.A. The impact of parental health on the schooling and health of young children

We first focus on how parental health matters for their children's human capital outcomes (Table 2). During our sample period in Indonesia, elementary schooling and three years of secondary schooling are compulsory. We hence divide our sample for individuals between 6 and 15 and those beyond. As the OLS model shows, having poor parental health is strongly correlated with not being enrolled in school (column 1). However, when we include individual fixed effects, the negative effect is no longer statistically significant, suggesting that omitted variable biases or selection may be responsible for the OLS results. When using fixed effects, the

[3] Since our FE model exploits changes in health status, it precludes examining the impact of long-term chronic illnesses.

father being in poor health appears to negatively impact girls' school enrollment by 4 percentage points, but not boys (column 2 panels B and C). This could potentially be a consequence of son preference – when household income falls due to the household head being ill, daughters are pulled out of school before sons.

While school attendance is not much affected, parental health appears to closely linked to child health. Interestingly, while the health of both parents is closely correlated with child health when we look in the OLS model (column 3), the coefficient on paternal health is no longer statistically significant when we use individual fixed effects, whereas the coefficient on maternal health remains similar and highly significant (column 4). Poor maternal health increases the likelihood of the child to be in poor health by 5 to 6 percentage points. This is a large effect – since the mean of poor child health is around 10 percent, this represents a 50 percent increase in the likelihood of poor health. The coefficients on paternal and maternal health are statistically different at the 5 percent level. Having both parents in poor health also increases the probability of the child to be in poor health. The difference in OLS and FE models suggest that there are indeed unobserved characteristics that influence both parental health and the health of the child. However, it is clear that maternal health matters more for child health, and this effect is independent of other effects such as parental schooling and household income.

We look at two other human capital metrics, including height-for-age (z-score) and cognitive score. OLS results show strong correlations between paternal health and height-for-age, and the relationship largely still holds when looking at fixed effects (column 5). Here, paternal health appears to matter more – overall, poor paternal health reduces height-for-age by 0.09 standard deviations. Since an important determinant of height is nutrition, it is possible that

a negative health shock to the father leads to lower household income, and in turn lower food consumption and nutrition levels. We return to this hypothesis shortly.

Parental health is also strongly correlated with their children's cognitive score (column 7). Beginning in the second wave of IFLS, respondents between the ages of 7 and 24 were administered cognitive tests to assess their general cognitive level, as well as skills in mathematics. Having a parent in poor health is associated with around a 6 percent lower cognitive score for both girls and boys. However, both the magnitude and statistical significance of the estimates fall when using fixed effects (column 8), suggesting again that there are again uncaptured factors that leads parents to be in poor health and lower cognitive scores in the children. That said, the coefficient on maternal health remains negative and statistically significant for girls (panel C column 8).

IV.B. The impact of parental health on the schooling and health of youth

We then move on to examine the impact of parental health on youth between the ages 16 and 25. For older children who are beyond the age of compulsory schooling, it appears that the impact on school enrollment occurs when both parents are in poor health (Table 3 column 2). Again, child health is strongly linked to maternal health – moving from good to poor health increases the likelihood of the child being in poor health by approximately 30 percent, from a base of 12 percent. Having both parents in poor health compounds the effect (column 4). Height-for-age is not significantly impacted by parental health in this cohort (column 6). Girls' cognitive scores are substantially more affected by paternal health. A negative health shock to the father leads to a 14 percent decrease in the daughter's cognitive score, and when both parents experience a negative health shock, the effect increases to 26 percent. This suggests that the

quality, in addition to quantity, of education of girls could be affected by parental health (column 8).

Looking at the short-run effects of parental health, the result that stands out most apparently is the effect of maternal health on overall child health, which persists from early childhood to young adulthood. Paternal health matters significantly as well, but the pattern of where paternal health matters seem to be less clear. Another result that stands out is that girls' cognitive scores, which we interpret as the quality of their education, seem to be more affected by parental health. Paternal health appears to matter for children's height (nutrition) and schooling for girls when they are when they are young. For youth, it takes both parents to be in poor health to impact schooling, but the effect is large.

Our results on schooling are in contrast to Bratti and Mendola (2014), who find that maternal poor health is a more important causal determinant of school enrollment than paternal health when examining youth between ages 15 and 24 using data from Bosnia and Herzegovina. In a related vein, Case and Ardington use longitudinal data from South Africa and Kenya to show that maternal orphans are less likely to be enrolled in school and complete fewer years of school compared with paternal orphans. On the other hand, Gertler et al. (2005) use the IFLS to find that death of both parents matters for child schooling outcomes. They find that maternal death is more significantly linked to child health measures, which is consistent with our results that maternal health is more important for child health. Our results on maternal health are also in line with Coneus and Spiess (2006), whose findings using data from the German Socio-Economic Panel (SOEP) suggest that parental health tends to be transmitted to the child via the mother.

What are the channels through which parental health influence their children's health and schooling? One possible reason is that parents and children share similar same genetic endowments. Another reason could be that since parents and children live in the same environment, they experience the same household shocks or undergo behavior changes concurrently. Child fixed effects help ameliorate the first issue, since first differencing "subtracts" any time-invariant factors such as genetic endowments. Our fixed effects results that maternal health is more linked to child health than paternal health suggest that the channel is through maternal care rather than correlated household health shocks.

Of course, another obvious way is that medical expenditures divert away from other household resources, such as consumption or education expenditures. We explore this hypothesis further in Table 4, which examines household expenditures on different types, including expenditures on food, non-food (including medical expenditures), education, and vice goods such as cigarettes and alcohol. Household fixed effects are employed in FE models. In other words, we examine changes in household expenditures per household member due to health shocks to either the father or mother (or both). Standard errors are clustered at the household level.

As we can see in column 2, food expenditures are not significantly affected by health shocks when only one of the parents is sick. However, when both parents are sick, expenditures on food fall by 11 percent. At the same time, non-food expenditures, which include medical expenditures, increase by around 12-14 percent if either parent is sick. Education expenditures per household member are reduced by almost 16 percent when the father is sick, but not the mother (column 6). Interestingly, when the father is sick, spending on vice goods (cigarettes, alcohol, betel nuts) goes down by 25%, but goes up when the mother experiences a health shock,

suggesting that when maternal bargaining is poor (which it presumably is when she is in poor health), spending may get diverted towards non-child related goods (column 8). Overall, it appears that parental health shocks, and especially health shocks to the father, may indeed negatively impact household food and education expenditures, which could both lead to the effects we observe on child schooling and health.

IV.C. The long term impact of parental health

Finally, we assess the longer run impact of parental health. To do this, we examine the relationship between lagged parental health and current human capital outcomes. Since the first wave of IFLS was in 1993 and the most recent wave in 2007, the maximum number of years between two waves is 14, e.g., a child at 13 in 1993 would be 27 in 2007. As we are assessing adult human capital outcomes, such as wages and school attainment, we restrict the sample to those above 21. We also restrict the sample to those who first appeared in the survey under the age of 18, i.e., for respondents for whom we can credibly observe their parents' health during their childhood.

Results are reported in Table 5.[4] As before, OLS and FE estimates differ substantially. In our preferred FE model, lagged poor maternal health is associated with 5 percentage point reduction in the likelihood of completing high school (column 2). This represents a 10 percent reduction from a base of 50 percent of high school completion in the sample. Because matching lagged values of both maternal and paternal health leads to many missing observations, we also experiment with entering only maternal and paternal health in separate regressions (panels B and C). The results are consistent with panel A. However, lagged parental health does not appear to be causally linked to the probability of completing university (panel 4), although individuals with

[4] Unfortunately, we do not have enough power to perform these regressions by gender separately.

parents who had their father and mother in poor health in the last survey wave are 3 to 4 percentage points less likely to complete university (column 3). Controlling for own health last survey wave, lagged parental health does not seem to influence current health (column 5).

In summary, parental health matters importantly throughout their children's life trajectories in complementary ways. As the primary caregiver of the family, maternal health matters contemporaneously for child health through young adulthood. As the main income earner, paternal health may matter more through influencing the household budget constraint and resources, which in turn affect the children's schooling and health outcomes. When both parents are sick, children are served a double whammy. Longer-run effects of poor maternal health manifest in lower likelihood of high school completion, and the impact of poor paternal health during childhood on health also extends beyond childhood as measured by height.

V. Using alternative health measures

In this section, we offer a robustness check of using alternative health measures, specifically the ability to perform activity of daily living (ADLs). The concern with using self-reported health status is its subjective nature, which may lead to measurement error. In that case, attenuation bias will affect both the OLS and the fixed effects estimators, leading to a lower-bound estimate of the parental health shock. While ADL measures are still self-reported, they are generally considered as more reliable measures of health due to their specific and more objective nature, and have been used in a number of economic studies (for example, Gertler and Gruber 2002, and Strauss et al., 2010, among others). However, since there are substantially fewer observations with indicators of ADL, we rely on self-reported health in the main analysis. Following the literature, we choose the ability to walk 5 km as the main ADL metric. We report the results in Tables 5 and 6. Consistent with our main results, we find that poor parental health

is strongly linked to poor child health. As before, paternal health is more significantly linked to schooling outcomes whereas maternal health is more linked to child health.

VI. Using propensity score matching

Finally, we use propensity score matching as another econometric technique to assess the impact of health on the family. Results are reported in Appendix Tables 1 to 2. The main advantage of propensity score matching over OLS is that it allows for non-parametric estimation, but since propensity score matching only accounts for observable characteristics, any bias due to the latent selection issue may still remain. Hence these estimates should not be interpreted to be causal any more than our OLS results, but rather be used to guide further questions.[5]

Consistent with previous results, we find that parental health and child health are also positively correlated. Children with parents in poor health are less likely to be enrolled in school and more likely to be in poor health themselves. They are also less likely to have completed high school and university as adults, and less likely to be working if their father was sick in the last wave.

VII. Conclusion

In this paper, we explore how parental health affects the family. Our findings suggest that the economic returns to parental health are high. As the breadwinner of the family, the health of the father is crucial in ensuring the schooling and nutrition of his children. At the same time, maternal health is no less important. Even though women participate to a lesser degree in the formal labor market in developing countries, the mother tends to be primary caretaker of the family. As such, her health is vital in the functioning of the household. Our results indicate that

[5] In addition, although the IFLS asks questions about virtually every aspect of life, there are many missing observations for questions beyond the basic demographics. This leads to the tradeoff of fewer observations but a richer set of controls. To optimize statistical power, a limited set of covariates is used.

maternal health is strongly linked to child health, and also plays a role in child schooling and virtually every other dimension of human capital that we examine. The consequences of poor maternal health extends to adulthood in the form of less schooling and reduced labor force participation. The intrafamilial health relationship is complex: when one parent, and especially the mother, falls ill, husbands, sons and daughters all bear the brunt of the shock in the form of worse health. The results of this paper further support the importance of investments in health, and in particular, women's health in developing countries where there is systematic underinvestment in and discrimination against girls and women. Our paper also highlights the need for more research on understanding the interplay of within-family health and the mechanisms through which parental health matters.

References

Almond, D. (2006). Is the 1918 Influenza pandemic over? Long-term effects of in utero Influenza exposure in the post-1940 US population. *Journal of Political Economy*, 114(4), 672-712.

Almond, D., & Currie, J. (2011). Killing Me Softly: The Fetal Origins Hypothesis. *Journal of Economic Perspectives*, *25*(3), 153-72.

Asfaw, A., & Von Braun, J. (2004). Is consumption insured against illness? Evidence on vulnerability of households to health shocks in rural Ethiopia. *Economic Development and Cultural Change*, 53(1), 115-129.

Barker, D. J. (1995). Fetal origins of coronary heart disease. *BMJ: British Medical Journal*, 311(6998), 171.

Bredenkamp, C., Mendola, M., & Gragnolati, M. (2011). Catastrophic and impoverishing effects of health expenditure: new evidence from the Western Balkans. *Health Policy and Planning*, 26(4), 349-356.

Breierova, L., & Duflo, E. (2004). The impact of education on fertility and child mortality: Do fathers really matter less than mothers? (No. w10513). National Bureau of Economic Research

Bhalotra, S., & Rawlings, S. B. (2011). Intergenerational persistence in health in developing countries: The penalty of gender inequality? *Journal of Public Economics*, *95*(3), 286-299.

Bratti, M., & Mendola, M. (2014). Parental health and child schooling. *Journal of health economics*, 35, 94-108.

Case, A., & Ardington, C. (2006). The impact of parental death on school outcomes: Longitudinal evidence from South Africa. *Demography*, *43*(3), 401-420.

Charles, K. K. (1999). Sickness in the family: Health shocks and spousal labor supply. Ann Arbor, MI: Gerald R. Ford School of Public Policy, University of Michigan.

Chen, S. H., Chen, Y. C., & Liu, J. T. (2009). The impact of unexpected maternal death on education: First evidence from three national administrative data links. *American Economic Review*, 99(2):149-153.

Chen, Y., & Zhou, L. A. (2007). The long-term health and economic consequences of the 1959–1961 famine in China. *Journal of Health Economics*, 26(4), 659-681.

Coile, Courtney C. Health Shocks and Couples' Labor Supply Decisions." (2004). *NBER Working Paper* No. 10810.

Coneus, K., and C.K. Spiess. (2012). "The intergenerational transmission of health in early childhood--evidence from the German Socio-Economic Panel study." Econ Hum Biol 10(1): pp. 89–97.

Dercon, S., & Krishnan, P. (2000). Vulnerability, seasonality and poverty in Ethiopia. *Journal of Development Studies*, 36(6), 25-53.

Doyle, J. (2005). Health Insurance, Treatment and Outcomes: Using Auto Accidents as Health Shocks. *Review of Economics and Statistics*, 87(2):256–270.

Evans, D.K., and E. Miguel. (2007). "Orphans and schooling in Africa: A longitudinal analysis." *Demography* 44(1): pp. 35–57.

Falba, T. A., & Sindelar, J. L. (2008). Spousal concordance in health behavior change. *Health Services Research*, *43*(1p1), 96-116.

Frankenberg, E., Smith, J. P., & Thomas, D. (2003). Economic shocks, wealth, and welfare. *Journal of Human Resources*, 38(2), 280-321.

García-Gómez, P., Van Kippersluis, H., O'Donnell, O., & Van Doorslaer, E. (2013). Long-term and spillover effects of health shocks on employment and income. *Journal of Human Resources*, *48*(4), 873-909.

Gertler, P. & Gruber, J. (2002). Insuring Consumption Against Illness. *American Economic Review*, 92(1): 51-70.

Gertler, P., Levine, D. I., & Ames, M. (2004). Schooling and parental death. *Review of Economics and Statistics*, 86(1), 211-225.

Jacoby, H. G., & Skoufias, E. (1997). Risk, financial markets, and human capital in a developing country. *The Review of Economic Studies*, 64(3), 311-335.

Lleras-Muney, A. (2005). The relationship between education and adult mortality in the United States. The Review of Economic Studies, 72(1), 189-221.

Mohanan, M. (2013). Causal Effects of Health Shocks on Consumption and Debt: Quasi-experimental Evidence from Bus Accidents Injuries. *Review of Economics and Statistics*, 95(2):673–681.

Neelsen, S., & Stratmann, T. (2011). Effects of prenatal and early life malnutrition: Evidence from the Greek famine. *Journal of Health Economics*, 30(3), 479-488.

Strauss, J., Gertler, P., Rahman, O., Fox, K., 1993. Gender and life-cycle differentialsin the patterns and determinants of adult health. *Journal of Human Resources* 28, 791–837.

Thomas, D. (1990). Intra-Household Resource Allocation An Inferential Approach. *Journal of Human Resources, 25*(4), 635-664.

Thirumurthy, H., J.G. Zivin, and M. Goldstein. (2008). The economic impact of AIDS treatment: Labor supply in western Kenya. *Journal of Human Resources* 43(3): pp. 511–552.

Wagstaff, A. (2007). The economic consequences of health shocks: evidence from Vietnam. *Journal of Health Economics*, 26(1), 82-100.

Wilson, S. E. (2002). The health capital of families: an investigation of the inter-spousal correlation in health status. *Social Science & Medicine*, 55(7), 1157-1172.

Table 1 – Summary statistics of key variables

Variable	Mean	Std. Dev.	Min	Max	# of Obs.
Age	27.92	19.32	0	99	177,204
Male	0.49	0.50	0	1	178,987
Hindu	0.04	0.20	0	1	176,063
Worked last week	0.60	0.49	0	1	82,755
House last week	38.72	23.23	0	168	56,283
Salary last month (rupees)	526.95	1781.57	0	182000	25,565
Attends school (age 6 to 15)	0.83	0.38	0	1	25,347
Attends school (age 15 to 25)	0.25	0.43	0	1	39,421
Poor health (age 6 to 15)	0.09	0.28	0	1	35,524
Poor health (age 15 to 65)	0.12	0.32	0	1	81,701
Difficulty in walking 5 km	0.26	0.44	0	1	69,150
ADL index	93.28	14.66	0	100	69,138
Urban	0.50	0.50	0	1	161,848
Household size	6.41	2.98	1	39	161,856
Age of spouse	41.98	14.00	0	99	60,804
Spouse completed high school	0.13	0.34	0	1	51,479
Spouse ADL index	0.94	0.13	0	1	45,703
Age of mother	42.48	12.89	0	99	92,971
Mother completed high school	0.17	0.38	0	1	92,421
Mother in poor health	0.15	0.36	0	1	79,865
ADL index of mother	91.69	14.64	0	100	68,736
Age of father	46.17	12.50	15	99	79,283
Father completed high school	0.20	0.40	0	1	79,572
Father in poor health	0.13	0.34	0	1	65,353
ADL index of father	95.86	12.15	0	100	58,476
Cognitive Score	56.11	24.36	0	100	32,303
Height z-score	-0.05	1.00	-19.8	11.1	101,015

Summary statistics of parental variables are calculated for individuals under age 25. Summary statistics for labor force participation variables are calculated for individuals between ages 15 and 65. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 2 – Effect of parental health on child schooling and health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	School enrollment		Child in poor health		Height for age (z-score)		Ln(cognitive score)	
Panel A: All	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father in poor health	-0.0171**	-0.0136	0.0259***	0.0208	-0.0549**	-0.0905*	-0.0572***	-0.0463
	(0.0072)	(0.0130)	(0.0076)	(0.0155)	(0.0279)	(0.0549)	(0.0143)	(0.0349)
Only mother in poor health	-0.0133**	-0.0129	0.0580***	0.0554***	-0.0354	0.0052	-0.0589***	-0.0189
	(0.0064)	(0.0119)	(0.0084)	(0.0139)	(0.0248)	(0.0460)	(0.0134)	(0.0306)
Both parents in poor health	-0.0414***	-0.0147	0.1114***	0.0906***	0.0017	-0.0346	-0.0823***	0.0357
	(0.0143)	(0.0232)	(0.0194)	(0.0274)	(0.0529)	(0.0948)	(0.0247)	(0.0617)
# of obs.	20814	20814	14645	14645	14628	14628	13160	13160
Panel B: Males								
Only father in poor health	-0.0050	0.0117	0.0249**	0.0182	-0.0708*	-0.0913	-0.0528***	-0.0601
	(0.0094)	(0.0179)	(0.0097)	(0.0206)	(0.0416)	(0.0736)	(0.0197)	(0.0493)
Only mother in poor health	-0.0189**	-0.0226	0.0519***	0.0619***	-0.0569	0.0413	-0.0543***	0.0425
	(0.0086)	(0.0168)	(0.0089)	(0.0190)	(0.0371)	(0.0622)	(0.0182)	(0.0441)
Both parents in poor health	-0.0232	-0.0171	0.1098***	0.0515	0.0711	-0.0727	-0.0506	-0.0344
	(0.0169)	(0.0313)	(0.0177)	(0.0368)	(0.0754)	(0.1226)	(0.0370)	(0.0842)
# of obs.	10681	10681	7579	7579	7520	7520	6755	6755
Panel C: Females								
Only father in poor health	-0.0303***	-0.0446**	0.0280***	0.0272	-0.0397	-0.0966	-0.0622***	-0.0374
	(0.0097)	(0.0190)	(0.0101)	(0.0236)	(0.0404)	(0.0827)	(0.0204)	(0.0495)
Only mother in poor health	-0.0081	-0.0026	0.0650***	0.0494**	-0.0098	-0.0235	-0.0641***	-0.0866**
	(0.0090)	(0.0168)	(0.0096)	(0.0204)	(0.0368)	(0.0689)	(0.0192)	(0.0426)
Both parents in poor health	-0.0590***	-0.0072	0.1152***	0.1321***	-0.0649	0.0000	-0.1133***	0.1272
	(0.0171)	(0.0346)	(0.0184)	(0.0409)	(0.0686)	(0.1489)	(0.0369)	(0.0907)
# of obs.	10133	10133	7066	7066	7108	7108	6405	6405

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Sample includes children between ages 6 and 15. Standard errors are clustered by person. Fixed effects are at the person level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 3 – Effect of parental health on youth schooling and health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	School enrollment		Poor health		Height for age (z-score)		Ln(cognitive score)	
Panel A: All	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father in poor health	-0.0415***	0.0010	0.0333***	0.0099	-0.0642*	0.1583	-0.0922***	-0.0823
	(0.0138)	(0.0349)	(0.0106)	(0.0199)	(0.0387)	(0.4791)	(0.0253)	(0.0505)
Only mother in poor health	-0.0261*	-0.0493	0.0585***	0.0384**	-0.0311	0.3608	-0.0620***	-0.0172
	(0.0136)	(0.0344)	(0.0112)	(0.0174)	(0.0310)	(0.4612)	(0.0229)	(0.0433)
Both parents in poor health	-0.0502**	-0.1669***	0.0867***	0.1063***	0.0231	-0.3484	-0.0845*	-0.1252
	(0.0218)	(0.0601)	(0.0238)	(0.0339)	(0.0802)	(0.8078)	(0.0448)	(0.0901)
# of obs.	8465	8465	7798	7798	4628	4628	9135	9135
Panel B: Males								
Only father in poor health	-0.0460**	0.0066	0.0335***	0.0040	-0.0427	1.0868	-0.0992***	-0.0134
	(0.0198)	(0.0484)	(0.0127)	(0.0270)	(0.0516)	(0.6745)	(0.0308)	(0.0736)
Only mother in poor health	-0.0253	-0.0547	0.0488***	0.0655***	-0.0104	0.0715	-0.0592**	-0.0268
	(0.0196)	(0.0500)	(0.0122)	(0.0238)	(0.0507)	(0.8833)	(0.0296)	(0.0618)
Both parents in poor health	-0.0407	-0.1843**	0.0713***	0.0684	0.1423	0.2398	-0.0201	-0.0034
	(0.0332)	(0.0841)	(0.0222)	(0.0430)	(0.0888)	(0.9407)	(0.0540)	(0.1264)
# of obs.	4438	4438	3957	3957	2329	2329	4656	4656
Panel C: Females								
Only father in poor health	-0.0380*	-0.0033	0.0333**	0.0132	-0.0859	-0.8938	-0.0855**	-0.1439**
	(0.0209)	(0.0512)	(0.0141)	(0.0293)	(0.0543)	(0.9130)	(0.0347)	(0.0696)
Only mother in poor health	-0.0282	-0.0482	0.0699***	0.0144	-0.0526	0.7612	-0.0608*	0.0051
	(0.0203)	(0.0475)	(0.0139)	(0.0256)	(0.0509)	(0.6386)	(0.0335)	(0.0612)
Both parents in poor health	-0.0604*	-0.1446	0.1069***	0.1653***	-0.1050	-0.0145	-0.1609**	-0.2634**
	(0.0336)	(0.0879)	(0.0264)	(0.0542)	(0.0918)	(2.5367)	(0.0658)	(0.1292)
# of obs.	4027	4027	3841	3841	2299	2299	4479	4479

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Sample includes individuals between ages 15 and 25. Standard errors are clustered by person. Fixed effects are at the person level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 4 – Effect of parental health on household consumption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ln(Food expenditures per capita)		Ln(Non-food expenditures per capita)		Ln(Education expenditures per capita)		Ln(Vice goods expenditures	
	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Father only in poor health	-0.0412**	-0.0056	-0.0367	0.1446***	-0.2222**	-0.1588**	-0.2636***	-0.2454***
	(0.0188)	(0.0091)	(0.0360)	(0.0198)	(0.1069)	(0.0698)	(0.1021)	(0.0479)
Mother only in poor health	0.0176	0.0092	0.0386	0.1202***	0.0262	0.0301	0.4000***	0.2089***
	(0.0170)	(0.0088)	(0.0349)	(0.0191)	(0.0990)	(0.0671)	(0.0897)	(0.0461)
Both parents in poor health	-0.1230***	-0.1100***	-0.2400***	-0.0499	-0.3422*	-0.1483	0.0508	-0.0765
	(0.0380)	(0.0155)	(0.0903)	(0.0338)	(0.1982)	(0.1192)	(0.1512)	(0.0818)
# of obs.	52399	52399	52410	52410	52035	52035	52399	52399

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column represents a separate regression. Standard errors are clustered by household. Fixed effects are at the household level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Vice goods include alcohol, betel nuts, and cigarettes. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 5 – Long-run effect of parental health on human capital outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Complete high school		Complete university		Poor Health		Height for age		Worked last week	
Panel A: Lagged parental health	OLS	FE	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father in poor health in last	-0.0571**	-0.0073	-0.0289*	0.0146	0.0236	0.0170	-0.1148	-0.3554*	-0.0162	-0.1537**
survey wave	(0.0250)	(0.0200)	(0.0149)	(0.0190)	(0.0200)	(0.0364)	(0.0806)	(0.1901)	(0.0260)	(0.0664)
Only mother in poor health in	-0.0180	-0.0530***	-0.0375***	0.0064	0.0315*	-0.0035	0.0459	-0.0482	0.0154	0.0219
last survey wave	(0.0218)	(0.0174)	(0.0136)	(0.0164)	(0.0191)	(0.0318)	(0.0452)	(0.1801)	(0.0235)	(0.0580)
Both parents in poor health in	-0.0218	-0.0059	-0.0151	0.0359	0.0477	0.0427	-0.0442	-0.0773	-0.0722	-0.1357
last survey wave	(0.0452)	(0.0294)	(0.0247)	(0.0303)	(0.0379)	(0.0563)	(0.1807)	(0.2832)	(0.0484)	(0.1026)
# of obs.	4632	4632	4632	4632	3814	3814	3140	3140	3814	3814
Panel B: Paternal health										
Father in poor health in last	-0.0567**	0.0123	-0.0231**	0.0264	0.0266	0.0127	-0.1288	-0.2740*	-0.0300	-0.1502**
survey wave	(0.0242)	(0.0177)	(0.0107)	(0.0170)	(0.0182)	(0.0325)	(0.0837)	(0.1622)	(0.0231)	(0.0597)
# of obs.	4746	4746	4746	4746	3901	3901	3210	3210	3901	3901
Panel C: Maternal health										
Mother in poor health in last	-0.0177	-0.0443***	-0.0351***	0.0031	0.0315*	0.0034	0.0278	0.0066	-0.3423	0.0421
survey wave	(0.0193)	(0.0165)	(0.0129)	(0.0139)	(0.0167)	(0.0282)	(0.0554)	(0.1422)	(0.5382)	(0.0491)
	4963	4963	4963	4963	4077	4077	3346	3346	4077	4077

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Sample includes individuals above age 21 who first appeared in the survey below age 18. clustered by person. Fixed effects are at the person level. Controls include own health last survey wave, gender, age, age squared, religion, household size, ur father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest con level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 6 – Using alternative health measures: effects of parental health on child schooling and health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	School enrollment		Child in poor health		Height for age (z-score)		Ln(cognitive score)	
Panel A: All	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father has difficulty walking 5 km	-0.0037	-0.0170	-0.0018	-0.0141	-0.1076**	-0.1243**	-0.0264	0.0034
	(0.0103)	(0.0164)	(0.0088)	(0.0160)	(0.0481)	(0.0630)	(0.0211)	(0.0442)
Only mother has difficulty walking 5 km	-0.0049	-0.0047	0.0165***	0.0198**	0.0120	-0.0091	-0.0136	0.0334
	(0.0052)	(0.0088)	(0.0050)	(0.0081)	(0.0184)	(0.0347)	(0.0119)	(0.0237)
Both parents have difficulty walking 5 km	-0.0257**	-0.0253	0.0339***	0.0316**	0.0358	-0.0040	-0.0228	0.0351
	(0.0116)	(0.0166)	(0.0108)	(0.0159)	(0.0293)	(0.0656)	(0.0197)	(0.0428)
# of obs.	17078	17078	10831	10831	10703	10703	9865	9865
Panel B: Males								
Only father has difficulty walking 5 km	0.0050	-0.0058	-0.0009	-0.0269	-0.0219	-0.0456	-0.0223	0.0041
	(0.0138)	(0.0235)	(0.0130)	(0.0220)	(0.0555)	(0.0893)	(0.0305)	(0.0627)
Only mother has difficulty walking 5 km	0.0008	-0.0106	0.0129**	0.0187*	0.0271	0.0043	-0.0094	0.0467
	(0.0074)	(0.0122)	(0.0065)	(0.0111)	(0.0288)	(0.0490)	(0.0163)	(0.0343)
Both parents have difficulty walking 5 km	-0.0133	-0.0214	0.0319**	0.0449**	0.0264	-0.0755	0.0008	0.0098
	(0.0142)	(0.0231)	(0.0129)	(0.0216)	(0.0569)	(0.0918)	(0.0289)	(0.0593)
# of obs.	8771	8771	5610	5610	8170	8170	5060	5060
Panel C: Females								
Only father has difficulty walking 5 km	-0.0131	-0.0266	-0.0020	-0.0005	-0.1929***	-0.2053**	-0.0322	0.0168
	(0.0138)	(0.0231)	(0.0138)	(0.0234)	(0.0512)	(0.0885)	(0.0317)	(0.0629)
Only mother has difficulty walking 5 km	-0.0111	0.0022	0.0203***	0.0210*	-0.0023	-0.0180	-0.0180	0.0236
	(0.0077)	(0.0126)	(0.0070)	(0.0119)	(0.0278)	(0.0490)	(0.0170)	(0.0330)
Both parents have difficulty walking 5 km	-0.0384***	-0.0294	0.0358**	0.0187	0.0475	0.0679	-0.0489	0.0602
	(0.0147)	(0.0239)	(0.0141)	(0.0237)	(0.0570)	(0.0934)	(0.0307)	(0.0623)
# of obs.	8307	8307	5221	5221	5206	5206	4805	4805

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Sample includes children between ages 6 and 15. Standard errors are clustered by person. Fixed effects are at the person level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 7 – Using alternative health measures: effects of parental health on youth schooling and health

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	School enrollment		Difficulty walking 5 km		Height for age (z-score)		Ln(cognitive score)	
Panel A: All	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father has difficulty walking 5 km	-0.0199*	-0.0568***	0.0565***	0.0690**	-0.0114	-0.0472	-0.0204	0.0197
	(0.0106)	(0.0174)	(0.0168)	(0.0315)	(0.0417)	(0.1138)	(0.0208)	(0.0593)
Only mother has difficulty walking 5 km	0.0073	-0.0118	0.0948***	0.0996***	0.0100	0.0991	0.0096	0.0155
	(0.0074)	(0.0109)	(0.0101)	(0.0190)	(0.0236)	(0.0732)	(0.0127)	(0.0345)
Both parents have difficulty walking 5 km	-0.0266***	-0.0355**	0.1151***	0.1336***	-0.0475	-0.0876	-0.0435**	-0.0084
	(0.0095)	(0.0163)	(0.0154)	(0.0296)	(0.0379)	(0.1047)	(0.0189)	(0.0554)
# of obs.	17143	17143	7797	7797	8244	8244	8384	8384
Panel B: Males								
Only father has difficulty walking 5 km	-0.0302*	-0.0366	0.0509***	0.0268	-0.0414	-0.2414	-0.0178	0.1050
	(0.0157)	(0.0241)	(0.0162)	(0.0321)	(0.0507)	(0.1468)	(0.0284)	(0.0847)
Only mother has difficulty walking 5 km	0.0077	-0.0062	0.0382***	0.0176	0.0211	0.0959	0.0401**	0.0502
	(0.0101)	(0.0152)	(0.0095)	(0.0193)	(0.0326)	(0.0966)	(0.0170)	(0.0496)
Both parents have difficulty walking 5 km	-0.0390***	-0.0562**	0.0350**	0.0283	0.0252	-0.1124	0.0121	-0.0057
	(0.0146)	(0.0233)	(0.0146)	(0.0303)	(0.0457)	(0.1376)	(0.0250)	(0.0816)
# of obs.	8923	8923	3956	3956	4165	4165	4278	4278
Panel C: Females								
Only father has difficulty walking 5 km	-0.0088	-0.0716***	0.0631**	0.1130**	0.0152	0.1536	-0.0234	-0.0599
	(0.0155)	(0.0250)	(0.0276)	(0.0542)	(0.0581)	(0.1782)	(0.0304)	(0.0836)
Only mother has difficulty walking 5 km	0.0069	-0.0165	0.1528***	0.1808***	0.0005	0.1094	-0.0191	-0.0221
	(0.0102)	(0.0154)	(0.0165)	(0.0327)	(0.0382)	(0.1117)	(0.0191)	(0.0485)
Both parents have difficulty walking 5 km	-0.0151	-0.0138	0.1937***	0.2317***	-0.1169**	-0.0804	-0.0994***	-0.0313
	(0.0143)	(0.0228)	(0.0245)	(0.0508)	(0.0531)	(0.1614)	(0.0281)	(0.0756)
# of obs.	8220	8220	3841	3841	4079	4079	4106	4106

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Sample includes individuals between ages 15 to 25. Standard errors are clustered by person. Fixed effects are at the person level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Table 8 – Using alternative health measures: long run effects of parental health on adult human capital outcomes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Complete high school		Complete university		Height for age		Ln(Salary)	
Panel A: Lagged parental health	OLS	FE	OLS	FE	OLS	FE	OLS	FE
Only father has difficulty walking 5k in last survey wave	0.0510*	-0.0264	-0.0166	-0.0185	-0.0443	-0.0725	0.2887***	0.3751
	(0.0274)	(0.0221)	(0.0187)	(0.0150)	(0.0879)	(0.1466)	(0.1018)	(0.4964)
Only mother has difficulty walking 5k in last survey wave	0.0452***	-0.0137	-0.0206*	-0.0149*	-0.0644	-0.0179	-0.0672	0.1373
	(0.0148)	(0.0121)	(0.0108)	(0.0088)	(0.0458)	(0.0780)	(0.0728)	(0.2421)
Both parents have difficulty walking 5k in last survey wave	0.0058	0.0086	-0.0539***	-0.0306**	-0.0888	0.0779	-0.0958	0.3448
	(0.0255)	(0.0201)	(0.0146)	(0.0136)	(0.0847)	(0.1289)	(0.1398)	(0.4002)
# of obs.	7369	7369	7369	7369	4823	4823	2277	2265
Panel B: Paternal health								
Father has difficulty walking 5k in last survey wave	-0.0190	0.0215	-0.0314***	-0.0116	-0.0415	0.0642	0.0483	0.2849
	(0.0165)	(0.0146)	(0.0116)	(0.0080)	(0.0617)	(0.1310)	(0.0876)	(0.5242)
# of obs.	4746	4746	4746	4746	3821	3821	1936	1758
Panel C: Maternal health								
Mother has difficulty walking 5k in last survey wave	0.0233*	0.0125	-0.0231**	-0.0011	-0.0513	0.0025	-0.1114	0.0771
	(0.0138)	(0.0116)	(0.0094)	(0.0068)	(0.0405)	(0.0848)	(0.0702)	(0.2353)
	4963	4963	4963	4963	3987	3987	1936	1936

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Standard errors are clustered by person. Fixed effects are at the person level. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Appendix Table 1 – Effect of parental health on child schooling and health: propensity score matching

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	School enrollment			Child in poor health			Height for age (z-score)			Ln(cognitive score)		
Panel A:	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Father only	-0.0126	0.0059	-0.0317**	0.0334***	0.0354***	0.0322***	-0.0470	-0.0717	-0.0152	-0.0696***	-0.0698***	-0.0736***
	(0.0097)	(0.0128)	(0.0148)	(0.0078)	(0.0110)	(0.0113)	(0.0287)	(0.0467)	(0.0318)	(0.0166)	(0.0234)	(0.0240)
Mother only	-0.0224**	-0.0303**	-0.0133	0.0662***	0.0653***	0.0689***	-0.0491**	-0.0665*	-0.0274	-0.0829***	-0.0837***	-0.0836***
	(0.0093)	(0.0131)	(0.0130)	(0.0084)	(0.0116)	(0.0124)	(0.0245)	(0.0358)	(0.0335)	(0.0167)	(0.0220)	(0.0253)
Both parent	-0.0407**	0.0035	-0.0871***	0.1215***	0.1192***	0.1235***	0.0408	0.0965	-0.0161	-0.1001***	-0.0781*	-0.1162**
	(0.0182)	(0.0233)	(0.0280)	(0.0203)	(0.0276)	(0.0286)	(0.0406)	(0.0675)	(0.0498)	(0.0312)	(0.0438)	(0.0455)
# of obs.	12393	6409	5984	11752	6090	5662	11646	5995	5651	10770	5543	5227
Panel B:												
Father in po	-0.0194*	0.0155	-0.0515***	0.0417***	0.0382***	0.0410***	-0.0126	-0.0757	-0.0128	-0.0607***	-0.0432	-0.0508**
	(0.0104)	(0.0134)	(0.0158)	(0.0100)	(0.0128)	(0.0143)	(0.0251)	(0.0495)	(0.0304)	(0.0157)	(0.0280)	(0.0254)
# of obs.	15929	8222	7707	14970	7749	7221	14957	7693	7264	13606	7000	6606
Panel C:												
Mothers in	-0.0263***	-0.0343**	-0.0204	0.0612***	0.0649***	0.0765***	-0.0554**	-0.0313	-0.0357	-0.0461***	-0.0605***	-0.0986***
	(0.0099)	(0.0143)	(0.0144)	(0.0089)	(0.0117)	(0.0132)	(0.0253)	(0.0306)	(0.0305)	(0.0158)	(0.0217)	(0.0248)
# of obs.	17007	8757	8250	16028	8288	7740	15928	8176	7752	14488	7438	7050

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Standard errors are clustered by person. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Appendix Table 2 – Effect of parental health on youth schooling and health: propensity score matching

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	School enrollment			Child in poor health			Height for age (z-score)			Ln(cognitive score)		
Panel A:	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Father only in poor health	-0.0398***	-0.0561***	-0.0229	0.0453***	0.0470***	0.0440***	-0.0642***	-0.0645***	-0.0665**	-0.0545	-0.0222	-0.0963
	(0.0108)	(0.0151)	(0.0154)	(0.0092)	(0.0127)	(0.0133)	(0.0177)	(0.0240)	(0.0264)	(0.0373)	(0.0404)	(0.0688)
Mother only in poor health	-0.0318***	-0.0429***	-0.0213	0.0564***	0.0412***	0.0734***	-0.0464***	-0.0469**	-0.0451*	-0.0155	0.0202	-0.0548
	(0.0101)	(0.0140)	(0.0145)	(0.0089)	(0.0114)	(0.0138)	(0.0172)	(0.0222)	(0.0261)	(0.0289)	(0.0355)	(0.0452)
Both parents in poor health	-0.0631***	-0.0839***	-0.0390	0.1283***	0.1181***	0.1293***	-0.0891**	-0.0359	-0.1573**	-0.0427	0.0314	-0.1272
	(0.0179)	(0.0267)	(0.0251)	(0.0205)	(0.0274)	(0.0299)	(0.0364)	(0.0405)	(0.0639)	(0.0559)	(0.0450)	(0.0965)
# of obs.	13086	6809	6277	11661	5927	5734	8468	4281	4187	8577	4380	4197
Panel B:												
Father in poor health	-0.0529***	-0.0345**	-0.0388**	0.0505***	0.0514***	0.0489***	-0.0537**	-0.0529**	-0.0788**	-0.0244	-0.0132	-0.0310
	(0.0122)	(0.0176)	(0.0188)	(0.0104)	(0.0145)	(0.0160)	(0.0210)	(0.0242)	(0.0309)	(0.0183)	(0.0227)	(0.0273)
# of obs.	14136	7333	6803	12536	6353	6183	9241	4659	4582	9318	4753	4565
Panel C:												
Mothers in poor health	-0.0418***	-0.0375**	-0.0266	0.0575***	0.0486***	0.0887***	-0.0225	-0.0195	-0.0532	-0.0212	0.0058	-0.0901**
	(0.0116)	(0.0161)	(0.0163)	(0.0093)	(0.0127)	(0.0171)	(0.0354)	(0.0345)	(0.0482)	(0.0289)	(0.0464)	(0.0419)
# of obs.	14979	7759	7220	13153	6637	6516	9692	4867	4825	9750	4945	4805

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Standard errors are clustered by person.Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.

Appendix Table 9 – Effect of lagged parental health on schooling and labor market outcomes: propensity score matching

	(1)	(2)	(3)	(4)	(5)
Panel A: Lagged parental health	Complete high school	Complete university	Height for age (z-score)	Work last week	ln(Salary)
Father only in poor health in last survey wave	-0.0607***	-0.0359***	-0.0696	-0.0145	0.4120***
	(0.0195)	(0.0116)	(0.0583)	(0.0233)	(0.0761)
Mother only in poor health in last survey wave	-0.0168	-0.0296***	0.0008	0.0008	0.0679
	(0.0179)	(0.0107)	(0.0498)	(0.0202)	(0.0906)
Both parents in poor health in last survey wave	-0.0700*	0.0126	-0.0584	-0.1015**	-0.3037
	(0.0361)	(0.0256)	(0.1587)	(0.0470)	(0.3021)
# of obs.	7368	7368	4823	5218	2277
Panel B: Paternal health					
Father in poor health in last survey wave	-0.0538**	-0.0153	-0.0222	-0.0474*	0.2097
	(0.0211)	(0.0123)	(0.0505)	(0.0262)	(0.1291)
# of obs.	7579	7579	4946	5354	2322
Panel C: Maternal health					
Mother in poor health in last survey wave	-0.0365**	-0.0312***	-0.0708	-0.0074	-0.0412
	(0.0186)	(0.0102)	(0.0566)	(0.0209)	(0.1142)
	7961	7961	5161	5602	2443

* significant at 10% ** significant at 5% *** significant at 1%

Notes: Every column in each panel represents a separate regression. Standard errors are clustered by person. Controls include gender, age, age squared, religion, household size, urban, father's age, father's age squared, father's religion, father's highest completed schooling level, mother's age, mother's age squared, mother's religion, mother's highest completed schooling level, and year dummies. Underlying data are from the Indonesia Family Life Survey 1993, 1997, 2000, and 2007 waves.