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Costly Posturing: Relative Status, Ceremonies and Early Child Development

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Abstract

Participating in and presenting gifts at funerals, weddings, and other ceremonies held by fellow villagers have been regarded as social norms in Chinese villages for thousands of years. However, it is more burdensome for the poor to take part in these social occasions than the rich. Because the poor often lack the necessary resources, they are forced to cut back on basic consumption, such as food, in order to afford a gift to attend the social festivals. For those pregnant women in poor families, such a reduction in nutrition intake as a result of gift-giving can have a lasting detrimental health impact on their children. Using a primary census-type panel household survey in 18 natural villages in rural China, this paper shows that children born to mothers with low income status who are exposed to greater number of funerals and other types of ceremonies in their natural villages during their pregnancies are more likely to display higher rates of stunting and wasting (too short and skinny) for their age.

Keywords: Relative Status, Squeeze Effect, Nutrient Intake, Stunting, Wasting, Gender
JEL Codes: D13, I32, O15

1. Introduction

It is common wisdom that the best way to cut hunger and malnutrition is through income growth. However, Deaton (2010) uncovers a famous food puzzle: despite rapid economic growth in the past several decades in India and China, calorie consumption per capita has declined and the rate of improvement in nutritional status has been relatively slow. Surprisingly, when given more resources, the poor tend to eat less basic staple food and consume greater amount of tastier, albeit less nutritious, food (Jensen and Miller, 2008). Moreover, the poor are more likely to spend their extra income on entertainment and social festivals (Banerjee and Duflo, 2007). A question arises: Why, amid income growth, do the poor prefer to consume less food at the potential high cost of nutritional status?

Of course, there are many potential explanations to the puzzle. Reductions in physical activities and thus the need for calories associated with economic growth are one representative explanation (Deaton, 2010). However, this channel alone cannot explain why the child malnutrition rate in India has barely improved in the past several decades, considering that children's physical activities might not have declined as much as adults. In this paper, we offer an alternative explanation: Due to social pressures and concerns for status, the poor are forced to cut basic necessities in order to afford gifts for social events in their communities.

In many low income countries, rural people live in closely knit communities. It is a social norm that people are compelled to attend weddings, funerals, and other social festivals in their communities and present a gift. In a recent book (2011), Banerjee and Duflo provide the following insightful observation on the phenomenon of "keeping up with neighbors":

"Poor people in the developing world spend large amounts on weddings, dowries, and christenings. Part of the reason is probably that they don't want to lose face, when the social custom is to spend a lot on those occasions. In South Africa, poor families often spend so lavishly on funerals that they skimp on food for months afterward."

Because the poor has limited resources, the fiscal burden of hosting or taking part in these social events is much higher for the poor than the rich. In order to save money for hosting the events or preparing a gift, the poor have to cut back basic necessities such as food. Such a reduction in food intake may have a lasting detrimental impact on nutritional and health status of the poor. In other words, the reductions in food intake and stagnant improvement in nutritional status are likely caused by increased social spending.

It is challenging to test the squeeze effect of "keeping up with neighbors" using commonly available household surveys; they normally sample only a few households in a community, making it impossible to measure relative concerns. In this paper, we use a unique primarily collected census-type panel household survey in 18 natural villages in rural China to test the squeeze effect of social spending on children's health outcome. The dataset is unique in several ways. First, all of the households in the natural villages are measured in three waves. Since the villages are in remote and poor mountainous areas, the natural villages form a good reference group. Therefore, we are able to measure the relative deprivation status for each household over years. Second, all of the children's anthropometric information was collected in the third wave survey in 2009. Third, we collected detailed information on funerals, weddings, and other ceremonies in the past ten years.

Because the number of funerals in a natural village is largely beyond the control of a family, we use it as an identification strategy to examine the impact of fetal exposures to funeral shocks on children's health outcome. We focus on the impact of frequent social events that occur at the very beginning of life—the fetal period. Our results show that it is the children of the poor who are more vulnerable to the shocks of funerals. Those born to mothers who were exposed to funerals during their pregnancies are more likely to display higher rates of stunting and wasting (too short and skinny) for their age. For the poor, attending social events may yield an unintended negative consequence on their children's health outcome. However, avoiding social networking with neighbors may result in social exclusion.

The rest of the paper is organized as follows: Section 2 provides evidence that social spending has a squeeze effect on the poor's food consumption; Section 3 examines the impact of prenatal exposures to social shocks on child health outcome; and Section 4 concludes.

2. Social Spending and Food Consumption

<u>Literature on Social Spending</u>

It has been increasingly recognized in the economics literature that people care about their relative standing in a society and that the concern for status shapes both consumption and savings behavior (Veblen, 1989; Duesenberry, 1949; Esterlin, 1974; Sen, 1983; Frank, 1985; Van de Stardt et al., 1985). The literature on relative concern and status consumption is largely focused on rich people and high-income countries. It is widely documented that the rich care about status and tend to indulge conspicuous consumptions. Recently, there is an emerging body of literature showing that the poor are also subject to relative concerns—the phenomenon of "keeping up with the Joneses" applies to the poor as well. For example, the poor prefer to consume designer-label goods in Bolivia (Kempen, 2003); lavish weddings are ubiquitous in India (Banerjee and Duflo, 2007); funerals in Ghana (The Economist, 2007) and South Africa (Case et al., 2008) cost more than one year's household income; and in Nepal, rural residents' expected adequate level of consumption is largely influenced by the average consumption of the other people living in the same village (Fafchamps and Shilpi, 2008). Powered by relative concerns in a manner similar to the rich, the poor also tend to spend more of their extra income on status goods and in visible social occasions.

Apart from relative concerns, social norms may also dictate the behavior of social spending. In developing countries, social networks, particularly within villages, can provide informal insurance (Udry, 1990). For instance, in the event of a family member's death, the pooled gifts from social networks can help the survivors to defray part of what are quite often costly funeral expenses. However, it takes time and effort to build and maintain social networks. Gift exchanges play an important role in lubricating social networks. Attending and presenting a gift at friends' and neighbors' weddings, funerals, and other social occasions is a social norm in many parts of the world. Furthermore, gift-giving is largely reciprocal. In China, a family is supposed to pay back previously received gifts later on according to the prevalent market price of gift size per occasion (Yian, 1996).

It is an open question as to which of the above two channels better explains the observed social spending behavior among the poor. Putting that aside, however, both mechanisms predict that the poor tend to spend more of their extra money on more socially visible goods and activities.

Patterns of Social Spending in Rural China

The objective of this paper is not to test the mechanisms behind social spending but rather to present empirical evidence that social spending poses a heavy burden on the poor using a unique dataset from China.[1] China is largely a *guanxi* (network) society. Participating in and presenting gifts at funerals, weddings, and other ceremonies held by fellow villagers have been regarded as social norms in Chinese villages for thousands of years. Despite its ubiquitousness in daily life, there is surprisingly little empirical evidence in the economics literature on the patterns of social spending across income groups and over time in Chinese societies.

The dataset for this study comes from three waves of census-type household survey conducted in 18 natural villages in Puding County, a nationally designated poor county in Guizhou Province in China.[2] The survey area offers an ideal setting to study the relationship between social spending and food intake among the poor for several reasons. First, poverty rate is quite high in the county. As shown in Table 1, in 2004, more than one-third of people lived below the national poverty line. Using the higher international poverty line of one dollar per day, the poverty incidence would be even higher. Second, despite the initial high incidence of poverty, the real per capita income has grown rapidly at an annual rate of more than 10% from 2004 to 2009. This provides us with a good opportunity to study Deaton's food puzzle as to why the improvement in nutritional status has been stagnant among the poor amid rapid income growth. Third, our survey villages are in rather isolated and mountainous areas. In such an isolated environment, villagers naturally interact much more frequently with each other within the same natural village than with those residing outside their home village. As a result, the natural villages form a clearly defined reference group.[3] By surveying all the households in the natural villages, we are able to accurately measure relative income status for each household within a natural village.

The survey collected detailed information on household demographics, income, consumption and transfers. The first wave of the survey included 801 households at the beginning of 2005. The second wave of the survey was administered in early 2007 and 833 households was interviewed. In January 2010, the third wave follow-up survey was conducted

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[1] In another paper, Chen and Zhang (2011) look at the relative importance of peer effect, status concern, and risk pooling on the escalation of social spending in rural China and conclude that both peer effect and status concern matter.

[2] This survey was jointly conducted by the International Food Policy Research Institute (IFPRI), Chinese Academy of Agricultural Sciences (CAAS), and Guizhou University.

[3] Because of the high degree of isolation from the outside, people within a natural village know each other well. Three small neighboring natural villages of ethnic Miao group form y a strong bond among themselves. Therefore we combine them when defining a reference group.

and 872 households were interviewed. In the second and third waves of the survey, we asked the households to report major events, including weddings, funerals, come-of-age ceremonies, during the past ten years, as well as the related expenses and gifts received. In this area, all the households keep a gift book, which lists the amount of all gifts received and the names of gift givers in major ceremonies held by them. In the third wave of the survey, we used digital cameras to record gift books from all the households in three out of eighteen natural villages. The data enable us to examine the patterns of social spending in different social occasions over time and across income groups.

Table 2 presents the average gift size per occasion, number of weddings and funerals, and participation rate of funerals within a natural village from 2004 and 2008, based on the gift record data collected in three natural villages. Three salient features are apparent from the table. First, average gift size per occasion has increased from 2004 to 2008. Second, the difference in gift size between rich and poor is minimal. Surprisingly, the poor at the bottom 25% of income distribution on average spend even more on a gift per occasion than their top 25% counterpart in the same village across all the years. The finding is consistent with our field observation that in the survey areas, there is an implicit "market price" for gift size per occasion that people follow when extending a gift. Third, participation at funerals is almost universal within a natural village. As shown clearly from the last column, more than 95% of households attend fellow villagers' funerals. This is consistent with the findings by Brown et al. (2010) that participating in funerals is largely driven by social norms. The rather standard gift size and nearly universal participation rate of major ceremonies indicate that the average gift expenditure per capita in a natural village should be positively related to the number of ceremonies held in a year. This is apparently the case, as shown by the strong positive correlation between the two variables in Figure 1.

The Squeeze Effect of Social Spending on Food Consumption

Because the poor have limited financial resources, social spending poses a much heavier fiscal burden on the poor than the rich. In order to afford a gift to attend a social festival, they have to make a sacrifice elsewhere. Living on the margin, they have little to cut back. Tightening their financial belt and skimping purchases of meat, sugar and other food items for a few weeks after the ceremony is often the default option for the poor. Figure 2 plots the share of cash expenditure spent on gifts and food by relative status, measured by Deaton relative deprivation Index (2001, shortened as RD index thereafter).[4] For those with lower relative status (larger value along the horizontal axis), we can clearly see that the drop in the share of food expenditure is accompanied by the increase in the share of gift expenditure. In principle, they could eat more food and suffer less from malnutrition by simply spending less on gifts. But apparently they did not make such a choice. By comparison, for those households with higher status (smaller values along the horizontal axis), both lines barely move.

To further test the squeeze effect of social spending on the food consumption of people with low status, we run a simultaneous unrelated regressions (SUR) on the share of food and gift cash expenditure. In the first regression (R1), we include the number of ceremonies held by fellow villagers, Deaton Relative Deprivation Index (RD), the interaction term between the above two variables, as well as a set of control variables at the household level, and year and administrative village fixed effects. The coefficient for the interaction term is statistically significant and negative. This suggests that those with lower status spend less on food consumption than their richer counterparts, provided that they attend the same number of ceremonies in a given year.

However, one may argue the number of ceremonies may capture some unobserved factors which also determine consumption patterns. For example, it is possible that a richer village can afford more wedding and come-of-age ceremonies than a poorer village. In other words, the incidence of ceremonies may stand for a natural village's wealth level. To ameliorate the concern on the potential endogneity problem of the ceremony variable, we replace it with the number of funerals held by fellow villagers in the second regression (R2). For a household, a death in other families within the same village is largely an exogenous shock to itself. The coefficient for the interaction term in the second regression remains negative and significant, suggesting a squeeze effect of social spending on food consumption among those in the lower social spectrum.

3. Quantifying the Effect of Social Spending on Child Health Outcome

Fetal Origins Hypothesis

To resolve Deaton's food puzzle, next we need to test if a cut in food intake as a result of social spending comprises nutritional status, in particular that of children. A burgeoning body of

[4] We will discuss the measure in detail in the next section.

literature on fetal origins hypothesis suggests that *in utero* is a critical period for human development. *In utero* exposures to malnutrition are likely to adversely affect health outcomes in later life (Barker and Osmond, 1986; Barker et al., 1989).

However, it is impossible to directly test this hypothesis using human subjects in a controlled experiment. The empirical literature largely relies on natural shocks, such as famine and drought, to identify the casual effect of prenatal exposures to malnutrition on long-term health outcome. For example, studies based on the Dutch Famine (1944-1945) reveal that the famine had negative impacts on various health related outcomes, such as mental disorder in early adulthood, schizophrenia, and lower glucose tolerance in adults (Neugebauer et al., 1999; Brown et al., 2000; Hulshoff Pol et al., 2000; Ravelli et al., 1998). Children born during a drought in rural Zimbabwe show a higher rate of stunting in the subsequent two years (Hoddinott and Kinsey, 2001). Maccini and Yang (2009) show that high rainfall at the very beginning of life is associated with better health and education outcomes in later life for Indonesian women.

Yet, not all empirical studies based on natural shocks confirm the fetal origins hypothesis. For instance, studies on the survivors of the Leningrad Siege (1941-1944) in general conclude that those exposed to starvation in the fetal stage do not show much difference in health outcomes from cohorts born outside Leningrad and in other years in the later stages of life. One key reason is that in the event of severe shocks like the Leningrad Siege, only the healthier survive and can be observed in later life. Therefore, the presence of mortality selection renders it less likely for researchers to observe the negative health impact on the survivors later on. Mu and Zhang (2011) show that prenatal exposures to the Chinese Great Famine (1959-1961) result in higher disability rates for female survivors but not for males, largely because of much larger excess male mortality rates during the famine.

The studies based on natural shocks have provided tremendous insight on the fetal origins hypothesis in extreme events. However, most people, even the poor, do not suffer from natural shocks as severe as famine. Instead, they face more frequent, yet minor, social shocks —funerals and wedding that they are obligated to attend. Do children born to mothers exposed to more frequent social shocks have worse health outcome as predicted by the fetal origins hypothesis? To our knowledge, no studies have examined the impact of prenatal exposures to social shocks on child health outcome.

In the third wave of our survey, we collected anthropometric information for all the children in our sample. The data enables us to address the above question. We use three variables—height-for-age, stunting and wasting—as major child health outcome measures. Stunting and wasting are defined based on WHO standards.

As shown in Table 4, more than half of children born in 2008 are stunted.[5] Despite impressive annual rates of income growth at more than 10% from 2004 and 2008, the stunting rate had not declined, but rather rose slightly in the sample villages. The problem is more acute among girls, whose stunting rate increased from 44.8% in 2004 to 61.1% in 2008. The rate of wasting shows a similar pattern. As illustrated, the Deaton food puzzle can be observed in rural China as well.

The observed Deaton puzzle may have something to do with *in utero* exposures to social shocks. Table 5 reports the average height-for-age z-score for children born between 2004 and 2008 according to low and high income groups in villages with more frequent and less frequent social shocks (number of ceremonies). The last column measures the difference-in-differences (DID) of the z-score. All the values are negative, suggesting that it is children of the poor income groups who exhibit lower z-scores when exposed to more frequent social shocks at the fetal stage. Because of the small sample size for each cohort, we cannot compute the *t*-value of the DIDs. In the last row, we pool together all the children born between 2004 and 2008. The DID value is highly significant and negative. While this simple analysis based on two-by-two discrete groups shows some suggestive evidence on the squeeze effect of social spending on child health outcome, it is interesting to further investigate if there is a linear negative relationship between the continuous variables of z-scores and number of ceremonies. Figure 3 depicts the height-for-age z-score against the number of ceremonies exposed in the fetal period for the high and low income status groups. For the low-income status group, the greater number of exposures to ceremonies, the lower value of z-score. In contrast, the figure does not reveal an obvious pattern between z-scores and social shocks for the high-income group.

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[5] The third wave survey took place in January, the coldest time of the year when people often wear heavy winter clothes. However, it is hard to weigh children's clothes, in particular those of newborns. Therefore, the measurement for the weight of young babies is likely less accurate. In the wake of this concern, we exclude those born in 2009 in our empirical analysis.

The simple DID analysis and bivariate plot provide tentative evidence in support of the squeeze effect of fetal exposures to social events. In order to more rigorously the squeeze effect, we need to control for more variables in more quantitative analyses.

Measuring Reference Groups and Relative Status

Before going to the quantitative analyses, we need to first define reference groups and measure relative status. The theoretical models on relative concerns often take reference groups as given. However, in empirical analyses, defining reference groups is more of art than of science. People interact with others in different cycles in their work and family life. Identifying and measuring reference groups are always a great challenge for empirical research on social interactions.

The challenge may be greater in cities than in rural areas. In rural areas in developing counties, people often live in a rather close community. Two recent studies on China show that people in rural China often use their home village as a reference group (Knight, Song and Gunatilaka, 2007; Mangyo and Park, 2011). In our survey area, the natural villages are located in an area renowned for its Karst landform, which presents a barrier for frequent interactions across villages. Therefore, in this paper, we primary use the natural village as a reference group in our empirical analyses.[6]

Having defined reference groups, next we need to measure relative concerns, as they are often mentioned as a key motive behind social spending in the literature. In this paper, we adopt the widely used Deaton RD index (2001). The index captures the idea that a person is deprived if others in the group possess something that one does not have. It closely follows the spirits of Frank, Levine, and Dijk (2010) and Hopkins and Kornienko (2004).[7]

The Deaton RD index originated from Yitzhaki (1979) and Wildman (2003). The level of deprivation experienced by an individual i with income y relative to another individual with income z is formulated as,

[6] We also check the robustness of our results using alternative reference groups, surname, and relative networks within a village.

[7] Frank, Levine and Dijk (2010) define "Expenditure Cascade" in an economy where every agent judges own behavior based on others closest above them. Hopkins and Kornienko (2004) develop a rank-based theoretical model that captures the status concern motive for lower ranked agents. In the model, rising average income of their fellow residents triggers a competition for status that extends all the way down to the bottom of the distribution. Moreover, Hopkins and Kornienko (2004) relate positional spending to a measure of income inequality, which pave the way for us to empirically identify status seeking and social influences.

$$D(i;y) = z - y \quad \text{if } y < z \quad \text{or} \tag{1}$$

$$D(i;y) = 0 \qquad \text{if } y \geq z \tag{2}$$

Based on this formula, an individual would feel more deprived as the number of individuals in society with more income than this individual increases. Thus, an overall measure of deprivation for the individual *i* is computed by summing the differences in income and weighting it with the proportion of people with higher income than the individual *i*. The above measures tend to overstate relative deprivation of individuals in high-income reference groups. This could be a very important issue when incomes differ substantially across groups. To make scale invariant, Deaton (2001) proposes a measure of relative deprivation for an individual *i* with income *x*:

$$(1/\mu)\int_{x}^{x^T}(y-x)dF(y) \quad \text{or} \quad (1/\mu)[1-F(x)][\mu^{+}(x)-x] \tag{3}$$

where μ denotes mean income for those in the reference group, x^T is the highest income in the group. *F(y)* is the cumulative distribution of incomes among individuals in the group, and $\mu^{+}(x)$ is the average income of those with income higher than the individual with income *x*. The Deaton RD index normalizes difference between average income of those with higher income and income *x* weighted by the proportion of those with income higher than the individual *i*. The Deaton RD index takes into account differences in the scale of income distribution across groups. Unlike other deprivation measures, such as deprivation of absolute income (Li and Zhu, 2006), the Deaton RD index is scale invariant. In others words, it will not automatically double as everyone’s income doubles.

<u>Quantifying the Effect of Social Shocks on Child Health Outcome</u>

The standard child nutritional and health demand function, derived from a welfare maximization framework, often includes income, food prices, access to healthcare, genetic make-up, and other individual characteristics (Behrman and Deolalikar, 1988; Strauss and Thomas, 1995, 2008). In this paper, we include the Deaton relative deprivation measure as well as its interactions with variables of interest as additional variables. The specification can be written as:

$$\begin{aligned} Outcome_{ijt} &= \alpha RD_{j,t=1} * CAB_{j,t=1} + \beta RD_{j,t=0} * CBB_{j,t=0} + \gamma_0 RD_{j,t=1} + + \gamma_1 RD_{j,t=0} \\ &+ \gamma_2 CAB_{j,t=1} + \gamma_3 CBB_{j,t=0} + \alpha_c \cdot C_{ijt} + \alpha_p \cdot PCG_{jt} + \alpha_a \cdot A_{jt} + \alpha_p \cdot p_t + \alpha_h \cdot H_{jt} + \alpha_s \cdot S_{jt} + \varepsilon_{ijt} \end{aligned} \tag{4}$$

where $Outcome_{ijt}$ denotes child *i*'s nutrients intake and health status in household *j* at time *t*; RD_{jt} denotes relative status for household *j*; C_{ijt} is a vector of child i's characteristics, including age, sex and birth order; PCG_{jt} is a vector of characteristics of the principal care giver, including household head sex, education, ethnicity, cadre status, father's height and mother's height, and major shocks; A_{jt} captures household j's predicted wealth; p_t denotes a vector of local food prices; and H_{jt} is a vector of local health facility characteristics, such as distance to the closest clinic center. Other household characteristics, including share of youth, share of the elderly, household size, and share of migrants, are controlled. The estimations with village and year fixed effects are clustered at the maternal level.

Two time periods are critical in the identification of squeeze effect: the fetal period (t=0) and the period after birth (t=1). $CBB_{j,t=0}$ is the number of ceremonies held by other families within the same home village in the year prior to child birth. Similarly, $CAB_{j,t=\gamma}$ is the number of ceremonies held by others after childbirth. As discussed earlier, the number of ceremonies may reflect a village's wealth level, which may potentially influence child health outcome. To address this concern, we also use the number of funerals held by other households in a natural village in regressions.

The main coefficients of interest are α and β. The magnitude and significance level of these two coefficients shows us whether exposures to social events shocks in the fetal period or after birth matter to child health outcome.

Building upon the findings from Figure 3 and Table 5, we run separate regressions on three child health outcome variables,—height-for-age z-score, stunting, and wasting,—in low and high income groups. The specification is the same as in equation (4) except that it excludes the interaction terms of RD. Table 6 reports the regression results for the key variable of interest, the number of funerals exposed in pre-natal period and after birth, respectively. Children born to mothers in low income groups, who are exposed to more funerals during their pregnancies, show lower height-for-age z-scores and display higher rates of stunting and wasting. In contrast, the health outcomes of children born to richer families do not appear to be vulnerable to social event shocks experienced in the year prior to their birth. Unlike *in utero* exposures, the number of social events exposed after birth have little to do with child health outcomes. The findings in this table indicate that the health outcomes of children born to poor families are associated with the number of social events held in their village in the year before their birth.

One may question the arbitrary way of dividing the sample into low and high-income groups. In Table 7, we regress the three health outcome variables on the whole sample by interacting the Deaton RD measure with the incidence of ceremonies or funerals at the natural village level in the year prior to or in the years after child birth. Regardless of whether we use the number of ceremonies or funerals, the interaction term of *in utero* exposures to the number of social shocks incurred prior to birth with the Deaton RD measure is always statistically significant, negative in the regression on height-for-age z-scores, and positive in regressions on stunting and wasting rates. Considering that a larger value of the RD measure means a lower status, the significant interaction terms mean that children from households with lower status and prenatally exposed to social event shocks are more likely to be shorter and develop higher rates of stunting and wasting than those from higher status households. In comparison, none of the coefficients for the interaction term between the Deaton RD measure and the number of ceremonies or funerals after birth is significant.

In the above two tables, we do not distinguish between the impact differences on boys and girls. In the human biology literature, it has been widely documented that boys are more susceptible to adverse nutritional environment than girls in the early life. To examine the potential gender difference, in Table 8, we run separate regressions on the health outcomes of boys and girls. The table reports the results using the number of funerals as proxy for social spending.[8] We find that boys from lower status households who are prenatally exposed to the same number of funerals display worse health outcomes than those from higher status families. However, prenatal exposures to social events do not seem to affect girls' health outcomes. The findings are largely consistent with the literature that girls are more robust than boys in early life. Interestingly, the interaction term between the Deaton RD index and the number of funerals exposed after birth in the regression on z-score for girls (second row in R2) is negative and statistically significant at 10% level. This is perhaps due to the son-preference culture in rural China (Mu and Zhang, 2011). In financially lean times, parents are more likely to allocate a larger proportion of resources, including food, to sons at the expense of daughters.

[8] The results are similar when using the number of ceremonies. They are available upon request.

Although the number of funerals held by other family members within a village is largely beyond an individual household's control, there is still a possibility that the mortality rate at the natural village level may be highly persistent over time and unhealthy people tend to live in the same village. If this is the case, then the number of funerals also represents some underlying unobserved factors which might influence child health outcomes. Under this circumstance, using the funeral variable may result in biased estimates. We use two approaches to rule this possibility out. First, we run a falsification test on the squeeze effect by lagging the variable on the number of funerals by one year. In other words, in this test the variable labeled "# of funerals before birth" actually corresponds to the number of funerals held in a natural village in the year of child birth rather than in the year prior to birth. All the coefficients for the interaction term are statistically insignificant, regardless of whether we use the number of funerals before birth or after birth. Thus, the number of funerals in years other than the year prior to child birth does not seem to affect child health outcomes.

Second, to examine whether the mortality rate captures unobserved health status for the population at large, in Table 10 we regress height-for-age z-scores and mortality rates at the natural village level on the proportion of households who suffered from major illness, as well as a set of other natural village-specific variables, including Gini coefficient, share of ethnic minority population, average household income, average household head age, average year of schooling, year fixed effects, and administrative village fixed effects. If the number of funerals captures some underlying health status at the natural village level, we would expect that the incidence of major illness is related to both mortality rate and height-for-age z-score. However, the coefficient for the health variable in both regressions is insignificant.

Robustness Checks on the Squeeze Effect

Because we do not know the exact dates of funerals, we cannot match them with the months of mothers' pregnancies. Instead, we simply count the number of funerals held by other families in the home village in the year prior to a child's birth and use it as a measure of fetal exposures to social shocks. This simple procedure may result in measurement errors. For example, if a child is born in December this year, then funerals held in the last year won't directly affect the child's *in utero* development. As a robustness check, we restrict our sample to those children born between January and June. Children in this sample are definitely conceived in the year prior to their birth.

Table 11 repeats the main regressions in Table 7 on the restricted sample. The coefficients for the interaction terms between the Deaton RD measure and the number of funerals prior to birth are statistically significant and in expected sign. The findings are totally consistent with those reported in Table 7.

Although people are familiar with each other within natural villages, villagers from the same family clan are still likely to interact more frequently among themselves than with other clans. If it is true, then using the natural village as a reference group would likely result in measurement errors on relative status and consequently estimations bias on the regression results. We use two ways to define family clans. In the first loose definition, we classify households whose heads share the same surnames as the same network. In the third wave of our survey, we asked village leaders and informants to help draw kinship network maps within a natural village. As the second definition, we directly use the identified kinship network as a reference group. Table 12 presents the regression results. The regressions follow the same specifications as in Table 7 except that we replace natural villages with surname and kinship networks as a reference group. Specifications R1-R3 use information on surname networks within natural villages. The coefficients for the first interaction term in R1-R3 are statistically significant, showing that funerals held in surname networks tend to lower the height-for-age z-score and increase the probability of wasting for those children from lower-status households. As shown by the significant coefficients in the first row and the last three columns (R4-R6), when using kinship network as a reference group, the squeeze effect still shows up. It is noted that none of the interaction terms in the second row, between RD measures and number of funerals after birth, is significant. Overall, regressions based on three different reference groups yield largely consistent results—prenatal exposures to social event shocks have an unintended negative consequence on the health outcomes of children born to lower-status families.

The literature on fetal origins hypothesis has shown that mortality selection associated with extreme natural shocks may mask the identification of long-term negative impact on health (Mu and Zhang, 2011). In the event of severe shocks, the most fragile fraction of the population is more likely to die first. As a result, the survivor population tends to be healthier than the general population in the absence of shocks. In other words, the presence of mortality selection will make it harder to discern the adverse effect of fetal origins. The population in the 18 natural villages in our sample was not subject to any major natural shocks. The social events, albeit a heavy fiscal burden for the poor, are unlikely to lead to excess mortality. The presence of excess mortality, if any, will only strengthen our results as the selection effect tends to trump the scarring effect (Pearson, 1912; Bozzoli et al., forthcoming).

Another potential selection problem is that children may have moved to cities with their migrant parents, thereby leaving behind an unhealthy group of children in the villages. Our surveys were conducted right before the Chinese New year when almost all migrants return home and children are at home for their winter break. Comparing the list of respondents' names from the 2006 survey with that of the 2009 survey, we do not find any attrition. Although many young people have taken migratory jobs throughout most time of the year, they generally leave their children behind with grandparents in their home villages because of the high cost of living and discrimination against migrants' children in urban schools.

Since height-for-age z-scores can be both positive and negative, we cannot directly take a logarithm on them. Instead, in our main regression, we simply use the original z-scores as a dependent variable, although most of the right-hand variables are in logarithmic form. To explore whether this linear-log specification yields drastically different results, following Hoddinott and Kinsey (2001) we transform the z-scores into percentiles according to international standards and then take the logarithm of the percentile. Appendix Table A reports the estimation results under this specification. In general, the results on the squeeze effect of *in utero* exposures to shocks remain largely the same as using z-scores.

The stunting and wasting cutoff values are based on WHO standards. The Chinese population is on average shorter and lighter in weight than the world average, thereby likely implying a cutoff value. The China Center for Disease Control (CDC) publishes its own cutoff values for the Chinese population. In Appendix Table B, we report the main results with the same specifications to Table 7 by replaying the WHO standard with the CDC standard. Both the sign and magnitude of prenatal squeeze effects are quite similar to those based on the WHO standard. Once again, we do not find a noticeable effect on exposures to social shocks after birth.

4. Conclusions

It has been widely noted that the improvement in nutritional status among the poor in developing countries lag far behind income growth. Deaton (2001) and Banerjee and Duflo (2007) have asked: why don't the poor eat more with their extra income?

In this paper, we argue that social spending can have a squeeze effect on food consumption, which in turn compromises nutritional status. In developing countries, most of the poor live in a close community where they know each other well. Their consumption decisions are shaped not only by their own preferences and budget constraints, but also by peers in their communities. When peer pressure and status are of importance, people tend to spend more on visible goods and activities (like social festivals) at the expense of less visible goods, including food. Gift exchange is almost a universal phenomenon in developing countries. One important feature of gift exchange is reciprocity. In many rural areas, it is a social norm to attend neighbors' weddings, funerals, and other major ceremonies. Because of the reciprocal nature of gift exchange and "mandatory" participation, gift-giving places a much heavier burden on the poor than on the rich. In order to afford a gift, the poor often have to forgo the consumption of meat, eggs, and other food items for weeks after attending a social event. Such a squeeze on food intake can extract an unintended long-term toll on the children of pregnant women. In contrast, because they have financial slack and food consumption accounts for a small share of their budget, the rich do not need to worry about food consumption when engaged in conspicuous behavior.

Using a unique census-type household survey collected in remote mountainous villages in China, we are able to clearly define reference groups and empirically examine the impact of social spending on food consumption and nutritional status. We find that children born to households with lower income status develop shorter and lighter physical stature if their home villages held a greater number of social events in the year prior to their birth.

A question thus arises: given the negative impact of social spending on child health outcome, why don't the pregnant women avoid attending fellow villagers' social festivals in the first place? There are several possible explanations. First, people may not be aware of the negative health consequence of prenatal exposures to social events. To our knowledge, this paper is one of the first papers to provide empirical evidence showing the existence of such an effect. It is likely that a more informed mother will be more careful in making a choice between eating adequate and healthy foods and attending a neighbor's social event.

Second, when rewards for higher status are high and punishment for lower status is grave, people, in particular the poor, will intensify their competition in status goods consumption (Hopkins, 2010). In China, sex ratios have become increasingly unbalanced (Bulte *et. al,* 2011).

As a result, the marriage market competition has intensified greatly over the past several decades. Under such a marriage market squeeze, the poor have to vigorously signal their wealth through bigger houses, more generous bride price payments, lavish wedding banquets, and active participation in social events within their village. In fact, the competition in social spending is more intensive among the poor segment of the population in rural China (Brown *et. al*, 2011; Chen and Zhang, 2011).

In the paper, we have focused mainly on child health outcomes. *In utero* exposures to adverse events may also affect education achievement and earning potentials in later life (Almond and Currie, 2011). As predicted by the fetal origins hypothesis, people who are exposed to a malnourished environment before birth are likely to develop a series of chronic diseases in adult life. As a future research project, it is interesting to continue to follow the population in the villages over a longer period of time and quantify the impact of *in utero* exposures to social events on education achievement, earnings, and health outcomes in later stages of life.

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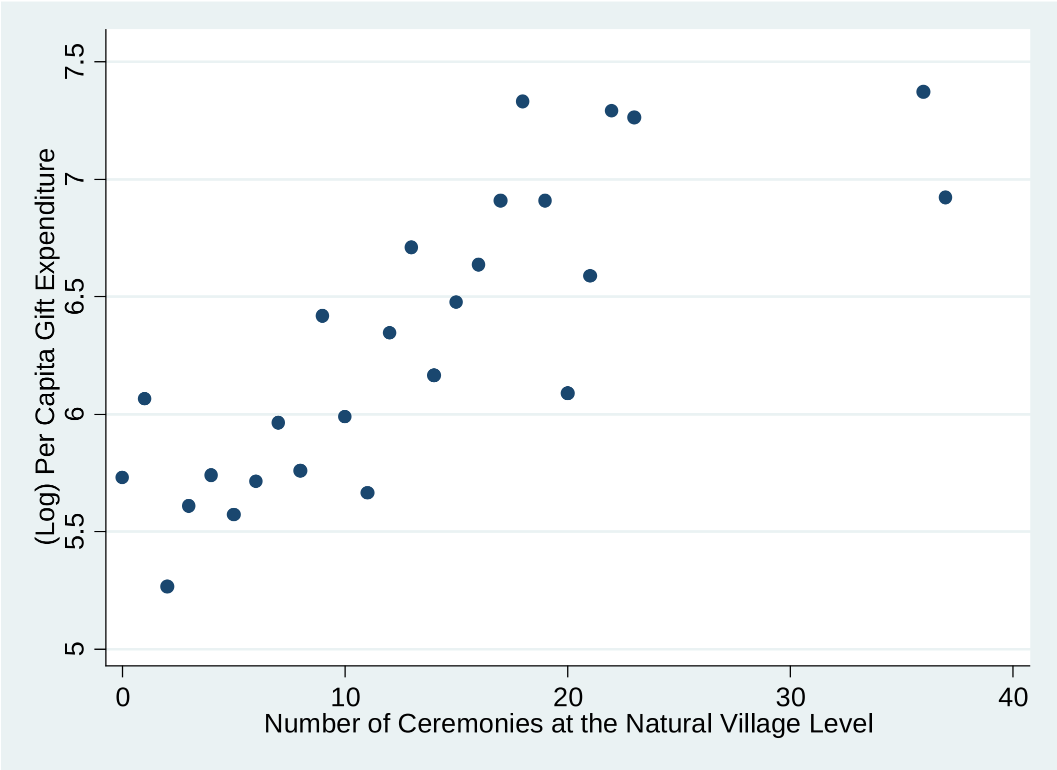

Figure 1 Average Per capita Gift Expenditure and Number of Ceremonies in a Natural Village

Notes: The figure is computed based on our three-wave household survey data in 2004, 2006 and 2009 in Guizhou Province. The horizontal axis represents the number of ceremonies at the natural village level in the three survey years, while the vertical axis represents the average per capita gift expenditure (log) at the natural village level in the corresponding year.

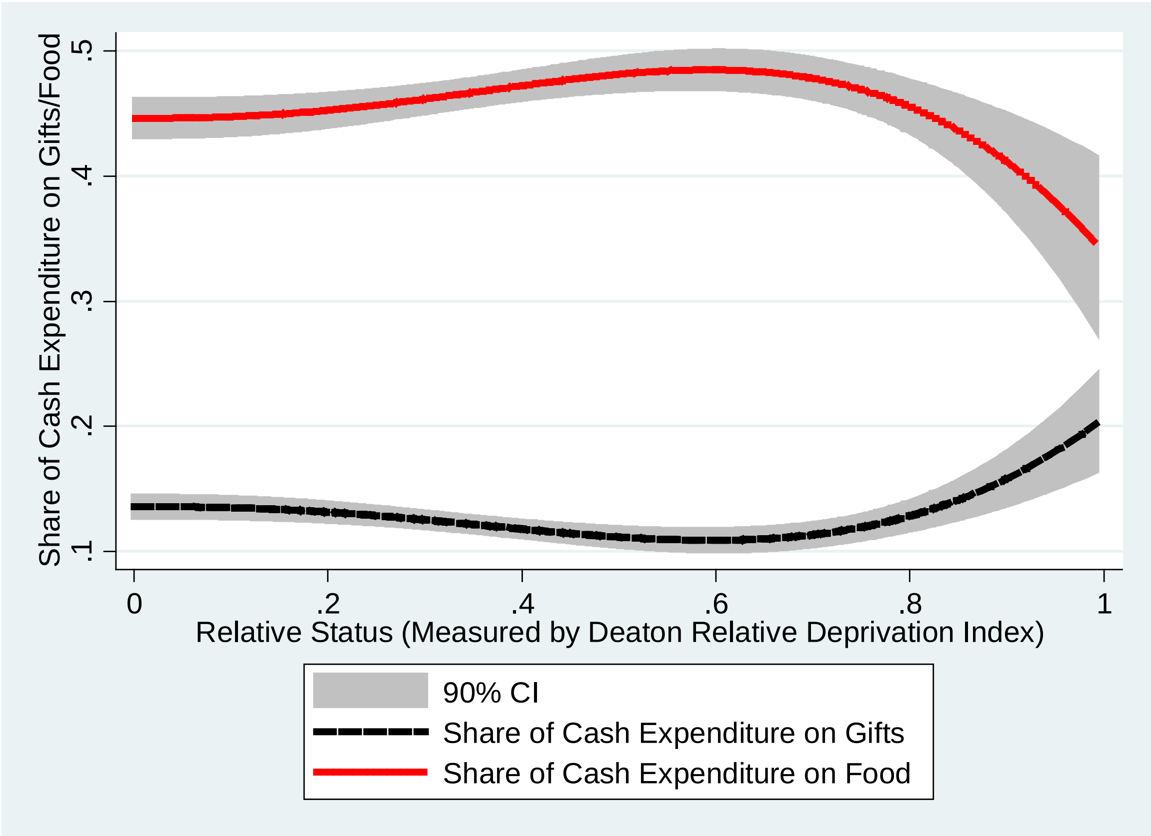

Figure 2 Share of Cash Expenditure Spent on Gifts and Food

Notes: Deaton index ranges from 0 to 1, with 1 corresponding to the lowest status and 0 standing for the highest status. All households surveyed in 2004, 2006, and 2009 are used to generate this figure.

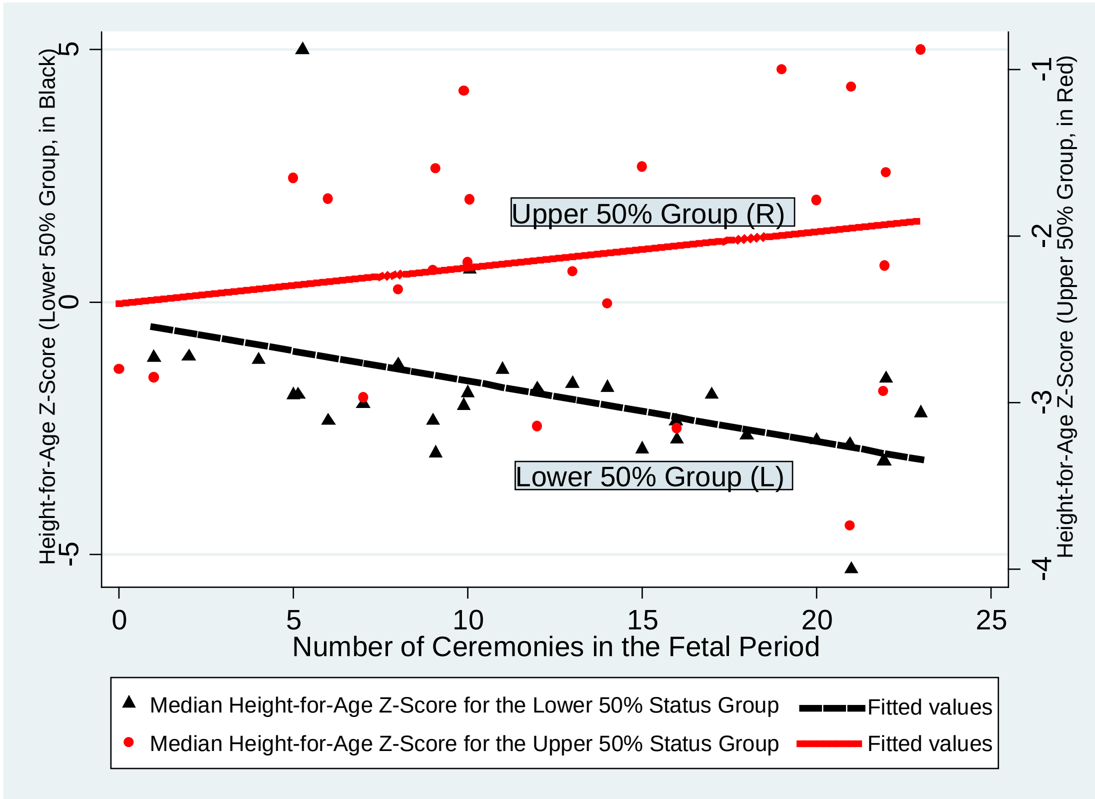

Figure 3 Number of Ceremonies and Height-for-Age Z-Score by Income Status Group

Notes: The high and low-income groups are divided based on the difference between household income and natural village median household income in the year prior to a child's birth. Because the income data are only available for three years when surveys were conducted, we use income data in 2004 to define income status in 2003 and 2004, data in 2006 to match income status in 2005 and 2006, and data in 2009 to infer income status in 2007. The anthropometric information for children born 2004-2008 are taken from the 2009 survey. The vertical axis represents the median height-for-age z-score corresponding to the number of ceremonies at the natural village level between 2005-and 2009.

Table 1 Summary Statistics on Major Economic Indicators of Guizhou Household Surveys in 2004, 2006 and 2009

	Total		
	2004	2006	2009
Per capita annual income (RMB)	1404	1817	2855
Income below poverty line of 892 RMB (%) (P0)	37.3	36.3	22.4
poverty-gap below poverty line (P1)	14.5	15.0	10.1
squared poverty-gap below poverty line (P2)	7.5	8.3	6.4
Income inequality (Gini)	43.1	48.2	55.2
(Mean) Deaton relative deprivation index	0.423	0.432	0.495
Share of consumption (%)			
Food	47.8	42.2	35.5
Gift and festival spending	7.9	13.9	15.2

Source: Authors' survey data

Notes: Deaton Relative Deprivation Index (Deaton, 2001) measures household-specific relative status in a natural village. It is valued between 0 and 1. The larger the number, the lower the relative status, and the more relatively deprived a household is.

Table 2 Summary Statistics on Major Ceremonies in Three Natural Villages

Year	Female Wedding		Male Wedding		Funeral		All the ceremonies		Gift giving per occasion by income group (RMB)			% of villagers attending funerals
	Gift size	# of ceremony	Gift size	# of ceremony	Gift size	# of ceremony	Gift size	# of ceremony	bottom 25%	middle 50%	top 75%	
2004	41.6	0.77	54.1	1.65	41.5	3.19	45.8	9.29	49.8	44.1	45.5	100%
2005	59.9	0.77	47.8	1.47	40.4	2.03	50.2	9.82	47.9	53.1	47.1	100%
2006	71.8	0.94	55.7	0.94	30.7	2.13	43.7	12.18	53.4	38.7	43.2	95.1%
2007	59.9	1.13	41.2	2.06	54.7	4.30	57.9	9.00	63.0	50.2	62.6	99.1%
2008	60.5	1.31	63.5	1.75	92.5	3.32	71.9	9.38	67.3	75.4	66.1	98.6%

Notes:

1. The gift spending data were based on gift records kept in all of the households in three natural villages collected in the 2009 survey. They have been adjusted into constant 2004 prices(yuan) using rural consumer price index published in *China Statistic Yearbook* (China National Statistical Bureau, various issues). A household's income status is based on its income standing in a natural village at a given year. Because the income data are available only for three years when surveys were conducted, we use household income surveyed in 2006 to define income status in 2005, and income data in 2009 to compute income status in 2007 and 2008.
2. The gift books record all the gifts received and the corresponding names of gift givers in different occasions. Based on these names, we can compute the participation rate for major events, such as funerals, within each natural village.

Table 3 The Effect of Ceremonies and Funerals on the Share of Food and Gift Cash Expenditure

	R1-Food Share	R1-Gift Share	R2-Food Share	R2-Gift Share
	SUR estimation		*SUR estimation*	
Rd * (log) # of *ceremonies*	-0.054**	0.007		
	(0.023)	(0.015)		
(log) # of *ceremonies*	0.020	0.014*		
	(0.012)	(0.008)		
Rd * (log) # of *funerals*			-0.042*	0.029*
			(0.024)	(0.016)
(log) # of *funerals*			0.030	-0.004
			(0.018)	(0.009)
Deaton RD	0.157***	0.014	0.096**	-0.028
	(0.056)	(0.036)	(0.044)	(0.028)
Year effect	Yes	Yes	Yes	Yes
Village fixed effect	Yes	Yes	Yes	Yes
Household shocks	Yes	Yes	Yes	Yes
(Pseudo) R2	0.204	0.239	0.203	0.239
N	2085	2085	2085	2085

Notes:
The SUR estimation represents seemingly unrelated regressions on the shares of cash expenditure spent on food and gift. The number of ceremonies and funerals refer to the total number of ceremonies and funerals held by others villagers in a natural village in the year prior to a child's birth. Robust standard errors are in parenthesis. The estimations are clustered at the year X natural village level. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Table 4 Height-for-age Z-scores, Stunting Rate (%) and Wasting Rate (%)

Birth year	Total			Boys			Girls		
	Z-score	Stunting (%)	Wasting (%)	Z-score	Stunting (%)	Wasting (%)	Z-score	Stunting (%)	Wasting (%)
2004	-2.07	51.47	16.18	-2.19	56.41	15.39	-1.91	44.83	17.24
2005	-2.27	42.31	13.46	-2.36	43.33	13.33	-2.11	40.91	13.64
2006	-2.45	59.58	17.02	-2.74	64.00	12.00	-2.17	54.55	22.73
2007	-2.08	41.51	16.98	-2.20	41.38	17.24	-1.91	41.67	16.67
2008	-3.01	53.33	16.67	-2.72	50.00	14.29	-3.60	61.11	22.22

Notes: Child anthropometric indicators were taken from the 2009 survey. Stunting is defined as height-for-age z-score less than two standard deviations of the WHO standard. Wasting is defined as weight-for-age z-score less than two standard deviations of the WHO standard.

Table 5 Ceremony Frequency and Height-for-Age Z-scores by Income Group

Ceremony / Income Status	Frequent (1)	less frequent (2)	(1)-(2)		Difference-in-Difference
Birth year: 2004					
Lower 50%	-2.89	-1.66	-1.23	(3)	
Upper 50%	-1.24	-2.15	0.91	(4)	(3)-(4)= -2.14
Birth year: 2005					
Lower 50%	-2.41	-1.98	-0.43	(3)	
Upper 50%	-2.21	-2.54	0.33	(4)	(3)-(4)= -0.76
Birth year: 2006					
Lower 50%	-3.06	-2.71	-0.35	(3)	
Upper 50%	-1.64	-2.31	0.67	(4)	(3)-(4)= -1.02
Birth year: 2007					
Lower 50%	-2.92	-0.42	-2.50	(3)	
Upper 50%	-2.32	-2.47	0.15	(4)	(3)-(4)= -2.65
Birth year: 2008					
Lower 50%	-3.27	-2.87	-0.40	(3)	
Upper 50%	-2.86	-3.08	0.22	(4)	(3)-(4)= -0.62
Birth year: 2004-2008					
Lower 50%	-2.87	-1.87	-1.00	(3)	
Upper 50%	-2.04	-2.60	0.56	(4)	(3)-(4)= ***-1.56*** (0.53)***

Notes:

The groups of "frequent" and "less frequent" are defined based on whether the number of ceremonies in a natural village is below or above the median number of ceremonies in our sample for a given year. The "Lower 50%" and "upper 50%" income groups are defined according to a household's income status compared to the median household income within its natural village in the year prior to a child's birth. In the last row, all the cohorts born between 2004 and2008 are combined. The standard errors are presented in parentheses.

Table 6 Exposures to Funerals and Child Health Outcomes by Income Group

	R1-high	R2-low	R3-high	R4-low	R5-high	R6-low
	Height for Age (*OLS*)		Stunting (*Linear Probability*)		Wasting (*Linear Probability*)	
(log) # of funerals *before* birth	0.589	-1.225***	-0.106	0.157*	-0.006	0.185**
	(0.416)	(0.448)	(0.084)	(0.085)	(0.044)	(0.090)
(log) # of funerals *after* birth	-0.186	-0.239	0.036	-0.052	-0.027	-0.067
	(0.291)	(0.527)	(0.070)	(0.068)	(0.054)	(0.071)
Deaton Rd *before* birth	-1.564	-0.339	-0.003	0.034	0.023	-0.369
	(1.241)	(0.997)	(0.257)	(0.241)	(0.252)	(0.238)
(Pseudo) R2	0.389	0.169	0.350	0.147	0.098	0.130
N	117	117	117	117	117	117
AIC	457	532	113	138	103	137

Notes:

1. Due to the small sample size, we divide the sample into high income group (R1, R3 and R5) and low income group (R2, R4 and R6) according to the difference between a household's income and its natural village's median income.
2. The health outcome measures are based on the WHO standard.
3. The number of funerals is defined as the total number of funerals held by other households in a natural village.
4. Household level characteristics (ceremony frequency before and after child birth, predicted per capita income, head sex, education, cadre status, share of youth, share of the elderly, household size, share of migrants, minority identity, father's height and mother's height, other shocks), child characteristics (age dummy, sex, birth order), village characteristics (distance to the closest clinic center, village dummy) are also included but not reported here. The estimations are clustered at the year X natural village level.
5. Robust standard errors are in parenthesis. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Table 7 Exposures to Ceremonies and Funerals, Relative Status, and Child Health Outcomes

	R1-ceremony	R2-funeral	R3-ceremony	R4-funeral	R5-ceremony	R6-funeral
	Height for Age (*OLS*)		Stunting (*Linear Probability)*		Wasting (*Linear Probability)*	
Deaton Rd * (log) # of ceremonies/funerals *before* birth	-2.430***	-0.384**	0.322*	0.489**	0.201*	0.391**
	(0.656)	(0.196)	(0.175)	(0.236)	(0.120)	(0.185)
Deaton Rd * (log) # of ceremonies/funerals *after* birth	-0.110	-0.249	-0.274	0.344	0.110	-0.055
	(0.724)	(0.184)	(0.190)	(0.214)	(0.111)	(0.133)
(log) # of ceremonies/funerals *before* birth	0.802*	0.187	-0.091	-0.276**	-0.072	-0.192
	(0.421)	(0.116)	(0.114)	(0.125)	(0.071)	(0.105)
(log) # of ceremonies/funerals *after* birth	-0.079	0.205*	0.179	-0.174	-0.040	-0.021
	(0.375)	(0.105)	(0.110)	(0.120)	(0.072)	(0.077)
Deaton Rd *before* birth	-0.495	-0.360	0.068	-0.429	0.108	-0.434
	(2.059)	(0.981)	(0.572)	(0.403)	(0.298)	(0.390)
(Pseudo) R2	0.213	0.202	0.185	0.157	0.081	0.133
N	234	234	234	234	234	234
AIC	592	576	188	239	224	211

Notes:

1. The number of ceremonies and funerals refer to the total number of ceremonies and funerals held by others villagers in a natural village in the year prior to a child's birth.
2. The health outcome measures are based on the WHO standard.
3. Household level characteristics ceremony frequency before and after child birth, predicted per capita income, head sex, education, cadre status, share of youth, share of the elderly, household size, share of migrants, minority identity, father's height and mother's height, other shocks), child characteristics (age dummy, sex, birth order), village characteristics (distance to the closest clinic center, village dummy) are also included but not reported here. The estimations are clustered at the year X natural village level.
4. Robust standard errors are in parenthesis. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Table 8 Exposures to funerals and Child Health Outcomes by Gender

	R1-Boy	R2-Girl	R3-Boy	R4-Girl	R5-Boy	R6-Girl
	Height-for-Age z score *OLS*		Stunting (*Linear Probability)*		Wasting (*Linear Probability)*	
Rd* (log) # of *funerals* before birth	-4.166**	-0.365	0.522*	0.254	0.416*	0.206
	(1.533)	(1.040)	(0.289)	(0.231)	(0.238)	(0.311)
Rd* (log) # of *funerals* after birth	0.569	-2.393*	-0.310	0.123	-0.095	0.089
	(1.097)	(1.294)	(0.273)	(0.333)	(0.190)	(0.245)
(log) # of *funerals* before birth	1.868*	-0.071	-0.293*	0.220	-0.189	-0.116
	(0.985)	(0.588)	(0.167)	(0.158)	(0.127)	(0.194)
(log) #of *funerals* after birth	-0.585	1.716*	0.234	-0.188	0.053	-0.155
	(0.626)	(0.856)	(0.162)	(0.194)	(0.115)	(0.131)
Deaton Rd	2.289	-0.842	-0.180	0.016	-0.440	-0.401
	(1.803)	(1.851)	(0.296)	(0.348)	(0.424)	(0.464)
(Pseudo) R2	0.275	0.325	0.298	0.270	0.148	0.193
N	139	95	139	95	139	95
AIC	610	377	157	106	127	112

Notes:
The number of ceremonies and funerals refer to the total number of funerals held by others villagers in a natural village in the year prior to a child's birth. Robust standard errors are in parenthesis. The estimations are clustered at year X natural village level. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Table 9 Falsification Test on the Squeeze Effect of Exposures to Funerals on the Early Child Health Outcome

	R1	R2	R3
	Height-for-Age Z Score	Stunting	Wasting
Rd * (log) # of funerals *before* birth	-0.408	0.027	0.059
	(0.295)	(0.059)	(0.051)
Rd * (log) # of funerals *after* birth	0.069	-0.040	-0.015
	(0.183)	(0.039)	(0.035)
(log) # of funerals *before* birth	0.236	-0.033	-0.029
	(0.205)	(0.028)	(0.032)
(log) # of funerals *after* birth	-0.014	0.013	0.024
	(0.118)	(0.022)	(0.026)
Deaton Rd *before* birth	0.722	0.050	-0.208
	(1.049)	(0.223)	(0.218)
(Pseudo) R2	0.192	0.213	0.160
N	234	234	234
AIC	982	237	239

Notes: The specification is similar to Table 7 except that we lag the number of funerals for each age cohort by one year. Robust standard errors are in parenthesis. The estimations are clustered at year X natural village level. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Table 10 Are Child Health Outcomes and Overall Disease / Mortality Rate at the Natural Village Level Determined by Any Common Factors?

(Natural Village Level)

	R1	R2	R3	R4
	Mean Height-for-Age z-score	Mortality rate	Mean Height-for-Age z-score	Mortality rate
Proportion of households suffering from big diseases in a village during a year	-21.703	0.107		
	(16.613)	(0.156)		
Self-rated health status			1.680	-0.001
			(2.500)	(0.016)
Gini coefficient	-5.169*	-0.022	-4.180	-0.020
	(2.742)	(0.015)	(3.310)	(0.014)
Proportion of ethnic minorities	0.199	-0.016	0.090	-0.016*
	(1.048)	(0.009)	(0.940)	(0.009)
(Mean) village income (log)	1.699**	-0.012**	1.495*	-0.012*
	(0.727)	(0.005)	(0.788)	(0.006)
(Mean) head age	0.183***	0.001	0.189***	0.001
	(0.051)	(0.001)	(0.054)	(0.001)
(Mean) year of education	1.123***	-0.004**	0.979***	-0.003*
	(0.301)	(0.002)	(0.325)	(0.002)
(Mean) mother's height	0.107***	0.001**	0.112***	0.000*
	(0.015)	(0.000)	(0.017)	(0.000)
Rate of tap water access	1.993	-0.030***	0.940	-0.027***
	(1.206)	(0.009)	(1.180)	(0.007)
Rate of water pollution	2.714	-0.003	2.470	-0.009
	(1.643)	(0.015)	(1.410)	(0.016)
Rate of difficulty in water access	3.142***	-0.037***	2.020	-0.034***
	(1.056)	(0.009)	(1.410)	(0.010)
(Mean) distance to nearest clinic	-3.031**	0.002	-2.726*	0.001
	(1.268)	(0.003)	(1.322)	(0.004)
Year dummies	Yes	Yes	Yes	Yes
Administrative village dummies	Yes	Yes	Yes	Yes
(Pseudo) R2	0.673	0.418	0.661	0.407
N	72	72	72	72

Notes:

1. This table attempts to rule out the possibility that unhealthy people tend to live in a natural village where unobserved health factors might simultaneously affect the mortality rate in a village and height-for-age z-score for children. To be consistent with other tables and figures, three-wave household survey (2004, 2006, 2009), five-year information on household shocks (2004-2008) and z-score for children born between 2004 and 2008 are merged to produce this table. All variables in the regressions are aggregated to the natural village level with 16*5 observations. However, 8 observations are dropped in R1, mainly because no child was born in some small size villages in a year.
2. Self-rated health status is over the range of 1-5, with 5 the healthiest.

Table 11 Robustness Check: Impact of Exposures to Funerals on the Health Outcome of Children Born Between January and June

	R1	R2	R3
	Height-for-Age	Stunting	Wasting
Rd * (log) # of funerals *before* birth	-3.162***	0.396*	0.697**
	(1.007)	(0.184)	(0.267)
Rd * (log) # of funerals *after* birth	-1.677*	-0.226	-0.090
	(0.963)	(0.245)	(0.215)
(log) # of funerals *before* birth	1.664**	-0.197	-0.447*
	(0.670)	(0.161)	(0.262)
(log) # of funerals *after* birth	0.975*	-0.125	-0.025
	(0.532)	(0.140)	(0.120)
Deaton Rd *before* birth	2.970	-0.202	-0.524
	(1.886)	(0.332)	(0.428)
(Pseudo) R2	0.213	0.189	0.265
N	110	110	110
AIC	417	118	81

Notes: The specification is the same as Table 7 except that we restrict our sample to children who were born between January and June. Robust standard error in parenthesis. The estimations are clustered at year X natural village level. The symbols *, **, and *** indicate confidence levels of 90%, 95%, and 99%, respectively.

Table 12 Robustness Check: Squeeze Effect of Exposures to Funerals on Child Health Outcomes using Alternative Reference Groups

	R1	R2	R3	R4	R5	R6
	Surname Network			*Kinship Network*		
	Height-for-Age Z-Score	Stunting	Wasting	Height-for-Age Z-Score	Stunting	Wasting
Rd*# of *funeral intensity* before birth	-0.506**	0.049	0.126**	-0.717*	0.152*	0.153**
	(0.253)	(0.050)	(0.049)	(0.407)	(0.091)	(0.074)
Rd*# of *funeral intensity* after birth	-0.071	-0.038	-0.030	-0.186	-0.037	-0.038
	(0.198)	(0.048)	(0.037)	(0.343)	(0.087)	(0.060)
# of *funeral intensity* before birth	0.180	-0.020	-0.057**	0.226	-0.053	-0.075
	(0.140)	(0.030)	(0.027)	(0.237)	(0.055)	(0.050)
# of *funeral intensity* after birth	0.124	0.008	-0.009	0.132	-0.010	0.002
	(0.111)	(0.029)	(0.017)	(0.209)	(0.048)	(0.037)
Deaton rd	-0.187	0.235	0.006	0.129	0.375	0.039
	(0.908)	(0.189)	(0.234)	(1.110)	(0.281)	(0.227)
(Pseudo) R2	0.202	0.185	0.122	0.214	0.443	0.116
N	234	234	234	234	234	234
AIC	977	246	213	980	329	220

Notes:
The specification is the same as Table 7 except that we use replace natural villages with surname and kinship networks as reference groups. Both surname and kinship network reference groups are confined to the boundaries of a natural village. Robust standard errors are in parenthesis. The estimations are clustered at the year X natural village level. The symbols *, **, and *** indicate confidence levels at 90%, 95%, and 99%, respectively.

Appendix Table A Height-for-Age Z-score Equation Estimated in Log-linear Form

	(log) Percentiles Height-for-Age
Deaton Rd *(log) # of funerals *before* birth	-0.795**
	(0.309)
Deaton Rd *(log) # of funerals *after* birth	-0.326
	(0.271)
(log) # of funerals *before* birth	0.350*
	(0.186)
(log) # of funerals *after* birth	0.245
	(0.171)
Deaton Rd *before* birth	0.870*
	(0.514)
(Pseudo) R2	0.206
N	234
AIC	595

Notes:
This table is the same as Table 7 except that the dependent variable is in logarithmic form. To avoid negative values of height-for-age z-score, the percentiles for z-scores are calculated. The z-score is based on the WHO standard. Robust standard error in parentheses. The symbols *, **, and *** indicate confidence levels of 90%, 95%, and 99%, respectively.

Appendix Table B Impact of Fetal Exposures to Funerals on Early Child Health Outcome: using the CDC Standard

	R1-Stunting	R2-Wasting
Deaton Rd * (log) # of funerals *before* birth	0.437*	0.389*
	(0.230)	(0.227)
Deaton Rd *(log) # of funerals *after* birth	0.185	-0.050
	(0.194)	(0.147)
(Pseudo) R2	0.121	0.132
N	234	234
AIC	345	209

Notes: see Table 7.