Costly Posturing: Relative Status, Ceremonies and Early Child Development†

Xi Chen, Cornell University

Xiaobo Zhang, International Food Policy Research Institute

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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 pregnancy are more likely to display higher rates of stunting and wasting (too short and skinny) for their age.

Keywords: Relative Status, Squeeze Effect, Nutrients Intake, Stunting, Wasting, Gender

JEL Codes: D13, I32, O15

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1.Introduction

Deaton (2010) raises 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 visible goods and occasions, such as shirts and wedding ceremonies (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?

Certainly, 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:

"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 nutrition 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 this mechanism 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 pregnancy are more likely to display higher rates of stunting and wasting (too short and skinny) for their age. We provide suggestive evidence on the intermediate pathways linking social events with health outcomes. It is most plausible that expenditures on social occasions take scarce cash resource away from basic food consumption.

The rest of the paper is organized as follows: Part II summarizes the literature; Part III lays out empirical strategy and discusses data and key measures; Part IV and Part V present main results and extensions, respectively; Part VI concludes with a discussion on the mechanism.

2. The Literature

2.1 Relative Standing and Social Spending

Relative income affects well-being. [1] The literature has often referred to *keeping up with the Joneses* in high-income groups. [2] However, it is widely documented that poor people also allocate scarce resources to social expenditure. [3] For them, large household spending in social occasions competes with basic consumption. The literature on social spending is dominated by its risk-pooling and income generating mechanism in environments that lack formal financial markets (Rosenzweig, 1988; Coate and Ravallion, 1993; Townsend, 1994; Udry, 1994; Fafchamps and Gubert, 2007). Other studies find that social spending helps climb social ladders and embodies a preference for following richer people (Frank, Levine and Dijk, 2010; Brown et al., 2011).

However, a large proportion of resources devoted to social spending may impose negative externalities that hinder efforts to reduce poverty for households living close to subsistence, since money spent on social occasions is not available for basic food, health care, or productive investments. In Brazil and India, the demand for food relative to overall expenditure could be much higher for the poor, but no salient difference between the poorest and the richest is seen in elasticity of food demand (Deaton and Subramanian, 1996; Thomas and Strauss, 1997; Banerjee and Duflo, 2007). In Kenya, large funeral expenses force households to liquidate productive assets and fall into poverty (Mango et al., 2009). Summarizing over these cases, the short term squeeze may lead to a persistent welfare loss. From a public policy perspective, it is crucial to identify shocks that can have long-run effects.

Moreover, while a large proportion of resources are spent on social occasions in many developing countries, China has one of the highest and one that is increasing very fast. In rural

[1] Though put forward in the seminal work of Veblen (1899), economics has been focusing on absolute well-being. Duesenberry (1949) brought forward relative income hypothesis. Since the 1970's, compelling evidence on relative concern has been accumulated (Easterlin, 1974; Sen, 1983; Frank, 1985; Van de Stadt et al., 1985).

[2] For example, Frank (1997) notes that in the US counties with high income inequality, intense competition for social status leads to higher median housing prices, higher personal bankruptcy rates, and a higher incidence of divorce. Bowles and Park (2002) find that total working hours were positively associated with higher inequality in OECD countries over time. Frank, Levine and Dijk (2010) further find that relative concern could well explain the link between inequality and observed disparities in international savings rates.

[3] Evidence from designer-label goods consumption in Bolivia (Kempen, 2003), lavish festivals in India (Banerjee and Duflo, 2007), "splendid" funerals in Ghana (*The Economist*, 2007) and South Africa (Case et al., 2008), relative deprivation and migration in Mexico (Stark et al., 1991), soaring bride-prices and dowries in south Asia and Africa (Rao, 1993; Dekker and Hoogeveen 2002), marriage payments in Bangladesh (Anderson, 2007), and community level consumption in Nepal (Fafchamps and Shilpi, 2008) show strong support for relative concern. Fafchamps and Shilpi (2008) further notice that isolation from market is associated with a significant increase in relative concern.

China, social spending has increased much faster than income and other consumption (Brown et al., 2011), suggesting resources are being squeezed from basic consumption and productive investment. Funerals are so lavish that an average of five-time annual per capita income is spent on a funeral, and gift competition for fellow villagers is very intense (Chen and Zhang, 2011).

2.2 The Fetal Origins Hypothesis

In research on child nutrition, the idea that environmental conditions in a certain sensitive period of life may have long-run, irreversible effects is known as "critical-period programming". When a fetus suffers malnutrition, the resulting stress can induce irreversible adaptations to the hunger environment that alter its permanent ability in later life to adjust to improved nutritional opportunities. In the long run, the mal-adaptation can lead to negative health outcomes in later stages of life (Barker and Osmond, 1986; Barker et al., 1989; Godfrey and Barker, 2000).

Teasing out the causal impacts of nutritional shocks at different points in the lifecycle is difficult given the strong correlation of deprivation across the vulnerable periods in the lifecycle (Glewwe and King, 2001). Studies have argued that the period after weaning from breast milk until age 24-36 months may be critical, as protection from the mother during pregnancy and breast-feeding ends. For example, malnutrition between 1 and 2 years (versus the first year of life) has a stronger relationship with cognitive development in the Philippines (Glewwe and King, 2001). Physical growth falters between one and two years of age (but not for cohorts who were between two and five years old at the time) for cohorts born during a drought in rural Zimbabwe (Hoddinott and Kinsey, 2001). The potential for an individual stunted in the first few years of life to "catch up" is limited (Martorell, 1995). Maccini and Yang (2009) find that the period after weaning from breast milk matters. As counterevidence, Maccini and Yang (2009) also show that the fetal period does not seem to matter in Indonesia.

Moreover, sometimes it is difficult to judge a priori whether prenatal or postnatal exposure is more influential simply because different aspects of early development are subject to different processes. For example, early postnatal exposure to Pandemic influenza apparently

had a larger impact on hearing than did prenatal flu exposure (Heider, 1934). Mental health conditions and non-cognitive skills seem to have large and persistent effects independent of those captured by measures of child health at birth (Almond and Currie, 2011).

Relative to studies that utilize extreme drought and civil war (Alderman et al., 2006), pandemics (Almond, 2006) and twin births (Behrman and Rosenzweig, 2004), our paper on relationship between lavish ceremonies and later-life outcomes is in a less extreme way.

The potential squeeze effect of household social spending depends on the fetal origins effect combined with benefits from mutual insurance. While the fetal origins effect negatively affects child health outcomes, there might exist a positive impact of mutual insurance. If the former effect dominates the latter, squeeze effect is observed.

Gender bias can be observed for squeeze effects that treat males and females differently, such as in Mu and Zhang (2011). However, squeeze effects should not display gender bias before birth if any of the following two cases applies: 1) if no gender selection technology is available to households and ceremony shocks are not large enough to distinguish gender difference or; 2) gender bias in resources reallocation exactly cancels out the net impact among the fetal origins effect and mutual insurance effect. Otherwise, we should be able to observe squeeze effect with gender bias.

3. Empirical Strategy

3.1 Reference Group and Relative Status

A proper definition of reference group is essential to the measures of relative standing and squeeze effect. Reference group can be defined quite differently depending on the specific context. In a developed society, information flow is fast and efficient, so it is difficult to define reference groups. However, in an impoverished region poor public infrastructure impedes resource flow, and the local norms usually strengthen reciprocity within communities. These differences facilitate a much improved definition of the reference group in our study. The special local geographic condition, *Karst* landform, prevents local residents in natural villages[4] from frequent connections with outside world.

[4] In contrast to an administrative village that holds the lowest level bureaucratic entity in China and includes several natural villages, a natural village is spontaneously and naturally evolved over a long time period.

A recent empirical economics study in rural China suggests that village reference groups are salient for rural residents living in close proximity (Mangyo and Park, 2011). Sociologists also document that in northern China villagers absent from a funeral are considered an extremely unfriendly gesture (e.g., Yan, 1996). Per capita gift giving in rural Guizhou also show a fast increasing pattern along with the growing number of ceremonies during a year (Figure 1). Table 3 presents booming gift size over all major social events. The bottom income group spends no less than their richer counterpart on per social occasion. Matching written gift records with our three-wave census household survey, it is found that nearly all local residents participate and present gifts in ceremonies, especially during funerals. Therefore, natural village is adopted as the reference group. Both number of social events and relative status are measured at the natural village level.

One is deprived if others in the group possess something that one does not have. However, agent-specific relative status/deprivation is not captured by the conventional community-specific inequality measures. In this paper, relative status/deprivation is defined by two indicators: the rank-Gini interaction and the Deaton relative deprivation index. The interaction between relative status and ceremony frequency serves as the key variable that identifies heterogeneous squeeze effect along the income spectrum. Our relative status measure – the Deaton relative deprivation index (2001) - is similar in spirit to Frank, Levine and Dijk (2010) and Hopkins and Kornienko (2004).[5]

The Deaton 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,

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

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

[5] 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.

Based on this form, one would feel more deprived as the number of individuals in society with higher income increases. Thus, an overall measure of deprivation for the individual i is given by summing the differences in income and weighting it with the proportion of people with higher income than the individual i. Deaton (2001) proposes a measure of relative deprivation for an individual *i* with income x at the provincial level and stratifies it by urban and rural regions:

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

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 measure is the normalized 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.

Many relative status/deprivation measures tend to overstate relative status/deprivation of individuals in high-income reference groups. This could be a very important issue when incomes differ substantially across groups or when a panel dataset is used to measure relative status/deprivation over time. The Deaton index takes into account differences in the scale of income distribution across groups. In other words, unlike some other status/deprivation measures such as deprivation of absolute income (RDA) (Li and Zhu, 2006) Deaton index will not automatically double if everyone's income doubles.

3.2 Health Outcome Measures

Wasting and stunting are frequently used to measure malnutrition. However, long-term malnutrition status is better characterized by stunting than wasting, as height-for-age (HAZ) captures long-term impact of malnutrition on general health status of the population, while we cannot easily disentangle short-term impact of malnutrition from long-term impact if weight-for-age (WAZ) is used.

The main health outcomes are measured in both binary and continuous indicators. Height-for-age z-score is used in OLS estimations, while stunting status in both the CDC and the WHO standards are estimated in linear probability regressions. As a complement, wasting based on the WHO standard is also estimated.

Throughout the evaluation, we define that early childhood ends at age five. This definition offers both advantages and disadvantages over analyses that focus on the prenatal period. Mortality is substantially lower during early childhood than *in utero*, which reduces the scope for selective attrition caused by shocks that affect the composition of survivors. However, it is unlikely that environmental sensitivity during early childhood tapers discontinuously at any precise age (including age five). Therefore, we should keep in mind that we cannot make sharp temporal comparisons of a cohort exposed to social events shocks to a neighboring cohort unexposed by virtue of its being too old to be sensitive (Almond and Currie, 2011).

3.3 Empirical Model

The measure of nutritional status and health outcomes is an argument in the welfare function of a household (Behrman and Deolalikar, 1988; Strauss and Thomas, 1995, 2008). Well-being should be improved as nutritional status improves. Decisions that parents make about resources allocation during early child development are constrained in several ways, such as income, time, food prices, health facilities, genetic make-up, and knowledge and skills. Maximizing the household welfare function subject to these constraints generates first-order conditions that yield a reduced-form child nutritional and health demand function:

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

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, involving 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. 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 household j's peer ceremony frequency before birth. Similarly, $CAB_{j,t=\gamma}$ is household j's peer ceremony frequency after birth. Besides the scenario that incorporating all ceremonies to identify squeeze effect, we also use fellow villagers' funeral ceremonies to mitigate the endogeneity concern. Estimation results under both definitions are presented in the main results.

From the two-year old cohort onwards, children experienced at least two years social events shocks, different weighting strategies are adopted: one way is to use Almon (1965) lag to discount more distant shocks; another way is to only account for shocks one year before and after birth; a third way is to add up all shocks over years without discount. Both $RD_{j,t=0} * CBB_{j,t=0}$ and $RD_{j,t=\gamma} * CAB_{j,t=\gamma}$ measure squeeze intensity.

The hypothesis to be tested is whether both α s and β s are significantly positive (negative) when the outcome variables are stunting and wasting (height-for-age z-score), suggesting ceremony shocks bias towards the lower tail of the distribution. A comparison of the magnitude and significance between α and β informs us whether social events shocks bias towards the fetal period.

An accurate identification of squeeze effects relies on one's closeness to fellow villagers. Other than peers' number of funerals defined at the natural village level, two alternative definitions of reference groups are adopted in local natural villages: surname networks and kinship networks. It is assumed that fellow villagers sharing big surnames or having large kinship (blood & distant relatives) networks are more pressed to engage in social spending.

Previous medical studies suggest heterogeneous month effects, as a same shock occurs at different time during the fetal period demonstrates varying impacts on child development. Ideally, the fetal origins hypothesis can be tested for each month. However, the small sample

size for each month cohort precludes us from distinguishing the effects. Meanwhile, we are not able to identify squeeze effect for each age cohort due to the limited sample size for each age cohort between 2004 and 2008.

3.4 Data

The dataset for this study comes from three waves of census-type rural household survey conducted by us in three administrative villages (including 18 natural villages) in Puding County, Western China.[6] Though a median level county in Guizhou, Puding doubles the national average in poverty rate (Table 1). It is both geographically and ethnically diversified due to its unique Karst landform separating people from outside and 20 ethnic minorities living in the county, including Han, Miao, Buyi, Gelao, and Yi. In total, ethnic minorities comprise about 20% of population. These features uniquely facilitate natural villages, natural communities that evolved without political command but geographic conditions, to be well-defined reference groups.[7]

The first wave survey included all 801 households at the beginning of 2005. The survey collected detailed information on household demographics, income, consumption, transfers, expenditures and incomes related to gift-giving, weddings, funerals, and blood donation. Most information was collected for each household member, including those who were working outside the county at the time of survey. A follow-up survey of the same households was administered in early 2007 and 833 households was interviewed. In January 2010, the third wave follow-up survey was conducted and 872 households were interviewed.

During the third wave, information on a three-day food intake for all family members was collected. The work was implemented two month before the major festival in China, purging the influence of public holiday. As a complement, in all three waves data on annual food consumption was also collected. Health indicators, such as height and weight, were also surveyed. However, weight-for-age seems to suffer from more measurement error in our

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

[7] Because of isolation from outside, people know each other well. On average most residents have some kinship relations within a natural village. For several natural villages of ethnic minority groups there are strong links across them, therefore we combine those natural villages.

survey data compared with height-for-age, since the third wave took place in harsh winter during which local people wore heavy clothes and this factor is not easily estimated.

Throughout the three-wave survey, it is observed that household spending on cash gifts and festivals accounts for a large proportion of cash expenditure. Figure 2 illustrates a very interesting consumption pattern. The poorest among the poor (to the right part of Figure 2) allocate a lower share of cash expenditure on food but a higher share on gift giving. They could eat better and suffer less from malnutrition by simply spending more on basic food.

Reflected in the rate of wasting, stunting and height-for-age z-score, the consequences are severe for health status among little children (Table 2). Frequent and costly ceremonies accounts for the welfare loss. Figure 3 demonstrates that children born after experiencing more ceremonies in their prenatal period generally possess lower height-for-age z-score. In contrast, ceremonies afterwards do not suggest this pattern. Dividing all children into high/low income groups and frequent/less frequent groups, the initial double difference and t-test also show that frequent ceremonies affect health outcome. Further considering that ceremonies have been increasingly costly, it is very likely that there is association between social events and early child well-being.

This trend is coupled with the recent surge in income inequality and a large population in poverty. Shown in Table 1, the Gini coefficient has been increasing from 0.43 in 2004 to 0.55 in 2009, and at the same time 22.4 percent of the population is below the $0.37/day (equivalent to 892RMB/day) local official poverty line. The former might motivate the rich to spend lavishly in social events and the poor to follow the norm, while the later drags people to below the cut-off line of basic consumption.

4. Empirical Results

Poor health outcomes in an impoverished context during early childhood are very likely to be associated with insufficient food and nutrients intake. Due to the poor market access and competition for cash budget allocated between social events and food, the fetal origins hypothesis predicts long-lasting negative effects on health if children in the prenatal period experience frequent ceremonies. Before testing squeeze effects, we explore whether the trade-

off between spending on food and social events binds for households of lower status and whether they are both associated with frequent ceremonies.

The test for this potential pathway through which costly social events harm health outcomes is presented in Table 5. In R1 and R2 seemingly unrelated regressions (SUR) on the determinants of shares of cash expenditure on food and gifts are simultaneously estimated. The estimations with three-wave household survey data confirm that food cash expenditure is moved to be spent on gifts through costly and frequent ceremonies. R3 and R4 simply replace number of all ceremonies by number of all funerals in a natural village, and results are unchanged.

The persistent characteristics of children that could plausibly be thought to be determined are those having to do with their crucial stages in physical development (especially *in utero*) that can have long-lasting consequences. Before presenting estimations on squeeze effects identified through an interaction between number of ceremonies in the fetal period and the corresponding relative status, our sample is divided into two groups: the lower 50% income group and the upper 50% income group. For the low income group, estimations without the interaction term present significant squeeze effects on three standard measures of wellbeing: height-for-age z-score, stunting and wasting. However, squeeze effect is not evident for the high income group, which suggests that the poorer group among the poor is the victim of large social spending (Table 6).

Given the small sample size for this study, we are not able to further divide samples into smaller income groups. Instead, in all the following estimations number of ceremonies is interacted with relative income status to capture squeeze effects across the income spectrum.

Table 7 presents main results for squeeze effects in the fetal period and one year after birth on three mid to long term health measures, i.e., height-for-age z-score, stunting and wasting. The odd columns use variation in peers' number of all ceremonies in a natural village interacted with relative income status, while the even columns simply utilize peers' number of funerals to interact with relative status. In both cases, the coefficients for the fetal period interactions are significant, suggesting that squeeze effects bias towards the lower income hierarchy. None of after-birth squeeze effect is salient for the three health outcomes.

Other results on height-for-age z-score, stunting and wasting include: children from ethnic minority households, households with lower income, male head, lower share of the elderly, shorter mother, and households suffer from other major shocks are more likely to be associated with poor health outcomes.

The results on squeeze effects are robust to the inclusion of more types of social events other than funerals. However, to minimize the concern for endogeneity when more social events are included, all the estimations following Table 7 define squeeze effects based on number of funerals.

Do squeeze effect demostrate gender bias? Ceremony shocks are hypothezed to bias towards girls for a combination of the two forces: one, parents may have son preference in food allocation. When both boys and girls suffer equally from ceremony shocks, the negative impact may gradually disappear for boys while last for girls; two, the fetal origins effect due to social event shocks may demonstrate more negative impact on boys. Considering the fact that sex selection technology is not available to most local households in the impoverished region, we expect to observe squeeze effects towards boys in the prenatal period (due to force two) and towards girls after birth (due to force one).

In Table 8, our results confirm the two hypothesized forces when height-for-age z-score is utilized as the health outcome, while we confirm squeeze due to the fetal origins effect when wasting or stunting status is treated as an outcome variable.

5. Additional Evidence and Robustness

Correct timing is crucial to the identification of fetal origins effect. To verify squeeze effects, a falsification test is conducted by purposefully switching one year backward peers' number of funerals. If findings above are valid, the mismatch between number of funerals and the fetal period should result in no squeeze effects. Table 9 shows the test with all three health outcome variables, and indeed no significant effect is found.

Table 10 further tests a possibility that might undermine our identification of squeeze effect. If unhealthy people tend to live in a neighborhood where unobserved health factors simultaneously might affect the incidence of major diseases / mortality rate in a village and z-

score for children, the identified squeeze effects will be confounded. The sample is composed of all natural village/year combinations that have children born in the categories. Fortunately, we do not find significant association between mean z-score and proportion of households suffering from big diseases or high mortality rate in a village during a year.

Extreme case may lead to attrition bias due to the possibility that some unhealthy children died prior to 2009. However, several aspects determine that selection is not an issue. First, it is believed that frequent social events should not be strong enough to cause differential mortality in our sample, and checking respondents' name list for each wave informs us that selection is not evident.[8] Second, evidence shows that even for high mortality populations, the impact of mortality selection is minimal (Pitt and Rosenzweig, 1989). Moreover, our estimations based on surviving children should provide us with a lower bound of squeeze effects, since higher mortality leads to healthier survivors due to the fact that the selection effect overwhelms the scarring effect (Pearson, 1912; Bozzoli et al., forthcoming). In the medical literature, boys suffer more from mortality selection, but we still observe the squeeze effect for boys in the fetal period.

To rule out the concern for sensitive identification with different reference groups, in Table 11 squeeze effects are tested with two alternative networks. The household-specific networks aim to capture idiosyncratic pressure from peers' social events at the household level, since one may believe that actual squeeze effects depend on one's "closeness" to fellow villagers. "Closeness" can be measured according to one's affiliation with different groups.

Specifications R1-R3 use information on surname networks within natural villages. Results show that funerals in surname networks negatively affect height-for-age z-score and are associated with higher probability of wasting. Meanwhile, specifications R4-R6 use kinship networks information within natural villages. The prenatal squeeze effects are significantly associated with lower height-for-age z-score and higher stunting and wasting probability. It is noted that none of the after-birth squeeze is salient. Overall, squeeze effects identification with

[8] Our survey team managed to visit each household several times and during a major festival when nearly all children were present. Comparing respondents' name list for the 2006 survey and the 2009 survey, the size of each age cohort does not shrink over time. Children born during 2004-2006 but only appear in the 2009 survey are from long-term migrants returning to the villages. Very few children are in this category, as living expenses are very expensive in urban area. Grandparents normally take care of the left-behind children.

alternative reference groups verifies that geographic reference groups, especially at the natural village level where people live in close proximity, are salient for rural Chinese residents.

Since our data do not have information on exact months of funerals, there is always a concern on whether specific funerals were actually experienced by an age cohort in the prenatal period. Table 12 partially addresses this concern by looking at children born in the first six months, as they are more likely to fully experience the funerals in the year prior to birth. Results show that squeeze effects on three health outcomes are not sensitive to the change in this cutoff point.

Linearity is imposed in the above estimations, while it is plausible that social events affect nutritional status in a log-linear way. Since height-for-age z-scores are positive and negative, we explore this possibility by transforming the scores into percentiles of international references and take the logarithm of the percentile. Estimation under the log-linear setting are reported in the Appendix A, and the results suggest a same squeeze pattern: prenatal squeeze effects are associated with lower percentile of z-score. Squeeze effects are insignificant after birth.

In the Appendix B, we also test the robustness of estimations under a different health standard – the CDC standard. Results suggest that the magnitude of prenatal squeeze effects is quite similar, while no after-birth squeeze effect is found.

The following three concerns might still call robustness into question. To save space, we discuss our robustness tests that address the concerns without presenting Tables here. The results are available upon request.

First, we do not control for birth order in main estimations in the first place due to the self-selection concern. In the literature, higher order children are more likely to suffer from malnutrition due to competition with siblings for resources, maternal depletion and higher rate of infection, and gender discrimination (Das Gupta, 1987; Horton, 1988). To check the possibility that birth order drives malnutrition status, we re-estimate the main model with birth order. The squeeze effect increases slightly, while birth order is largely insignificant.

A second concern is that children's growth velocity may slow with age. We address the concern by replacing child age with its logarithmic term in the main settings. The squeeze effect becomes even more significant, while the logarithmic age term is significant. Age and squared

age are tested in another setting with similar results. However, this latter setting imposes a curvature that might be too pronounced. Overall, both settings suggest that decreasing growth velocity fits the data.

To address the possibility that boys and girls have significantly different curvatures regarding the relationship between age and z-score, when separately estimating the determinants of health outcomes, the correspondent logarithmic age terms are compared. We find that the height-for-age z-score is weakly increasing in boys' age (at the 10% confidence level) but at a decreasing rate, while it is not significant for girls. This strategy is less restrictive in functional form and improved upon Alderman et al. (2006) that only interacted child age with gender. Our variable of interest - the squeeze effect - is unchanged.

6. Conclusion and Discussion

Poor households in developing countries have devoted a large proportion of resources on social occasions. Due to the competition for scarce resources between social events and basic consumption, lavish social spending leads to long-lasting negative consequences on well-being, such as malnutrition during early child development.

China has one of the highest shares of household social spending and one that is increasing very fast. This paper uses unique primary data from an impoverished region in rural China to explore the consequences when social events squeeze crucial stages in early physical development (especially *in utero*). Our surveyed villages are isolated from outside due to the unique geographic condition, which enables definition of reference groups along village boundaries.

We find that frequent social events/funerals organized by fellow villagers lead to lower height-for-age z-score, higher probability of stunting and wasting for children aged 1-5. The squeeze effect is much stronger towards the lower tail of the distribution, and is more salient for prenatal social events but generally not true for after-birth ceremonies. These findings stress the crucial role of the fetal origins effect in early child development. Moreover, gender bias in squeeze effects is more pronounced after birth when child sex is revealed.

The potential pathways through which squeeze effect affect early child physical development are explored. We find salient trade-off between share of cash expenditure spent on food and gifts through costly and frequent ceremonies in the neighborhood, especially for households of lower social status.

Having anticipated large gift expenditure in the future, poor households lower current food consumption or even engage in health compromising behavior (Brown et al., 2011). Meanwhile, as a social norm for hosts, much food is often wasted during ceremonies in Chinese society, squeezing out already insufficient local food supply in the remote communities.

It is true that gift spending has the reciprocal nature. However, in the context without financial markets to insure risks and smooth consumption, large expenditure for the poor today will probably leave a gap unfilled unless other basic expenditures are cut. Moreover, the gift price is bidding up over time, leaving a host today notably larger commitments tomorrow.

In the case of prenatal squeeze effect we are exploring so far, two contrasting phenomena are simultaneously observed: costly social events and insufficient nutrients intake. The resulting impact is severe and in some cases even irreversible. Our case is essentially similar to de-worming for school children in Kenya, iodine intake for pregnant women in Tanzania, iron supplements for workers in Indonesia and so on. All these studies conclude that there is a substantial increase in lifetime productivity. However, if the gains are so obvious and the cost is little, why do not the poor improve their well-being simply by reallocating more resources to basic food consumption?

There are several possibilities. One is that they do not believe it will matter, but this definitely does not explain every case. Another could be that people lack information. For example, the effects of de-worming pills, iodine capsules and iron supplements in improving well-being in the far future takes much time to be possibly apparent. Similarly, prenatal squeeze effects also take time to show.

Our empirical study provides evidence in a new dimension. The social norms for presenting gifts in traditional ceremonies held by fellow villagers have evolved for thousands of years. Chen and Zhang (2011) find that concern for status plays an important role when the consequence of falling behind is grave. For example, families with unmarried son are more

likely to be active in social spending as they need to build bigger houses, bid up bride price, and throw larger wedding banquet in order to improve their sons' likelihood of marriage in the increasingly tightening marriage market. Moreover, large windfall income intensifies status competition, escalating gift giving behavior. Further, the prevalence of peer influence amid a closely connected community compels people to follow.

More evidence is needed to understand the motives for overspending on social events. Based on a better understanding on social norms and more effective interventions conceived to inform people the long-term consequences, public interventions will be able to more efficiently target the pregnant women and households of lower status and address negative externalities due to gift competition.

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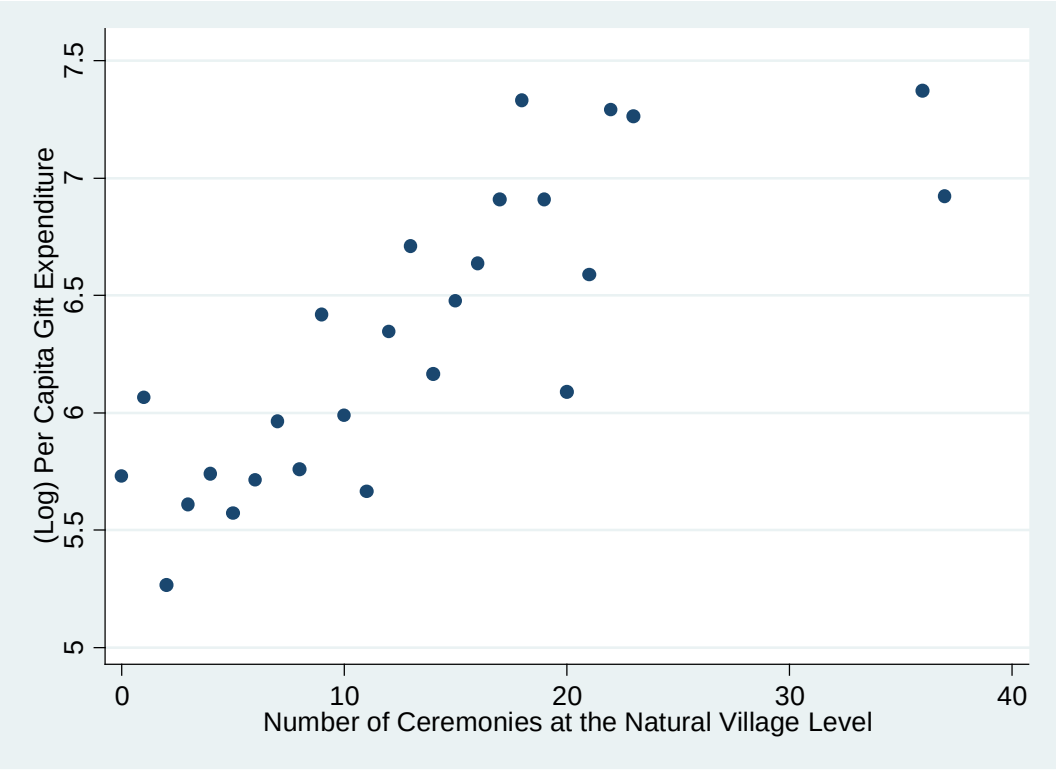


Figure 1 Average Per capita Gift Expenditure and Number of Ceremonies in a Natural Village

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

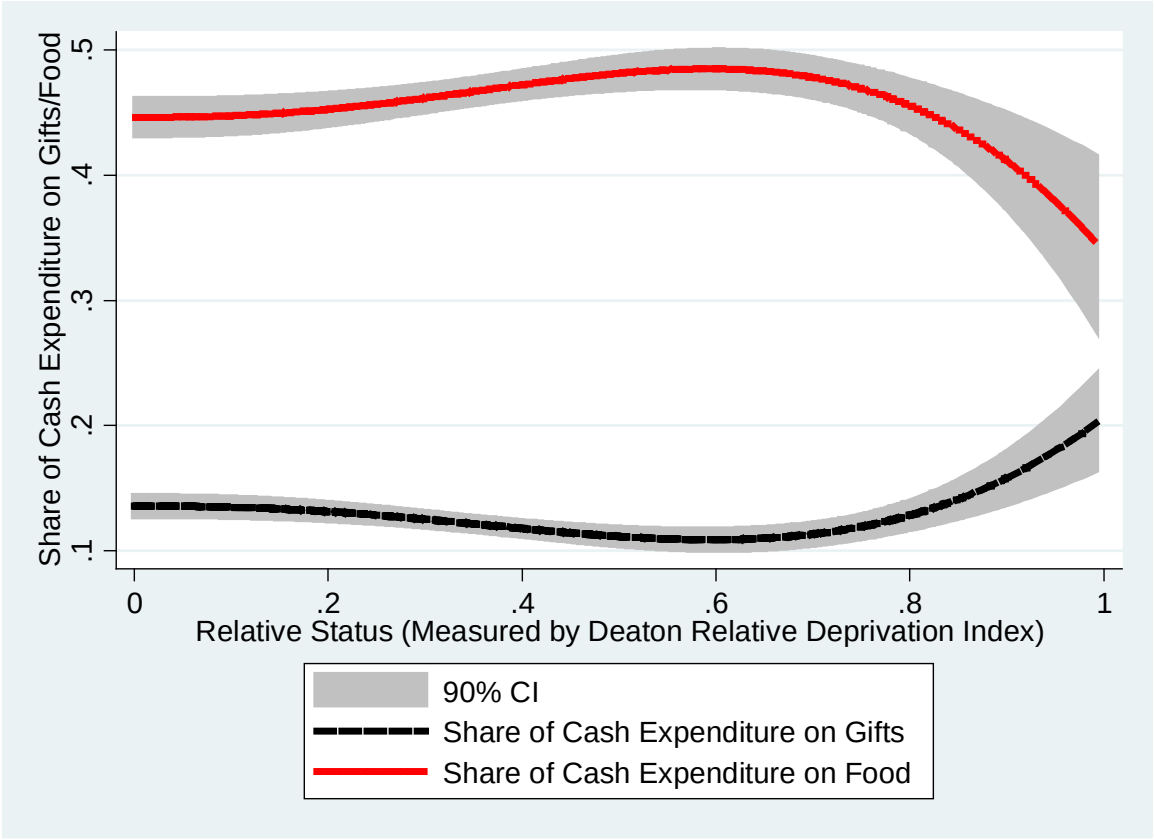


Figure 2 Share of Cash Expenditure Spent on Gifts and Food

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.

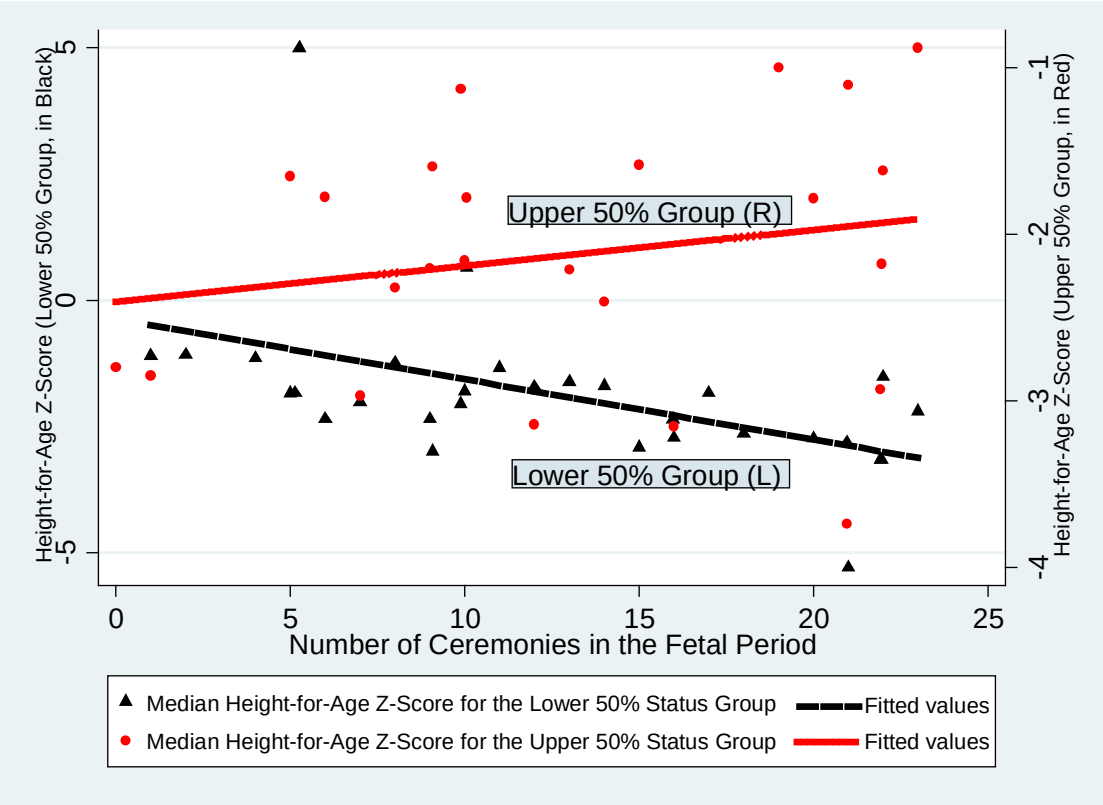


Figure 3 Number of Ceremonies and Height-for-Age Z-Score by Income Status Group

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 2005-2005.

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 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: Children's anthropometric indicators were taken from the 2009 survey. Stunting is defined as height-for-age z-score less than two standard deviations (SD) of the WHO standard. Wasting is defined as weight-for-age z-score less than two standard deviations (SD) of the WHO standard.

Table 3 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 the households in three natural villages collected in the 2009 survey. They have been adjusted into constant 2004 price (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 4 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 5 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 simultaneous 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 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?

	R1	R2
	Mean Height-for-Age z-score in each Natural Village	
Proportion of households suffering from big diseases in a village during a year	-0.213 (15.839)	-
Mortality rate	-	14.472 (19.124)
Gini coefficient	-6.103* (3.364)	-6.424* (3.370)
Proportion of ethnic minorities	0.441*** (0.945)	0.293 (0.957)
(Mean) village income (log)	1.262*** (0.928)	1.213 (0.904)
(Mean) head age	0.213** (0.081)	0.218*** (0.080)
(Mean) year of education	0.801*** (0.256)	0.793*** (0.253)
(Mean) mother's height	0.085*** (0.031)	0.091*** (0.032)
Year dummies	Yes	Yes
Administrative village dummies	Yes	Yes
(Pseudo) R2	0.331	0.184
N	72	72

Notes:

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.

Table 11 Robust 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.

Table 12 Robust Check: Impact of Exposures to Funerals on the Health Outcome of Children Born Between January and June

	R1	R2	R3
	Height-for-Age	Stunting	Underweight
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.

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

	R1
	(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 parenthesis. The symbols *, **, and *** indicate confidence levels of 90%, 95%, and 99%, respectively.

Appendix 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.