Blood for Social Status: Preliminary Evidence from Rural China

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ABSTRACT

Evidence from developing countries has shown that relative concern matters for wellbeing. Overconsumption of positional goods due to status seeking contributes to an overall loss of welfare. Rural western China serves as an ideal destination to observe relative concern and induced social phenomenon. In Guizhou province, the negative effect of positional spending is even more intense when households living close to subsistence are compelled to donate blood to *keep up with the Jones*. Utilizing a census-type household survey data in 26 natural villages in rural Guizhou, we find that poverty leads to blood donation, especially through differentiated poverty depth. Meanwhile, social status seeking is intensified through income inequality, relative deprivation, and positional spending within a reference group, which renders more blood donation participation and at a higher level. The intensified blood donation is more saliently induced by relative deprivation than by income inequality, suggesting that further attention should be paid to what the most suitable inequality measure is in policy design or evaluation. The result is robust to different measures of relative deprivation. Further, the herd effect of blood donation exists, suggesting weak agents in making blood donation decisions. Interestingly, shortly after shocks such as unanticipated gift giving expenditure and livestock death, people are more likely to donate blood, while they generally do not engage in blood donation to cover anticipated large social expenditure such as house building and wedding.

Keywords: Blood Donation, Social Status, Poverty, Inequality, Relative Deprivation, Rural China

JEL: I32, J22, D13, D63

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1. Introduction

A longstanding assumption in neoclassic economics is that an agent's utility depends solely on the absolute level of well-being. However, recent evidence from developing countries has shown that relative concern over the others' consumption matters. This reality has focused attention on positional goods—those for which relative position matters most.

Positional consumption is considered as a vehicle facilitating social networks. However, the concern is that households allocate too much resource to positional goods, instead of non-positional goods, which in turn contributes to an overall welfare loss. The pressure to spend lavishly in many social occasions, such as festivals, funerals, gift giving, house building and weddings is particularly strong, since such. Such pervasive conspicuous consumption and status seeking behavior reflect the high value accorded to positional concerns. There is a critical issue of individual rationality versus collective irrationality. The fact that "positional externalities" compels villagers to spend lavishly on positional goods to avoid becoming isolated from local networks is thus a problem that is particularly acute for households living close to subsistence.

Income disparity itself might further worsen the well-being of the poor through being relatively deprived within their reference groups, rather than only working through well-recognized income inequality (for example, the Gini coefficient) that everyone feels the same. In this process, the poorer a household is, the higher share of income it needs to distract from more urgent non-positional consumption, which renders a stronger feeling of being surpassed on the social ladder. Empirical evidence has shown a negative relationship between relative deprivation and health outcomes as well as health behavior. What is still unknown is whether being relatively deprived induces people to search for unsustainable ways to compensate, such as exchanging blood for cash.

In some rural areas in China, there is limited opportunity for households to increase farm income. Opportunities to earn non-farm income are also severely limited, and the inequality of non-farm earnings (including remittance) is particularly serious. To the poor, the need for cash income to avoid being relatively deprived and facilitate gift exchange and social spending has compelled many households to engage in the practice of donating blood. Worse still, faced with shocks (such as unanticipated social spending, natural disasters, livestock deaths, and diseases), donating blood becomes their last resort. First, it is fairly easy to compensate cash shortage in a short time period, and it seems to the poor that donating blood is not harmful. Second, as a

supply-side market, this activity does not depend on labor demand conditions. Further, it is usually the case that the poorer households are, the lower qualities of labor they have. However, the blood (or *fluid*) labor among the poor and the rich share equal quality and price, which renders the poor comparative advantage in donating blood rather than supplying labor.

What make the blood donation market special? At first glance, people may feel uncomfortable or even outrageous, which are absent in a regular good market. Those feelings reflect concern over poverty and inequality in the market relations. Moreover, concern over weak agents exists that those who act in the market might not be the people who bear the consequences of those actions. Besides, possible extreme outcomes accounts for another great concern. Repeated blood donation undermines donateers' long-term wellbeing and leads to persistent poverty because of its lasting harmful effects. For example, the HIV/AIDS epidemic is proved exacerbated following blood plasma donation. Among women of reproductive age, blood donation might undermine cognitive performance and work productivity of mothers and their children. The standard neoclassical economics wisdom seems to vote for banning this market, which might not be a good answer. Induced by such an attempted ban, the forces underlying the market may not disappear but intensify. Intuition tells us that possible effective actions must always be supplemented by direct measures to reduce poverty and inequality which lead to the market in the first place.

Accordingly, this paper aims to address four major issues. First, we analyze whether and to what extent poverty induces blood donation; second, we verify whether blood donation reflects income inequality, including inequality that everyone in a reference group feels the same and relative deprivation that everyone feels differently; third, to capture social status seeking, positional spending within reference groups is measured to test whether it aggravates blood donation; besides, we test whether the herd effect of blood donation exists. Together with status seeking, the herd effect might worsen relative deprivation and reflect the weakness of agency in making decisions.

To our knowledge, this is among the first studies to addressing the economic meanings of blood donation to the poor and the relatively deprived. While blood donation behavior has been documented in sociological, philosophical, ethical, anthropological literatures and popular novels and also mentioned in economic papers, we have not seen any paper in economics solely focusing on this behavior. Meanwhile, while all the relevant literature uses individual cases as

their basis of studies, this paper is primarily based on a local survey of all individuals. As far as we know, it is the first data set that includes extensive information on blood donation.

Importantly, blood donation is rich in economic meanings: first, blood donation participation and level are parallel to regular labor supply decisions, except that every individual, regardless of the poor and the rich, is generally endowed with equalized blood quality but unequal human resource. The differed labor provision and blood donation help us further understand the lives of being poor; second, the study of blood donation behavior might enrich our understanding of the differences in inequality and relative deprivation. In certain contexts, traditional inequality measures might underestimate or even conceal the real effect of inequality on deprivation and the resulting blood donation; third, blood donation behavior might help us understand risk management strategy of being poor, which might be reflected in the link between shocks and blood donation; finally, the herd behavior of blood donation and gift giving is interesting to explore.

The rest of this paper is organized as follows: In Section 2, we present existing literature on blood donation market, relative concern, and relative deprivation measurement; In Section 3, the recent surge in status seeking and blood donation in rural China is documented; Section 4 derives illustrative models to explore relationships between key factors and lays out our empirical strategy; Section 5 describes data and presents summary statistical analysis; Section 6 reports initial estimation results on blood donation participation function and blood donation level function; Section 7 concludes.

2. Literature Review

2.1 Understanding Blood Donation Market

What makes blood donation market different from market for apples? This question has been puzzling social scientists for quite a long time. Faced with this kind of markets the standard neoclassical economics seems to cut no ice. For example, getting rid of these markets or banning them might not be the best or only answer to them. With attempted bans, forces underlying the market may not disappear but intensify. However, people share the similar feeling that market operation and exchange often evoke contradictory emotions. To quote Kanbur (2004):

"Certain markets evoke popular discomfort, distrust and even outrage. Trade in arms, drugs, toxic waste, child labor and body parts, for example, elicits these reactions to different

Degrees… Three key parameters—extremity, agency and inequality—have a bearing on our intuitive reactions and serve to differentiate markets. The more extreme are the likely outcomes of a market, the further is the agent who acts in the market from agents who bear the consequences of those actions, and the greater is the degree of inequality in market relations, the more likely it is that the operation of the market will provoke discomfort."

Possible effective actions must always be supplemented by direct measures to reduce poverty, inequality, and relative deprivation which lead to the markets in the first place. Meanwhile, effective measures should be based on careful evaluation of differing characteristics in each individual market.

Existing literature on blood donation market focuses on two aspects. The first category of studies analyzes participants' micro behavior. Shao (2006) builds an ethnographic account of blood donation and HIV/AIDS among different people in several villages in China. Using a signaling behavior model, Seabright (2004) finds that a qualitative and discontinuous difference between gifts and sales, or free participation in civic activities and participation at a price award, can emerge between individuals even when there is no discontinuity in individual's types. Kanbur (2004) argues that there exist three key characterizing parameters, extremity of outcomes, weakness of agency, and inequality in the market relations, that capture whether a specific market is noxious or not. Satz (2004) reviews four approaches in contemporary political thought to the limits of market and defends the democratic egalitarian approach to market. Besides the three important features that characterize noxious markets in Kanbur (2004), Satz (2004) discusses how such markets undermine values and procedures that are crucial to a liberal democracy. Accordingly to Kanbur (2004) and Satz (2004), we next show that the donating of blood qualifies as a noxious market on grounds of extreme outcomes from *long-term* donation, possible weak agency problems, and worsening inequality.

First, blood donation might suffer from extremity of outcomes. Unlike the donation of body parts that cannot be renewed by the body, the donating of blood is seemingly less irreversible and extreme. However, persistent blood donation has been found harmful to health outcomes in the long run, which undermine blood donators' wellbeing and lead to persistent poverty. To labor force, frequent blood donations often lead to much less energy in conducting farm work or off-farm work and serious reliance on donating blood. Sometimes, participants are fearfully lean and even cannot stand still for a few minutes. To women of reproductive age, frequent blood

donation might undermine cognitive performance and work productivity of two generations through higher rates of anemia. Particularly, blood donation behavior even induces high probability of HIV/AIDS infection in areas that blood plasma is usually collected. The prevalence of HIV/AIDS epidemic caused by donating blood plasma in some areas deprives thousands of lives every year.

Second, blood donation reflects weakness of agency. It is not reasonable to assume that an individual has perfect negative information on long-term blood donation. Even if information is not an issue, extremely bad health outcome tomorrow might not be really felt today. Put another way, uncertainty and time lag break the tie between observed and actual consequences. Meanwhile, under miserable family conditions in China, blood donation behavior is based on a household's decision on behalf of its members who are responsible and feel guilty to make their self beneficial decisions. Further, deception sometimes makes agency problems even worse. In some areas, for example, the less informed and the elderly are usually deceived to donate blood to alleviate locally pervasive diseases such as rheumatism. Finally, blood donation decisions of people around each other often exert great influence on an agent's decision. It might be that other people's pursuit of blood cash to finance more status seeking expenditure induces an individual to follow suit, given that it is "easy" with no other alternatives.

Further, blood donation behavior shows inequality in market relations. Now suppose that agents are not weak and participants truly recognize all possible consequences, how does economic inequality act on heterogeneous agents? Firstly, blood donation market power is asymmetrically distributed, i.e. purchasers (blood plasma collection station) are fewer and are regionally monopolistic. To the contrary, blood donateers have very few alternatives other than donating blood. Secondly, the inequality is also reflected by the fact that different parties might suffer quite differently in the absence of blood market. Extremely negative outcomes might occur to blood donateers, but not blood collectors. With blood market, this fluid body part goes from the poor who badly need money to survive to the rich who can afford to enjoy the fruit. Thirdly, in many cases the poor are compelled to donate blood under the pressure of feeling unequal, being relatively deprived and isolated from social networks.

The second category of studies focuses on blood market efficiency. Titmuss (1970) and others (Solow, 1971; Arrow, 1972) compare blood market efficiency between blood collected from unpaid versus paid volunteers. Titmuss (1970) shows that the American system, where part

of blood donors are paid, is less efficient both quantitatively (supply problems, large waste) and qualitatively (many post-transfusion accidents) than the British system, which relied on unpaid volunteers. Besides, Titmuss calls for "giving altruistic" in a world of radically distant relations and with no expectation of anything in return, both financial and moral reward. Arrow (1972) acknowledges that market was only one means among many to distribute goods. He agrees with Titmuss that in this specific case it was inferior to unpaid volunteer action. Solow (1971) accuses Titmuss' opponents narrow-minded economicism. However, Arrow refuses to accept the idea that a mix between the market and giving would hurt giving. Solow also criticizes Titmuss for comparing two extreme market cases.

The studies on blood market efficiency are closely linked to the study of micro behavior. At the micro level, bought blood is collected from individuals badly need cash. At the market level, bought blood has the effect of reversing redistribution in that the well-off benefits from the blood of the poor. Commercial blood stations are usually opened in impoverished districts, meaning that blood collected by market means is of lower quality than by unpaid volunteers. Generally, unpaid volunteers have no reason to lie about their health or medical records, which might not be true for people who exchange blood for money.

2.2 Relative Concern and Well-Being[1]

Why do some people rather than the others rely on donating blood? A part of this issue relates to the understanding of relative concern. A longstanding assumption in traditional economics is that an agent's utility depends solely on the absolute level of well-being[2], generally measured by consumption. However, an idea was implicitly put forwarded on the publication of *The Wealth of Nations* in 1776 that people should be endowed with the ability to appear in public without shame. Dated back to Veblen's seminal work in 1899, a few people started to believe that utility or happiness depends in part on the comparison of one's own consumption to that of others, and it was first formally modeled by Duesenberry (1949) in his relative income hypothesis. Since 1970's, compelling evidences on relative concerns have been accumulated which include Easterlin (1974), Sen (1983), Frank (1985), Van de Stadt et al. (1985) among others.

[1] As we show later, relative concern is reflected in more dimensions than positional spending. However, in the current literature, people focus on positional spending. Therefore, we briefly review relevant literature.
[2] The permanent income hypothesis and the life cycle hypothesis are two typical examples.

Recently, the idea of relative concern has been broadly applied to explain numerous interesting social and economic phenomenons in developed societies. For example, Frank (1997) notes that in the U.S. 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. Other evidences include Clark and Oswald (1996), Solnick and Hemenway (1998), Neumark and Postlewaite (1998), Stutzer (2004), Luttmer (2005). Frank and Levine (2008) further find that relative concern could well explain the link between inequality and observed disparities in international savings rates, which were not predicted by traditional consumption theories. Frank and Levine (2008) define "Expenditure Cascade" in an economy where every agent except the richest one judges own behavior according to others closest above them.

Contrary to Veblen's argument that no class of society, not even the abjectly poor, foregoes all customary conspicuous consumption, Heffetz (2007) shows that relative concern through conspicuous spending is only relevant for rich context. However, evidence from designer-label goods consumption in Bolivia (Kempen, 2003), festivals' budget in India (Banerjee and Duflo, 2007), "splendid" funerals in Ghana (*Economist*, 2007), relative deprivation and migration in Mexico (Stark et al., 1991), 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.

2.3 The Measurement of Relative Deprivation

Besides shown in positional consumption and income inequality, relative concern is also reflected by relative deprivation among people of a reference group. Relative deprivation is originally proposed by Runciman (1966), who argues that one is deprived if the others in the group possess something that one does not have. Easterlin (1974) proposed a simple model to incorporate consumption norms into individual's utility maximization framework whereby utility of individual *i* depends on *i*'s consumption relative to a weighted average of other people's consumption. Yitzhaki (1979) develops the definition by viewing income as personal possessions and deriving the relationship between relative deprivation and income inequality. Chakravarty

(1990) defined relative deprivation as "utility foregone" because of not possessing the economic variables under consideration. Similar to Easterlin (1974), Cooper et al. (2001) proposed a model whereby individual's utility depends on the absolute quantity and the quality of a good consumed as well as on the quantity and quality of status good consumed relative to reference or peer group members. Wildman (2003a, 2003b) shows the relationship among average health, health inequalities, absolute level of income, and income inequalities, and links absolute and relative income hypotheses in the production of health.

In Yitzhaki (1979) and Wildman (2003a), the level of deprivation experienced by an individual i with income y relative to another individual with income z is formulated as,

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

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

Based on this form, one would feel more deprived as the number of individuals in society with higher income z 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. Accordingly, Li and Zhu (2006) define relative deprivation of absolute income (RDA) and relative deprivation over individual income (RDI) as,

$$RDA = \frac{1}{N}\sum_{j}(y_j - y_i) \quad \forall y_j > y_i$$

$$RDI = RDA_i / y_i$$

Through normalization by N, the number of people in their reference groups, RDA adopts normalized total income of other group members who earn more than i does to measure the relative deprivation of person i with income y_i. RDI is defined as the ratio of RDA relative to person i's own income.

Intuitively following the well-known measure of Gini coefficient, Wildman (2003b) proposes a measure of relative deprivation for an individual with income y at the provincial level and stratifies it by urban and rural regions as follows:

$$d_y(F) = \mu[1 - F_1(y)] - y[1 - F(y)]$$

where μ denotes mean income and the population is ranked by income. $F_1(y)$ is the cumulative proportion of total income up to the income y and $F(y)$ is the cumulative proportion of the population up to the individual with income y.

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:

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

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. In sum, the measure is the normalized difference between the average income of those with higher income and income x weighted by the proportion of those with income higher than the individual i.

In other measures, Li and Zhu (2006) use individual's centile rank of income within their reference groups. Different from the aforementioned measures, the rank ignores the magnitude of income differences among individuals. Thus, centile rank contains less information on relative deprivation than other measures. Meanwhile, while larger values in RDA, RDI, Deaton_RD, and Wildman_RD indicate higher degrees of relative deprivation, higher centile rank means a lower degree. Besides, unlike the Gini coefficient, which is bounded between 0 and 1, relative deprivation measures are not limited in value and therefore have larger variations in the sample.

Importantly, while income inequality is an aggregate measure of income distribution for a community or the whole society, relative income measures are individual specific. Relative deprivation reflects a person's position or relative to the others within a reference group. In a densely populated and isolated rural society, residents usually compare themselves with others within the natural village. Thus, we can define sound reference groups and construct relative deprivation indexes at the natural village level.

3. Status Seeking and Blood Donation in Rural China

How does relative concern affect densely populated and isolated rural society in contemporary China? First, it is important to note that there have been fierce status competitions throughout Chinese history, especially since the agriculture civilization. In recent decades, economic and structural transformation in China has been followed by escalation in conspicuous consumptive investment, particularly housing, but no increases in productive investment that would secure durable increases in welfare (Brauw and Rozelle, 2008). Relative share of rural residents' incomes allocated to gift-giving, dowry, bride price, and funerals, are thought of as

vehicles for social prestige that might challenge social status (Yan, 1996; Liu, 2000). Such spending also facilitates social networks, which may be relied upon for mutual assistance, personal financing, or other forms of help.

On the other hand, the welfare consequences of "positional externalities" associated with status seeking are severe for Chinese households living close to subsistence. The highly ritualized practices of gift-giving compel villagers to offer gifts in order to avoid isolation from local networks. Generally, farm income is limited and nonfarm income is unequal and favorable to the rich, for poor residents large portions of income facilitating gift exchange cannot be compensated without unsustainable economic activities, such as donating blood. The isolated context further deprives people's equal opportunities to migrate out and acquire remittance, and dense population aggravates status seeking activities. Brown et al. (2008) recorded oral evidence during field work that inflows of remittances to some households set in motion status contests with adverse consequences of the others through long-term blood donation.

In China, blood is mainly supplied by voluntary donations. However, in Guizhou, Henan, and some other remote rural areas, blood stations provide cash compensation to blood donateers.[3] Once the plasma is removed, the blood is re-infused. It is prohibited to donate blood more than once every two weeks (Asia Catalyst, 2007). In August 2004, the State Administration of Taxation issued a new stipulation that the purchase of human blood is not subject to tax-free agricultural produce and should not be calculated at 13 % of the purchase price for the deduction of purchases VAT as applied to agricultural produce. Accordingly, Shao (2006) argues what makes human blood an "agricultural product" in the first place. Economic reform in China began with the agricultural reform in the late 1970s. After the release of production incentives and chemical fertilizer usage in the 1980s, individual peasants are faced with more and more price fluctuations in the market both for inputs and outputs as a result of decollectivization. More market fluctuation and less arable land per capita due to the increasing population make agricultural production risky and unprofitable. Ironically, it is the economic liberalization, which once droved the reform process, that deprives the poor of any power to retain their blood labor, leaving them only profound frustration over its absence.

Recently, Guizhou province has been a new supplier of blood plasma for the heel of the Henan Province in China (Yin, 2006). In 2006, there were 25 blood plasma stations in Guizhou,

[3] For example, in rural Guizhou, people get 80 Yuan nutrition subsidy for the plasma contained in 580 cc of blood.

which supplied 40% of total blood plasma, giving it the largest market in China. Meanwhile, blood donation stations in the county were shut down in 2006 due to Hepatitis C contamination and predatory behavior of over extracting blood plasma, some residents continued to rely on donating blood, often traveling outside the county to make donation.

4. Illustrative Models and Empirical Strategy

4.1 Poverty, Shocks, and Blood donation

In an underdeveloped local context, it is usually the case that people donate blood at the same price,[4] while their human resources vary a lot, implying an equalized "fluid labor" price (p) and unequal normal labor price (w).

First, it is easily shown that how poverty might affect blood donation decisions. Assume a household has two types of labor resources, normal labor (l) and fluid labor (b). The utility function decreases in the two types of labor supply. (1-l) denotes leisure, which enhances utility level. Assume a utility maximization of a Cobb-Douglas function, and we normalize the price of consumption goods bundle (c) to be 1.

$$\max_{c,l,b} U(c,l,b) = Ac^{\alpha}(1-l)^{\beta}(1-b)^{\gamma}$$

$$\text{s.t.} \quad c = wl + pb + a \tag{1}$$

where the constraint is equivalent to $c + w(1-l) + p(1-b) = a + w + p$. a denotes all other income sources. The first order condition shows that when w is lower for the poor, they tend to substitute b for l. Put another way, they tend to supply more blood and less normal labor relative to the rich, as they have comparative advantage in donating blood. The level of blood donation depends on the price ratio of blood to normal labor.

$$(1-l^{*}) = \frac{\beta}{\alpha+\beta+\gamma} \cdot \frac{a+w+p}{w} \qquad (1-b^{*}) = \frac{\gamma}{\alpha+\beta+\gamma} \cdot \frac{a+w+p}{p} \tag{2}$$

People in poverty are usually vulnerable to shocks. Assume a two-period utility maximization model where there is a shock, for example, livestock death, natural disaster, or big disease, at the end of period 1. The utility maximization for period 1 is unchanged. Faced with

[4] In this paper, our census-type survey covered three administrative villages (i.e. 26 natural villages). All the households are faced with the only one blood market that sets up a unique blood compensation price once blood donateers pass a pre-donation test. Generally, most people easily pass that test, partly reflecting the current situation that market blood supply is in severe shortage relative to market demand. Refer to section 3 for more detailed information.

the shock, the household would change its optimal choice in period 2. It is important to note that household normally cannot change labor supply immediately, because it also depends on labor market demand condition. However, people can easily increase their fluid labor supply within a short time, because blood plasma is in high demand. Thus, the new choice variable is goods consumption (c) and blood donation (b), while l is given before shocks. Shocks can also directly influence utility through $S(s)$. Consumption is negative in shocks, and blood donation is positive in response to shocks. $f(s)$ denotes probability of shocks with various degrees.

$$\max_{c,b} EU(c(s), l, b(s), s) = \sum_{s} [Ac(s)^{\alpha}(1-l)^{\beta}(1-b(s))^{\gamma} S(s)] f(s)$$

$$\text{s.t.} \quad c(s) + w(1-l) + p(1-b(s)) = a + w + p \quad \forall s$$

4.2 Relative Concern, Positional Spending, Inequality, and Blood Donation

It is assumed that people care about their own wellbeing relative to the others. We define c_{x_i} as own consumption of a positional good for individual *i*, c_{y_i} as that individual's consumption of a non-positional good, $c_{\hat{x}}$ as positional spending by others in the reference group, Z_i as a vector of socioeconomic and demographic variables, *p* as the relative price of good *x, and* I_i as income. Agent i's utility maximization problem

$$\max_{c_{x_i}, c_{y_i}} U(c_{x_i}, c_{\hat{x}}, c_{y_i}, Z_i; p, I)$$

$$\text{s.t.} \quad I_i = pc_{x_i} + c_{y_i} \tag{3}$$

We assume there is a sub-utility function $S()$ capturing status benefits, which is determined by differences between c_{x_i} and $c_{\hat{x}}$.[5] Besides, there is a sub-utility function $V()$ capturing neoclassical utility from own consumption. α is a weighting parameter between the two utilities.

$$U_i = \alpha S(c_{x_i} - c_{\hat{x}}) + (1-\alpha)V(c_{x_i}, c_{y_i}) \text{ and } 0 \le \alpha \le 1 \tag{4}$$

Solving for FOC, $\partial U_i / \partial c_{x_i} = 0$, then differentiating yields:

$$\frac{\partial c_{x_i}}{\partial c_{\hat{x}}} = \frac{\alpha S_{xx}}{\alpha S_{xx} + (1-\alpha)V_{xx} - 2p(1-\alpha)V_{xy} + p^2(1-\alpha)V_{yy}} \tag{5}$$

[5] We can also define a sub-utility function $S(\cdot)$ capturing status benefits as $S = S(x_i / \hat{x})$ or $S = F(x_i)$ that captures ordinal rank of the agent in the reference group.

If $S_{xx} < 0$, that is, the marginal value of status falls as one has more of it, then the denominator of the RHS is definitely negative, and the numerator is negative. Therefore, it reflects the essential characteristic of a "follower" ($\partial c_{x_i} / \partial c_{\hat{x}} > 0$), i.e. status seeking generates positional spending as strategic complements.

Next we introduce normal labor and fluid labor in the utility maximization. In accordance with equation (4), we define components of a utility function S $(\cdot)$ and V $(\cdot)$ in log forms.

$$U(c_x^{\alpha_x}, c_y^{\alpha_y}, l, b) = e^{(1-\alpha)V(\cdot)} e^{\alpha S(\cdot)} = [A c_x^{\alpha_x} c_y^{\alpha_y} (1-l)^{\beta} (1-b)^{\gamma}]^{1-\alpha} [S(c_x^{\alpha_x}, F(c_x^{\alpha_x}))]^{\alpha} \qquad (6)$$

where the utility function (4) is achieved after a monotonic transformation. The first part denotes utility from own consumption, and the second part denotes utility from relative consumption and the induced status. Here $c_x^{\alpha_x}$ denotes status consumption, and $F(c_x^{\alpha_x})$ denotes percentage of households with lower social status.

It is shown in equation (5) that positional spending of good c_x by people in the reference group increases the positional spending of the other people. To simplify the following analysis, we assume $\alpha = 0$ and discuss the impact of relative concern on blood donation through changing α_x. The higher α_x is, the higher proportion of income on status seeking there will be.

$$\max_{c_x, c_y, l, b} U(c_x^{\alpha_x}, c_y^{\alpha_y}, l, b) = A c_x^{\alpha_x} c_y^{\alpha_y} (1-l)^{\beta} (1-b)^{\gamma}$$

$$\text{s.t.} \quad c_y + p_{x/y} c_x = wl + pb + a \qquad (7)$$

(7) is equivalent to $c_y + p_{x/y} c_x + w(1-l) + p(1-b) = w + p + a$. The FOC shows that

$$(1-l^*) = \frac{\beta}{\alpha_x + \alpha_y + \beta + \gamma} \cdot \frac{w+p+a}{w} \qquad (1-b^*) = \frac{r}{\alpha_x + \alpha_y + \beta + \gamma} \cdot \frac{w+p+a}{p} \qquad (8)$$

$$\frac{\partial l^*}{\partial \alpha_x} = \frac{\beta(w+p+a)}{w(\alpha_x + \alpha_y + \beta + \gamma)^2} > 0 \qquad \frac{\partial b^*}{\partial \alpha_x} = \frac{r(w+p+a)}{p(\alpha_x + \alpha_y + \beta + \gamma)^2} > 0 \qquad (9)$$

$$\frac{\partial b^*}{\partial \alpha_x} - \frac{\partial l^*}{\partial \alpha_x} = \frac{(w+p+a)}{(\alpha_x + \alpha_y + \beta + \gamma)^2} \cdot \frac{rw - \beta p}{pw} \quad \begin{cases} >0 & r/\beta > p/\text{w} \\ =0 \text{ if } & r/\beta = p/\text{w} \\ <0 & r/\beta < p/\text{w} \end{cases} \qquad (10)$$

where marginal difference in fluid labor and normal labor supply is ambiguous in sign. However, it is easily shown that the poor usually have higher proportion of income contributed by blood donation. After normalizing $\alpha_x + \alpha_y + \beta + r$, the elasticity of scale, to 1, it is found that the ratio

of blood subsidy among the poor is larger, because poor households usually have smaller share of income enjoying no blood donation r , lower other income a , and lower wage w .

$$\begin{aligned}\text{Ratio of blood income} &= \frac{\text{pb}^*}{w+p+a} = \frac{\text{p}}{w+p+a}\cdot\left(1-\frac{r}{\alpha_x+\alpha_y+\beta+r}\frac{w+p+a}{p}\right) \\ &= \frac{\text{p}}{w+p+a} - \frac{r}{\alpha_x+\alpha_y+\beta+r} = \frac{\text{p}}{w+p+a} - r\end{aligned} \tag{11}$$

How does inequality influence positional spending and the resulting blood donation? The link between inequality and positional spending is theoretically ambiguous, partially because a more unequal income distribution might reduce status seeking among the middle class and aggravate status seeking in each of the two tails of distribution. Also, it might be caused by heterogeneity that some people are highly competitive and others are conformists, and people differ in their pride and compassion towards the poor around them. Meanwhile, inequality might have direct impact on blood donation decisions other than through status competition. In sum, the relationship between inequality and blood donation behavior remains open for empirical test, particularly in the context of rapid changes in income distribution within reference groups.

4.3 Empirical Strategy

The primary results in this paper focus on estimating what determine household choices of blood donation. Three issues arise immediately when using typical cross-sectional data to explore these relationships empirically. First, nearly all surveys rely on sampling, and they might not capture the full picture of relative status within groups. Second, simultaneity concerns may be present since a household's behavior might directly alter aggregate indicators within reference groups. Third, reference groups are usually not easily identified (Chen and Zhang, 2009). We alleviate these problems by utilizing a census-type data set in a remote mountainous region[6] and subtract an individual household's value from the aggregated level indicators in the reference group to predict household behavior.[7] We assume that reference groups are at natural village

[6] Guizhou is a typical area in the world with Karst landform.

[7] We assume that individual behavior varies with the median feature of group behavior other than the mean, since median behavior is not suffered from extreme values. More importantly, it is closer to the real world that people normally follow the general public around them in social spending or deciding whether to participate in donating blood and to what degree. However, the validity of this treatment is based on the assumption that the researcher a priori knows the group with whom a person may interact. For more detailed way to solve simultaneity problem in principle, please also refer to Manski (2000).

level.[8] Besides, there is no need to care about goods price and blood price vector, since the 26 surveyed natural villages share one goods market and blood bank, and per unit compensations from blood donation are the same across individuals over time.

Our first goal is to estimate two equations of blood donation participation of the forms:

$$Bloodpart_{i,r} = \alpha_0 + \alpha_1 Income_{i,r} + \alpha_2 povline_i + \alpha_3 Income_{i,r} * povline_i + \beta_1 Gini_r + \beta_2 behaviorRD_r + \psi X_{i,r} + \varepsilon_{i,r} \quad (12)$$

$$Bloodpart_{i,r} = \alpha_0 + \alpha_1 Income_{i,r} + \beta_1 RDindex_{i,r} + \beta_2 behaviorRD_r + \Phi X_{i,r} + \varepsilon_{i,r} \quad (13)$$

where $Bloodpart_{i,r}$ in both (12) and (13) denotes whether or not a household i in natural village r donates blood. In order to test whether donating blood is a poverty issue, we use the information of income, poverty line. $Income_{i,r}$ denotes per capita income of household i in village r excluding blood donation compensation. $povline_i$ indicates whether or not a household i is in poverty by comparing per capita income without blood donation with the official poverty line. The interactive term between $povline_i$ and $Income_{i,r}$ tests whether the deeper a household is in poverty, the higher probability it donates blood.[9]

$Gini_r$ is used to test whether inequality in a village r influences household blood donation participation. However, the Gini coefficient only captures inequality at the village level. Thus, we also estimate equation (13) including one of the five major relative deprivation indexes $RDindex_{i,r}$ each time. While all the relative deprivation indexes developed in the literature are based on income information within a reference group, in this paper we try to test other aspects of relative concern, i.e. the effects of collective behavior $behaviorRD_r$ on a household's blood donation participation. Specifically, we include in different scenarios the median level gift spending, the gift giving participation rate, the median level blood donation compensation, or the

[8] Reference groups are most likely to be defined at the natural village level, because they are evolved naturally without political command, but through generations of residence. In the surveyed natural villages, there are 30 households on average, which form a close link connecting each other. Usually, the majority of residents retain certain kinds of kinship within a natural village. Recent migration exerts little influence on reference groups. First, more often only some members migrate, not the whole family. Second, even migrants themselves are not likely to change reference groups because of the Hukou system and all the other discriminative policies. In urban China, rural migrants usually join rural migrants' social networks, which differ from urban residents' networks. That is also the reason why rural residents tend to migrate, considering higher absolute income and no worse relative deprivation in the short run. However, further studies on long-term migration and changes in reference groups are needed.

[9] Blood donation in the long run may prevent people from supplying quality labor, which renders lower income and higher probability of poverty. However, at least in the short run this link is weak. Consistent with our results from the illustrative model and survey data, people may simultaneously supply more blood and labor in the short run.

blood donation participation rate in the reference group. To alleviate the potential simultaneity problem, we subtract each household i from these indicators of collective action when we test their effects on household blood donation participation.

$X_{i,r}$ is a set of household level and village level control variables, including household head's education, ethnicity, party membership, share of family members who migrate out, villages dummy, whether a household in poverty has member(s) in serious illness, and whether or not all family members are seriously disabled. In the specifications later, we also consider ex post information on shocks and big social events. Specifically, we consider whether one or two years before or after 2004 marriages of male or female family members, house building, family member death, serious diseases, natural disasters, and deaths of livestock might affect household blood donation participation.

Our second objective is to estimate two equations on the *level* of blood donation:

$$Bloodvol_{i,r} = \delta_0 + \delta_1 Income_{i,r} + \delta_2 povline_i + \delta_3 Income_{i,r} * povline_i + \gamma_1 Gini_r + \gamma_2 behaviorRD_r + \psi Y_{i,r} + \varepsilon_{i,r} \quad (14)$$

$$Bloodvol_{i,r} = \delta_0 + \delta_1 Income_{i,r} + \gamma_1 RDindex_{i,r} + \gamma_2 behaviorRD_r + \Phi Y_{i,r} + \varepsilon_{i,r} \quad (15)$$

where $Bloodvol_{i,r}$ denotes blood donation volume of household i in village r. Although equations (14) and (15) share the similar settings with equations (12) and (13), they differ slightly in defining $behaviorRD_r$ and $Y_{i,r}$. $behaviorRD_r$ in equations (14) and (15) add in explanations of blood donation volume using *level* of collective actions, such as median blood donation volume and median gift spending within the reference group, instead of dummy variables. Besides, we finally test the effects of shocks and social events using level variables. All the ex post information of shocks and social events comes from our 2006 survey, when we asked each household for this information from 2002 to 2006 (i.e. two years before and after 2004). This information is reliable, because local residents usually keep detailed records of expenditures on big social events and gift giving to the others within a long time period.

5. Data and Descriptive Statistics

5.1 Data Source

The data set for our proposed study comes from a census-type rural household panel survey in three administrative villages in Puding County, Guizhou Province, Western China.[10] Puding County, located in the central part of the poorest Guizhou province in China, is an ideal choice for studying rural poverty since it is a median level county in Guizhou, which suggests that its income profile is representative of Guizhou. More importantly, it is geographically isolated as well as multi-ethnic populated[11]. Currently, Guizhou provides the largest market share of blood plasma in China.

In Chengguan Township of Puding County, all the 805 households in three administrative villages with 26 natural villages were administered at the beginning of 2005. The surveys collected detailed information on household and individual demographics, income, consumption, transfers, expenditures and incomes related to giving gift, wedding, and funeral. Information was collected for each household member, including members that were working outside the county at the time of the surveys. Besides detailed information on social spending, we collected household blood donation data. Blood donation information was accurate since each time income from blood donation consisted of a large amount relative to their annual income per capita. Besides, this behavior did not frequently happen, which guaranteed a clear memory.

To analyze the causal factors of blood donation, a follow-up survey of the same households was administered in early 2007 and 833 households was conducted. However, this second wave of survey was halted by the local government when we were trying to collect blood donation data. We ended up collecting blood donation information from only two thirds of samples. Meanwhile, in 2006, local blood donation stations were shut down due to Hepatitis C contamination and predatory behavior of over extracting blood plasma. In order to have a more realistic understanding of blood market in Guizhou, we only adopt the blood donation data from the 2005 survey, but we also use ex post information on social events and shocks from the 2007 survey to capture blood donation behavior in 2004.

5.2 Village and Household Summary Statistics

Table 1 and Table 2 present summary statistics, less variable and more variable respectively, for the three administrative villages. In Table 1, the larger distance to county seat renders

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

[11] More than 20 ethnic groups are living in Puding county, including Han, Miao, Buyi, Gelao, and yi. In total, ethnic minorities comprise about 20% of population.

administrative village 1 significantly fewer marketing opportunities. Thus, the proportion of households with migrants rose from 31% to 50% during the study period. In contrast, migration fell sharply in the second administrative village as new on-farm opportunities developed with the new road. A smaller share of households in the third administrative villages includes migrants. Instead, over 60% of the households in village 1 have members employed off-farm, whereas less than half of the households in the other villages do. Meanwhile, the share of minority households in village 1 is overwhelmingly higher than the other two. Family members in village 1 also experience significantly fewer average school years.

Table 2 provides the FGT measures which show that head-count index, poverty gap, and squared poverty gap under both the high poverty line and the low poverty line are uniformly larger for village 1 and village 2. Compared to village 1 and 2, village 3 has much higher per capita income and income growth, higher percentage of flat land, higher land rental rate, higher values of home appliances, and easier access to drinking water.

Income inequality and expenditure inequality in village 2 from 2004 to 2006 are the highest among all three villages. Seen from income and consumption inequality decomposition, farming and local non-farm jobs (part-time job and wage job) are the largest income inequality contributors, while food and medical care are the largest expenditure inequality contributors. However, the role played by farming and food in determining inequality are much smaller than their income shares. Remittance is a large contributor to income inequality compared to its income share. Inflows of remittances to some households set in motion status contests with adverse consequences of the others through their long-term blood donation (Brown et al., 2008). If this is the case, we need to worry about the current unequal migration opportunities and its negative impacts on local residents. Blood donation itself is poverty reducing as well as inequality alleviating. Gift income is relatively inequality reducing, and gift and festival spending is inequality increasing.

5.3 Statistical analysis of Blood Donation

At the village level, compared to village 1 and village 2, village 3 has smaller share of households donating blood. Table 3 shows that in 2004 respectively 41%, 29%, and 20% of households in three interviewed villages in 2004 donated blood, which represents 9% of annual

income to the mean household.[12] Actually, both in 2004 and 2006, participation rates of blood donation are the highest in village 1, while it is the lowest in village 3. Meanwhile, median and the distribution of blood donation income in village 2 is the largest. It is also true for mean per capita blood donation in village 2 that mean per capita blood donation are 197, 235.5, and 113.4 for three administrative villages respectively. Considering the unique market price of blood donation the three villages face, it means that on average per capita blood donation are 1000cc per year in volume. Among the three villages, village 2 ranks the first in blood donation volume per capita, with village 1 and village 3 rank the second and the third respectively. However, at natural village level, more natural villages in administrative village 1 have positive median per capita blood income than the other two administrative villages. In general, data from all villages show that the lower per capita Income, the higher income ratio of blood donation (Figure 4).

Income inequality and consumption inequality in village 2 from 2004 to 2006 are the highest among all three villages. Poverty simulation excluding blood donation income shows large percentage increases in FGT measures. The percentage changes are the highest for village 1 and village 3 (Table 4). Graphically, Figure 1 illustrates poverty situation in the three villages before and after deducting blood donation compensation.[13] After excluding the compensation, the Gini coefficient is even higher for the three villages in both years, which indicates that blood donation behavior actually mitigates unequal distribution. Inequality decomposition verifies that blood donation reduce income inequality, since it accounts for 10.9% of total income but contributes only 1.8 to total inequality.

What are the factors that influence household blood donation decisions? One of the direct answers might come from policy enforcement. China regulates that people more than 50 years old, less than 50kgs (male), less than 45kgs (female), or people seriously disabled, are not eligible to donate blood plasma. However, the only regulation that is generally effective is through preventing seriously disabled blood donor.[14] Blood donation usually reflect households'

[12] We also conducted a natural village level survey (Table 4), which shows that in 2004 23% of the households had blood donation experience, smaller than 28% in the household level survey. However, village level survey shows that in 11% of the households sold blood in 2006, while in the household survey it corresponds to 7%. On average, in 2004 12 households in each natural village treated blood donation as a stable income source, which reduced to 6.4 in 2006.

[13] The left vertical line denotes low poverty line (668 RMB), and the right vertical line denotes high poverty line (892 RMB).

[14] Regulations through other channels are not efficient because people in Guizhou are normally shorter and lighter than people in many other provinces. Faced with the huge demand for blood, it is not easy to enforce the age and

collective decisions, which mean that if any of the family members is able to donate blood, the household might turn out to be a blood provider. T-test shows that if all family members are seriously disabled, this household is less likely to donate blood, though it is not statistically significant. It is consistent with the fact that in the local blood donation station there are people seriously disabled donating blood (CHAIN, 2006). T-test also shows that seriously disabled households significantly live under poverty. Most of these families are named "five guaranteed family", and they receive government poverty subsidies.

Cash shortage might be another reason behind blood donation, especially when peasants are in their sowing season. Meanwhile, in some rural areas that are endowed with less land, local residents rely on donating blood to survive winters when food is in shortage. With limited opportunities to migrate out, we might find people with less land donate more blood. During the interview, some respondents told us that through donating blood they could avoid starvation when they were faced with food shortage. T-test shows that the relationships between per capita farmland and blood donation and its volume are negative, and the latter link is stronger.

Further, given that off-farm work opportunities are limited and people don't realize the long term effect of donating blood towards health outcomes, their initial blood donation decision to win "easy cash" may end up with reliance on blood donation in the long run, because they gradually feel lack of energy to do farm work. T-test shows that whether to donate blood or not and donation volume have a significantly negative relationship with low per capita farm income.

A public accepted view is that migration alleviates and finally eliminates the blood donation behavior, since they have more profitable alternatives to choose and more knowledge about health issues. However, our t-test shows that higher share of family members who migrate is associated with more blood donation volume and there is no relationship between migration and blood donation participation. This initial result might suggest that we are not at the turning point.

An interesting question would be whether a minority systematically differs from a Han person. Brown et al. (2008) find that minority people are significantly less likely to participate in social status competition, and here it is interesting to test whether being a minority is more/ less likely to donate blood. The result shows that minority people are significantly more likely to donate blood than their Han counterparts. Unlike gift-giving, donating blood seems to show no

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weight regulations. For more information, refer to China HIV/AIDS Information Network (http://www.chain.net.cn/).

culture shock between the Han group and other minorities. Blood donation compensation is treated as "easy cash" from all local community members, even more for minority groups.

Another thought provoking question is whether party member are less likely to donate blood, since intuitively their special political and social power should help them avoid this depressing behavior. We verify that party members generally have higher income and receive more education. However, the t-test between blood donation participation sample and non-participation sample shows that party members are significantly more likely to donate blood and donate more volume.

Social spending especially cash expenditure might also influence peasants' blood donation decisions, which is the main topic of this paper and will be extensively discussed. Besides, big shocks and future social events might also be relevant. However, on top of all these possible reasons, blood donation should essentially be a phenomenon of poverty, inequality, and deprivation.

5.4 Social Spending and Gift Giving

In Table 2, gift income as a share of total income rise by 41% in village 1, and rise by an amazing 127% in village 3. Among distributions of per capita gift expenditure and the median, village 3 is the largest. The share of gift expenditure and festival spending increases nearly 80% from 7% to 12%, surpassing education expenditure. Compared with income growth between 2004 and 2006, gift spending has higher growth rate.

Table 3 provides more detailed information on gift exchange. It includes all kinds of gift expenditures in different social occasions, but it excludes other non-gift expenditures occur during social events or shocks, such as weddings, funerals, big diseases, natural disaster, livestock deaths, college entrances, and child births. Those non-gift social expenditures usually occur in weddings and funerals, which will be extensively illustrated in Table 5 and Table 6. From 2004 to 2006, the participation rate of gift giving increases by 50% on average, with median per capita gift expenditure increases by nearly 4 times on average. Median gift per occasion that is given to direct relatives is much more than given to friends and neighbors, with a roughly equal increasing rate of 50% on average. On average, people sent out gift twice in 2006. Comparing median gift for male side and female side between 2001 and 2006, the male/female ratio of median gift expenditure per occasion converged, while in absolute value median gift per occasion for male side is still much higher than median gift for female side.

In the 2007 wave of survey, we collected recall data for social spending in the last ten years.[15] Gift expenditure and income in different social occasions were also collected. From gift receivers' records, we list in Table 5 gift income due to the marriage of each son in grooms' family and marriage of each daughter in brides' family. We also provide gift value in funerals of each family members died during that period. Although weddings and funerals do not often happen in the three villages, from Table 5 it is clear that gift expenditures per occasion during those major social events kept soaring in the last ten years.

Relative derivation research solely based on gift-giving might greatly the negative positional externality, many other social spending might also take major effects. In China, gift expenditure is just a small part of total social spending, while holding social occasions such as wedding and funeral usually call for much larger amount of cash expenditure.

Traditionally, on the one hand, the groom's family is responsible for paying bride price, which is often accompanied by gifts to the bride herself and huge expenditure holding the wedding ceremony. On the other hand, the bride's parents usually send out dowry to the bride. Usually, huge dowry spending competitions exist in order to help the bride gain more equal status within the new family. Table 6 illustrates that the median wedding expenditure in the last ten years has had a median year-on-year increase of 17% in the three villages, far exceeding per capita income in its growth rate and its absolute value. On the bride's family side, there has been a less prominent but significant growth during those years.

Funerals usually provide another opportunity for status competition both for the decedent's family and its relatives and friends. Funerals typically last several days, which involve all kinds of things from simple meals to fancy banquets. Table 6 shows a steadily large amount of spending and rapidly increasing trend.

If we further consider the massive house building campaign before marriage, the burden of social spending is even worse. Usually, the groom's family is responsible for building a house ("*Xi Fang*") for the new couple, which renders an expense far exceeds even the total cost of wedding ceremony. In the three villages, it is easily seen that a lot of *Xi Fang* are empty because the new couple migrate out to work. Nonetheless, the house is purposed to be built to show social status of parents from both sides.

[15] For social spending, most of rural households usually keep detailed record of involved names, expenditures, and gift sent out or received. In this way, local people can keep track of informal network around them. Thus, the recall error is low, even over a long period.

6. Empirical Results

Table 7 through Table 13 provide us with empirical test of blood donation decision. We highlight the role of status concern and how inequality, relative deprivation, and other people's behavior influence an individual's decision.

6.1 Relative Deprivation, Status Seeking, and Blood Donation Participation

Table 7 presents logit regression results for eight specifications and shows what determine whether or not a household donates blood. We include in each estimation per capita income excluding blood donation compensation to control household resources. Gini coefficient is also calculated after excluding blood donation compensation. Deaton (2001)'s relative deprivation measure, poverty line, interactive term between poverty and per capita income, blood donation participation rate, gift giving participation rate, and median level of blood donation volume in the reference group are included in the model. Other regressors include Household head's education level, ethnicity, whether he/she is a party member, the share of family members who migrate out to work, fixed effect at the level of administrative village, whether or not a household in poverty has member(s) in serious illness, and whether or not all family members are seriously disabled.

Four major results are summarized. First, we confirm that blood donation behavior is a reflection of poverty. As per capita income increases, households are significantly less likely to participate in donating blood. Meanwhile, households under poverty line are more likely to donate blood.[16] The significance of interactive term between poverty and per capita income shows that the deeper a household is in poverty, the more chance it participates in donating blood.

Second, we find that inequality on natural village level matters. Seen from model I and II, the more unequal it is in the local community, the more likely people donate blood. Even if the Gini coefficient are not significant in model III and IV, however, considering the possible simultaneity problem, Gini coefficient in the model without blood donation participation rate and median level of blood donation volume is still significant in driving blood donation participation.

Third, Gini coefficient can only capture village level inequality, while people with different income within a village might feel quite differently. That is why relative deprivation measures and other status competition information are needed. In Table 7, relative deprivation index

[16] The results below are robust to substituting the higher official poverty line (892RMB) for the presented lower poverty line (668RMB).

offered by Deaton (2001) is included. Results show that there is significantly positive effect of being relatively deprived on blood donation participation (also refer to Figure 3). The significance of relative deprivation index is robust to the specification when we do not include blood donation participation rate, median level of blood donation, gift giving participation rate, and median level of gift spending.

Fourth, to capture social status seeking, we adopt gift giving participation rate within each natural village to describe positional spending in the reference group.[17] We find that gift giving participation rate within the reference group significantly increases the likelihood of blood donation participation. Besides, blood donation participation rate and median level of blood donation within the reference group strengthen blood donation behavior.

After controlling for the aforementioned factors, the fact that a household in poverty with member(s) in serious illness still has significantly positive effect on blood donation participation, while the fact that all family members are disabled deters family from donating blood. This finding informs us the labor allocation strategy that families allocate their labor resource to blood donation as long as not all family members are seriously disabled.

It is also found that residents in administrative village 3 are less likely to donate blood, which might be caused by more work opportunities exposed there. Minority-headed households are no less active in donating blood than ethnic Han households, no matter whether village fixed effect variables are included or not, suggesting no large culture shock of attitudes towards donating blood. The share of migrants in a household has no significant effect on blood donation decision, perhaps implying that the positive effect from migration has not been large enough to drive people to the critical point. There might be fewer farm labors within a household after partial migration, which induces blood donation to be one of their possible choices. Another interesting finding shows that families with party members are more likely to donate blood, which is counterintuitive because village party members in China usually have more political and socioeconomic power than the others. Therefore, it deserves our further attention.

We are centrally interested in whether and how people are relatively deprived in the perspectives of both income and consumption and driven into donating blood. Table 8 presents five major relative deprivation indexes. The Deaton (2001)'s index and Li & Zhu (2006)'s RDI

[17] In some scenarios, whether a household participates in gift giving is adopted and used to check whether it is consistent with other relevant indicators, but it may suffer from simultaneity problem. Thus, we do not report the result here.

index, the most composite relative deprivation indexes, are significant at the 99% confidence level. Two less composite indexes, Wildman (2003b)'s index and Li & Zhu (2006)'s RDA index are significant at 95% confidence level when we incorporate blood donation participation rate at natural village level into the model. The Rank index conveys the least information on relative deprivation. Therefore, it is not significant in influencing blood donation participation. It is important that after controlling for relative deprivation from the perspective of income, other deprivation indicators such as blood donation participation rate and gift giving participation rate within the reference group significantly determine blood donation participation. Other regressors have similar influence as in Table 7 in terms of signs and degrees.

6.2 Relative Deprivation, Status Seeking, and Blood Donation Volume

While logit estimation provides us with useful information on which households donate blood, we are now interested in how these factors influence the level of blood donation. Since 576 households (71.8%) report no record of blood donation, we employ a tobit model for this analysis.

In Table 10, models I to IV verify that blood donation behavior are a reflection of poverty. Households with lower per capita income tend to donate more blood. Households under poverty line generally donate more blood.[18] The significance of interactive term between poverty and per capita income shows that the deeper a household is in poverty, the more blood it donates.

Meanwhile, the eight specifications in Table 10 show that the level of blood donation is much less a village level inequality issue than an individually relative deprivation issue. If we do not incorporate the idea of relative deprivation, redistribution policies might be deviated to the wrong route. Besides, village blood donation participation rate and median level of blood donation are incorporated. To capture social status seeking, we adopt gift giving participation rate and median level gift spending within the natural village to describe positional spending in the reference group. Results show that there is significantly positive effect of being relatively deprived on blood donation volume. Blood donation participation rate and median level of blood donation within the reference group increase the level of blood donation. Gift giving participation rate and median level gift spending within the reference group also increase the volume of blood donation. The significance of relative deprivation variable is robust to other

[18] The results below are robust to substituting the higher official poverty line (892RMB) for the presented lower poverty line (668RMB).

specifications, such as without blood donation participation rate, median level of blood donation, gift giving participation rate, and median level of gift spending.

Other results show that households with child in school generally donate less blood. The share of household members who migrate out has positive effect on blood donation volume. Residents in village 3 tend to donate significantly less volume of blood. Interestingly, party members tend to donate more blood. However, the fact that a household in poverty with member(s) in serious illness and that all family members are disabled have no significant effect on blood donation volume.

How are people relatively deprived and driven into donating more blood? Table 10 and Table 11 present three most composite relative deprivation indexes. The Deaton (2001)'s index and Li & Zhu (2006)'s RDI index are significant at the 95% confidence level. The less composite Wildman (2003b)'s index is partially significant at 90% confidence level when we incorporate blood donation participation rate or median level of blood donation at natural village level. It is important that after controlling for relative deprivation from the perspective of income, other deprivation indicators such as blood donation participation rate, median level blood donation, gift giving participation rate, and median level gift expenditure within the reference group significantly determine blood donation level.

6.3 Shock, Social Events, and Blood Donation

Table 9 presents determinants of blood donation participation considering shocks and big social events. Major findings are similar to we learned from Table 7 and Table 8. First, blood donation behavior is a reflection of poverty. Second, blood donation participation reflects inequality on natural village level. Even if the Gini coefficient are not significant in model II and VI, however, considering the possible simultaneity problem, Gini coefficient in the model without blood donation participation rate is significant in driving blood donation participation. Third, as an indispensable complement to the Gini coefficient, Deaton (2001)'s relative deprivation index significantly forces people to participate. The significance of Deaton (2001) index is robust to the specification when there are no blood donation participation rate and gift giving participation rate. Finally, to capture social status seeking, we adopt gift giving participation rate within each natural village to describe positional spending in the reference group, and we find its significantly positive effects on blood donation participation. Blood donation participation rate within the reference group strengthen blood donation behavior.

All of the eight models in Table 9 further consider the impact of shocks, large social events on blood donation participation. We find that shocks or events that lead to blood donation participation should occur suddenly and without expectation. For instance, we find that deaths of livestock significantly induce household to donate blood, which might be because it greatly affects farming, especially in mountainous regions. It is also found that the influences of livestock death on blood donation participation disappear after two years.

To the contrary, marriages of male or female family members, house building, and family member death in the past one or two years cause no significant blood donation participation. In parallel, marriages of male or female family members and house building in the next one or two years cause no significant blood donation participation neither. People may think that family member death can be out of expectation. It is true only in very few cases, while in many more cases family members die in old ages with large amount of precautionary savings paying for funeral fees and possible medical treatment. This is especially true in the Chinese culture where people have rooted tradition to save for funeral costs. Meanwhile, people exchange gifts in social events such as weddings, funerals, college entry, and house building (Table 5). Therefore, large expenditure is smoothed with no significant impact on blood donation participation.

Table 12 and Table 13 present determinants of blood donation level considering shocks and big social events. Based on Table 10, it is verified that 1) differentiated levels of blood donation are a reflection of poverty; 2) the level of blood donation is much less a village level inequality issue than a reflection of individually relative deprivation. The significance of Deaton (2001) index is robust to other specifications, such as without blood donation participation rate, median level of blood donation, gift giving participation rate, and median level of gift spending; 3) gift giving participation rate and median level gift spending in the reference group significantly capture social status seeking. Household blood donation volume increases in the median level of blood donation within the reference group.

The major difference between Table 12 and Table 13 is that in Table 12 we employ dummy variables testing shocks and big social events, while in Table 13 we apply actual expenditure variables measuring shocks and big social events. However, both of these two settings convey the same major conclusions as from Table 9. Comparing other results in Table 12 and Table 13 to Table 9, the positive effect of family member(s) in serious illness and all family members seriously disabled on blood donation disappears. In other words, the two factors only influence

blood donation participation but not the level of participation.

Finally, Figure 14 shows initial evidence of relative concern and blood donation using survey data from 2004 to predict household behavior in 2006. In this way, we are able to get rid of simultaneity issue. Indicators of herd behavior and effects of positional competition significantly aggravate blood donation participation. Besides, relative deprivation measures are significant. Household income excluding blood donation might be potentially endogenous because households can allocate labor resources across different income activities. We apply non-owned income such as remittance to be a proxy and find it not significant.

7. Initial Conclusions

Recent evidence from developing countries has shown that relative concern over the others' consumption matters. Rural China serves as an ideal destination to observe relative concern and closely related social phenomenon in readily identifiable reference groups because of closed ties among relatives and neighbors, isolation from outside market, mountainous geographic conditions among villages, and rapid economic and social transformation with worsening inequality and deepening poverty. In rural China, the fierce race for social status has brought in overconsumption of positional goods originally used to facilitate informal social networks. The fact that households allocate too much resource to positional goods, instead of non-positional goods, contributes to an overall loss of welfare. The concern is even strengthened when households living close to subsistence are compelled to donate blood to *keep up with the Jones*.

Applying a census-type household survey data in 2004 and some information from 2006 survey, there are five major findings based on our preliminary analysis. First, we confirm that blood donation behavior is a reflection of poverty, and as per capita income of households in poverty decreases, they are significantly more likely to donate blood. Second, blood donation reflect income inequality, including inequality that everyone feels the same and relative deprivation that everyone feels differently. The result is robust to different measures of relative deprivation. In some scenarios, relative deprivation significantly affects blood donation while inequality does not. It deserves further attention whether the underlying inequality effect is concealed when designing or evaluating policies. Third, the motive of social status seeking is also seen intensified through positional spending, which is measured and found to aggravate blood donation. Fourth, the herd effect of blood donation exists, which suggests that individual

blood donation decision is significantly influenced by people around them, and individual agents are weak in making own decisions. Finally, shortly after shocks such as unanticipated gift giving expenditure and livestock death, people are significantly more likely to donate blood, while for covering anticipated social expenditure such as house building and wedding, people do not significantly engage in blood donation before and afterwards.

We also conclude that people draw blood from their bodies to meet the immediate needs in unanticipated social occasions and production shocks. Continuous blood donation in the long run might partially come out of little access to cash credit to smooth income and consumption in impoverished areas where status seeking prevail or when production related shocks occur. The displaced distortion of financing constraints manifest itself in allocative inefficiency that may lead researchers and policymakers to mistakenly conclude that poor households routinely make serious allocation errors and to direct policy interventions towards the symptoms manifest in blood donation market rather than towards the root financial markets failures cause.

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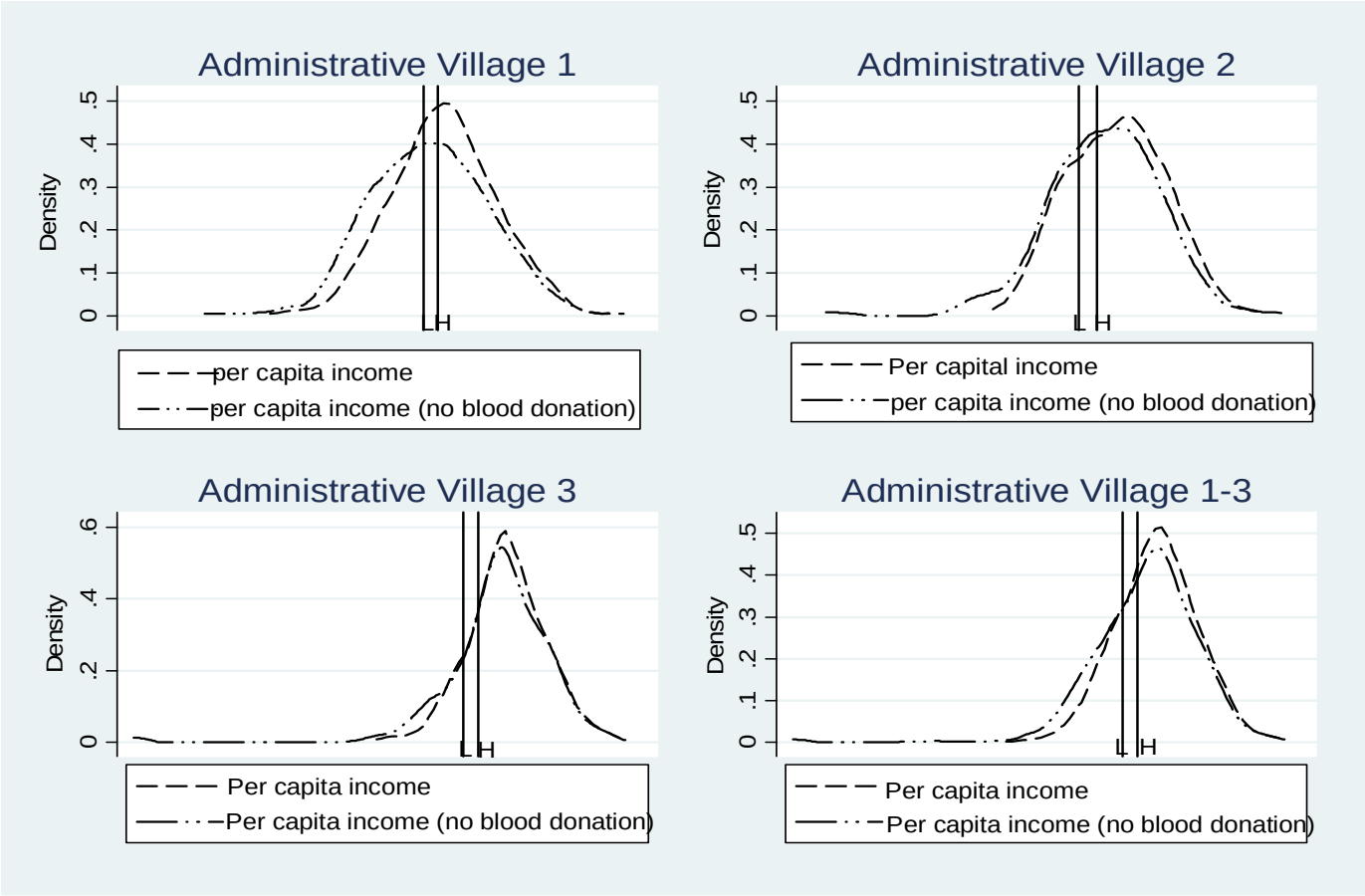
Figure 1 Distribution of Per Capita Income Including/ Excluding Blood Donation



Note: The two vertical lines "L" and "H" refer to the low and high poverty lines.

Figure 2 Computing Relative Deprivation from Distribution of Income (Deaton, 2001)

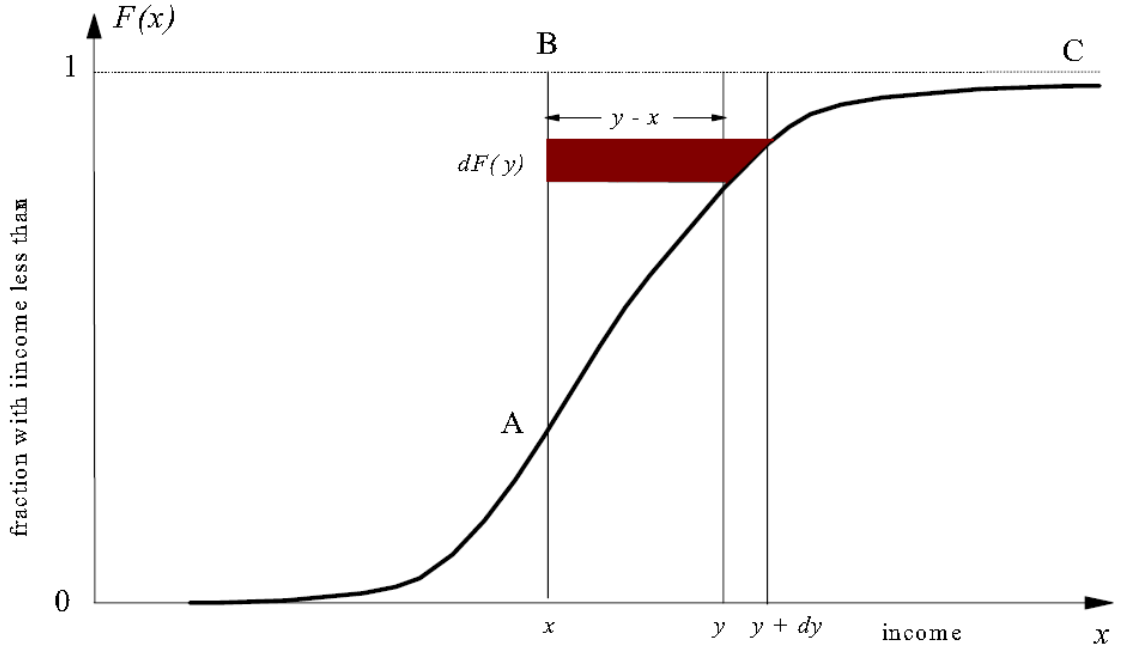
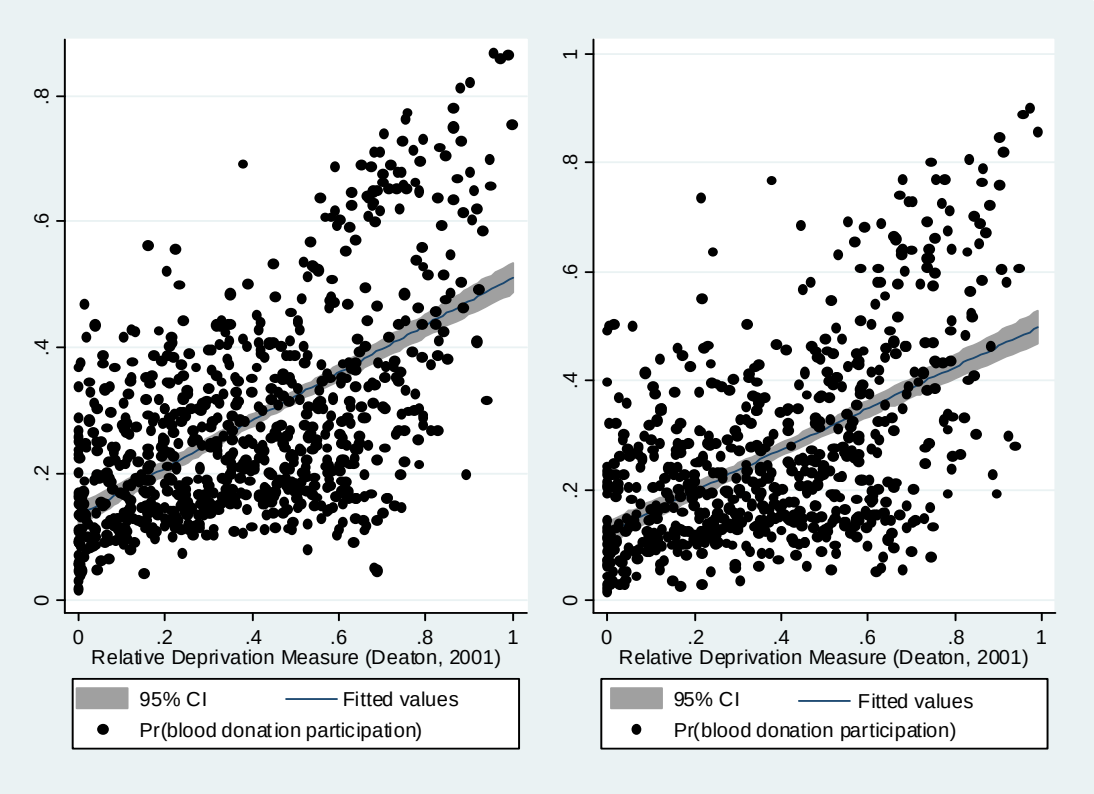
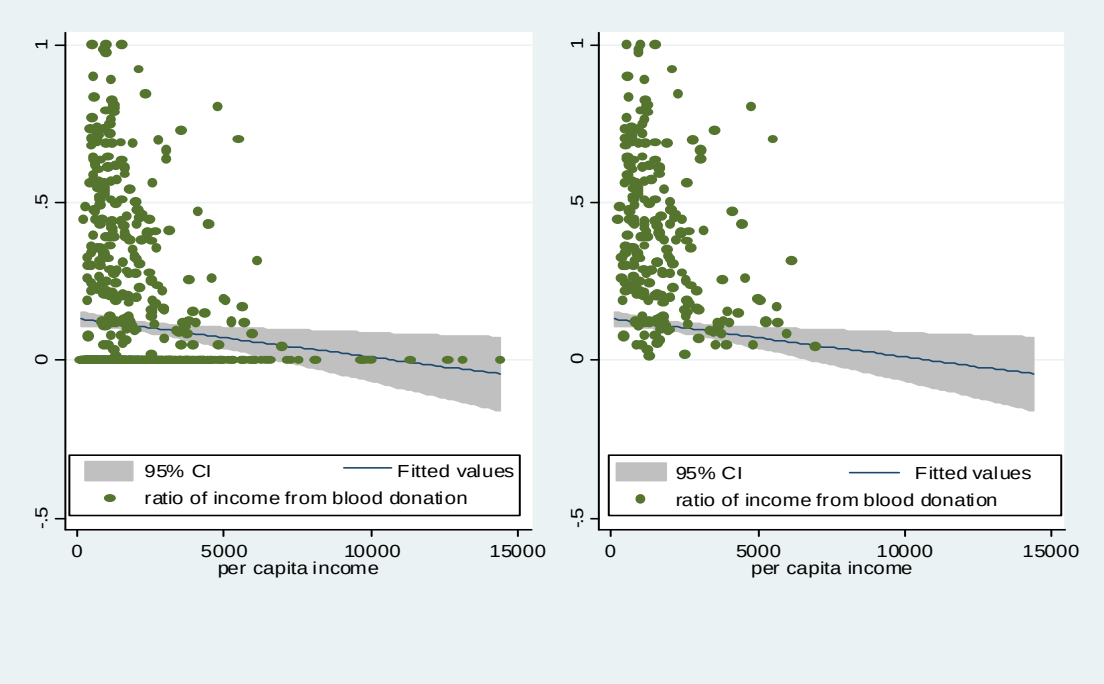


Figure 3 Relative Deprivation and Blood Donation Participation



Note: The left figure and right figure respectively show their relationship using equation (13) without / with potential effects of shocks and social events.

Figure 4 Income Ratio of Blood Donation and Per Capita Income



Note: The left figure includes households that do not donate blood.

Table 1. Summary Statistics by Three Administrative Villages (2004)

	Village 1	Village 2	Village 3	Total
Number of natural villages	11	5	10	26
Distance to county seat (km)	10	8	2.5	6.8
Number of households	257	151	393	801
Total population	1089	535	1449	3073
Share of minority households (%)	76.6	12.6	6.7	30.8
Share of household members aged 60 and above (%)	14.2	17.9	12.5	14.1
Share of households with migrants (%)	30.7	55	43.3	41.4
Share of household members who migrate (%)	12.3	13.5	12	12.4
Male head of household (%)	93.5	94.8	91.6	92.8
Education of household head (years)	2.87	3.06	3.98	4.44
Household average year of schooling	2.19	2.67	3.67	2.97
Per capita cultivated land (mu)	0.87	0.86	1.1	0.98
Percentage of flat land (%)	40	20.7	80	53.4
Land rental rate (Yuan per mu)	30	50	100	60
Share of households with TV (%)	39.3	39.7	61.6	50.3
Share of households with bicycles or motorcycles (%)	2.3	3.3	19.3	10.9
Share of households with phones (%)	8.9	15.2	23.4	17.2
Having difficulty with access to drinking water	79.4	80.1	39.2	59.9
Share of households with local non-farm jobs (%)	49.5	43.7	66.5	56.6
Share of households with self-employment (%)	7.4	3.3	7.4	6.6
Share of households with blood donations (%)	40.9	29.1	19.6	28.2

Table 2. Income, Consumption , and Inequality Decomposition by Three Administrative Villages (2004, 2006)

	Village 1		Village 2		Village 3		Total		Inequality Decomposition
	2004	2006	2004	2006	2004	2006	2004	2006	2004 (%)
Per capita annual income (RMB)	1381	1455	1648	2094	2089	2848	1779	2232	
Per capita consumption (RMB)*	818	1270	1125	1652	1562	2375	1223	1854	
Income inequality (Gini)	42.4	45.3	42.3	52.0	40.2	42.8	43.1	48.2	
Consumption inequality (Gini)	35.3	33.9	39	36.1	33.4	30.6	38.1	36	
Income inequality excluding blood donation (Gini)	46.6	46.9	44.7	52.5	42.4	43	46.3	49	
Income below low poverty line of 668 RMB (%) (P0)	37.6	37.9	30.1	32.4	13.2	12.6	24.8	25.1	
poverty-gap below low poverty line (P1)	14.2	15.4	9.2	11	4.4	4.3	8.7	9.4	
squared poverty-gap below low poverty line (P2)	7.2	8.9	3.7	5.5	2	2	4.1	5.1	
Income below high poverty line of 892 RMB (%) (P0)	54.1	52.5	41.1	44.1	23.4	21.1	37.3	36.3	
poverty-gap below high poverty line (P1)	22.4	23.3	15.8	17.9	8.1	7.5	14.5	15	
squared poverty-gap below high poverty line (P2)	12.2	13.6	7.7	9.6	3.9	3.7	7.5	8.3	
Sources of Income (%)									100
Agriculture	51.4	51.2	48.4	52.7	49.3	37.9	49.8	45	31
Farming	37.5	30.2	37.5	38.4	42.9	31	40.3	32	24.6
Livestock	13.9	21.1	10.8	14.4	6.4	6.9	9.5	13	6.3
Non-agriculture	27.2	36.8	21.8	27	36.4	49.9	30.7	41.2	62.6
Local non-farm jobs (part time job and wage job)	16.5	10.4	5.6	10.2	24.6	29.4	18.4	19.4	28.7
Self employment	2.6	3.7	5.7	6.5	4.9	10	4.4	7.3	18.6
Remittance from migrants outside the county	8.1	22.7	10.5	10.3	6.9	10.5	7.9	14.5	15.3
Disaster relief, anti-poverty programs, and deforestation subsidies	5.2	2.9	2.4	7	1.8	0.4	3	2.5	0.5

Gift income	3.2	4.5	11.7	11.6	4.9	11.1	5.6	9.1	4.1
Blood donation income	13	4.6	15.7	1.7	7.6	0.7	10.9	2.2	1.8
Expenditures (%)									100
Food	61	54.4	50.6	46.8	48	42.9	52.6	47.5	23.8
Clothing	4	4.1	3.2	3.5	4.4	4.6	4.1	4.2	3.2
Medical care	14.5	15.7	24.5	16.9	17.4	14.4	17.8	15.3	30.1
Education	7.1	9.4	8.4	11.3	9.5	11.4	8.5	10.7	6.1
Gift and festival spending	5.5	8.6	5.9	12.9	8.4	14.7	7	12.3	8.9
Others	7.9	7.8	7.4	8.6	12.3	12	10	10	27.9

* Per capita consumption excludes expenditures on housing, durable goods, funerals, and weddings of family members.

Table 3. Gift Exchange Expenditure and Blood Donation Compensation by Three Villages (2004,2006)

	Village 1		Village 2		Village 3		Total	
	2004	2006	2004	2006	2004	2006	2004	2006
Participation rate in Donating blood (%)	40.9	12.8	29.1	5.7	19.5	3.8	28.2	7.2
Mean per capita blood donation (RMB)	197	56.6	235.5	22.4	113.4	11	163.2	28.6
Cash compensation (nutrition subsidy) for Blood donation (RMB/500cc)**	80	80	80	80	80	80	80	80
Participation rate in gift giving (%)*	59.1	85.1	57	91.8	66.7	95.4	62.4	91.2
Median per capita gift expenditure (RMB)*	16	62.5	20	150	80	250	33.3	150
Median gift to direct relatives (RMB per occasion)	30	50	30	50	50	100	40	60
Median gift to friends/neighbors (RMB per occasion)	10	20	15	30	25	50	20	30
Times of Sending out gift in 2006	-	2.1	-	2.4	-	2.9	-	2.5
Median gift for male side (RMB per occasion)	-	50	-	50	-	100	-	50
Median gift for female side (RMB per occasion)	-	20	-	30	-	50	-	30
Median gift for male side in **2001** (RMB per occasion)	30		30		50		40	
Median gift for female side in **2001** (RMB per occasion)	10		17.5		20		20	

* "Gifts" exclude spending on weddings and funerals.

** The numbers are identical since all three villages are located around Puding station, the only one blood plasma collection station nearby.

Table 4. Percentage Change in Poverty and Inequality under the Simulation of Excluding Blood Donation income (2004)

	P0	P1	P2	Gini
Admin Village 1	32.8	54.7	71.9	9.6
Admin Village 2	18.6	46.1	86	5.8
Admin Village 3	32.5	61.3	91.2	5.3
Total	29.7	54.7	78.5	7.4

Table 5. Median Gift Received (RMB) in Different Social Occasions from 1996 to 2006 (per occasion)*

Year	Wedding: Groom's Family			Wedding: Bride's Family			Funeral	
	1st son	2nd son	3rd son	1st daughter	2nd daughter	3rd daughter	1st	2nd
1996	900	-	-	-	1000	-	500	-
1997	500	0	-	-	1000	-	1200	-
1998	0	0	-	0	-	-	1500	0
1999	0	0	0	0	-	-	1500	-
2000	0	-	-	0	-	-	2250	1600
2001	2500	1150	-	-	-	150	1200	-
2002	850	0	-	400	900	-	2000	1000
2003	2250	0	4050	240	-	-	2000	1200
2004	2100	2800	-	-	-	-	2200	2000
2005	1200	-	-	-	0	-	2000	-
2006	4800	-	-	3500	1250	-	1850	5000

* In other social occasions such as big diseases, natural disasters, and college entrances more and more local residents also exchange gifts.

Table 6. Median Marriage and funeral Expenditures (RMB) from 1996 to 2006*

Year	Wedding: Groom's Family				Wedding: Bride's Family			Funeral
	Brideprice	Gift to bride	Ceremony	Total Expenditure	Dowry	Ceremony	Total Expenditure	Total Expenditure
1996	2500	2000	2000	6500	0	1000	1000	1750
1997	3000	1800	2000	6800	1000	0	1000	3000
1998	3500	2000	2250	7750	1100	500	1600	3000
1999	2000	1800	2000	5800	300	0	300	3200
2000	3000	2000	2500	7500	2000	150	2150	3000
2001	3000	3000	3000	9000	2000	0	2000	3000
2002	4800	4250	2400	11450	400	0	400	2850
2003	3000	3500	3000	9500	1900	500	2400	3850
2004	8000	2500	3500	14000	-**	-**	-**	6000
2005	9500	5250	3700	18450	2000	0	2000	5000
2006	8800	5600	3750	18150	2250	3500	5750	5000

* Using Recall data from the 2007 survey

** No wedding was held for that category during that year.

Table 7 Logit Regression on Blood Donation Participation in 2004

	I	II	III	IV	V	VI	VII	VIII
Per capita income (thousand Yuan)	-0.000**	-0.000**	-0.000**	-0.000**	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Median blood donation income (natural village)				0.011***				0.010***
				(0.003)				(0.002)
Blood donation participation rate (natural village)			5.559***				5.164***	
			(0.851)				(0.748)	
Gift giving participation rate (natural village)		2.035**				1.581*		
		(0.982)				(0.970)		
Median gift spending (natural village)	0.007				0.005			
	(0.005)				(0.004)			
Gini coefficient (natural village)	3.659**	3.347**	-1.428	0.137				
	1.482	1.493	1.773	1.746				
Relative deprivation (Deaton, 2001)					1.819***	1.696***	1.630***	1.561***
					0.519	0.531	0.547	0.531
Poverty line	2.261***	2.260***	2.273***	2.266***				
	0.467	0.467	0.480	0.471				
Poverty line*per capita income	-0.004***	-0.004***	-0.004***	-0.004***				
	0.001	0.001	0.001	0.001				
Household head Education level	-0.021	-0.019	0.004	-0.016	-0.030	-0.028	-0.012	-0.030
	(0.029)	(0.029)	(0.031)	(0.030)	(0.029)	(0.029)	(0.030)	(0.029)
Share of household members migrate out	0.566	0.695	0.818	0.603	0.515	0.599	0.753	0.536
	(0.566)	(0.567)	(0.584)	(0.574)	(0.564)	(0.565)	(0.582)	(0.573)
Household head ethnicity	-0.016	0.041	-0.059	-0.064	0.077	0.121	0.055	0.045
	(0.248)	(0.245)	(0.248)	(0.247)	(0.241)	(0.240)	(0.244)	(0.242)
Administrative village 2	-0.404	-0.348	0.136	-0.014	-0.545**	-0.493*	0.041	-0.105
	(0.284)	(0.283)	(0.300)	(0.297)	(0.276)	(0.277)	(0.296)	(0.292)
Administrative village 3	-0.773***	-0.892***	0.144	-0.575**	-1.072***	-1.143***	0.009	-0.714***
	(0.270)	(0.273)	(0.302)	(0.273)	(0.261)	(0.263)	(0.303)	(0.269)
Party membership	0.623**	0.606**	0.743**	0.648**	0.676**	0.659**	0.832***	0.730**
	(0.301)	(0.302)	(0.307)	(0.302)	(0.299)	(0.300)	(0.303)	(0.300)
Household in poverty & member in serious illness	0.510**	0.496**	0.572**	0.550**	0.452*	0.435*	0.462*	0.463*
	(0.248)	(0.247)	(0.255)	(0.250)	(0.245)	(0.244)	(0.252)	(0.247)
All family members seriously disabled	-1.320**	-1.396**	-1.462**	-1.474**	-1.023*	-1.066*	-1.144*	-1.172*
	(0.639)	(0.637)	(0.635)	(0.630)	(0.596)	(0.598)	(0.605)	(0.600)
Observations	796	796	796	796	796	796	796	796

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8 Logit Regression on Relative Deprivation Measurement and Blood Donation Participation in 2004

	I	II	III	IV	V	VI	VII	VIII	IX	X
Per capita income (thousand Yuan)	0.000	-0.000***	-0.000***	-0.000***	-0.000**	0.000	-0.000**	-0.000***	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gift giving participation rate (natural village)	1.581*	1.682*	2.424**	1.682*	1.707*					
	(0.972)	(1.015)	(0.995)	(1.015)	(0.972)					
Blood donation participation rate (natural village)						5.164**	5.349***	5.320*	5.349***	5.295**
						(0.748)	(0.746)	(0.744)	(0.746)	(0.752)
RDI RD index (Li & Zhu, 2006)					0.218**					0.225**
					(0.053)					(0.054)
RDA RD index (Li & Zhu, 2006)				0.000					0.001*	
				(0.000)					(0.000)	
Rank RD index			0.003					0.002		
			(0.002)					(0.002)		
Wildman RD index (Wildman, 2003b)		0.000					0.001*			
		(0.000)					(0.000)			
Deaton RD index (Deaton, 2001)	1.696***					1.630***				
	(0.531)					(0.547)				
Household Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Household Head Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Village Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	796	796	796	796	795	796	796	796	796	795

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.

Table 9 Shocks, Social Events and Blood Donation Participation

	I	II	III	IV	V	VI	VII	VIII
Per capita income (thousand Yuan)	-0.000**	-0.000**	-0.000	-0.000	-0.000**	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gift giving participation rate (natural village)	2.794*		2.261**		2.791*		2.265**	
	(1.114)		(1.101)		(1.115)		(1.102)	
Blood donation participation rate (natural village)		5.972**		5.446***		6.033**		5.493**
		(0.960)		(0.828)		(0.961)		(0.829)
Gini coefficient (natural village)	3.6494**	-2.030			3.6886**	-2.1102		
	(1.721)	(2.086)			(1.721)	(2.089)		
Deaton RD index (Deaton, 2001)			1.895**	1.838***			1.891**	1.822***
			(0.600)	(0.628)			(0.601)	(0.629)
Poverty line	2.325**	2.297**			2.318***	2.292***		
	(0.538)	(0.555)			(0.538)	(0.556)		
Livestock death 1 year ago	0.595*	0.537*	0.550*	0.469				
	(.302)	(.313)	(.299)	(.311)				
Poverty line*per capita income	-0.004***	-0.004***			-0.004***	-0.004***		
	(0.001)	(0.001)			(0.001)	(0.001)		
Social Events (1 year ago)	Y	Y	Y	Y				
Social Events (1 year later)	Y	Y	Y	Y	Y	Y	Y	Y
Social Events (2 years ago)					Y	Y	Y	Y
Other Shocks (1 year ago)	Y	Y	Y	Y				
Other Shocks (2 years ago)					Y	Y	Y	Y
Household Head Characteristics	Y	Y	Y	Y	Y	Y	Y	Y
Household Characteristics	Y	Y	Y	Y	Y	Y	Y	Y
Village Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y
Observations	664	664	664	664	664	664	664	664

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.

Table 10 Tobit Regression on Blood Donation Volume in 2004

	I	II	III	IV	V	VI	VII	VIII
Per capita income (thousand Yuan)	-0.117*	-0.116**	-0.109***	-0.101*	-0.073	-0.082	-0.075	-0.067
	(0.042)	(0.042)	(0.042)	(0.041)	(0.054)	(0.056)	(0.053)	(0.051)
Median blood donation inc (natural village)				4.127***				3.811***
				(1.191)				(1.052)
Blood donation parti. rate (natural village)			2,375.000***				2,160.780***	
			(416.843)				(375.987)	
Median gift giving (natural village)		4.186*				3.512		
		(2.255)				(2.228)		
Gift giving parti. rate (natural village)	982.443**				837.444*			
	(489.786)				(493.639)			
Gini coefficient (natural village)	957.396	651.020	-1,062.190	-302.689				
	(755.795)	(799.050)	(842.598)	(862.158)				
Deaton RD index (Deaton, 2001)					591.159**	535.03**	547.875**	558.885**
					(266.929)	(276.147)	(261.955)	(261.390)
Household head Education level	-19.896	-21.212	-11.525	-19.292	-24.380*	-25.892*	-18.275	-25.003*
	(14.994)	(14.984)	(14.983)	(14.947)	(14.968)	(15.013)	(14.966)	(14.962)
Share of household members migrate out	606.305**	578.612**	647.806**	561.161**	576.472**	549.272*	634.137**	547.232*
	(282.085)	(280.770)	(279.589)	(280.031)	(283.946)	(283.036)	(281.648)	(282.286)
Household head Ethnicity	54.133	43.121	4.304	14.801	85.223	75.483	47.942	56.484
	(121.259)	(120.570)	(119.091)	(120.274)	(121.649)	(121.016)	(119.557)	(120.645)
Admin village 2	1.741	-36.126	214.777	140.123	-52.817	-79.258	181.643	101.224
	(140.337)	(139.300)	(144.021)	(147.038)	(140.949)	(139.597)	(145.151)	(147.858)
Admin village 3	-364.776***	-583.231***	95.108	-219.101	-454.197***	-619.594***	58.345	-263.015*
	(138.024)	(205.890)	(146.094)	(134.537)	(134.747)	(188.702)	(149.496)	(135.974)
Party membership	301.383**	286.506*	343.978**	305.116**	333.707**	321.700**	379.980**	342.652**
	(151.164)	(150.970)	(150.185)	(150.834)	(151.872)	(151.798)	(151.153)	(151.768)
Poverty line	819.627***	817.102***	789.500***	818.362***				
	(214.366)	(213.850)	(211.873)	(213.455)				
Poverty line* per capita income	-1.578****	-1.576***	-1.577***	-1.609***				
	(0.467)	(0.466)	(0.462)	(0.467)				
hh in poverty&member in serious illness	177.063	180.019	188.159	185.016	154.446	154.646	143.978	149.346
	(125.575)	(125.740)	(124.711)	(125.517)	(125.741)	(125.764)	(124.786)	(125.487)
All family members seriously disabled	-389.350	-385.352	-383.094	-415.329	-341.428	-331.588	-319.544	-358.963
	(280.023)	(278.660)	(273.240)	(277.644)	(281.665)	(280.533)	(274.915)	(279.428)
Observations	796	796	796	796	796	796	796	796

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.

Table 11 Relative Deprivation and Blood Donation Volume in 2004

	I	II	III	IV	V	VI	VII	VIII
Per capita income (thousand Yuan)	-0.144***	-0.145***	-0.137***	-0.129***	-0.135***	-0.148***	-0.109**	-0.107**
	(0.040)	(0.039)	(0.039)	(0.038)	(0.051)	(0.054)	(0.046)	(0.046)
Median blood donation inc (natural village)				3.981***				4.036***
				(1.043)				(1.047)
Blood donation parti. rate (nat. village)			2,220.770***				2,235.900***	
			(374.173)				(376.140)	
Median gift giving (natural village)		4.462**				4.099*		
		(2.127)				(2.479)		
Gift giving parti. rate (nat. village)	1,004.410**				856.206*			
	(486.670)				(515.802)			
RDI RD index (Li & Zhu, 2006)	18.752**	18.064**	18.824**	18.110**				
	(8.026)	(8.025)	(7.876)	(7.980)				
Wildman RD index (Wildman, 2003b)					0.141	0.087	0.236*	0.208*
					(0.135)	(0.149)	(0.125)	(0.127)
Household head Education level	-23.132	-24.9401*	-16.2473	-23.4684	-26.904*	-28.300*	-20.643	-27.550*
	(14.923)	(14.947)	(14.921)	(14.916)	(14.973)	(14.991)	(14.979)	(14.974)
Share of household members migrate out	566.726**	539.423*	626.829**	532.357*	534.373*	509.014*	608.313**	514.019*
	(282.960)	(281.640)	(280.264)	(280.877)	(284.344)	(283.264)	(281.566)	(282.142)
Household head Ethnicity	81.219	72.159	41.800	48.463	80.416	70.740	49.966	55.722
	(121.073)	(120.340)	(118.958)	(120.077)	(121.748)	(121.022)	(119.547)	(120.682)
Admin village 2	-51.244	-84.084	182.101	102.712	-62.662	-81.431	161.064	87.088
	(140.490)	(139.120)	(144.619)	(147.266)	(144.040)	(142.122)	(146.326)	(149.072)
Admin village 3	-434.100***	-653.230***	94.364	-231.879*	-469.919***	-649.710***	8.184	-307.184**
	(133.008)	(187.410)	(146.544)	(133.212)	(145.147)	(188.334)	(158.148)	(147.205)
Party membership	276.739*	264.128*	322.859**	285.966*	330.889**	317.641**	379.537**	339.427**
	(153.666)	(153.400)	(152.890)	(153.488)	(152.226)	(152.133)	(151.345)	(151.985)
hh in poverty&member in serious illness	173.609	173.555	160.505	165.307	150.514	155.982	133.566	140.497
	(125.227)	(125.170)	(124.226)	(125.000)	(126.365)	(126.723)	(124.891)	-(25.691)
All family members seriously disabled	-310.368	-305.243	-280.825	-318.991	-310.303	-303.148	-297.370	-334.523
	(282.383)	(281.040)	(274.341)	(279.238)	(283.679)	(282.758)	(275.612)	(280.695)
Observations	795	795	795	795	796	796	796	796

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.

Table 12 Occurrence of Shocks and Big Events, and Blood Donation Volume in 2004

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Per capita income (thousand Yuan)	-0.099**	-0.105**	-0.084**	-0.047	-0.051	-0.037	-0.098**	-0.103**	-0.082*	-0.049	-0.051	-0.038
	(0.043)	(0.044)	(0.043)	(0.056)	(0.055)	(0.053)	(0.043)	(0.044)	(0.043)	(0.057)	(0.055)	(0.053)
Median blood donation income (natural village)			3.708***			3.716***			3.754***			3.740***
			(1.295)			(1.128)			(1.294)			(1.125)
Gift giving parti. rate (natural village)		1,257.730**			1,122.80**			1,239.4**			1,110.509**	
		(525.866)			(528.242)			(525.003)			(527.518)	
Median gift giving (natural village)	3.427			2.837			3.471			2.961		
	(2.447)			(2.401)			(2.458)			(2.413)		
Gini coefficient (natural village)	1094.890	1247.810	132.583				1070.270	1243.900	91.169			
	(864.355)	(816.481)	(944.572)				(864.716)	(815.085)	(945.160)			
Deaton RD index (Deaton, 2001)				639.031**	646.82**	614.676**				614.516**	631.737**	590.489**
				(293.671)	(285.546)	(283.250)				(295.622)	(286.577)	(284.423)
Poverty line	741.695***	747.841*	715.58***				726.10***	734.180***	699.170***			
	(233.481)	(233.049)	(233.023)				(233.473)	(233.219)	(233.090)			
Poverty line* per capita income	-1.336***	-1.347***	-1.327***				-1.313***	-1.325***	-1.304***			
	(0.506)	(0.505)	(0.507)				(0.505)	(0.504)	(0.506)			
Livestock death 1 year ago	235.265*	220.650	215.705	218.985	206.081	195.861						
	(142.497)	(141.989)	(142.384)	(142.841)	(142.475)	(142.482)						
Shock & Event (1y-)	Y	Y	Y	Y	Y	Y						
Social Events (1y+)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Shock & Event (2y-)							Y	Y	Y	Y	Y	Y
H Head Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
H Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Village Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	664	664	664	664	664	664	664	664	664	664	664	664

Standard errors in parentheses * significant at 10%; ** significant at 5%; *** significant at 1% Y denotes that the factors are controlled.

Table 13 Expenditure on Shocks and Big Events and Blood Donation Volume in 2004

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Per capita income (thousand Yuan)	-0.099**	-0.105**	-0.083*	-0.040	-0.047	-0.033	-0.101**	-0.106**	-0.085**	-0.041	-0.046	-0.034
	(0.043)	(0.044)	(0.043)	(0.056)	(0.055)	(0.053)	(0.043)	(0.044)	(0.043)	(0.056)	(0.055)	(0.053)
Median gift giving (natural village)	2.964			2.391			2.953			2.429		
	(2.437)			(2.394)			(2.434)			(2.390)		
Gift giving parti. rate (natural village)		1,186.63**			1,043.90**			1,169.98**			1,029.30**	
		(524.265)			(527.792)			(522.952)			(526.102)	
Median blood donation income (natural village			3.574***			3.625***			3.572***			3.633***
			(1.298)			(1.129)			(1.299)			(1.127)
Deaton RD index (Deaton, 2001)				699.241**	693.026**	655.500**				695.215**	693.743**	648.100**
				(293.976)	(285.986)	(283.438)				(292.722)	(284.589)	(282.490)
Gini coefficient (natural village)	1188.980	1298.110	217.003				1220.770	1,333.78*	245.437			
	(862.504)	(813.810)	(943.857)				(859.020)	(810.238)	(941.443)			
Poverty line	753.057***	758.486***	731.84***				720.927***	728.058***	698.945***			
	(231.956)	(231.418)	(231.446)				(230.816)	(230.421)	(230.287)			
Poverty line* per capita income	-1.335***	-1.342***	-1.331***				-1.273**	-1.280**	-1.268**			
	(0.504)	(0.503)	(0.504)				(0.500)	(0.499)	(0.501)			
Livestock death 1 year ago	0.023	0.019	0.005	0.018	0.015	-0.003						
	(0.060)	(0.060)	(0.061)	(0.060)	(0.060)	(0.061)						
Shock & Event (1y-)	Y	Y	Y	Y	Y	Y						
Social Events (1y+)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Shock & Event (2y-)							Y	Y	Y	Y	Y	Y
H Head Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
H Characteristics	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Village Fixed Effect	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	664	664	664	664	664	664	664	664	664	664	664	664

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.

Table 14 Logit Regression on Blood Donation Participation in 2006 (Robustness Check)

	I	II	III	IV
Per capita income (thousand Yuan)	-0.000*	-0.000**	-0.000*	-0.000*
	(0.000)	(0.000)	(0.000)	(0.000)
Median blood donation income (2004)				0.008*
				(0.004)
Blood donation participation rate (2004)			4.552***	
			(1.670)	
Gift giving participation rate (2004)		3.858***		
		(1.55)		
Median gift spending (2004)	0.011*			
	(0.006)			
Relative deprivation (Deaton, 2001)	1.840**	1.823**	1.762**	1.699**
	(0.830)	(0.801)	(0.847)	(0.834)
Household Characteristics	Y	Y	Y	Y
Household Head Characteristics	Y	Y	Y	Y
Village Fixed Effect	Y	Y	Y	Y
Observations	531	531	531	531

Standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
Y denotes that the factors are controlled.