Is Social Capital the Capital of the Poor? The Role of Family and Community in Helping Insure Living Standards against Health Shocks

Paul Gertler
UC Berkeley and NBER*

David I. Levine
UC Berkeley**

Enrico Moretti
UC Berkeley***

March 2006

Keywords: Consumption, Insurance, Cooperation, Household, Social Networks.
JEL: I10, O12, O17.

* Haas School of Business MC #1900, University of California, Berkeley California 94720. Gertler@haas.berkeley.edu

** Haas School of Business MC #1900, University of California, Berkeley California 94720. tel. (510) 642-1697, fax (510) 643-1420, Levine@haas.berkeley.edu,

*** Department of Economics, University of California, Berkeley CA 94720. moretti@econ.berkeley.edu

Is Social Capital the Capital of the Poor? The Role of Family and Community in Helping Insure Living Standards Against Health Shocks

Abstract: We estimate the effect of social capital on the ability of households to insure consumption after unexpected negative shocks. Many theoretical models argue that strong ties to extended family members and to one's community help protect families when an adult becomes ill or disabled. Using household-level longitudinal data on Indonesian families, we test whether consumption declines less after a negative health shock for those with many ties to their community and for those in a community with dense ties. We take advantage of a particularly rich set of measures of social capital including measures of civic participation; the existence of traditions of mutual cooperation; long-term relationships in the community, and ethnic and linguistic diversity. We also examine the role of a large and prosperous extended family. We find little support for the hypothesis that social capital is the capital of the poor.

1. Introduction

Social capital refers to the "norms and networks that enable collective action" (World Bank 2000).[1] One can think of social capital, particularly social networks, as an asset that people accumulate, largely by spending time building relationships with and helping others. Some returns on this asset--such as affection for some relationships--are certain, while other returns depend on the state of the world. In this study we measure the extent to which social networks protect families' living standards when an adult becomes disabled.

When an adult in a household becomes disabled, household income often declines. Because formal insurance is usually not available in developing nations, households rely on precautionary savings, credit, and informal insurance to protect their standard of living. Credit and informal insurance, in turn, frequently depend on the connections between the injured person's household and its extended family and community. This pattern leads to the often-made claim that "social capital is the capital of the poor" (e.g., Woolcock and Narayan, 2000).

How important social capital is in helping families to insure consumption after adverse shocks is still an open question.[2] In this paper we take advantage of an extremely rich longitudinal dataset on Indonesian households to study whether close ties to community and family protect a household after a health decline. The ethnographic literature on Indonesia suggests that informal insurance within neighborhoods is often quite important after a family has received a negative shock (e.g., Sullivan 1994). For example, the traditional Javanese funeral normally involves monetary gifts to the family

[1] For more discussion of the concept of social capital and its measurement, see World Bank (2003). Coleman (1990) and Putnam (1993) are the seminal works on social capital. For critiques of the literature, see Sobel (2002).

[2] Evidence on the effects of social capital on the level of living standards includes Knack and Keefer (1997) and La Porta et al. (1997); see the review by Temple (2001). These analyses are subject to reverse causality, where prosperity can improve social capital (Miguel, et al., 2003), and by omitted variable bias. The relationship between social capital and growth is also unclear in theory, as high social capital can reduce growth by taxing high effort and skill accumulation to help less prosperous relatives and neighbors. Thus, it is also important to see how social capital affects risk, as in this paper.

of the deceased. Moreover, meals, childcare, and other resources are often provided by long-time neighbors to help maintain the family's well-being.

Our test for the importance of social capital is very simple. We test whether the decline in a family's standard of living after a negative health shock is less severe if the family lives in cohesive neighborhoods with neighbors who have lived there a long time and who interact with each other frequently or if the family lives near a large and wealthy extended family.

We begin the empirical analysis by testing whether Indonesian households are able to insure consumption against major illness shocks. Consistent with previous research, we find that large health shocks result in declines in consumption levels, and these reductions are not due to state-dependent utility or to reverse causality.[3] We then estimate the extent to which social capital mitigates the decline in consumption associated with the health shock. Specifically, we test the hypothesis that households with more social capital are more successful in insuring consumption than otherwise similar households with less social capital against the alternative that the decline in consumption is not related to social capital. We measure social capital both at the household and the community level and we examine social capital provided by the family and the community.

Two features of our data, the Indonesian Family Life Surveys (IFLS), make it particularly suited for this study. First, IFLS is a longitudinal survey that follows households over time and collects detailed health and consumption measures. By looking at within-household changes in consumption, we are able to account for many unobserved characteristics of families that are correlated with social capital and could potentially bias simpler cross sectional estimates.

Second, the IFLS collected detailed information on several variables that the theoretical literature identifies as potentially important antecedents of and proxies for social capital. The first is civic participation in community organizations both at the household level and at the community level. Second, the IFLS surveyed village chiefs as to whether there was an "ethic of mutual cooperation" in the community's traditional customs and law and whether it remained common practice at the time of the interview.

Third is the presence of long-term relationships in a community. Long-term relationships in the community are not in and of themselves social capital, but most theories suggest they should lead to social capital. Fourth, we use measures of ethnic and linguistic diversity because theories of ethnolinguistic fragmentation predict lower social capital when a household is of a rare group in a community with many groups. Finally, we examine whether households with prosperous nonresident living parents, siblings, and adult children are better able to insure consumption against health shocks.

Although we use several detailed and precise measures of social capital, we find surprisingly little evidence that social capital improves a family's ability to insure consumption against health shocks. While health shocks are associated with significant declines in consumption, the degree of decline is unassociated with the level of a household's community-based social capital. Even more surprisingly, family ties do not appear to be very important in helping to insure consumption. Indeed, households with large and prosperous families do not have smaller declines in consumption following a negative health shock than otherwise similar households without such potential extended family support. Overall, we find little support for the hypothesis that social capital is the capital of the poor and cast doubt on the importance of social capital in helping households insure consumption after negative shocks.

Because we measure consumption based on purchases, an important concern is that neighbors and family members may provide in kind transfers that we cannot measure. To assess whether this data limitation affects our results, we directly examine children's nutritional status using measures of children's height and weight. For example, if neighbors and friends provide meals to children whose parents are sick, and if parental health shocks are not infectious, then we should see that children's nutritional status is unaffected by parental health shock. We find that in general, social capital does not help children when parents suffer a negative health shock.

The next section describes the theory of social networks and their causes, with specific reference to the situation in Indonesia. Sections 3 and 4 describe our econometric specification and data source. Section 5 presents the main results, followed by a conclusion.

---

[3] See for example Cochrane 1991

2. Social Networks

The role of social networks in protecting people in times of need has well-established microfoundations in economic theories of mutual insurance (Thomas and Worral 2002), altruism, social norms (Hechter 1987), and reciprocity in games of repeated play (Fudenberg and Maskin 1986). Importantly, most of the health shocks we study are partly or entirely reversed over the next few years, which improves the ability of mutual insurance to operate in many of these theories.

These theories all suggest that social capital is greater when individuals are embedded within a dense network of social ties so that cooperation can be monitored and rewarded by others, or when there is affection amongst individuals that promotes altruism and expectations of future reciprocity. These theories also stress the importance of long-term relationships and expected future encounters. Long-term relationships provide incentives for cooperative behavior and the time needed to internalize group norms and to form bonds of affection.

A number of factors can lead to dense networks and long-term relationships, including a dense network of community groups, norms of cooperation, long tenure of oneself and one's neighbors in the community, ethnic and linguistic homogeneity, and close ties to extended family. We now discuss each of these sets of ties in detail in the Indonesian context.

Civic Participation: Putnam's seminal work (1993, 2000) emphasized that participation in multiple groups created the rich network of ties that increase information flows, mutual liking, and respect; facilitate monitoring; and make it easier to sanction free-riders and reward those who have provided public goods.

Much of the daily life of ordinary Indonesians revolves around institutions that facilitate such dense social interactions. Indonesian communities are typically characterized by vibrant organizational life, including financial self-help groups, farmers' groups and water groups (Sullivan 1994; Geertz 1961; Lont 2000; Grootaert 1999:52; Eldridge 1995).[4]

[4] There are parallels with the U.S. experience when national NGOs ranging from the American Bowling Congress and the YMCA to the Grange and the Knights of Columbus helped disseminate local organizations a century earlier (Skocpol, et al. 2000).

Many community organizations in both rural and urban Indonesia were originally based on informal rotating savings and credit associations (ROSCAs) called arisan in Indonesian, and larger credit cooperatives often retain a rotating structure (Eldridge 1995). Such rotating credit groups have received extensive attention in the social capital literature (Putnam 1993). We measure a number of dimensions of civic participation of the household (e.g., the number of group memberships) and of the community (the total number of groups in the community), with a special focus on the household and community density of *arisan* savings and credit groups.

Norms of Cooperation: While information on community groups captures formal organizations that may promote social capital, informal ties (for example, ties of affection and reciprocity that are due to family, friendship or informal organizations) can be important in people's lives even when formal groups are rare. If such ties are important, then norms can arise for mutual assistance. We measure such norms in each rural community with reports from an expert in traditional law on topics such as whether the community has an "ethic of mutual cooperation."

Long-term Relationships in the Community: People who grew up together tend to have interacted frequently, have formed bonds of affection, have internalized norms of cooperation, and are embedded (along with their other neighbors) in overlapping spheres of potential cooperation in everything from lending cooking oil to participation in local organizations to mutual business dealings.

In contrast, recent arrivals should have a harder time accessing norms of mutual assistance (DiPasquale and Glaeser 1999). For example, Sullivan (1994) provides ethnographic evidence from Indonesia on how newcomers are left out of networks of mutual assistance. Hence, in-migration likely lowers social capital, especially among the new arrivals.

In addition, out-migration can also lower social capital (Schiff 1998). Intuitively, social capital involves transfers, favors and exchanges today, often in return for favors implicitly or explicitly promised in the future. If the potential exchange partner is likely to migrate away tomorrow, the incentive to initiate a relationship with him or her is lower.

To capture these ideas we use several household- and community-level measures of long-term relationships. The household-level measures are whether one or both of the male or female household heads was born in the community, and the tenure of the household head in the community. The community level measures are the proportion of the community that was born there, the mean tenure of residents, the amount of out-migration from the region, and the amount of in-migration into the region. As these examples make clear, we deal with social capital as a feature of both the household and of its community.

Ethnic and linguistic diversity can affect interactions in many settings within the community. For example, if people of the same religion are more likely to interact in both social and religious settings, each set of interactions becomes embedded in a richer series of interactions and relationships. These interactions increase the rate of repeated play in games of cooperation and, thus, increase the likelihood of cooperation. These overlapping networks, in turn, imply reputations for unfriendly actions may be more likely to spread among those sharing a demographic group, and the group can more effectively sanction those who break group norms. When norms of appropriate behavior are likely to be enforced by outsiders, the threat of such enforcement can improve the odds of fair dealing and further enhance trust. Indeed, Bernstein (1992) describes how religious and social homogeneity, and the ensuing rich network of social interactions and institutions, helps promote cooperative behavior among Hassidic Jewish diamond traders. (Greif describes related cases, 1993, p. 530).

Ethnolinguistic fragmentation also makes communication more difficult. Indonesians speak literally hundreds of languages (although the majority speaks the national language Indonesian, often as a second language). If high costs of communication reduce the benefits (for example, the likelihood of forming friendships) of remaining in a community, we have an additional reason for heterogeneity to reduce social capital. Economists have documented the effects of ethnic and linguistic diversity at the level of nations (Easterly and Levine, 1997), regions (Alesina and La Ferrara, 2000; Alesina Baqir, and Easterly 1999), neighborhoods (Massey and Denton, 1993); workplaces, and ethnicity (Grimard 1997).

As is standard, we measure ethnolinguistic fragmentation as the odds that two

people chosen at random in the community speak different languages. We use an additional measure of ethnic diversity equal to the share of people not from the largest ethnic group. At the household level, linguistic isolation may matter more than community-wide fragmentation. Thus, we also measure the share of the community that do not speak the main language of this household.

Social Capital within the Extended Family: The forces of long-term relationships, dense networks, and many potential spheres of cooperation are strongest within families (Putnam 1995: 73). Hence, we expect extended families frequently to provide important reserves of social capital.

Evidence from several nations suggests that extended families often help insure consumption for family members that suffer bad news (e.g., Rosenzweig and Stark 1989 in rural India; Bentolila and Ichino 2000 in Europe). Moreover, families sometimes use this fact in deciding the optimal marriage patterns, so that farmers facing high risk marry off children to more distant locations where weather risks are less correlated (Rosenzweig, and Stark, 1989).

The ethnographic evidence on the ethnic Chinese in Indonesia suggests patterns similar to Indian villages studied by Rosenzweig and Stark (1989), with families in need relying on an often geographically-dispersed clan. The ethnographic research on other groups always shows family is important, but often emphasizes that Indonesians (especially on Java, where most Indonesians live) have higher reliance on their neighborhood than do people in most parts of the world. Thus, we expect people with many living parents and siblings to suffer lower reductions in their standard of living when health declines.

More prosperous extended family members presumably help more than less prosperous relatives. Thus, we also test if transfers are larger and consumption more stable when illness strikes people with a more prosperous extended family.

Where family members are also in the community, ties of social capital are particularly high (Sullivan, 1994). Thus, we test whether having relatives living nearby has the largest effect on insuring consumption after negative health shocks.

3. Econometric Specification

The main empirical tests of this paper are based on a simple idea. We test whether households with more social capital are insuring consumption against unexpected idiosyncratic shocks more than otherwise similar households with less social capital. We focus on health shocks (which are largely unexpected and transitory) to the head of the household and his spouse.

Specifically, we regress the growth in log per capita consumption for household *i* in community *j* on community fixed effects (α_j), the change in health (Δh_{ij}), the interaction of change in health with a measure of social capital SK, and a vector of demographic controls (X_{ijk}):

$$\Delta \ln(\frac{C_{ij}}{n_{ij}}) = \alpha_j + \beta \Delta h_{ij} + \gamma \Delta h_{ij} \times SK_{ij} + \delta \cdot SK_{ij} + \sum_k \lambda_k X_{ijk} + \varepsilon_{ij} \quad (1)$$

where C_{ij} is non-medical care household consumption and n_{ij} is household size. In the empirical implementation, we use several alternative measures of social capital.

Equation (1) is a straightforward generalization of existing econometric models of consumption insurance in the literature.[5] It regresses first differenced household log per capita consumption against the change in health and the interaction of change in health and social capital. If there is full insurance of illness, then there will be no effect of the change in health on the change in consumption, implying $\beta = 0$. However, previous work indicates that insurance against health shocks is not full in this sample, so that $\beta > 0$. The focus of this paper is on the magnitude of γ. If households with more social capital are better insured against health shocks, we should see that $\gamma < 0$. In theory, it is possible that households with high levels of social capital are fully insured. On the other hand, if social capital does not help households to insure consumption, then we should see that $\gamma = 0$.

One important concern is the potential endogeneity of social capital. The distribution of social capital across households and communities is clearly not random. If the residual is correlated with the interaction of changes in health and social capital, estimates of γ will be biased. It is important to note that the model controls for

[5] See for example Gertler and Gruber 2002.

permanent unobserved heterogeneity across households. In particular, the first differencing sweeps out correlations from time-invariant omitted unobserved household characteristics (such as preferences and genetic health endowments) that confound identifying the effect of illness on consumption.

We also control for community dummies to capture shocks to regional price levels, weather, local epidemic, local business cycle, and other time-varying community level factors that could affect changes in consumption and health. For example, village-level health shocks like a flu epidemic or illnesses due to polluted water are fully absorbed by these community dummies.

Finally, the vector X controls for demographic characteristics to capture other factors that may be important determinants of consumption changes over time: the husband's and wife's age and education, and the change in log family size and family structure.

To measure changes in health, Δh, we use both changes in the health of the household head and in the health of his spouse. It is important to note that most of the health shocks that we analyze are transitory, as documented below. This is particularly relevant for our empirical strategy. To the extent that health shocks are permanent, theories of mutual insurance that depend on future interaction suggest we should see a decline in household consumption when health declines: $\beta>0$. At the same time, our empirical strategy would still work if some of (but not all) the health shocks in our sample are permanent or if social capital operates through altruism and affection. While the presence of some permanent health shocks may result in health declines predicting lower consumption (that is, $\beta > 0$), what we are interested in is the coefficient on the interaction between health shocks and social capital, γ. There is no reason to believe that permanent shocks are more frequent in villages with higher social capital.

An important assumption of the insurance model is that the utility function is separable in consumption and health and in consumption and leisure. As a result, the marginal utility of consumption does not depend on the state of health directly, nor indirectly through induced changes in leisure. If this is not true, then even with full insurance, the growth of consumption will vary with the state of health. That is, in the formulation above, changes in health (h_{ij}) will be correlated with omitted preferences and

thereby with the error term, biasing the estimated coefficient β in equation (1). This is unlikely to be a major problem for our empirical strategy, for two reasons. First, the effect on estimates of the coefficient of interest, γ, depends on whether the error term is correlated with the interaction of social capital and health shocks, after conditioning on health shocks. Although changes in health may be correlated with omitted preferences and thereby with the error term, there is no reason to expect that the interaction of changes in health and social capital would be. Second, we directly test for such "state dependence" in consumption behavior. We show below that we find no evidence that state dependence explains our empirical results.

A related concern is idiosyncratic changes in household income that feed back into health--for example, a bad harvest or job loss that results in a deterioration of health (perhaps through lower nutrition or mental depression). This is unlikely to present a major source of bias for γ because we would need such income shocks to be more strongly correlated with health at households with particularly high or with particularly low social capital. In addition, our empirical results, presented in detail later, suggest that this type of reverse causality is not important.

4. Data

We estimate the model with data from the Indonesia Family Life Surveys (IFLS).[6] The IFLS is a panel survey of over 7,000 households representative of 83% of the population that collected socioeconomic information including a detailed consumption module at the household level and detailed information from individuals including health status measures. The IFLS interviewed households in 1993 and again in 1997. There are 7,224 households in 1993, of which 6,742 can be matched in 1997. Raw self-reported consumption data appear quite noisy. Thus, to minimize measurement error in consumption, we trim the bottom and top 1 % in 1993 and 1997, and the bottom and top 1 % in consumption changes between 1993 and 1997. After trimming we are left with 6,353 observations. Of these, 4,480 observations have data for all the relevant variables. After dropping single-headed households and households with heads over age 60, we are left with 3,281 observations. Results were similar when we included single-parent

[6] See Frankenberg et al. (1993) Frankenberg and Thomas (2000) for detailed descriptions of the surveys.

households in the sample. Descriptive statistics for the measures described below are provided in table 1.

***Social Capital*:** A major strength of the IFLS is that it provides detailed information on several social capital variables. In this paper, we take advantage of the richness of the data and use several alternative measure of social capital, most of which capture aspects of social networks.

First, we use civic participation in community organizations. IFLS provides several measures of participation, both at the household level and at the community level. At the household level, we measure the number of unique groups that household members belong to. We also highlight lending a savings groups, as these play important roles in some studies of social capital.

We complement the household-level measure of civic participation with several community-level measures. We first measure civic participation as the average number of unique group memberships in the other households in the community sample surrounding each household, as well as the average number of lending and savings groups.

Second, a unique feature of IFLS is that it surveyed village heads regarding local culture and traditions, including social norms and mutual assistance. Specifically, village chiefs identified as local experts in traditional customs and law (*adat)* were asked to state whether a particular norm had held in traditional law and whether it remained common practice at the time of the 1997 interview. The adat survey instrument contains one question directly related to social capital, the extent of an "ethic of mutual cooperation" in the community.

A third measure of social capital is the presence of long-term relationships in a community. Long-term relationships in the community are not in and of themselves social capital, but most theories suggest they should lead to social capital (as described below). Thus, we expect consumption to decline less after a negative health shock for those who have lived a long time in the community and for those in communities with many long-term residents.

Fourth, we use measures of ethnic and linguistic isolation and fragmentation.

Theories of ethnolinguistic fragmentation typically predict lower social capital when a household is of a rare group and when a community has many groups. These hypotheses need not hold if the small groups are cohesive yet remain large enough to provide effective insurance. To measure linguistic isolation we calculate the share of the IFLS sample (roughly 30 households per community) that speaks a different language at home than does the household head at this household. To measure ethnolinguistic fragmentation we use a common diversity index equal to the odds that two people selected at random from a community speak different languages at home. To measure ethnic diversity we look at the share of people *not* in the largest ethnic group.

Finally, we look at the role of family support in insuring consumption after health shocks. If social capital within the extended family is important, then households with many and prosperous nonresident living parents, siblings, and adult children will be better able to insure shocks. We first look for the role of potential transfers; that is, the resources of non-resident siblings and parents. We then test the importance of actual transfers.

Health: We measure changes in health using an index of an individual's self-reported ability to physically perform activities of daily living (ADLs). These physical functioning measures are based on individuals' self-ratings of ability to engage in five specific activities (carry a heavy load for 20 meters; sweep the floor or yard; walk for 5 kilometers; take water from a well; and bend, kneel, or stoop), rather than general assessments of illness symptoms. These self-reported ADL measures have been shown to have high reliability (consistency between tests and interviewers) and validity (consistency between individual assessments of different skills) in both the United States and Southeast Asia (Andrews et al., 1986; Guralnik et al., 1989; Strauss et al., 1993; Ware, Davies-Avery, and Brook, 1980). They are routinely used in studies of labor supply in the United States (e.g., Bound, 1991; Bound et al., 1995). Importantly, in many studies respondents with high education and income self-report more illness symptoms than do more disadvantaged respondents. In contrast, ADL measures typically show more disability among those with low income and education in both U.S. and low-income samples (e.g., Strauss et al., 1993; Smith and Kington, 1997).

The specific ADL questions in the IFLS survey were adapted from standard U.S. measures after extensive testing and modification to ensure that questions fit the local cultural context. To minimize measurement error, every adult in the household was interviewed directly and proxy responses were not accepted. The responses to these questions on the survey were coded either as can do it easily (a value of 1), can do it with difficulty (3), and unable to do it (5). The responses to these questions were then combined in accordance with the following algorithm developed for the RAND Medical Outcome Study (Stewert et al., 1990):

$$ADL\ Index_i = \frac{Score_i - Minumum\ Score}{Maximum\ Score - Minumum\ Score}$$

The ADL index takes on a value of 1 if the individual can perform all ADLs without difficulty and zero if the individual cannot perform any ADLs.

The means and standard deviations of the health outcome measures for the husband and wife are presented in Table 1. On average, in our sample, the mean ADL index for the husband is 0.98 in 1993 and 0.97 in 1997 out of a possible 1. The percentage of husbands who have an ADL index equal 1 is 92 % in 1993 and 86 % in 1997. The decline is more pronounced for wives, for whom 83 % have an index equal to one in 1993 and 65 % in 1997. Within a cross section, there is no trend in the ADL index as people age from 20 to 60 for either husbands or wives.

Many respondents report changes in health status between 1993 and 1997. Figure 1 pictures the distribution of the nonzero changes in the ADL indices. Between 1993 and 1997, 12 percent of the heads in the sample report a deterioration of their ADLs, 5 % report an improvement, and 83 % report no change. For wives, 29 % report a deterioration in their ADLs, 11 % report an improvement, and 60 percent report no change.[7]

[7] To interpret average ADL changes, the change in ADL index for an individual who in 1993 has no difficulty in performing all ADLs and fully loses the capacity to perform 1 activity of daily living out of 5 by 1997 would be -0.2. If he or she lost the ability to perform them all, then the change in the index would be –1. If he or she was unable to perform any of the ADLs in 1993 and then was able to perform all in 1997, the change in the index would be +1.

It is important to note that despite their severity, changes in ADLs are usually transitory. Of those reporting any limitation in ADLs in 1993, two thirds of them reported fewer or no limitations by 1997.[8] The high rate of improvement reflects both the relative youth of our sample and an important difference in the interpretation of ADLs in developed and developing country contexts. In wealthier and more developed countries such as the United States, limitations in the ability to feed oneself, bathe, and toilet indicate a severe incapacitation that would make one close to bedridden and may reflect long-term disability. However, in a developing country setting such as Indonesia, performing ADLs requires more physical ability than in developed countries. For example, bathing in much of Indonesia generally requires going to the river and bathing using a sarong (a large tubular-like fabric) to maintain modesty. This requires much more effort and coordination than bathing in one's house. Also, toileting requires the use of Eastern as opposed to Western toilets, which often are located outside the main living quarters. Hence, basic indicators capture less severe limitations in Indonesia than such indicators would in more industrialized nations. As a result, it is not surprising that people recover from basic limitations, suggesting that we are indeed measuring severe temporary changes in health as opposed to permanent deterioration. This is confirmed by the fact that effects are similar when we examine only decreases in the ADL index.

Although the ADL index is a more objective measure of health status than self-reported symptoms (see Gertler and Gruber, 2002), it may still contain a certain amount of subjective judgment. Fortunately, identification of the econometric models in this paper comes from changes in ADL between 1993 and 1997. To the extent that the

---

[8] The recovery rate may be slightly higher because some of those reporting limitations in 1997 may have fully recovered between the surveys, and have become disabled in 1997 due to a new injury or illness.

In any case, even for disabilities known to be permanent, theories of altruism and some theories of mutual insurance involving repeated play among many players will lead to insurance even for disabilities known to be permanent.

subjective component in an individual's assessment of his or her physical capabilities is constant between 1993 and 1997, it is differenced out in our analysis. [9]

***Consumption*:** The dependent variable for our analysis is the change in the log of monthly nonmedical consumption per capita. Consumption is measured using a 57-item questionnaire covering a comprehensive list of food and nonfood consumption items. The questionnaire collected both expenditures and the value of home-produced consumption for each item. The 1993 IFLS log per capita consumption distribution closely matches the same distribution generated from the longer SUSENAS for the same geographic locations. Consumption is in nominal per capita terms. However, we account for location-specific differences in inflation rates by including a separate intercept for the rural and the urban areas of each province.

Control variables: We control for changes in family size or structure by including the change in log family size and a series of measures of the change in the share of the family that is male and female in age groups 0-5, 6-17, 18-49, and 50 plus. As noted above, we also control for other potential factors that can affect preferences and that might be correlated with illness: the head's gender, age, education, and marital status, and the wife's age and education.

5. Results

We first present a baseline model without social capital (Section 5.1). The baseline model establishes that households are not fully insured against consumption risk. We also use it to show that state dependence and reverse causality do not account for these results.

[9] Few individuals in Indonesia are covered by health insurance other than the implicit insurance provided through the almost free public health care system. Moreover, this insurance typically has capped benefits that will be of only minimal use after a major disability arises. A larger segment of the population is covered as government employees, but this insurance only covers the small co-payments required at public facilities. Disability insurance is almost nonexistent. Thus, we do not examine the effects of formal insurance. On average, user fees at public facilities amount to 5% of costs. While the public health care system provides extensive primary care services, its hospital care is more limited. Moreover, many individuals opt to pay out of pocket for higher-quality private sector services; thus, over half of all utilization is provided by the private

We then turn to models with social capital – the main focus of the paper. We present results corresponding to each of the 5 dimensions of social capital described in Section 3: civic participation; ethic of mutual cooperation; long term relationships in the community; ethnic and linguistic diversity; and extended family. We conclude this section with a non-parametric test across all the regressions and with some robustness checks.

5.1 Baseline Results

We begin by estimating a baseline version of equation (1) but without social capital (Table 2a). As mentioned above, we use both shocks to husband's health as well as shocks to wife's health. We weight health shocks by an individual's predicted wage as a share of the husband and wife's combined predicted wages.

To construct a predicted wage we regressed age, education and other observables on earnings using the subsample who reported labor market earnings. We then projected this wage for everyone in the sample, including those who are self-employed and not in the labor force. The weights accounts for the fact that a health shock of a high-earning adult will probably affect household consumption more than a similar shock to an adult with a low expected contribution to the household budget. For example, we assume that when the husband is expected to earn more than the wife, the husband's illness represents a larger loss of income than when the wife experiences the same illness. Results are similar if we do not weight by predicted wages.

The coefficients on the weighted changes in the husband's and in the wife's ADL index are very similar: 0.367 versus 0.382. To see the magnitude of these effects, recall that an illness that reduces the husband's ADL index by eliminating one of the five abilities reduces his ADL index by 0.2. As on average husband's have projected earnings of over half the family income, the weighted ADL change is a bit over half as much, about 0.12. A 0.12 decline in weighted ADLs times the coefficient of 0.367 equals a 4 percent decline in consumption. A similar decline in the wife's ADL index lowers household consumption by a bit less than 4 percent (as wives' weights in household income averages 0.47, a bit less than half).

---

sector.

In table 2b we present variants of the baseline estimates. For convenience, in column 1 we report the estimates from Table 2a. In column 2 we combine husband and wife health shocks in one variable that summarizes the health shocks to the household. When we sum the husband and wife weighted health shocks, we find a coefficient equal 0.376 (that is, on average when one of the two adults in a household loses one of the 5 measured capabilities, the household has 3.76% lower consumption). In the remainder of the paper, we use this combined measure as our preferred measure of health shocks. This combined measure has the advantage of characterizing health shocks to the household in the most parsimonious way.

The fact that illnesses measured by ADL changes are strongly associated with consumption changes suggests that they represent uninsured shocks to a family's opportunity set. An alternative interpretation is that when adults' health declines, their preferences may change in ways that reduce consumption – a possibility known as state dependence. Reverse causality is also a possibility, where a large negative consumption shock (for example, from a very bad harvest) reduces health. In another paper we present detailed results finding no evidence for state dependence or reverse causality for these data (Gertler, Levine and Moretti, 2003)[10]. Here we briefly restate the results.

First, it is unlikely that state dependence could account for the very large family consumption effects that we find, given that we are measuring illness to only one of the adults and that the average family size in our data is almost five. For example, if consumption is distributed equally across family members, a movement in intermediate ADLs from 1 to 0 would have to lower the husband's consumption by roughly 100 percent to explain our result. Given the low correlations of ADL changes within a household, this result is not plausible even if breadwinners initially consume more than their share of the household's expenditures.

If there is state dependence, then the husband's and wife's health should affect consumption regardless of the amount each individual is paid for work. If the results are due to lower incomes, then health should affect consumption in proportion to the individual's contribution to family income. Consistent with the latter interpretation, we

[10] Gertler and Gruber (2002) also find no evidence of state dependence using a different panel data set from Indonesia.

find disability among spouses with high expected earnings (given their age, education, and so forth) affects consumption more than disability among spouses with lower expected earnings. This result is also consistent with reverse causality (where lower income reduces health).

A disability lowers the calorie needs of someone who engages in physical labor more than the needs of other workers. Nevertheless, the effects of disability on consumption are essentially identical for the adults who were and were not initially engaging in physical work (column 3). Again, this result rejects important state-dependent preferences.

If our results are due to inadequate insurance (not state-dependent preferences), families that are better able to self-insure should see a smaller effect of illness on consumption. Thus, a reduction in the labor supply or increase in medical care expenditures should not reduce consumption much for families with high assets and savings in the first period (1993). In fact, in column 4 we show that health shocks do not affect consumption for those with meaningful assets (those in the top quartile in 1993).

If reductions in health reduce demand for consumption, then the effects should be similar regardless of whether a family has savings or not. In contrast, if consumption declines for families unable to self-insure, then those with high savings should have better-insured consumption. In results not reported here, we find that families that live near a financial institution have smaller declines in consumption after a health decline than do families living far from a financial institution. We show, further, that this result holds even for microfinance institutions that are targeted at the poor and, thus, are not located primarily in more prosperous regions.

To summarize, we find that health shocks to both the husband and to the wife matter in proportion to their contribution to family earnings, that the effects of health shocks are the same for physical and nonphysical laborers, and that families with significant assets and with easy access to a savings institution are unaffected by health shocks. Taken together, these findings strongly refute the contentions that state dependence or reverse causality drive our results.

5.2 The Effects of Social Capital

We now turn to estimates of equation 1. The models in this section interact each measure of social capital with changes in health status to see if high levels of that indicator of social capital predict more stable consumption when health declines. We first discuss our several tests of the effects of social capital within a community, and we then look at evidence concerning the role of the extended family.

5.2.1 Civic Participation

We begin by focusing on civic participation, as measured by membership in civic groups. Most measures of social capital can exist at two levels: that of the household and that of the community. For example, a household may belong to many organizations, and it may be in a community with many active organizations. Either of these attributes may contribute to more assistance in times of need; thus, when appropriate, we measure both. Throughout the paper, the reported standard errors account for clustering at the community level any time we use village-level measures of human capital.

At the household level, we measure the number of group memberships people held in the household. These groups range from the irrigation society to the contraceptive users' group and from the rotating savings and loan associations to the youth sports club. If several people in the household belonged to one group, we counted that group only once. The mean household had members that belonged to 2.9 different groups.

Households that are members in many groups in 1997 have lower declines in consumption when health declines between 1993 and 1997 (Table 3, col. 1). Three additional group memberships (an increase of about 2 standard deviations) raise predicted consumption sufficiently to insure the entire shock.[11]

An important caution for these results is that the 1993 survey did not collect

[11] To see this result, consider a household where one spouse lost one of his or her five ADLs completely. As the couple has ten ADLs in total, the household ADL index falls by roughly 0.1. That figure will be slightly above or below 0.1 if the disabled spouse has the higher or lower predicted earnings than the other spouse. The results in Table 2a imply a 0.1 decline in the ADL index led to 3.76% lower consumption on average. Here we see that if there are 3 more unique group memberships and a 0.1 decline in the couples' ADL index, we expect 3 (group membership) * 0.1 (decline in family weighted

group memberships; thus, our measures are from 1997, *after* the health shock. Thus, those households that could maintain their standard of living may also have been able to maintain group memberships. In results not shown we find that memberships and consumption are correlated; thus, part of the apparent "insuring" we find may be due to this alternative causality.

In some tests, Putnam (2000) finds an important discontinuity between those with any organizational memberships and those with none. When we reran our measures of civic participation using this cut-point we continued to find consumption was significantly more stable after a health shock for those with positive group memberships (col. 2).

We complement the household-level measure of civic participation with several community-level measures. We first measure civic participation as the average number of unique group memberships in the other households in the community sample surrounding each household. Living in a community with high group memberships predicted better consumption insurance, but the effect was not statistically significant (col. 3).

We were particularly interested in the role of rotating savings and credit associations (*arisan*), given the role they play in stabilizing consumption in some parts of the world. The presence of an *arisan* in the community (as measured by neighbors' responses or by the response of the community head) and membership by this household were not reliable predictors of consumption stability (columns 4-6).

We were also interested if people received more help from the community if they had more social capital. Because the dataset has no information on 1993 assistance, we use only 1997 data; this limitation increases the odds that omitted factors affect both consumption and a household's civic participation.

Finally, we examine how two measures of civic participation, both at the household level (number of organizations members belong to) and at the community level (average number of group memberships neighbors belong to), predict consumption after health shocks. We did not find that more memberships or denser networks of memberships predict higher likelihood of receiving help from the community after a

---

ADL index) * 0.123 (coefficient on interaction) = .037 = 3.7% higher consumption.

shock.

Overall, these results indicate that our measures of civic participation are not associated with smaller declines in consumption following a health shock.

5.2.2 Norms of Mutual Cooperation

Norms related to mutual assistance, and organizations supporting those norms, are one means by which civic participation may be particularly linked to assistance in times of need. As mentioned above, our data provide a unique opportunity to test for this type of social capital. Our measure of such norms is derived from the traditional customs and law (*adat*) module of the 1997 Indonesia Family Life Survey. In 270 rural enumeration areas, village chiefs identified a local expert in *adat*, and these experts were asked to state whether a particular norm had held in traditional law and whether it remained common practice at the time of the 1997 interview.

The adat survey instrument contains one question directly related to social capital, the extent of an "ethic of mutual cooperation" in the community, which takes on a value of one if there is cooperation and zero otherwise. Almost all villages reported an ethic of cooperation, and 88 percent of the villages in our sample reported having organizations specifically intended for such mutual assistance.

These responses are best thought of as the opinions of influential community members. Although this information on traditional laws is a credible proxy for social norms, it is not without problems. Limitations in the *adat* module include interviewing only one respondent, almost always male, per community and having no clear reference to what time period "traditional" norms were supposed to apply.

The decline in consumption after a negative health shock was similar regardless of whether the village did or did not have a tradition of mutual assistance (Table 4, col. 1). At the same time, the point estimate of the effect is larger in the small number of villages with no systematic activity to assist individuals in difficulty (coefficient of –0.44, SE = .34, n.s., table 4 col. 2). Although the coefficient is large, it is not statistically significant. These effects are estimated imprecisely in part because so few villages lack these institutions.

There are smaller and still not statistically significant effects consistent with

partial insurance in communities with a tradition of specific activities to assist community members (col. 3). If we examine current practices, not traditions, results are inconsistent in sign and none are statistically significant (col. 4-6).

Overall, these results provide no evidence that an ethic of mutual cooperation reduces the declines in consumption following a decline in health.

5.2.3 Long-term Relationships in the Community

Long-term relationships in the community are not in and of themselves social capital, but most theories suggest they should lead to social capital. Neighbors who have grown up together typically have more emotional ties, a denser network of ties, more opportunities to engage in reciprocity, and greater expected future opportunities. Thus, we expect tenure in the village to predict better insured consumption after health shocks.

In 64% of the households, either the husband or wife was born in the community, our first measure of long-term relationships. Our estimates provide no evidence that a locally born spouse reduces the harmful effects of disability on household consumption (Table 5, col. 1).

We also tested the effects of tenure in the community as a continuous variable. Families whose male or female head had lived longer in a community had identical effects of disability on consumption as families that had recently arrived (Table 5, col. 2).

In results not shown, no difference existed when we looked separately at the husband's and wife's native status or community tenure. These results are also robust to dropping households that moved between the two waves of the survey.

To complement these household-level measures of longevity in the community, we estimated the community-level counterparts. Respondents whose neighbors had longer tenure did not have better insured consumption when their health declined (Table 5, col. 3). These results were robust to controlling for individual native status or tenure.

A weakness of the measure of average tenure in the community is that we have data on only a few dozen households. As such, there is both sampling error and error due to the fact that tenure is likely to be clustered, so that the IFLS may capture a subset of a community whose tenure is not representative. To avoid these problems we merged in data from the Supas, a large nationally representative dataset with information on birth

district and current district. We analyze the 1995 Supas; thus, it was collected midway between the two waves of the IFLS. We identify the share of adults (those over 18) who live in a respondent's district but were not born there. When we interact this share with the loss of ADLs, there is no evidence that having more neighbors born in this district helps insure consumption (Table 5, col. 4).

Tenure in the community measures social capital formed from past interactions. Social capital may also be stronger based on expected future interactions – as in theories of repeated games. If so, communities with low rates of out-migration are likely to have stronger social capital, as people expect kind acts today to be reciprocated in the future.

We measured out-migration three ways. We first measured the share of those 15 or over in 1993 who had moved away from the community by 1997. We next measured the share of households who were present in a community in 1993 and who moved away by 1997 (that is, both the head and spouse left their 1993 community). Our third measure is from the Supas and captures the proportion of people who reported being born in this district but no longer lived there in 1995.

For each measure of out-migration, theories of social capital based on forward-looking interactions suggest that high out-migration will predict a larger elasticity of consumption with respect to health changes. In fact, in communities with higher rates of out-migration (by any measure), consumption was no less insured after a negative health shock than in communities with low rates of out-migration (Table 5, col. 5-7).

5.2.4 Ethnolinguistic Fragmentation

Theories of ethnolinguistic fragmentation typically predict lower social capital when a household is of a rare group and when a community has many groups. At the same time, these hypotheses need not hold if the small groups are cohesive yet remain large enough to provide effective insurance.

We use two measures of fragmentation. First, we measure linguistic isolation using the share of the IFLS sample (roughly 30 households per community) that speaks a different language at home than does the household head at this household. Second, we measure ethnolinguistic fragmentation using a common diversity index equal to the odds that two people selected at random from a community speak different languages at home.

Specifically, the index of linguistic fragmentation is one minus the sum of the squared language shares:

Index of ethnolinguistic fragmentation = $1 - \Sigma_i S_i^2$,

where S_i is the share of each language group i. This diversity index is zero in a community where every sampled household spoke the same language and approaches unity in a highly diverse community.

In interpreting our estimates, one should keep in mind that our measure of fragmentation is noisy because it is based on only a few dozen households per community. At the same time, these households are from a single neighborhood. Thus, our index may be a reasonable proxy for ethnolinguistic fragmentation of the neighborhood, which may be the most important scale for mutual assistance.

A second issue is that measuring language is subtle in Indonesia. Indonesian is the *lingua franca* of the archipelago, but is not a language many adults grew up speaking. Thus, the IFLS questionnaire asks: "What language is most often used in this household, other than Indonesian?" The possible responses include a number of regional languages as well as "only Indonesian used."

The effects of ethnolinguistic fragmentation and isolation both predict slightly more stable consumption after a shock, but neither effect is statistically significant (table 6). Perhaps because 80 percent or more of each community usually speak the community's dominant language, there is not much precision for these estimates.

Overall, these results indicate that our measures of ethnolinguistic fragmentation are not associated with smaller declines in consumption following a health shock.

5.2.5 Social Capital within the Extended Family

Overall, the results in Sections 5.2.1 to 5.2.4 indicate that social capital defined in terms of civic participation, social norms of mutual cooperation, length of tenure in a community, and ethnolinguistic fragmentation does not appear to be an important factor in helping households cope with negative health shocks. We interpret these finding as saying that many community characteristics that theoretical models would suggest increase informal insurance are in fact not empirically important.

A concern is that our models might not have sufficient power to detect important

insurance from the community. However, the fact that we do find that consumption does not respond much to health shocks among families with high assets and those who live near banks (Section 5.1) is reassuring on this front.

We now turn to tests of informal insurance within the extended family. Even if mutual cooperation within communities is not particularly important, it is still possible that mutual cooperation arises within extended families. However, interpretation of these results requires caution, as much assistance within families is presumably due to altruism, not just norms and expectations of future reciprocity.

Whether mutual assistance is driven by altruism or the expectation of reciprocation, if social capital within the extended family is important, then households with many and prosperous nonresident living parents, siblings, and adult children will be better able to insure shocks. We first look for the role of potential transfers; that is, the resources of non-resident siblings and parents. We then test the importance of actual transfers.

Our first measure of family resources is merely the number of parents and siblings who are alive but do not live in the same household. On average, having a larger extended family does not predict the most stable consumption after a negative health shock (Table 7, col. 1). When we look separately at the role of parents and of siblings, neither group is particularly useful (col. 2 and 3).

Remote family members can be useful in insuring locality-wide shocks such as weather. Nevertheless family members living next door presumably adjust their assistance more closely to health shocks than do distant ones; they can better observe need and they often have closer emotional ties. Thus, we also entered the family resources measure only for those living in the same community. The loss of an ADL reduces log consumption per capita by similar amounts regardless of the number of living extended family members in the community (Table 7, col. 4).

Although a simple count of the number of family members is useful, it is important to know if the family members are able to afford assistance. To compute family resources, we construct an index of the ability to pay of the extended family. To create this index we predict log(consumption) based on age, education, and (for siblings only) whether they worked in a manual occupation. We then sum the predicted

consumption across the non-resident siblings and then across non-resident parents. This functional form implicitly assumes that two siblings with low expected consumption are as useful in insuring consumption as a single sibling with twice their expected consumption. With larger datasets, more flexible functional forms that incorporate extended family members' declining marginal utility of income and their income relative to each other and to the focal household would be appropriate.

On average, having an extended family with higher ability to pay does not predict more stable consumption after a negative health shock (Table 7, col. 5). Again, results are similar if we look separately at the role of parents and of siblings (col. 6 and 7) or if we focus on relatives in the same community (col. 8).

Consumption can be a noisy indicator of assistance received. Thus, we also look at a more direct measure: actual receipt of assistance. Our measure is self-reported receipt of assistance in 1997; thus, we cannot control for 1993 assistance to test if health declines predict higher transfers.

Estimates of probit models reported in column 1 and 2 of Table 8 indicate that households did not report significantly higher odds of receiving help from parents or from siblings if their health declined**.** In fact, the coefficients were positive (that is, help was more likely if health rose), but not statistically significant. In addition, the real value of transfers from parents and siblings did not rise when health declined (col. 3 and 4).

5.2.6 A nonparametric test across the regressions

Overall, the quality of IFLS data is particularly good, especially compared with many existing datasets from developing countries.[12] However, a potential limitation of our estimates concerns measurement error in our indicators for social capital. For example, some indicators such as memberships and tenure are from a sample of neighbors –a potentially noisy measure of both the neighborhood and the community characteristics. Other measures such as the number of organizations are reports from the village head, and it is possible he misreports due to ignorance or to make the village appear more progressive and in line with government policies. Moreover, not all organizations are equally active and we do not measure intensity of relationships.

[12] For example, the attrition rate in the IFLS is only 5%.

It is likely that measurement error biases the coefficients of interest toward zero. If so, a simple signs test across the many measures can have power even when tests on single measures have little. Specifically, we can count the number of coefficients on the interactions of ADL changes and social capital measures that are of the sign predicted by theory. A simple sign test may be misleading because these measures are not independent. At the same time, a negative result is particularly convincing because the measures were constructed by one of us who was looking for the strongest possible measures of social capital.

When we do this count in Table 9, 41 of the 71 coefficients indicate that ADL changes affect consumption less in settings with stronger social capital. This result is very close to (and not statistically significantly different from) 50% of the predicted sign. Of the statistically significant coefficients, 8 are of the sign predicted by theory, and 4 are not. These results do not provide any consistent evidence that our constellation of measures of social capital capture important resources for those suffering from disabilities.

5.2.7 Robustness checks

This section describes several additional checks on our results. An important component of consumption is food consumption. We measure food consumption based on food purchases. This may be a problem if much assistance from neighbors is delivered in kind. For example, ethnographies suggest it may be important that neighbors provide meals to children whose parents are sick. Our data would show declining consumption expenditures, even if total food consumption were fairly stable. As the neighbor relationship is from within the community and therefore is not formal insurance, assistance in kind may be more in keeping with social norms than assistance with cash (Webley, 1993).

To assess whether this data limitation affects our results, we have examined children's nutritional status. If neighbors do provide meals to children whose parents are sick, and if parental health shocks are not infectious, then children's nutritional status should be unaffected. Specifically, we have looked at changes in child weight, changes in child height, child weight for height, child weight for age, and child mortality.

Typical results from these tests are in Table 10, which examines how change in child height for age for children 0 to 5 in 1993 is affected by whether a parental health shock occurs in a household or a community with high civic participation. If social capital protected children, then we expect the measures of adult health shock times the measure of civic participation to be negative. In fact, none of the interactions of adult health shocks with the household's number of unique group memberships (col. 1), number of unique *arisan* (rotating savings and credit associations) group memberships (col. 2), the community's intensity of group memberships (col. 3), the community's intensity of *arisan* memberships (col. 4), and whether the community has an *arisan* are of the predicted sign and significance (col. 5).

In results not shown, results are no more supportive when we examine the other dimensions of social capital: tenure of the household and neighbors in the community, linguistic isolation, and so forth. Similarly, results are no more supportive when we look at the other child health outcomes: weight for height, child mortality, and so forth.

Parental health loss due to infectious disease can also reduce children's health. To account for this possibility, we performed similar tests on a sample of adults not reporting symptoms of infectious diseases, and found similar results (results not shown).

A final concern is that, as we noted in the section on tests of state-dependent preferences, households with high assets appear able to self-insure declines in ADLs. If such people were also low on social capital, including them in the regressions would bias our tests against finding a role for social capital. In fact, in Indonesia, financial wealth predicts high, not low, social capital. Nevertheless, we reran the regressions only on the bottom 75 percent of the sample, and results were quite similar to those reported in the text (results not shown).

6. Conclusion

There are many forms of social solidarity and many antecedents to these forms. Using a particularly rich data source, we have created several measures for some of the important sources and dimensions of social capital in a community and a family.

To our surprise, households that were long-time residents in a community with many long-time neighbors, that belonged to many civic organizations in communities

with many civic organizations and with norms of mutual assistance, that were members of the ethnolinguistic majority group in a community with a large linguistic majority, and that had a large and prosperous extended family did not fare better after an adverse health shock than households lacking these sources of social support.

It is always possible that unmeasured forms of social capital are more important than the measures we used. Nevertheless, we have used more measures than most analyses, and fear the errors of data mining at least as much as the errors of missing measures. In fact, a correction for multiple comparisons would further bolster the claim of no statistically meaningful interactions between health shocks and social capital.

It is also possible that neighbors and friends respond largely by providing direct services that are not measured in the several questions on transfers. However, we have multiple measures of assistance, ranging from consumption expenditures to qualitative measures of helping behaviors. More importantly, when we use direct measures of the nutritional and health status of children, we find results in line with our main specifications.

An important concern is that our method might not have sufficient power to detect important insurance from the community. The fact that we can find that consumption does not respond much to health shocks among families with high assets and those who live near banks is reassuring on this front.

The results in this paper refer only to one type of shock in one nation. Studies of high-frequency shocks such as a fisherman's daily catch suggest that mutual insurance is much more helpful in those cases (Platteau and Abraham, 1987). Conversely, others have found that insurance is not nearly as successful at larger and low-frequency events (Platteau 1997). That social capital does not provide measurable assistance in Indonesia, a nation famous for its traditions of mutual assistance, casts doubt on the proposition that in much of the less industrialized world informal networks are up to the job of helping all families in need.

It remains to be seen in what times and places and for what forms of shocks social networks better help families in need. Given the general ineffectiveness of community-provided social safety nets in Indonesia, it remains to be seen if the public sector can create safety nets to complement those formed by a community without crowding out

what informal assistance already exists.

References

Alesina, Alberto and Eliana La Ferrara, "Participation in Heterogeneous Communities" NBER Working Paper No. W7155 June 1999.

Alesina, Alberto, and Eliana La Ferrara, "The Determinants of Trust" NBER Working Paper No. 7621 March 2000.

Alesina, Alberto; Baqir, Reza; Easterly, William "Public Goods and Ethnic Divisions," Quarterly Journal of Economics; 114(4), November 1999, pages 1243-84.

Andrews, G., A. Esterman, A. Braunack-Mayer, and C. Rungie (1986). Aging in the Western Pacific . Manila: World Health Organization.

Attanasio, Orazio; Davis, Steven J. "Relative wage movements and the distribution of consumption," Journal of Political Economy," Dec 1996, 104(6)1227-1262.

Becker, Gary Stanley, The economics of discrimination, Chicago: University of Chicago Press, 1957.

Becker, Gary X. and Nigel Tomes, "Child endowments and the quantity and quality of children," Journal of Political Economy, 1976, 84, 4, pt. 2, S143-162.

Bentolila, Samuel, and Andrea Ichino, "Unemployment and Consumption: Are Job Losses less Painful near the Mediterranean?" CESifo Working Paper No. 372 : November 2000

Bernstein Lisa. "Opting out of the Legal System - Extralegal Contractual Relations in the Diamond Industry." Journal of Legal Studies, Jan, 1992, V21(n1):115-157.

Bound J., (1991). "Self-Reported versus Objective Measures of Health in Retirement Models," Journal of Human Resources, 26, 106-38.

Bound J., M. Schoenbaum, and T. Waidman (1995). "Race and Education Differences in Disability Status and Labor Force Participation," Journal of Human Resources 30, S227-S267.

Brenner, Suzanne April. (1998). *The domestication of desire: women, wealth, and modernity in Jav*a. Princeton, N.J.: Princeton University Press.

Byrne, D. (1971). The attraction paradigm. New York: Academic Press.

Byrne, D., G. Clore, & P. Worchel (1966). The effect of economic similarity-dissimilarity on interpersonal attraction. Journal of Personality and Social Psychology, 4, 221-224.

Canova, Fabio; Ravn, Morten O. International consumption risk sharing. International Economic Review, Aug 1996, 37(3)573-601.

Cochrane, John H. "A Simple Test of Consumption Insurance." Journal of Political Economy, Oct 1991, 99(5):957-976.

Coleman, James. (1990). *Foundations of Social Theory*. Cambridge: Harvard University Press.

Cox, Donald. "Intergenerational Transfers and Liquidity Constraints," Quarterly Journal of Economics, Feb 1990, 105(1):187-217.

Cox, Donald; Jappelli, Tullio. Credit Rationing and Private Transfers: Evidence from Survey Data Review of Economics & Statistics, Aug 1990, 72(3):445-454.

Deaton, Angus (1992b). Understanding Consumption. Oxford: Claredon Press.

Deaton, Angus, 1991, "Savings and liquidity constraints," Econometrica 59, 1221-48.

DiPasquale, Denise, and Edward L. Glaeser. (1999). "Incentives and Social Capital: Are Homeowners Better Citizens?" *Journal of Urban Economic*s, 45(2), 354-384.

Dreze, Jean and Amartya Sen, Hunger and public action, Clarendon Press Oxford 1989.

Easterly, W., Levine, R. (1997), "Africa's Growth Tragedy: Politics and Ethnic Divisions", *Quarterly Journal of Economics* 112:1230-50.

Eldgridge, Philip J. (1995). *Non-Governmental Organizations and Democratic Participation in Indonesia*. Oxford University Press.

Frankenberg, E., L. Karoly, P. Gertler, C. Peterson, and Wesley D. The 1993 Indonesian Family Life Survey: Overview and Field Report. Santa Monica, CA: RAND, 1995, DRU-1195.

Fudenberg, Drew and Eric Maskin (1986). "The Folk Theorem in Repeated Games with Discounting or with Incomplete Information", *Econometrica*, 54, 533-556.

Geertz, Hildred, The Javanese Family, Free Press, Glencoe IL 1961.

Gertler, Paul, and Jonathan Gruber (2002). "Insuring Consumption Against Illness," *The American Economic Review*, Vol. 92, No. 1 (March), pp. 51-70.

Gertler, Paul, David I. Levine and Enrico Moretti, "Do Microfinance Programs Help Families Insure Consumption Against Illness?" University of California, Berkeley Center for International and Development Economics Research (CIDER) working paper C03-129, 2003.

Greif, Avner, Paul Milgrom, Barry R. Weingast, "Coordination, Commitment, and Enforcement: The Case of the Merchant Guild," The Journal of Political Economy, Vol. 102, No. 4. (Aug., 1994), pp. 745-776.

Greif, Avner. "Contract enforceability and economic institutions in early trade: The Maghribi traders' coalition," American Economic Review, Jun 1993, 83(3): 525-548.

Grimard, Franque. Household consumption smoothing through ethnic ties: Evidence from Cote d'Ivoire, Journal of Development Economics, Aug 1997, 53(2)391-422.

Grootaert, Christiaan, "Social Capital, Household Welfare, and Poverty in Indonesia," Grootaert, Christiaan, World Bank Working Paper 2148, 1999. [http://www.worldbank.org/html/dec/Publications/Workpapers/wps2000series/wps2148/wps2148.pdf]

Guralnik, J., L. Branch, S. Cummings and J. Curb (1989). "Physical Performance Measures in Aging Research," Journal of Gerontology, 44, 141-46.

Hayashi, Fumio, Joseph Altonji and Laurence Kotlikoff (1996). "Risk Sharing Between and Within Families," Econometrica, 64, 261-294.

Hechter, Michael. (1987). *Principles of Group Solidarity*. University of California Press: Berkeley, CA

Jalan, Jyotsna; Ravallion, Martin. Are the poor less well insured? Evidence on vulnerability to income risk in rural China Journal of Development Economics, Feb 1999, 58(1)61-81.

Sullivan, John, Local Government and Community in Java, Oxford University Press, Singapore, 1992.

Kan, Kamhon. Empirical evidence on consumption smoothing and intergenerational transfers Southern Economic Journal, Jul 1996, 63(1):76-94.

Knack, S. and Keefer, P. (1997). "Does social capital have an economic payoff? A cross-country investigation." *Quarterly Journal of Economic*s, 112(4), 1251-1288.

Kochar, Anjini (1995). "Explaining Household Vulnerability to Idiosyncratic Income Shocks," American Economic Review, 85, 159-164.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R. (1997). "Trust in large organizations." *American Economic Revie*w, 87(2), 333-338.

Ligon, Ethan, "Risk-sharing and Information in Village Economies,"" 1998. Review of Economic Studies 65(4): 847-864.

Ligon, Ethan, J. P. Thomas and T. Worrall. (2002). "Informal Insurance Arrangements with Limited Commitment: Theory and Evidence from Village Economies", *Review of Economic Studie*s, 69 (1), pp. 209-44.

Lillard, Lee A; Willis, Robert J. Motives for intergenerational transfers: Evidence from Malaysia Demography, Feb 1997, 34(1):115-134.

Lont, Hotze. (2000). "Finding the right balance: Financial self-help organizations as sources of security and insecurity in urban Indonesia", *International Review of Social History*, 45, 159-177.

Loury Glenn C. "Why Should We Care About Group Inequality?" 1989 268-290. Shulman, Steven; Darity, William, Jr., eds.. The question of discrimination: Racial inequality in the U.S. labor market. Essays by Robert Higgs et al. Middletown, Conn.: Wesleyan University Press

Mace, Barbara J.. Full Insurance in the Presence of Aggregate Uncertainty Journal of Political Economy, Oct 1991, 99(5):928-956.

Massey, D.S. and N. A. Denton (1993). *American apartheid: Segregation and the making of the underclass.* Harvard University Press, Cambridge, Mass.

McCarthy, Jonathan. Imperfect insurance and differing propensities to consume across households Journal of Monetary Economics, Nov 1995, 36(2)301-327.

Morduch, Jonathan (1995). "Income Insuring and Consumption Insuring," Journal of Economic Perspectives, 9 (Summer), 103-114.

Morduch, Jonathan (1999). "Between the market and State: Can Informal Insurance Patch the Safety Net?" The World Bank Research Observer (August), 14 (2), pp. 187-208.

Nelson, Julie A. Comment - On testing for full insurance using consumer expenditure survey data Journal of Political Economy, Apr 1994, 102(2)384-394.

Pfeffer, J. 1983. Organizational Demography. In B. Staw & L. Cummings (Eds.), Research in Organizational Behavior, Vol. 5. Conn.: JAI Press.

Platteau, Jean-Philippe and Anita Abraham, "An inquiry into quasi-credit contracts: the role of reciprocal credit and interlinked deals in small-scale fishing communities," *The Journal of Development Studies*, July 1987; 23(4): 461-90

Platteau, Jean-Philippe, "Mutual insurance as an elusive concept in traditional rural communities," *Journal of Development Studies,* v. 33., n. 6, Aug. 1997, pp. 764-796.

Putnam, Robert D. Bowling alone: The collapse and revival of American community. New York: Simon & Schuster, 2000

Putnam, Robert D. with Robert Leonardi and Raffaella Y. Nanetti. Making democracy work: civic traditions in modern Italy, Princeton, N.J. : Princeton University Press, 1993.

Putnam, Robert D. 1995. Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 65-78. Available at http://muse.jhu.edu./demo/journal_of_democracy/v0006/putnam.html

Putnam, Robert D., "The Strange Disappearance of Civic America," The American Prospect no. 24, Winter 1996 [http://www.prospect.org/archives/24/24putn.html].

Ravallion, Martin; Chaudhuri, Shubham. Risk and insurance in village India: Comment Ravallion, Martin; Chaudhuri, Shubham. Risk and insurance in village India: Comment Econometrica, Jan 1997, 65(1):171-184.

Rosenzweig, Mark R. "Women, insurance capital, and economic development in rural India" Journal of Human Resources, Fall 1993, 28(4): 735-758.

Rosenzweig, Mark R.; Stark, Oded. "Consumption Smoothing, Migration, and Marriage: Evidence from Rural India." *Journal of Political Economy*, Aug 1989, 97(4): 905-926.

Schiff, Maurice. (1998). "Trade, Migration, and Welfare: The Impact of Social Capital", *World Bank Working Paper Series #2044.*

Schultz, T.P. and A. Tansel (1997). "Wage and labor supply effects of illness in Cote d'Ivoire and Ghana: Instrumental variable estimates for days disabled," Journal of Development Economics, Elsevier, vol. 53(2), pages 251-286.

Sindelar, J. and D. Thomas (1991). "Measurement of child health: Maternal response bias," Economic Growth Center Discussion Paper #663, Yale University.

Smith, James P, and Raynard Kington, Demographic and economic correlates of health in old age *Demography*, Feb 1997, 34(1): 159-170.

Stewert, A., J. Ware, R. Brook, and A. Davies-Avery et al. (1990). Measurement of Adult Health Status: Physical Health in Terms Functional Status. Cambridge: Harvard University Press.

Strauss, J., P. Gertler, O. Rahman, and K. Fox (1993). "Gender and Life-Cycle Differentials in the Patterns and Determinants of Adult Health," *Journal of Human Resources*, 28, 791-837.

Sullivan, Norma, Masters and Managers: A study of Gender Relations in Urban Java, Allen and Unwin, St. Leonards, Australia, 1994.

Tajfel, H., & J. C. Turner (1986). The social identity theory of intergroup behavior. In S. Worschel & W. G. Austin (Eds.), Psychology of intergroup relations (2nd ed., pp. 7-24). Chicago: Nelson-Hall.

Temple, Jonathan, "Growth effects of education and social capital in the OECD countries," Working paper, Department of Economics, University of Bristol, 2001 (not author of paper). [http://www.bris.ac.uk/Depts/Economics/research/pdffiles/dp01520.pdf]

Townsend, Robert M. Financial systems in Northern Thai villages Quarterly Journal of Economics, Nov 1995b, 110(4):1011-1046.

Townsend, Robert M. Risk and insurance in village India. *Econometrica* 62, 3 (May 1994) 539-591.

Townsend, Robert M. Consumption insurance: An evaluation of risk-bearing systems in low-income economies. Journal of Economic Perspectives. V. 9, n. 3, Summer 1995a, pp. 83-102.

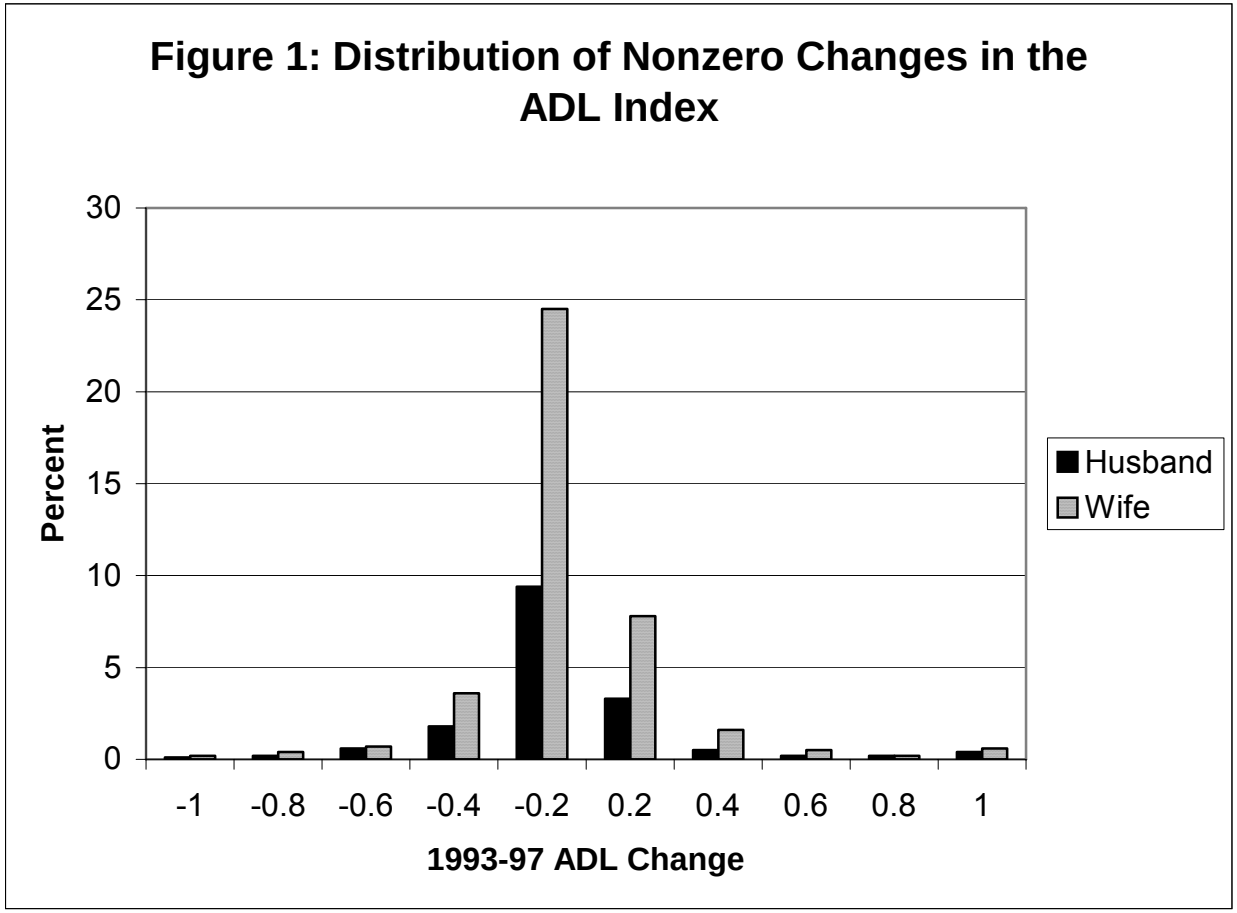
Ware, J., A. Davies-Avery, and R. Brook (1980). Conceptualization and Measurement of Health Status for Adults in the Health Insurance Study: Vol. IV, Analysis of relationships Among Health Status Measures. R-1987/6-HEW. Santa Monica, CA. RAND.

Webley Paul Stephen S.E.G. Lea, "The Partial Unacceptability of Money in Repayment for Neighborly Help," 1993 65-76 *Human Relations*, Vol. 46, No. 1

Michael Woolcock & Deepa Narayan "Social Capital: Implications for Development Theory, Research, and Policy" *The World Bank Research Observer, vol. 15, no. 2 (August 2000)*, pp. 225–49.

World Bank, Social Capital Home Page. 2000 [http://www.worldbank.org/poverty/scapital/index.htm].

Yaron, Jacob; Benjamin, McDonald; Charitonenko, Stephanie. Promoting efficient rural financial intermediation World Bank Research Observer, Aug 1998, 13(2):147-170.



Note: The graph does not show the 80% of husbands and 60% of wives with a stable ADL index.

Table 1a: Summary Statistics Head of Household and Spouse Characteristics (N=3281)

	Head		Spouse	
Variable	**Mean**	**SD**	**Mean**	**SD**
ADL Index (Intermediate) – 1997	0.971	0.096	0.936	0.117
ADL Index (Intermediate) – 1993	0.982	0.097	0.962	0.122
Proportion reporting any ADL limitation – 1997	0.134		0.342	
Proportion reporting any ADL limitation – 1993	0.067		0.161	
Proportion reporting increase in ADL index (97 – 93)	0.045		0.106	
Proportion reporting decrease in ADL index (97 – 93)	0.119		0.291	
Age - 1993	40.376	9.831	35.273	9.375
Educational attainment – no schooling (=1)	0.108	0.310	0.191	0.393
Educational attainment – primary school (=1)	0.553	0.497	0.558	0.497
Educational attainment – jr. high school (=1)	0.130	0.336	0.123	0.328
Educational attainment – high school (=1)	0.163	0.369	0.111	0.314
Educational attainment – college (=1)	0.047	0.212	0.018	0.133

Table 1b: Summary Statistics for Household Characteristics (N=3281)

	1993		1997	
Variable	**Mean**	**SD**	**Mean**	**SD**
Monthly Consumption per person (Rupiah)	52,267	43,421	96,213	81,770
Food Transfers (per capita) to outside parties (Rupiah)	6,667	2,106	1,512	4,232
Number of household members	5.015	1.911	4.952	1.776
Share of males age 0-5	0.076	0.120	0.052	0.096
Share of males age 6-17	0.140	0.156	0.141	0.148
Share of males age 18-49	0.228	0.129	0.236	0.133
Share of males age 50+	0.058	0.114	0.067	0.109
Share of females age 0-5	0.072	0.118	0.051	0.095
Share of females age 6-17	0.136	0.153	0.139	0.145
Share of females age 18-49	0.242	0.118	0.250	0.125
Share of females age 50+	0.048	0.106	0.054	0.105
Rural Household (=1)	0.562	0.496	0.572	0.495

Table 1c: Summary Statistics for Social Capital Measures (N=3281)

Data from 1993 unless otherwise marked.	Mean	Std Dev
Civic Participation		
Number of unique group memberships in household 1997	2.872	1.753
No group memberships (cooperative, neighborhood, etc) in household 1997	0.087	.238
No *arisan* group memberships in household 1997	0.403	0.491
Number of unique group memberships in other households in community 1997	2.277	0.906
Average # of *arisan* group memberships for other households in community 1997	0.87	0.650
Community has *arisan* saving and borrowing group in 1997 (community level)	.739	
Ethic of Mutual Cooperation – tradition (community level)		
Ethic of mutual cooperation in community - tradition 1997	0.989	
Community groups with principle of mutual cooperation - tradition 1997	0.871	
Specific activity to assist community member - tradition 1997	0.957	
Ethic of Mutual Cooperation – practice (community level)		
Ethic of mutual cooperation in village - practice 1997	0.966	
Community groups with principle of mutual cooperation - practice 1997	0.876	
Specific activity to assist community member - practice 1997	0.973	
Long Term Relationships in the Community		
Either Head or Spouse born in community 1993	0.638	
Tenure of head of household in community 1993	25.182	16.807
Average tenure of neighbors in community 1993	24.323	14.385
Share of neighboring adults who migrate outside of district 1993 to 1997 (community level)	0.057	0.124
Share of households that migrated outside of district 1993-to 997 (community level)	0.025	0.043
Out-migration: Share of pop age 18+ born in community & emigrated (SUPAS - 1995)	0.284	0.152
In-migration: Share of pop age age 18+ born elsewhere & immigrated (SUPAS - 1995)	0.263	0.199
Ethnic and Linguistic Diversity		
Linguistic Isolation (1- proportion of community sharing household's language (1997))	0.183	0.248
Linguistic Fragmentation (1-Herfindahl index of languages (1997))	0.182	0.290
Ethnic diversity (1 - proportion of community from largest ethnic group (1997))	0.182	0.209
Extended Family: Ability to Pay (estimated based on the sum of adult family members' predicted log Consumption based on their gender, education, age, and, for siblings only, occupation.)		
Ability to pay of extended family	9.34	5.61
Ability to pay of extended family living in this community	2.47	2.60
Ability to pay of siblings	7.29	4.67
Ability to pay of parents	2.05	1.71
Extended Family: Number of Extended Family Members		
Number of adult extended family members	9.13	4.03
Number of adult extended family members in community	2.48	2.49
Number of siblings	7.44	3.50
Number of parents	1.69	1.26
Number of extended family members with college education	0.23	0.79
Number of extended family members in community with college education	0.027	0.226
Number of siblings with college education	0.220	0.775
Number of parents with college education	0.006	0.082
Transfers from Extended Family & to Outside Parties		
Received positive transfers from siblings in 1997	0.52	
Received positive transfers from parents in 1997	0.451	
Δ in transfers from siblings 1997-1993 (Δ real transfers / 1993 consumption)	0.014	0.059
Δ in transfers from parents 1997-1993 (Δ real transfers / 1993 consumption)	0.020	0.061
Δ transfers (food) to outside parties 1997-1993 = (Δ real transfers / 1993 consumption)	0.005	0.041
Help From Extended Family and Community		
Received help (money, goods or services) from parents in past 12 months (1997)	0.450	
Received help (money, goods or services) from siblings in past 12 months (1997)	0.514	
Received help (money, goods or services) from community in past 12 months (1997)	0.321	
Deceased Individuals in household		
Number of deceased household members 1993 to 1997	0.061	0.253
One or more deceased household members 1993 to 1997	0.058	

Note: We use 1993 data for household and community characteristics whenever possible. Some data on social groups is only available in 1997. Measures with no reported standard errors are indicator (0/1) variables.

Table 2a: Baseline Regression Predicting Change in Log Per Capita Consumption

	Coefficient	Standard Error
(Δ in Husband's Wage ADL Index)* his predicted earnings/(predicted husband+wife earnings)	0.367*	(0.164)
(Δ in Wife's Wage ADL Index) * her predicted earnings/(predicted husband+wife earnings)	0.382*	(0.137)
Head is Female	0.723	(0.589)
Head's Age	-0.016	(0.012)
Head not completed Primary School	0.025	(0.037)
Head completed Primary School	0.043	(0.048)
Head completed Junior High	0.013	(0.049)
Head completed Senior High	0.031	(0.069)
Spouse's Age	-0.007	(0.011)
Spouse not completed Primary School	-0.056	(0.031)
Spouse completed Primary School	-0.049	(0.045)
Spouse completed Junior High	-0.020	(0.051)
Spouse completed Senior High	-0.084	(0.089)
Head's Age Squared	0.0001	(0.0001)
Spouse's Age Squared	0.0001	(0.0001)
Δ in # of Household Members	-0.660	(0.071)
Δ Share of males age 0-5	0.203	(0.290)
Δ Share of males age 6-17	0.403	(0.284)
Δ Share of males age 18-49	0.518	(0.287)
Δ Share of males age 50+	0.122	(0.314)
Δ Share of females age 0-5	0.0351	(0.292)
Δ Share of females age 6-17	0.384	(0.285)
Δ Share of females age 18-49	0.356	(0.281)
Δ Share of females age 50+	0.161	(0.567)
R^2	0.095	

Notes: Standard errors in parentheses. The dependent variable is the change in log per capita consumption. The model is estimated with community fixed effects. Omitted demographic group is Δ Share of females age 0-5. Omitted education category is Some college or above. The sample size is 3281. * = statistically significant at the .05 level.

Table 2b: Variants of Baseline Regressions and Tests of State Dependence
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2	Model 3	Model 4
(Δ in Husband's Wage ADL Index)* his predicted earnings/(predicted husband+wife earnings)	0.367 (0.164)		0.282 (0.281)	
(Δ in Wife's Wage ADL Index) * her predicted earnings/(predicted husband+wife earnings)	0.382 (0.137)		0.339 (0.152)	
Δ in Sum of Head & Spouse's ADL Indexes, weighted by each's predicted earnings as a share of (husband + wife earnings)		0.376 (0.100)		0.474 (0.115)
Δ in Head's Weighted ADL × Head Had a Physical Labor Job in 1993			-0.009 (0.307)	
Δ in Spouse's Weighted ADL × Spouse Had a Physical Labor Job in 1993			-0.071 (0.189)	
Δ in Sum of Weighted ADL × Highest 1993 Asset Quartile (=1)				-0.404 (0.228)
R^2	0.06	0.06	0.07	0.09

Notes: Each column reports the results from a separate regression whose dependent variable is the Δ in Log Monthly Per Capita Consumption. In addition to the variables reported in the table, the regressions also include all of the variables used in the models reported in Table 2a as well as community dummies. Model 3 uses observations only for which the husband or wife was working for pay in 1993. Models 4 has the main effect on asset quartile. The sample size for all models is 3281.

Table 3: Measures of Social Capital: Civic Participation
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Δ in sum of weighted ADL index × Number of unique group memberships in household	0.123 (0.058)					
Number of unique group memberships in household (1997)	0.0198 (0.0067)					
Δ in sum of weighted ADL index × no group memberships in household (cooperatives, neighborhood, etc)		-0.616 (0.302)				
No group memberships in household 1997 (cooperatives, neighborhood, etc)		-0.071 (0.040)				
Δ in sum of weighted ADL index × no memberships in household				-0.106 (0.196)		
No memberships in household 1997				-0.128 (0.024)		
Δ in sum of weighted ADL index × Number of unique *arisan* group memberships in household			0.071 (0.016)			
Number of unique group memberships in other households in community (1997)			0.094 (0.109)			
Δ in sum of weighted ADL index × average *arisan* group memberships for other households in community (1997)						0.058 (0.158)
Average number of *arisan* group memberships for other households in community 1997						0.071 (0.024)
Δ in sum of weighted ADL index × community has saving and borrowing group in 1997					-0.006 (0.224)	
Community had a saving and borrowing group in 1997					-0.028 (0.027)	

Notes: As in table 2. Sample size = 3281.

Table 4: Ethic of Mutual Cooperation
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Δ in sum of weighted ADL index × Ethic of mutual cooperation in community – tradition	1.546 (1.302)					
Ethic of mutual cooperation in community - tradition	0.047 (0.114)					
Δ in sum of weighted ADL index × Community groups with principle of mutual cooperation – tradition		-0.437 (0.343)				
Community groups with principle of mutual cooperation – tradition		-0.067 (0.043)				
Δ in sum of weighted ADL index × Specific activity to assist community members – tradition			-0.196 (0.380)			
Specific activity to assist community member – tradition			-0.099 (0.069)			
Δ in sum of weighted ADL index × Ethic of mutual cooperation in community – practice				1.066 (1.018)		
Ethic of mutual cooperation in village – current practice 1997				-0.061 (0.077)		
Δ in sum of weighted ADL index × Community groups with principle of mutual cooperation – current practice 1997					-0.476 (0.336)	
Community groups with principle of mutual cooperation - current practice 1997					-0.047 (0.044)	
Δ in sum of weighted ADL index × Specific activity to assist community members – current practice 1997						0.208 (0.453)
Specific activity to assist community member - current practice 1997						-0.024 (0.089)

Notes: As in Table 2. Traditions are reported in 1997 and refer to the traditional practices in the community.

Table 5: Measures of Social Capital: Long Term Relationships in the Community
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Δ in sum of weighted ADL index × either head or spouse born in community	-0.0800 (0.209)						
Either head or spouse born in community	0.0025 (0.0243)						
Δ in sum of weighted ADL index × tenure of head of household in this community		-0.004 (0.005)					
Tenure of head of household in community 1993		-0.0004 (0.0008)					
Δ in sum of weighted ADL index × average tenure of neighbors (that is, years they have lived in this community)			-0.0003 (0.006)				
Average tenure of neighbors in community 1993			-0.0003 (0.0010)				
Δ in sum of weighted ADL index × Proportion of population born elsewhere and immigrated to this district (from 1995 SUPAS)				0.032 (0.541)			
In-migration: Proportion of population born elsewhere and immigrated to this district (from 1995 SUPAS)				0.037 (0.091)			
Δ in sum of weighted ADL index × Proportion of neighboring adults who migrate outside of district 1993 to 1997					0.0031 (0.418)		
Out-migration: Proportion of neighboring adults who migrate outside of district 1993 to 1997					-0.023 (0.054)		
Δ in sum of weighted ADL index × Share of neighboring households that migrate outside of district						2.532 (2.606)	
Out-migration: Share of neighboring households that migrate outside of district 1993 to 1997 (community level)						0.004 (0.262)	
Δ in sum of weighted ADL index × Proportion of population born in community and emigrated (from 1995 SUPAS)							0.212 (0.765)
Out-migration: Proportion of population age 18+ born in community and emigrated (from 1995 SUPAS)							0.031 (0.104)

Notes: Standard errors in parenthesis. All regressions include controls for head and spouse's age, education and gender, as well as change in number of household members and change in age composition of household and community dummies. Sample size = 3281. * significant at 5%; ** significant at 1%

Table 6: Measures of Social Capital: Ethnic and Linguistic Diversity
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2
Δ in sum of weighted ADL index × Linguistic Fragmentation (1-Herfindahl index of languages)	0.345 (0.437)	
Linguistic Fragmentation (1-herfindahl index of languages)	0.064 (0.061)	
Δ in sum of weighted ADL index × Linguistic Isolation (1-share of community sharing household's language)		0.069 (0.393)
Linguistic Isolation (1- proportion of community sharing household's language)		0.087 (0.047)

Notes: Standard errors in parenthesis. All regressions include controls for head and spouse's age, education and gender, as well as change in number of household members and change in age composition of household and community dummies. Sample size = 3281. * significant at 5%; ** significant at 1%

Table 7: Role of Extended Family
Dependent variable = Change in Log Per Capita Consumption

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Δ in sum of weighted ADL index × number of adults in extended family	-0.006 (0.024)							
Number of adult extended family members	0.0034 (0.0029)							
Δ in sum of weighted ADL index × number of parents		0.043 (0.077)						
Number of parents		0.002 (0.010)						
Δ in sum of weighted ADL index × number of siblings			-0.014 (0.028)					
Number of siblings			0.004 (0.003)					
Δ in sum of weighted ADL index × number of adults in extended family in community				0.032 (0.036)				
Number of adult extended family members in community				0.0039 (0.0048)				
Δ in sum of weighted ADL index × ability to pay of extended family					-0.015 (0.020)			
Ability to pay of extended family					0.0022 (0.0024)			
Δ in sum of weighted ADL index × ability to pay of extended family in community								0.0320 (0.0365)
Ability to pay of extended family in community								0.0048 (0.0044)
Δ in sum of weighted ADL index × ability to pay of parents						0.027 (0.063)		
Ability to pay of parents						0.009 (0.007)		
Δ in sum of weighted ADL index × ability to pay of siblings							-0.028 (0.025)	
Ability to pay of siblings							0.002 (0.003)	

Notes: See Table 2. Ability to pay is predicted consumption per capita based on age, education, and (for siblings) occupation.

Table 8: Transfers from Extended Family – Probability of receiving a transfer
Dependent variable = Change in Log Per Capita Consumption

	Received positive transfers from non-resident siblings in 1997	Received positive transfers from non-resident parents in 1997	%Change in real transfers from non-resident siblings (1997-1993)	%Change in real transfers from non-resident siblings (1997-1993)
	Probit – Marginal effects	Probit – Marginal effects	OLS	OLS
	Model 1	Model 2	Model 3	Model 4
Δ Sum of head and spouse's delta intermediate ADL indexes (1997 - 1993)	0.14768 (0.08558)	0.10611 (0.10113)	0.00871 (0.00984)	0.01474 (0.01028)
Ability to pay of siblings	0.00716 (0.00234)**		0.00089 (0.00027)**	
Ability to pay of parents		0.04467 (0.00726)**		-0.00371 (0.00075)**
Observations	3265	2642	3258	2799
Number of fixed effects			63	63
R-squared			0.01	0.01

Notes: Standard errors in parenthesis. All regressions include controls for head and spouse's age, education and gender, as well as change in number of household members and change in age composition of household and community dummies. Probit marginal effects reports the change in the probability for an infinitesimal change in each independent, continuous variable and, by default, the discrete change in the probability for dummy variables. Ability to pay is estimated based on age, education, and (for siblings) occupation.

* significant at 5%; ** significant at 1%

Table 9: How often did the interaction coefficient have the predicted sign?

Interactions of Δ in sum of weighted ADL index × Measure of Social Capital

	Number of coefficients out of 71 regressions	Percent	Share predicted by noise
Opposite sign from theory	30	42	50
Statistically significant with sign predicted by theory	8	11	5
Sign predicted by theory	41	58	50
Statistically significant with sign contrary to theory	4	5	5

Note: We code a sign as predicted by theory in regressions where those with more of that measure of social capital had smaller reductions in consumption when health (as measured by ADLS) declines. The sign test of 58% of the 71 coefficients being of the sign predicted by theory is not statistically significantly different from zero at standard confidence intervals using the assumption that the tests are independent and the estimates are binomially distributed.

Table 10: Child height and adult health shock * civic participation

Probit with dependent variable = change in height for age z-score among children 0 to 5 in 1993.

	Model 1	Model 2	Model 3	Model 4	Model 5
Number of unique group memberships in household (1997) × Δ father's ADL	-0.083 (0.241)				
Number of unique group memberships in household (1997) × Δ mother's ADL	0.234 (0.158)				
Number of unique group memberships in household (1997)	-0.008 (0.028)				
Number of unique *arisan* group memberships in household 1997 × Δ father's ADL		0.079 (0.297)			
Number of unique *arisan* group memberships in household 1997 × Δ mother's ADL		-0.164 (0.321)			
Number of unique *arisan* group memberships in household 1997		-0.053 (0.049)			
Average number of unique group memberships for other households in village (1997) × Δ father's ADL			-0.327 (0.458)		
Average number of unique group memberships for other households in village (1997) × Δ mother's ADL			1.111* (0.442)		
Average number of unique group memberships for other households in village (1997)			0.295 (0.602)		
Average number of *arisan* group memberships for other households in village 1997 × Δ father's ADL				0.363 (0.622)	
Average number of *arisan* group memberships for other households in village 1997 × Δ mother's ADL				-0.790 (0.751)	
Average number of *arisan* group memberships for other households in village 1997				1.301 (0.917)	
Community has saving and borrowing group (*arisan*) in 1997 × Δ father's ADL					-0.950 (0.823)
Community has saving and borrowing group in 1997 × Δ mother's ADL					0.822 (0.804)
Community has saving and borrowing group in 1997					0.000 (0.000)

Standard errors in parentheses. * significant at 5%; ** significant at 1%. Additional controls include the main effects on father's and mothers ΔADL (= ADL 97 - ADL 93), 1993 log(household consumption), log(number of household members in 1993), log(Number of children 10 and younger in 1993), female child, 5 child age dummies, father's and mother's education in years, and each parent's baseline ADL, baseline BMI, baseline height (log), with dummy variables for missing parental health data.