Kinship and Financial Networks, Formal Financial Access and Risk Reduction

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Many risks are present in rural developing economies: illness, weather, the sudden need to finance an investment opportunity, etc. Yet for many households in rural developing economies, consumption and investment are insured against short-term, idiosyncratic risks to a large extent, despite limited availability of formal banking and insurance products. The importance of kinship networks in facilitating consumption smoothing and investment financing has been documented in many settings. Yet, while the importance of kinship networks and financial access are each increasingly well-documented, the *channels* through which these effects occur and the relationship between them are not well understood. We use unique data from rural Thai households to examine this interplay.

I. Data

A. Household data

Data are from the 1999-2005 monthly waves of the Townsend Thai Monthly Survey (Townsend et al. 1997). A total of 531 households in 16 villages are observed in each of the 84 months. Data were collected on households' demographic composition, expenditure and income. The most common occupation in the sample is rice farming (35 percent of households), followed by non-agricultural labor (including owning a non-agricultural business) (12 percent), growing corn (10 percent), raising livestock (9 percent), and agricultural wage labor (5 percent). Growing other crops, raising fish or shrimp, growing orchard crops, and construction each account for less than 5 percent. (See Samphantharak and Townsend (2010) for summary statistics and details of variable construction).

B. Financial network data

Transfers with other households in the village are prevalent: gifts from other households in the same village equal 9 percent of average expenditure. Borrowing from and lending to other households in the village are also widespread in the data. We use data on loans and transfers with other households in the village to construct a financial network of the village. For borrowing/lending and transfers with other households in the village, the surveyed household is asked to identify the structure (essentially, the address) in which the counterparty household lives. This is matched to a village census which records the address of every household in the village, and which is updated when households move. This allows us to identify the counterparty household for each within-village transaction, even if they are not themselves in the survey.[1] Some households are directly connected to banks, while others are indirectly connected, because they borrow from an individual who in turn borrows from a bank.

Because we are interested in the role of indirect access to financial institutions in facilitating access to credit, we construct directed links, from lender/giver to borrower/receiver. We have time-varying information on when households borrow from each other, but anticipation of being able to borrow may matter for consumption and investment decisions even in months

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[1] We can observe links of the form A→B→C even if B is not in the survey. We will miss links of the form A→B→C→D if neither B or C is in the survey. This can cause nonclassical measurement error, causing some linked individuals to appear unlinked (Chandrasekhar and Lewis 2011), biasing the estimated effect of indirect links toward zero.

when borrowing does not take place. Moreover, capital does not necessarily flow instantaneously through the financial network: a household may borrow from a bank in January, and then on-lend some of the money in March, for example. Therefore, we collapse the time variation in the data and construct, for each pair of households i, j in the dataset, an indicator for whether i ever borrows or receives transfers from j. We can then construct a variable γ_{ij} that represents the length of the shortest directed path from i to j. In network theory, this is referred to as the geodesic distance from i to j. Household i is said to be *reachable* by household j ($r_{ij} = 1$) if there exists any path from i to j.

For the 600 households who ever borrow from another household in the village, the average household borrows from 2.5 other households (minimum 1, maximum 19). The average total amount borrowed from other households in the village over the 7-year sample, conditional on ever borrowing, is 73,727 baht. The average amount borrowed per transaction is 12,200 baht, which is equal to 60% of average monthly household expenditure. Thus, intra-village borrowing transactions tend to be large, but relatively infrequent, with the average household who ever borrows, borrowing from other villagers 4.75 times over 84 months.

We also have information on borrowing from financial institutions. The institutions we consider here are commercial banks and the Bank for Agriculture and Agricultural Cooperatives, which we refer to jointly as banks. We define $\gamma_{i,B}$ as the length of the shortest directed path from i to a bank: 1 if i borrows directly from the bank, 2 if i borrows from someone who borrows from the bank, etc. Let $d_{i,B} = 1$ if the household is directly connected ($\gamma_{i,B} = 1$) and $r_{i,B} = 1$ if there exists any path to i from the bank ($\gamma_{i,B} < \infty$).

C. Kinship network data

We have data on the location of the parents, siblings, adult children, and parents' siblings of each surveyed household head and his/her spouse, if these relatives are living. If any of these relatives live in the same village as the surveyed household, we define the household as having kin in their village, $k_i = 1$. Otherwise, $k_i = 0$. Seventy-four percent of households have at least one relative living in the same village.

II. Empirical specifications

A. Consumption

To investigate the impact of both kin and financial networks on consumption smoothing, we run regressions that modify the standard omnibus insurance specification (Townsend 1994) to allow the effect of income fluctuations to depend on the presence of kin, on net worth, and on direct and indirect connections to financial institutions. Alem and Townsend (2011) show that, with endogenous financial participation, a per-period shock common to all households who participate in the financial system should be added to the standard full insurance regression. Our notion of access to the financial system is connection (direct or indirect) to either the BAAC or to commercial banks. Therefore, our consumption-smoothing specification takes the form:

$$(1)\Delta c_{ivt} = \alpha_1 \Delta y_{ivt} + \alpha_2 \Delta y_{ivt} \times d_{i,B} + \\ + \alpha_3 \Delta y_{ivt} \times r_{i,B} + \alpha_4 \Delta y_{ivt} \times k_i \\ + \alpha_5 \Delta y_{ivt} \times \bar{w}_i + \delta_{B,t} + \varepsilon_{it}$$

where c_{ivt} and y_{ivt} are, respectively the per capita consumption and income of household i in month t, $d_{i,B}$ and $r_{i,B}$ indicate, respectively, direct and any connection to the financial system; k_i is an indicator for presence of kin in the village, $\bar{w}_i$ is household i's average net worth over the sample period and $\delta_{B,t}$ is a common time effect for all households connected to the financial system.

First-differencing removes any non-time varying characteristics of households which might be correlated with their ability to smooth consumption. For this reason, we do not include the main effects of financial access, presence of kin, or net worth.[2]

[2] As noted below, we are not able to first-difference the investment data due to a small number of positive investment events per household, we have also run levels results for consumption. These results are directly comparable to the investment results. In these specifications we include the main effects of k_i, $r_{i,B}$, and $\bar{w}_i$. The qualitative results are similar to the differenced specifications.

B. Investment

To investigate the impact of kinship networks and financial networks on the ability to smooth investment in the face of cash flow fluctuations, we run regressions that modify the standard cash flow-sensitivity specification to allow the effect of income fluctuations to depend on the presence of kin, on net worth, and on connections to financial institutions. Alem and Townsend (2011) show that the investment and income variables should be scaled by total household assets to create an appropriate linear approximation to the optimal investment function of a firm. Because this will introduce heteroskedasticty, we compute heteroskedasticty-robust standard errors. We focus on positive investment events, and examine how the size of such events responds to the household's cash flow. We do not include household fixed effects in the investment regression because the number of positive investment events is small for each household. We include village-fixed effects, δ_v, to capture common characteristics such as suitability of the area for different occupations (rainfall, proximity to large towns, etc.), as well as a common time effect for all households connected to the financial system, $\delta_{B,t}$. We focus here on the effect of being connected at any distance, $r_{i,B}$. Thus our investment-smoothing specifications takes the form:

$$\left(\frac{I}{A}\right)_{ivt} = \alpha_1 \left(\frac{y}{A}\right)_{ivt} + \alpha_2 \left(\frac{y}{A}\right)_{ivt} \times r_{i,B} + \alpha_3 \left(\frac{y}{A}\right)_{ivt} \times k_i + \alpha_4 \left(\frac{y}{A}\right)_{ivt} \times \bar{w}_i + \beta_1 r_{i,B} + \beta_2 k_{i,B} + \beta_3 \bar{w}_i + \delta_v + \delta_{B,t} + \varepsilon_{it} \tag{2}$$

III. Results

A. Consumption

Due to space constraints, we do not present the results of estimating Eq. (1) in table form, but we discuss them here. First, we estimate a restricted version of Eq. (1) which does not allow the effect of income fluctuations to vary by financial access, kinship or net worth. The results show that the Thai households in our sample achieve quite good consumption smoothing on average, with a one baht income change associated with a 0.0078 baht consumption change; however this is significantly different from zero at the 1 percent level, indicating that the households are not fully insured. Estimating a full version of Eq. (1), we see that households not connected at all to a bank are much worse insured than the average, with a one baht income change associated with a 0.1645 baht consumption change (significant at 1 percent) for this group. Being directly connected to a bank reduces the consumption-income comovement by 0.1658 baht (significant at 1 percent), yielding a net sensitivity of -0.0013, insignificantly different from zero (p=0.696). An indirect connection has a virtually identical impact, reducing the consumption-income comovement, relative to no connection, by 0.1643 baht (significant at 1 percent), yielding a net sensitivity of 0.0002, insignificantly different from zero (p=0.958). Net worth is associated with significantly reduced consumption-income sensitivity, as expected, but the impact is small: one million baht in additional net worth is associated with a reduction in the consumption response to a one baht income change of 0.00021 baht (significant at 1 percent). Conditional on financial access and net worth, the effect of kin is to *increase* consumption sensitivity by 0.0102 baht per one baht income change (significant at 1 percent).

These results indicate that access to the formal financial system plays an important role in smoothing consumption in the face of income shocks. Strikingly, an indirect connections is as effective as a direct connection, suggesting that borrowing and lending among households acts to distribute capital from formal financial institutions. Ignoring the effect of being indirectly connected to financial networks and institutions, and using households not directly connected as a comparison group, may yield biased estimates of the effect of financial access, due to the spillover of indirect access through other households.[3]

B. Investment

We now turn to discussing the results for smoothing investment in the face of cash flow

[3] This echoes the findings of Angelucci et al. (2009) on the spillover effects of cash transfers in the presence of village-level insurance.

fluctuations. Table 1 presents the results. Column 1 shows results for the full sample: unconditionally, a one baht increase in cash flow increases investment by 0.1078 baht, consistent with the findings of Samphantharak and Townsend (2010), chapter 6. Column 2 adds controls for kinship, financial access, and net worth (main effects and interactions with income; we report only the interactions with income to save space). Investment is highly sensitive to cash flow for households without kin in the village, with a one baht income change associated with a 0.6526 baht investment change, significantly different from zero at the 1% level. The presence of kin in the village substantially mitigates this sensitivity, however, reducing the response to a one baht change by 0.4136 baht. Bank connections do not appear to be significantly helpful in smoothing investment, in contrast to their central role in consumption smoothing.

Why are consumption and investment different? The theory of the role of social networks suggests an explanation. Ambrus et al. (2010) and Karlan et al. (2009) argue that, in the absence of formal commitment, networks that generate the most surplus for their members can sustain the largest flows of funds. For a household who has borrowed and now must repay or, received insurance-motivated transfers and now must reciprocate, the threat of losing a high-value relationship, or seeing a friend or relative ostracized in response to the household's defection, relaxes the temptation to renege on their obligation. Anticipating this, households with strong ties can credibly transfer larger sums among each other, and outside lenders may also be able to lend on the basis of this social collateral.

Therefore, if the role of kin is to facilitate borrowing large amounts for investment, loans that borrowers could not otherwise commit to repay, we should see the effect of kin concentrated among households for whom investment opportunities are large relative to wealth. Since observed investment sizes are endogenous with respect to the household's access to financing, we use a household's occupation, in essence, as an proxy for the average scale of investment opportunity a given household might face. Our theory predicts that households in occupations where the average investment size is large relative to average wealth should derive the most benefit from presence of kin. We group together the occupations with the above-median observed investment-to-net worth ratios: business owners; farmers of crops other than rice, corn and orchard trees; and non-agricultural workers (including business owners). The occupations with below-median investment-to-net worth ratios are rice farmers; farmers raising pigs and cows; corn and orchard tree farmers; and shrimp and fish farmers. Columns 3 and 4 of Table 1 present the results. As in column 2, the effect of cash flow fluctuations is allowed to vary by kinship, net worth, and connection to banks. Strikingly, it is for the occupation group with above-median ratios of observed investment to net worth that the effect of kin presence is evident: in this group, those without local kin experience an investment change of 0.637 associated with a one baht income change, and having kin in the village reduces this by 0.506 baht (significant at 1 percent). For occupation categories with smaller investment-to-net worth ratios the effect of kin presence is small in magnitude and insignificant.

IV. Discussion and conclusions

These results shed light on the question of *why* kinship networks and financial access matter in smoothing consumption and investment in the face of income volatility, by examining which type of networks (kin versus financial) matter for which type of insurance: the relatively small deviations of realized income from desired contemporaneous consumption, versus the potentially large difference between the scale of an investment opportunity and the amount of cash on hand to finance it. The fact that access to financial institutions appears to be helpful in smoothing consumption, while kinship networks are not helpful, suggests that financing needs of these magnitudes can be most effectively met with borrowing that can be implicitly or explicitly collateralized with tangible assets or threatened loss of participation in the financial network. On the other hand, kinship networks are important in financing investment for transactions too large to be collateralized with tangible assets, so that extended or nonpecuniary punishments by kin are important in assuring lenders that their loans will be repaid.

TABLE 1 — KINSHIP, FINANCIAL ACCESS AND INVESTMENT

	(1) No controls	(2) All house-holds	(3) Above-median investment size	(4) Below median investment size
Income	.1078*	.6526***	.637***	0.0077
	[.0649]	[.195]	[.2102]	[.3359]
IncomeX…				
Any link		-0.1268	-0.0821	0.2931
to bank		[.1288]	[.1292]	[.3983]
Kin in		-.4136***	-.5056***	0.4543
village		[.1549]	[.1599]	[.3256]
Net worth		-0.1087	-.0405**	-0.371
(mill. baht)		[.0762]	[.0205]	[.2357]
N	6055	5794	2319	3463

Note: Heteroskedasticity-robust standard errors in brackets.

Our finding that being indirectly connected to the financial system is as beneficial as a direct connection implies that not every household in a village needs to use the banking system directly in order to benefit, if interpersonal gifts and lending are widespread. It also suggests that evaluating financial access by comparing those who use the banking system to those who do not may yield significant mis-estimates of the effect of financial access. Those without even indirect access and those without kin in a village remain highly vulnerable to fluctuations, while the indirectly connected and those with kin do relatively well.

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