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An evaluation of financial institutions: Impact on consumption and investment using panel data and the theory of risk-bearing[☆]

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ABSTRACT

The theory of the optimal allocation of risk and the Townsend Thai panel data on financial transactions are used to assess the impact of the major formal and informal financial institutions of an emerging market economy. We link financial institution assessment to the actual impact on clients, rather than ratios and non-performing loans. We derive both consumption and investment equations from a common core theory with both risk and productive activities. The empirical specification follows closely from this theory and allows both OLS and IV estimation. We thus quantify the consumption and investment smoothing impact of financial institutions on households including those running farms and small businesses. A government development bank (BAAC) is shown to be particularly helpful in smoothing consumption and investment, in no small part through credit, consistent with its own operating system, which embeds an implicit insurance operation. Commercial banks are smoothing investment, largely through formal savings accounts. Other institutions seem ineffective by these metrics.

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1. Introduction

There has been little theory-based assessment of formal and informal financial institutions which uses not only financial statements and institutional detail but also household panel data on actual customers. Here we explicitly incorporate the diversity of shocks across households in an environment with productive opportunities in a choice model of financial participation. We use the theory of an optimal allocation of risk-bearing to derive both consumption and investment equations for customers of financial institutions. We also do the same for those in financial autarky. Finally, we make participation endogenous and evaluate the formal and informal financial institutions that offer savings, credit and insurance.

We make use of the Townsend Thai data, a panel of approximately 960 households, including about 200 running their own businesses. The data start in May 1997, just prior to the onset of the July 1997 financial crisis, and continue through 2001, that is, through the recovery. Thus there is macro, aggregate risk.[1] The data are gathered from households and small businesses specialized in different mixes of occupations and subject to different shocks. Thus, there is ample idiosyncratic risk.[2] The data contain the mea-

[1] In the working paper version (Alem and Townsend, 2004), we show that consumption drops across both surveyed regions in the first three years. Surprisingly however, the few statistically significant common time effects in income over households explain little of the income variation. Droughts, floods and price changes are events that drive much income change according to the surveyed households, but these are not uniform within and across regions.

[2] In the working paper version (Alem and Townsend, 2004), we show that wage earners and those in agriculture suffered lower declines in income than anticipated in the Thai government's policy response, and business owners suffered large declines in income on average. Within each of the occupation groups there is enormous heterogeneity income change.

surements of consumption, investment, and income necessary to carry out the standard risk-bearing or equivalent-with-complete-market tests. Further, the data record the actual use of formal and informal financial institutions and mechanisms by type of financial product, both borrowing and saving. From this we can see which devices are used and gauge the plausibility of econometric instruments for subsequent actual participation. The instruments are derived from baseline key informant interviews and from a baseline 1996 village-level census from the Community Development Department (CDD). One of the instruments makes use of a Geographic Information System (GIS).

The principal findings offer a score card or rating system for the major financial institutions of the country. A government development bank (BAAC) is shown to be particularly helpful in smoothing consumption and investment, in no small part through credit, consistent with its own operating system, which embeds an implicit insurance operation. Commercial banks are smoothing investment, largely through formal savings accounts. Other institutions seem ineffective by these metrics.

The paper is outlined as follows. Section 2 describes the data used in the analysis. In Section 3, we present the basic choice model of financial regimes featuring the assumed environment. In Section 4, we derive from the theory of optimal allocation of risk the explicit consumption and investment equations used in the empirical work. In Section 5, we do the same for those in financial autarky. In Section 6, we derive the econometric specification, including how we use the data and our instruments. The assessed impact of each major financial institution is summarized in Section 7. Section 8 provides additional results and interpretation. Section 9 concludes.

2. Data and institutions

The panel data used in this paper come from a project funded by the National Institutes of Health, the National Science Foundation, and the Ford Foundation (see, Townsend, 1997). An initial cross-sectional survey, with retrospective data, was fielded in May, 1997, before the crisis that began with the devaluation of the Thai baht in July, 1997. Two regions were chosen deliberately: namely, the more developed Central region and the relatively poor, semi-arid Northeast. Within each region two provinces were chosen deliberately as each had at least one county (*amphoe*) that had been randomly selected in all previous rounds of the larger Socio-Economic Survey (SES). In the Central region the province of Chachoengsao is adjacent to Bangkok and contains an industrial corridor that makes its way to the eastern seaboard. The province of Lopburi is in the fertile central valley north of Bangkok. In the Northeast, the province of Sisaket is the poorest in Thailand according to provincial product data, and Buriram, also in the Northeast, represents a transition province as one moves west back toward Bangkok.

Within each province twelve *tambons* or sub-counties were chosen at random (see Binford et al., 2004). Within each *tambon*, four villages were chosen at random from an enumeration of villages available from the Community Development Department (CDD), and within each village fifteen households were chosen at random from a listing held by the headman.[3] In addition to the household questionnaire, survey instruments were designed for the headman of each village, soliciting in particular a retrospective village history of the use of formal and quasi-formal financial institutions.

With the advent of the crisis, funding from the Ford Foundation allowed a resurvey one year later (in May, 1998) of one-third of the original sample, and this was continued with NICHD funding into subsequent years. The data used in this paper is through 2001. For this Townsend Thai resurvey panel, four *tambons* were chosen at random from the original twelve of each province.[4] Otherwise, the same villages and the same households were selected for re-interviews. The target number of households was 960, or 240 in each province. The actual response rate for this 1997–1998 pairing is relatively high, for example, 98.2% of the target 1997 households respond again to the resurvey. Likewise, there were successful re-interviews of 96.2%, 97.1% and 96.5% for the other pairs of years. Tables A.1 and A.2 in the Appendix contain a summary of key variables used in the data analysis.

Measurement of income, consumption and investment. We note that income is measured as the difference between gross income and gross expenses, solicited from the household for each occupation category separately: business, agriculture, fish/shrimp, farming and livestock. Labor income is gross revenue from wages. Likewise, all physical assets held at each interview date are solicited along with purchase date and value at that time. Discrepancies in ownership across interviews are checked and reconciled with the households directly. Depreciation rates, e.g., 10%, can be applied to create retrospective panel data on wealth. There are, in addition, direct questions on land sales and acquisitions, the major asset in many cases (this is not depreciated). Consumption is measured by a solicitation of 13 items[5] that best predict aggregated non-durable consumption expenditure in the larger more comprehensive Socio-Economic Survey. In practice, 50–80% of the variation can be explained by these 13 items. A price index at the province level was obtained using average prices of purchases of consumption in order to deflate and express income, consumption and investment in real terms.[6] Specifically, the Townsend Thai annual data records both the overall value and quantity of the first 9 consumption items purchased by each surveyed household. There is a considerable range for these deduced prices for a given year and province, and so in order to reduce measurement error and provide a reliable overall central tendency, the top and bottom 25% of the histogram for each item are removed, then a simple average is taken. The overall price index is constructed by weighting each price item by its quantity in the base year (Laspeyres).

Measurement of financial participation. Membership in or being a customer of the various financial institutions was solicited in the 1997 interview, along with a retrospective history. Hence, we know in principle if a household was using a commercial bank in, for example, the 1996 baseline year, the year prior to the survey. We also have measurements of all subsequent financial transactions (borrowing, lending, saving) with the formal sector (type of institution, e.g., BAAC, village funds such as Production Credit Groups [PCGs], commercial banks) and with the informal sector (output purchaser, money lender, friends, relatives, store owners). There are also data on remittances and the use of rice in storage.

Financial institutions overview. We emphasize here that we have the typical array of financial institutions of emerging market economies: government banks, local savings and loans, a private

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[3] The mean and median numbers of villages in a *tambon* are 10.38 and 10.0 respectively. Thus, the fraction of villages chosen from the total is approximately 40%. The sampling rate for *tambons* in a province is 3% and the sampling rate for households in a village is 11%.

[4] With the exception that one *tambon* was set aside for a separate intensive monthly survey.

[5] Grain, milk and milk products, meat, alcohol consumed at home, alcohol consumed away, tobacco, gasoline, ceremonies, house repairs, vehicle repairs, educational expenses, clothing and meals away from home.

[6] As a robustness check, a national deflator price index was obtained from the National Statistics Office and the results, though statistically weaker, did not vary in sign and order of magnitude.