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CHAPTER 5

Microenterprise and macropolicy

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**1 SOME BACKGROUND AND MOTIVATION:
THREE WELL-KNOWN PROGRAMS**

Motivation for this contribution is best provided by describing briefly three relatively recent experiences in the world of banking and finance:

1 The Grameen Bank in Bangladesh was started in 1976 by a Professor of Economics, Muhammad Yunus, Chittagorn University. Bangladesh is a poor country with low levels of average per capita income, high rates of infant mortality, and low levels of literacy especially among women. Believing that economically active but assetless poor households were being excluded from official lending sources and exploited by usurious moneylenders, the Grameen Bank began lending to borrower groups of five people who underwrite each other's loans, promising to pay as a group to the bank in case a member defaults. Currently, the average loan is relatively small, \$80.00, and the nominal interest rate is 16.5 percent, with inflation at 10 percent. Again, no collateral is required. Strikingly, the repayment rate of loans is 98 percent, on average, with women constituting the majority of borrowers. This lending system continues to attract donor attention, e.g., the Ford Foundation, and continues to expand dramatically, with the number of borrowers, number of villages, and credit outstanding often doubling from year to year. Grameen-type lending systems have been introduced into Malaysia, Nepal, and, in the United States, into the city of Chicago and rural Arkansas.

2 The Badan Kredit Kecamatan (BKK) began as a provincial development bank in central Java, Indonesia, using government funds to subsidize agricultural credit. Started in the early 1970s, by 1983 the BKK consisted of 483 branches covering most of Java with 1,300 village posts. Then, in 1985,

Indonesia went through a dramatic fiscal stabilization and austerity program, virtually eliminating subsidized credit. There was an accompanying and quite explicit Financial Institutions Development Program, in collaboration with the US Agency of International Development, mobilizing savings though allowing savings to be withdrawn on demand. Government operated BKK-like systems have been adopted in other regions and islands: LPK in west Java, BKPD in west Java, and LPN in west Sumatra, for example. There has been dramatic expansion in the number of participants and amounts saved. Increases in savings of the order of 50 percent per year are typical. Indonesian systems have been influential in the debate on liberalization and financial-sector reform.

3 Accion International operates non-government organizations in 13 countries in Latin America and in the Caribbean, lending to the poor either as individuals or to groups. A specific example is PRODEM in Bolivia, one of Latin America's poorest countries, intent on servicing small-scale business enterprises in the informal sector, particularly those ravaged by inflation prior to stabilization in 1985 and excluded from more formal banks and austere government programs, post stabilization. Charging relatively high real interest rates and promoting savings mobilization, Banco Sol has now emerged from PRODEM as an official, formal bank in Bolivian cities. It is making large profits while retaining its altruistic service orientation. Meanwhile, PRODEM is expanding into relatively remote rural areas. Accion International has expanded its programs to the US, to the cities of New York and Chicago.

**2 THE KEY QUESTIONS AND A POLICY
ALGORITHM**

What do we make of these episodes? How do we evaluate these interventions? Should we recommend similar programs or interventions elsewhere?

Broadly speaking there are three standard responses to these questions. These responses shall be characterized here.

The first response to these episodes and interventions is that we should do nothing in other places. The idea is that the world must be optimal already, the way it is. This is especially so if one takes into account bribes and the difficulty of political action. Apparent inefficiencies may appear from time to time, but any attempts to take action would be thwarted by bureaucracies. Regulatory agencies are captured after all.

This is no place for a long critique of the first view. Suffice it to note that this view undercuts the notion of useful discovery in economics. No researcher can design and help implement a Pareto-improving mechanism.

The second response to these episodes and interventions is also conservative but envisions productive action. Specifically the second response is that the problem is in the regulation. The recommendation is to liberalize financial markets, get the interest rate up to its market level, and separate the operation of credit markets from transfers and subsidies. This is the standard market response, popularized among others by the Ohio State school.

A short critique of the second response might note that the standard supply and demand diagram, with credit on one axis and the interest rate on the other, is a partial equilibrium diagram. The credit market is not embedded into an explicit dynamic general equilibrium context. The commodity point, the credit contract, needs to be spelled out, and the presence or absence of other financial instruments, particularly those for risk-bearing, needs to be made explicit. The applicability of the diagram when there are private information and incentive problems can also be called into question.

The third response to these episodes and interventions is a liberal view, and it extols the virtues of the institutions using the metrics of the institutions themselves. The Grameen Bank in Bangladesh, the BKK in Indonesia, and PRODEM in Bolivia are extolled for profitability, increases in savings, increases in credit, types of borrowers reached, novel lending procedures, and the building of financial infrastructure. The facts may well be accurate; the programs may have an enormous impact by these standards.

The criticism of the third view is obvious. These standards or metrics for success do not come from theory.

All three views lead us to the obvious policy algorithm. Use theory to think about the logic of all the observables. Try to understand what we see, and what happens in an intervention, by describing an economic model, with all the logic made explicit. Indeed, one can go one step further. Theory may suggest an ideal operating system, with standards one can use to judge whether the actual economy is optimal or not. The next step then is to use, or acquire, microeconomic data to see if the theory is correct and if there is some hope for improvement. In practice one iterates from theory to data and back again, as described in more detail in Rashid and Townsend (1994), for example. But the point is that theory and data are being used heavily in crafting responses to the policy question.

3 APPLYING THE ALGORITHM IN THAILAND

This chapter will ask these key policy questions and attempt to get answers via the policy algorithm just described. In this sense this contribution

describes a method of analysis, a method which might well be applied to any economy or country. Indeed, the chapter describes research and policy analysis using theory and data from a large variety of contexts. The chapter tries to tie together apparently diverse efforts by showing how they fit into the policy algorithm.

Still, because one is shifting across countries, data sets, and diverse theories, the chapter runs the risk of being poorly focused. So, to tie it all together, repeated references to one country are made. Thailand is featured as a leading example of how the policy algorithm can be applied. Each and every theory is applied and/or interpreted with knowledge of the institutions, the policies of government and non-government organizations, and the characteristics of households in Thailand. The data come from diverse sources, all collected or used by the author. One source is field research conducted in ten villages in northern Thailand (and to a lesser extent in the north-east). A second source is the large Socio-Economic Survey (SES) of the Thailand National Statistics Office (NSO), covering over 12,000 households in each of five years, from 1976 to 1990. A third source is institutional information gathered in 1993 under a preliminary analysis of the Bank for Agriculture and Agricultural Cooperatives (BAAC); the Credit Union League of Thailand (CULT); a temple, Wat Ba, in Chiangmai; and Operation LINK, a Thai-German program linking self-help groups to banks.

Background information on each of these Thai programs is provided in appendix A and appendix B reports on more of the details necessary for program evaluation. Suffice it to note here that the BAAC is a large, quasi-autonomous but government-operated rural development agency, the primary source of credit in rural areas of Thailand. CULT is a more selective, non-government organization promoting village-level and urban credit unions – for saving, borrowing, and some insurance. The Temple Wat Ba is a donor financed religious organization promoting village-level rice banks, buffalo banks, and rotating credit associations. Finally, Operation LINK, linking banks to self-help groups, hopes to connect the BAAC to such groups as Production Credit Groups (PCG's), neglected if not indigenous credit unions promoted earlier by the Community Development Department (CDD) of the Department of the Interior.

More specifically, the chapter proceeds as follows. Section 4 below discusses how Thailand's reasonably high level of growth is accompanied by an increasing degree of income and consumption inequality, a motivating force behind all of the Thai credit programs, all targeting the poor or middle-level households. Such facts on inequality are sometimes taken for granted, but that is not the right way to proceed, not in Thailand nor in any other country. Cross-country evidence is also presented. Section 5 goes on

to discuss the logic of the relationship between inequality and growth, and whether there are policy remedies. A tight, theoretical model is presented. The answer to the policy question in these models depends on whether or not there are "artificial" constraints on the allocation of credit. Section 6 critiques empirical work on savings, the permanent income hypothesis, and liquidity constraints as shedding related but as yet insufficient light on this issue. Further work on program evaluation in Thailand is proposed. Note how a macroissue is tied to microdata. Section 7 describes a related, tight theoretical model which makes explicit the link or correlation between measures of financial intermediation and growth. This correlation is sometimes taken for granted, and it does seem to be supported empirically. But section 7 asks whether microdata (testing consumption insurance) supports the tight theoretical intermediation-growth model. Section 8 goes into a more detailed discussion of consumption insurance and market efficiency and of actual and potential tests of the intermediation model, again with program evaluation in mind. Further evaluation along this line is proposed. Section 9 tackles the liberalization issue, asking whether privatization and financial-sector reform is necessarily a good thing and what metrics we might use to judge their success. Most of the metrics mentioned earlier turn out to be misleading. Finally, section 10 takes on the issue of subsidized credit, asking whether a model with imperfect information and incentive constraints would justify comingling altruistically motivated income redistribution with the operation of credit markets. Surprisingly, one such model does. Section 11 concludes with a brief discussion of the relationship between mechanism design models and microdata, how to gather data and test models so that we can evaluate and better design financial systems.

Again, appendixes A and B contain important additional material on the four Thai programs. Much of the material was gathered in the field in 1993 and is not reported elsewhere.

4 INEQUALITY IN THAILAND: MOTIVATION FOR THE THAI PROGRAMS

Figure 5.1 displays the monthly per capita incomes of Thai households sampled five times by the SES from 1975 to 1990. The household income numbers include wages; profits from agriculture, entrepreneurship, and livestock; and income in kind. The consumption numbers reported below include expenditures on food, clothing, shoes, and tobacco. The income numbers are meant to get at pretransfer income, exclusive of taxes, insurance premiums and indemnities, interest earnings, and adjustment to income by the purchase and sale of real and financial assets. These income

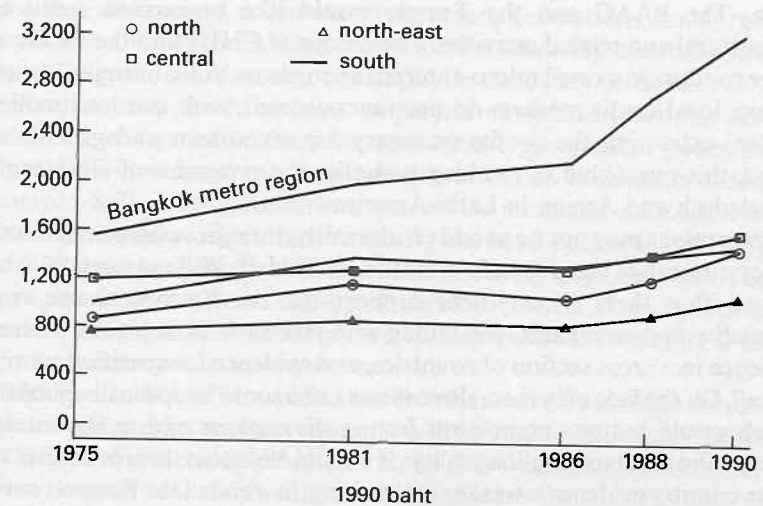


Figure 5.1 Per capita monthly income, 1990

numbers get at underlying income movements, not *ex post* adjustments. The consumption numbers get at necessary items and exclude luxury goods and consumer durables.

As is apparent from figure 5.1, Thailand as a whole experienced relatively high rates of growth of income in the 15-year period, about 4 percent per year on average, with the level of per capita average income in 1990 at \$806. Not apparent in the figure, much of this has come in the growth of services and industry, at the expense of agriculture. Further, levels and growth rates are uneven over space. Income and consumption in the north-east were 49 and 63 percent, respectively, of income and consumption in the greater Bangkok area in 1975, and these fell to 33 and 51 percent by 1990. The central, southern, and northern areas of the country display similar patterns relative to Bangkok. Indeed, the growth rate of per capita income of residents in the greater Bangkok area was 6.25 percent, much higher than in other regions.¹ On the other hand, the income and consumption numbers are not adjusted here to account for the increased cost of living in Bangkok, presumably not a small adjustment. Making such adjustments would take us in an important direction, trying to distinguish true welfare, or poverty, in rural and urban areas. But this is not attempted here.

Most of the Thai programs see a link between access to credit and growth of income, envisioning a kind of poverty trap, especially in rural areas. That is, low-income people cannot save much, and, in the absence of credit, cannot invest in productive projects even if the technology is brought to

them. The BAAC and the Temple would like to expand credit for agricultural and related activities. The unions of CULT and the PCGs are eager to support as well micro-enterprise programs. All four organizations believe local credit markets do not function well, with usurious money-lenders extracting the profits necessary for investment and growth. As noted, this same kind of thinking underlies the programs of Grameen in Bangladesh and Accion in Latin America.

Perceptions may not be at odds with reality, though measurement in the policy context of these specific countries is needed. Williamson (1991) has argued that there is empirical support for the Kuznets curve, with inequality first rising and then falling with levels of development. There is evidence in a cross section of countries, and evidence for specific countries as well. On the face of it, then, there seems to be some "empirical regularity" which would buttress complaints from policymakers and public interest groups about increasing inequality. It should be noted, however, that the cross-country evidence is weaker at the rising, low end of the Kuznets curve. Latin American countries have experienced more initial inequality than corresponding egalitarian Asians, for example. But this begs again the issue of policy design.

5 INEQUALITY AND GROWTH – IS INTERVENTION DESIRABLE?

The empirical relationship between growth and inequality cannot serve as a springboard for economic policy without further assessment of the logic of the relationship. Is inequality an inevitable product of the growth path? Would a myopic concentration on short-run equality lower all welfare? Does inequality foster accumulation, or would redistribution of wealth lead to higher growth and raise overall welfare? Is equality the right metric for judging the success of interventions?

These questions cannot be answered without coupling explicit theories of these relationships and more detailed measurement. We may take, as an example, the recent model of Lloyd-Ellis and Bernhardt (1993), representative of a larger literature, e.g., Banerjee and Newman (1991). In it, the relatively poor households of rural areas cannot finance newly emerging, highly productive projects in urban areas. Their inheritance or household wealth is too meager. Relatively rich households can finance these projects, with some relatively mediocre or less-talented households among them. Ironically, the large mass of laborers relative to the few initially financed projects keeps wages down and makes profits for entrepreneurs yet higher. Inequality between rich and poor thus increases in the short run, with wealth passed along to heirs. Eventually, though, a shortage of labor drives

up wages, and savings, accumulated over many generations, slowly reduces constraints on investment and expansion for relatively talented entrepreneurs, independent of wealth. Inequality is ultimately reduced.

Because there are fixed costs to project entry and resources are not unlimited at a point in time, the appropriate government policy in the Lloyd-Ellis-Bernhardt model is redistributive, via inheritance taxes, for example. Still, if the government sets out to maximize national average growth, the goal of redistribution should not be *ex post* equality. Early on, at least, some households should receive relatively large bequests. That is, there should be a constrained-optimal redistribution of wealth based on random assignment, something like a lottery. Induced inequality is necessary to finance yet faster expansion.

Models like that of Lloyd-Ellis and Bernhardt can be made to accommodate a credit market with borrowing linked to wealth. This comes, however, at the cost of some simplification. Piketty (1994) begins with the standard, Solow, capital accumulation model with diverse households. The household of each generation has an investment project which requires its own effort, though this effort is unobserved to outsiders. Each household decides how much to invest in its own project and therefore, given its inheritance, how much to save or to invest. Wealthy households can finance their own projects and save some residual. Moderately wealthy households choose to borrow but exert maximum effort nonetheless. But relatively poor households must borrow more. As a result, their incentive to make effort is low and their likelihood of project success is low. Knowing this the financial system allocates less credit to poor borrowers and does so at a higher rate of interest. Movement to a steady state is associated with increasing average wealth, reduced interest rates, and reduced credit constraints. But the Piketty model seems to allow multiple self-fulfilling steady states. Among these there is an inverse correlation between average wealth, on the one hand, and the level of interest rates, on the other.

Aghion and Bolton (1992) add to this story minimum-sized investment projects, somewhat like a fixed cost. Then, as in Lloyd-Ellis and Bernhardt, many households can be left in a traditional sector for some time. Here, however, these relatively poor households save and thus help to finance more wealthy, borrowing entrepreneurs. There are relatively wealthy, saving entrepreneurs as well. Over time, as aggregate wealth grows, a larger number of investment projects can be financed at lower interest rates. With increased maximum efforts, wealth accumulates all the more. A Kuznets curve is generated.

Though substantial progress is being made in theory, these models do not escape criticism. The technology and preferences seem rather special, at times almost contrived. That is, the stories which are told from the models

seem plausible enough, but the models reveal just how special the stories may be. Related, none of these dynamic models does well with economic geography. The relatively recent work of Krugman (1991) spells out an endogenous market structure with industrial concentration, something which a description of growth in Thailand calls to mind. But these spatial models have yet to be made dynamic.

From theory back to data. It is not obvious that this class of well-articulated theoretical models has empirical validity beyond delivering a Kuznets curve. Are households actually constrained in credit markets, in occupational choice, and in financing projects in the sense that the (extended) models predict? These questions can only be addressed by taking such well-articulated models to data.

6 SAVINGS AND LIQUIDITY CONSTRAINTS – A REVIEW OF SOME EMPIRICAL LITERATURE

The model of Lloyd-Ellis and Bernhardt can be used to think about an empirical test of liquidity constraints and a test of production efficiency. If we think of talent or set-up costs for potential entrepreneurs as an unobserved random variable, distributed in the population in a known way, then their model delivers a probabilistic relationship among the variables: the observed levels of bequests, potential inefficiency in production for actual entrepreneurs, and (constrained) occupational choice. Specifically, at relatively high levels of bequests, talented households become entrepreneurs and are unconstrained in production; only the untalented stay in the unproductive sector. At medium levels of bequest some of the relatively talented become entrepreneurs, but many of these are constrained in production, that is, they would hire more labor if they could do so, that is, if they had higher bequests (or access to credit). At relatively low levels of bequests there are talented households who would like to become entrepreneurs but are constrained from this choice. In summary, one could survey households of the model, asking laborers whether they would like to be entrepreneurs and asking the entrepreneurs if they are constrained in production. Similarly, one could choose parameters of technology and preferences to maximize the likelihood of responses in an actual survey.

Remarkably, something close to this exercise has been carried out in the US by Evans and Jovanovic (1989), using the data from the National Longitudinal Survey of Young Men. The wage is presumed to depend on experience and education and on a random iid shock. Entrepreneurial earnings are presumed to depend on a multiplicative talent variable as well as on an iid shock. Talent might also depend exogenously on wealth, a

correlation to be estimated in the data along with the cross-sectional distribution of the talent and shock variables. Finally, the model allows entrepreneurs to borrow up to some multiple of their wealth – something similar in spirit to the borrowing levels induced in the model of Aghion and Bolton (1992) and in Piketty (1994). The conclusion is that entrepreneurs are constrained in entry and in the level of operation. Credit constraints bind.

The work of Feder *et al.* (1991) may be seen in a developing country context, namely northern China, as a partial test of the same kind of model. Households who have ample access to credit should not be constrained by initial wealth in deciding which inputs to use, including labor hired on the market. That is, households not constrained by initial wealth should experience a separation between production and consumption decisions. Feder *et al.* confirm that constrained households, among others, those with low previous income or low savings, are influenced in agricultural production by variables such as available household labor.

Benjamin (1992) runs similar tests in Java, but finds households there may not be constrained by the size and composition of the household.

Feder *et al.* (1991) are able to calculate in theory and to estimate in practice the effect of pumping more credit into the economy. The theory allows households to choose among current consumption, future consumption, and investment. The latter is made possible by an exogenous valuation for terminal wealth, something like the bequest motive in the models of growth with inequality reviewed earlier. In theory more credit would increase variable inputs, increase investment, increase consumption, and increase output. In practice these results are confirmed in the Chinese data, but with much of the impact on current consumption.

Households with limited access to credit may also be less efficient in production, not because credit is limited but because they are less talented. That is, a financial institution may limit access to potential credit to a household who is perceived as less than diligent, while lack of diligence would also show up as a negative unobserved fixed effect in a cross-sectional estimate of production functions. To control for this, Feder *et al.* allow correlated errors in the credit selection and production relations. Still, the reduced form equation in Feder *et al.* which determines whether households are liquidity constrained is simply *ad hoc*; it is not derived from theory. Indeed, neither the “supply” nor the “demand” side of that equation is modeled.

The model of Evans and Jovanovic (1989) is explicit in allowing potential entrepreneurs to borrow some multiple of wealth, but one would like to have a model of how banks make decisions. Otherwise, as they note, one is left with an estimate of the impact of liquidity constraints on entrepreneurs

and on output without a real suggestion of how to remedy the problem, of how to increase credit. A promising direction would be elaborated versions of the models of Aghion and Bolton (1992), and of Piketty (1994), with the financial structures endogenous, both on the side of savings and on the side of credit. Related, when the decision problem is placed back in the context of the growth model, wages and interest rates move endogenously, no doubt influencing appropriate estimation.

Deaton (1989) has taken up the issue of savings in developing countries, tracking what is known about the relationship of savings and investment to growth. He reminds us again of the financial repression literature, noting however that the effect of increased interest rates on savings is ambiguous both in theory and in practice. He has in mind however a partial equilibrium decision problem, in effect, a partial equilibrium model of growth. But Deaton is skeptical that more or less standard models of growth pick up true motives for household savings. He prefers models in which the interest rate is already below the rate of time preference but models in which risk-averse households save for precautionary reasons.

This brings us naturally to a parallel empirical literature which emphasizes credit constraints but which draws attention to consumption smoothing rather than to investment. Specifically, the permanent income hypothesis supposes that households have free access to credit markets, borrowing and lending at a specified market rate of interest. This delivers a Euler equation in which the marginal utility of present consumption, at date t , is equal to the discounted expected marginal utility of future consumption, at date $t + 1$, times the gross interest rate. Roughly speaking, expected intertemporal marginal rates of substitution across households from dates t to $t + 1$ are equated to a common asset return. This implies a benchmark or standard for consumption smoothing. Specifically, though realized asset returns and incomes at date $t + 1$ can cause deviations from the *ex ante* Euler equality, such error terms should be unrelated to information known and used in forming expectations at date t . In short, after controlling for household-specific demographic changes and for individual, time, and aggregate (e.g., village) fixed effects, a household's consumption growth from t to $t + 1$ should not be related to idiosyncratic shocks at date t , e.g., household-specific income at t .²

The Euler equation standard for consumption smoothing has been much used in macroeconomic literature using US data and used in data sets from Third World countries, e.g., Wolpin (1982), and Paxson (1992). Paxson's work is an excellent example, with the added virtue here that it returns us to Thailand (and the SES data). Specifically, Paxson finds that propensities to save out of transitory income due to rainfall shocks are quite high. That is, savings are used to buffer consumption from income shocks. However,

propensities to save out of permanent income are also positive, a rejection of the permanent income model.

When Euler equations are shown to be violated, the literature asserts typically that households are liquidity constrained, e.g., Hayashi (1987). Authors Deaton (1989), Zeldes (1989), and other have taken this one step further, supposing households can save at a market rate of interest but cannot borrow. This is as in the Lloyd-Ellis and Bernhardt model, but here there is uncertainty. Then Euler equations continue to apply for those households and time periods when savings (and other liquid assets) are positive. But if savings are driven to zero and the household cannot borrow, then the Euler equation will be satisfied as an inequality. Technically, there is a Lagrange multiplier which is positive when households are liquidity constrained, in this sense, when income and savings are low. Zeldes (1989) applied this test to US households, showing that poor assetless households are constrained.

Morduch (1993) applied this test to data from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) showing that poor households in three Indian villages are constrained. More dramatically, constrained households are more likely to diversify *ex ante* into multiple plots and crops, though this may be costly, and less likely to adopt high-yield but risky varieties of seed. We return in this way to models which incorporate production, occupation, and other choices, as at the beginning of this section.

Despite the link between policy and credit constraints as outlined above, relatively little has been done in applied, village-level or program-level analysis. In the context of Thailand, for example, we might sort over households by use or access to local institutions. For example, does a village-level PCG or credit union allow intertemporal consumption smoothing, at least when savings are positive? Are there significant differences in consumption smoothing between villages with one of these institutions and villages without them? Are households in villages without a PCG more vulnerable to fluctuations? Perhaps the latter villages make greater, if costly efforts to diversify income sources. Perhaps the latter villages display more migration. Related, by Euler equation standards, are families and networks of friends and relatives more or less successful in consumption smoothing without policy intervention? Finally, do the formal programs of the BAAC allow this standard of consumption smoothing among its participants across locations?

A second related step is to check on the smoothing devices which households actually use. Own rice storage and livestock are alternative assets, and the associated Euler equations should be satisfied for households who hold positive levels of these assets across periods. Euler

equations should be satisfied at an inequality when assets are driven to zero. On the other hand, PCGs may discourage the withdrawal of accumulated savings even in times of stress. We need to understand institutional rules.

A third related step is to link consumption with production. Savings in PCGs may be used as collateral for seasonal production loans, and low savings may limit access to future production credit. This brings us back, of course, to the theoretical model of savings of Lloyd-Ellis and Bernhardt and the econometric credit-constraint model of Feder *et al.* That is, we need to understand better the rules for access and use of existing institutions in savings, in consumption, and in production credit. What are the actual patterns of use across various households? What are the actual patterns across various regions? Can we explain in this way growth with inequality?

7. LINKS OF REAL GROWTH TO FINANCIAL INTERMEDIATION

The BAAC features dramatic increases in savings, in credit, in the number of customers and villages reached, and in continual expansion in spatial access, as measured for example by the number of branches. CULT focuses on improved intermediation at the local, village level, believing its credit unions dominate earlier, indigenous arrangements, if any. Operation Link envisions improved interregional intermediation, with existing or improved local units linked up to a regional or national financial system. (CULT already offers these links to its own unions). Of course the Grameen and Indonesia programs reviewed earlier emphasize dramatic expansion in clients, with a focus on the growth of credit in Grameen and in the growth of savings in Indonesia. Accion is an example of a credit program emphasizing improved intermediation, as with Banco Sol in Bolivia.

Again, it is difficult to know what to make of these expansions in the absence of theory and further measurement. The goals of the programs are explicit, taking the form of targets for expansion, but are these the appropriate metrics for success? What metrics are suggested by a well-articulated model? What does that model predict about the relationship between intermediation and growth?

We shall take up this issue in the context of a model which is explicit about the presence or absence of intermediation while maintaining the standard of Pareto optimality. In the model of Greenwood and Jovanovic (1990), all households have access to two technologies or investment projects: a safe, low yield project and also a higher mean but higher variance project, subject to idiosyncratic and aggregate shocks (this could be extended to allow for multiple industries with common components within an industry). For a fixed cost of entry, and subsequent marginal costs per

unit invested, households can join one another in an intermediated system, benefiting from insurance against their idiosyncratic shocks (to smooth consumption) and benefiting from pooled advance information on yields. Both these allow higher average returns, and, with savings a fixed fraction of income, this implies higher growth. On the other hand, each household outside the intermediated sector must choose some combination of the two technologies in isolation and therefore is subjected to consumption which moves up and down with the success and failure of its own projects. There is more risk, a more conservative investment strategy, lower returns, and again, with savings the same fraction of income at low levels of income, lower growth. Initially, there is an unequal distribution of income, and so high-income households are in the financial system and the poor are excluded. Over time, however, more and more of the previously isolated poor save sufficient resources to cover the fixed costs of entry into the intermediated sector. This generates a large rise in measured levels of income and consumption. There is a particularly high rate of increase of growth of intermediation, income, and consumption on the income fringe, so to speak, that is, in expansion areas. Still, at the steady state, the rate of increase of growth slows, but at a higher level of growth than in autarky.

All this is Pareto optimal. It is not economic to finance the fixed entry costs for the poor all at once. Put differently, resources used to finance entry costs would pull others into poverty.

But what do we see in the data? Unfortunately, panel data at the household level are not available in Thailand to carry out the requisite tests of risk sharing and the relationship between risk sharing and growth at the household level. We can, however, make use of the Thai SES survey data by adding up over households in relatively small geographic regions, such as amphoes or, in English, "counties." This gives the average level of consumption and income in counties which were sampled repeatedly. Townsend (1995b) displays the number of households and amphoes which are useable in this way using five years of the SES data.

We can use the county-level income data to decompose income shocks into idiosyncratic and aggregate components. Idiosyncratic shocks are peculiar to a county, something which causes the county-average growth rate of income to diverge from regional- or national-average growth, averaging over all counties in a region or in the kingdom as a whole. As it turns out, income shocks are highly idiosyncratic. Using 193 counties in the north-east from 1988 to 1990, growth rates are dissimilar, with some counties experiencing negative growth or shortfalls of up to 77 percent and with other counties experiencing explosive growth, with growth rates of 111 percent. This is not atypical: a similar pattern emerges across other regions, and across other pairs of years. Moreover, there are relatively few aggregate

shocks. That is, there are few common fixed effects in growth rates, effects which are common to a given region and a given pair of years. This is apparent from formal tests reported in table 5.1.

We can sometimes find more common fixed effects by region if we focus attention on specific occupations. Households who report that their principal occupation is farming have more common fixed effects by region and pairs of years, for example. Still, the opposite is true if we restrict attention to rice farmers or to households who report their principal occupation is entrepreneurial (self-employed in industry, trade, and handicrafts). For these groups there are few if any fixed effects – most county-level shocks to their occupation are not shared by other counties in the same region (again, see table 5.1).

Now suppose that all households in a given region (at least all households in an occupational group) were linked up to one another via some common financial system. Then, in principle, idiosyncratic shocks across counties could be pooled. Specifically, under CRRA preferences, county-average consumption growth should track regional-average consumption growth, one to one. Controlling for this common regional shock (fixed effect), county-specific income growth should not influence country-specific consumption growth at all. Indeed, if everyone in the entire kingdom were linked up with one another, then country-average consumption growth should track kingdom-average consumption growth. Even regional shocks would be smoothed.

By this standard, regional- and national-level financial systems in Thailand are imperfect. Formal econometric tests of the risk-sharing hypothesis reject full insurance almost uniformly. Marginal propensities to consume out of idiosyncratic income growth are not zero – coefficients on county-specific income growth are positive and significant, sorting the data by region, pairs of years, and occupation groups. Still, some interesting patterns emerge. Counties in the greater Bangkok area, while experiencing the relatively high levels and growth rates in income and consumption noted earlier, experience as well relatively less insurance. The coefficients on idiosyncratic income growth are relatively high. Similarly, entrepreneurs tend to be less well insured. On the other hand, farmers in the north and the north-east actually pass some tests for full insurance when the 1990 data are excluded from the analysis. Related, please note the common fixed effect in consumption in table 5.1. In regressions the coefficients on idiosyncratic income growth are small and the coefficients on regional-average consumption growth (or a common fixed effect) are high.

These results are directly counter to the prediction of the Greenwood–Jovanovic model on the relationship between insurance and growth. Because growth rates of income and consumption are higher in Bangkok

than in other regions, and higher for entrepreneurs than for other occupation groups, one would predict from the model higher levels of insurance, not the other way around. It is possible, of course, that the level of aggregation is leading us astray. Micro, household-level data are needed to sort out whether insurance actually improves (or not) for those entering the financial system. Recall, by way of contrast, that in the model of Lloyd-Ellis and Bernhardt that relatively rich household dynasties experience faster growth through accumulated own savings, not through improved insurance.

In the absence of microdata one can look directly at the major financial institutions of the country and see what provisions for insurance (explicit or implicit) are contained in their operation. Rashid and Townsend (1994) have done this for the Grameen Bank and BRAC in Bangladesh; SEWA and WWF in Ahmabad and Madras, India; BKK and BRI in Indonesia; and FINCA in Latin America. Appendix B carries out a similar analysis for the BAAC, the Credit Union League, the Temple Wat Ba, and Production Credit Groups (PCGs) of the Community Development Department in Thailand. The interested reader is urged to consult appendix B for details. Suffice it to note here that there are ample possibilities for insurance with the Thai financial organizations.

Other cross-country data would lend support to the Greenwood–Jovanovic hypothesis that there is a link between financial intermediation and growth. Specifically, King and Levine (1993) use various measures of financial intermediation: the ratio of liquidity liabilities of the financial system, M3, to GDP; the ratio of deposits in financial institutions such as banks relative to that plus deposits in the central bank; the proportion of credit allocated to private enterprises excluding credit allocated by government development banks and state-owned enterprise, that is, the ratio of claims on the non-financial private sector to total domestic credit; and the ratio of claims on the non-financial private sector to GDP.

The measures of intermediation that King and Levine use do turn up significant correlations of intermediation with growth in a cross section of 80 countries from 1960 to 1989. In particular, they look at growth of per capita income, growth of capital, levels of investment, and a Solow-like measure of technological progress. Indeed, there is a correlation between lagged financial intermediation and contemporary average growth: “To illustrate the economic size of the coefficient, the results suggest that if in 1970 Zaïre had increased the share of domestic credit allocated by banks as opposed to the central bank from 26 percent to the mean value for developing countries in 1970 (about 57 percent), then Zaïre would have grown 0.9 percent faster each year in the 1970s, and by 1980 real per capita GDP would have been about 9 percent larger than it was.”

Table 5.1. Region, year, and community type patterns in income and consumption growth rates

F test for:	Different occupation groups						Different measures of income and consumption									
	All households		All farmers		Rice farmers		Entrepreneurs		All income		No in kind		Wages		Food	
	Y	C	Y	C	Y	C	Y	C	Y	C	Y	C	Y	C	Y	C
1	N:	75-81												*		
2	N:	81-86														
3	N:	86-88			**				*		**		**			
4	N:	88-90								**	**		**			
5	N										**		**			
6	NE:	75-81														
7	NE:	81-86									*					*
8	NE:	86-88	**	**	**	**	**	**	**	**	*		**		**	**
9	NE:	88-90	**	**	**	**	**	**	**	**	*		*		**	**
10	NE															
11	C:	75-81														
12	C:	81-86			**		*	**								
13	C:	86-88	**	**	**	**	**	**	**	**						
14	C:	88-90	**	**	**	**	**	**	**	**						
15	C															
16	S:	75-81														
17	S:	81-86														
18	S:	86-88														
19	S:	88-90	**	**	*				**							
20	S															
21	B:	75-81														
22	B:	81-86														
23	B:	86-88			*											
24	B:	88-90	**	**	**	**	**	**	**	**						**
25	B				**											**

Notes: This table presents the results of *F*-tests for the joint significance of dummy variables from regressions given by

$$\frac{\ln y_t^a - \ln y_t^b}{t - \tau} - \frac{\ln y_t^a - \ln y_t^b}{t - \tau} = b_{t,\tau}^a \delta_{t,\tau}^{a,c} + e_{t,\tau}^{a,c}$$

rates. Where the division is by occupation, consumption is equal to expenditures on food, clothing, shoes, and tobacco; and income is equal to wages, profits from farming, entrepreneurial income and income-in-kind. A * indicates that the test is significant at the 10% level, ** indicates significance at the 5% level. N = north, NE = north-east, C = central, S = south, B = Bangkok.

As King and Levine note, however, these illustrative experiments do not consider how to increase the variation in their variable BANK in 1970. Indeed, we are reminded of the model of Greenwood and Jovanovic (1990) which goes further and suggests it is not optimal to increase intermediation precisely because there are costs. So though the empirical results of King and Levine are suggestive of the intermediation results of the Greenwood–Jovanovic model, and roughly support the arguments of BAAC, CULT, PCG, and other Thai program officials that credit (and savings) are a good thing and that program expansion is desirable, the theory and the empirical results offer no real guidance on how fast credit programs should be expanded, and at what costs. Indeed, the Thai SES insurance results suggest that the mechanisms of growth may be unrelated to the insurance components being provided by informal and formal intermediation systems. Of course, this does not mean the logic of insurance theory is wrong. Even if current systems are limited, improved systems of risk sharing may actually increase growth rates and lessen inequality in the distribution of consumption and income.

A related criticism: what measures of financial intermediation should one use? In the Greenwood–Jovanovic model, those in the intermediated sector place all savings in banks while borrowing to finance enterprise activity. So for them the measure of the level of liquid liabilities goes up. However, incomes go up as well. Indeed, the ratio, the savings rate, is exactly the same as for those in the non-intermediated sector, at least for those who do not anticipate to be linked for a long time. Only those about to bear costs of entry save relatively more, suggesting higher savings rates in regions where there is new intermediary activity. However, those outside the intermediated sector save outside the sector, so the presumed increased savings is unmeasured. (Related, the models of Lloyd-Ellis and Bernhardt, and Deaton allow for bequests or savings but are unclear about whether this is done by the individual household alone or through a savings account in a financial institution. In the context of the present discussion, this distinction matters.) Recall also various of the measures assume a distinction between government and non-government savings and finance. These have no analogue in the Greenwood–Jovanovic model.

More generally, the model of Greenwood and Jovanovic allows intermediation and credit-insurance systems at the regional and national levels but contemplates only two extremes. Households in the intermediated sector are not credit-constrained in any way and receive perfect insurance, that is, perfect smoothing with others in the intermediated sector. Households outside the intermediated sector save on their own into their own technologies; there is no intermediation whatsoever, not locally, not even with nearby neighbors. The model of Greenwood and Jovanovic does not

allow intermediation to vary, say with good accommodation of local shocks in small groups or in villages, but less accommodation nationally across villages and regions. Related, local systems may be less costly.

8 MICROLEVEL TESTS OF RISK SHARING AND EFFICIENCY

The starting point for an extended analysis of risk sharing and efficiency would be a group of households. The group could be as small as a very local within-village kinship group or a small BAAC joint liability group. Moving up, the group could be all members of a village-level rice bank, a local credit union, or an entire village. Alternatively, the group of households could be a group of cross-village, family-related households or members of the district-level BAAC. Finally, the group could be everyone connected to some national-level organization, or the entire national-level economy itself.

We shall assume in the remainder of this section that markets or an equivalent set of institutions are perfect for any such group, derive implications from this assumption, and discuss how to implement empirical tests with household data. The focus is on the groups, at various levels of aggregation, and how to test for risk-sharing and efficiency.

So imagine a collection of households together for their entire lives. Each household is presumed to try to maximize expected discounted utility from a utility function which is separable over time and has as its arguments consumption and leisure. Each household owns various technologies, that is, has access to livestock, distinguishing types of animals; agriculture, distinguishing crops, soils and location of land; and perhaps to forestry. Each technology is subject to idiosyncratic, household-specific shocks and to aggregate, common shocks, that is, shocks common to the group. There are, as well, shocks to households internally, e.g., sickness, illness, death, and disability. But the group need not be considered in isolation to other groups or markets. Quite possibly, consumption, labor, livestock, and capital goods may be exchanged across groups in these markets. Related, individual households in the group can store grain and money and may be able to borrow or lend, or to give and receive remittances, in external markets, or within individuals and outside institutions.

The presumption, however, is that within-group consumption and leisure allocations are Pareto optimal for the group. This is, within-group credit and insurance markets (or an equivalent set of institutions) function perfectly well, while the smoothing with credit and insurance allowed by outsiders may be limited. Analytically, one can characterize these optimal allocations by maximizing a weighted sum of household utilities subject to

a group-wide budget constraint (or resource constraint), that the value of consumption and leisure of the group plus all purchased inputs such as seed and pesticide and all purchased capital inputs such as tractors and livestock of the group should not exceed the value to the group of gross crop output, livestock and assets sold plus income received from outside labor supply plus income from the decumulation of currency and grain stocks plus resources from acquisition of new loans less the paying off of old debts, the giving of remittances and the paying of insurance premia.

The implications of this full-insurance model for any particular group are well known. First, as in the description of risk-sharing in the Greenwood–Jovanovic model, household consumption and leisure should move with group-average consumption and leisure, as if there were common time-varying fixed effects for the group. Household-specific income shocks should have zero residual effects. Further tests along this line are reported momentarily. Second, household consumption and leisure decisions should be separate from production decisions, the standard neoclassical separation hypothesis extended to incorporate risk. Separation has been tested by Benjamin (1992), and also Feder *et al.* (1991) (both noted above), asking whether household labor and other demographic variables have an effect on production beyond time-varying wages or prices facing the group and/or internal shadow prices picked by a group fixed effect. Third, the group's use of currency, livestock, other real and financial assets should all be consistent with one another. Assets dominated in return should be held by no one. We shall come back to the group's smoothing relative to the outside economy in the discussion below.

Much of the existing empirical work has taken the "natural" group to be the village and proceeded with the empirical tests just outlined. Townsend (1994b) conducts extensive tests of villages as risk-sharing groups using data from the International Crops Research Institute of the Semi-Arid Tropics (ICRISAT). Part of the analysis establishes that taken one at a time households fail to take much advantage of diversification possibilities across soil, space, crops, and income sources. With the exception of Kanzara, per capita incomes across households in the village do not co-move much. The second part of the analysis establishes the relatively low influence of present household income on present household consumption: the marginal propensity for a household to consume out of idiosyncratic changes in income was no larger than 0.14 in any of the three villages. Versions of the permanent-income model which permit households to smooth present consumption against income fluctuations by borrowing and lending (as noted above) would make this coefficient close to the village real rate of interest, but reported real rates are much higher than this. However, the income coefficients are statistically positive, thus rejecting the

hypothesis of full insurance. The analysis also explores the sensitivity of consumption to other shocks. Neither unemployment nor sickness have a significant impact on a household's consumption.

There are, though, various anomalous patterns in these ICRISAT data and in other data. First, there are variations across households within villages, suggesting at least that the village may not be the "natural" group. Second, there are great variations across villages in apparently similar environments. Third, there may be patterns across relative to integration with the national (growing) economy. We shall take up each of these issues in turn.

First, then, the issue of disparities within villages. In the ICRISAT village of Aurepalle, the poor, landless laborers are significantly less well insured than their village neighbors, the landed farmers (see Townsend (1994b) and Morduch (1991)).

Field research in northern villages in Thailand seems to reinforce the ICRISAT results. An analysis of the village of Yang Pieng in Amphoe Omgoi is illustrative of the analysis. Specifically households in Yang Pieng are found to be producing rice almost exclusively. Yet rice yields vary from farmer to farmer, and good years and bad years are not coincident. Again we have income diversity. The sources of variation are rank ordered by farmers: variable monsoon rains and uneven flow of water within the region are said by virtually all farmers to be the dominant source of fluctuations, but crop diseases and pests are listed as important secondary sources of risk. (Other villages in the survey mention crop disease or pests as the most significant source of variation.) (For more details, see Townsend (1995a).)

Despite this diversity in income fluctuations in Yang Pieng, household consumption and labor supply should co-move. Again, this requires that households be linked to one another either via networks of friends and relatives or via community institutions. But one discovers from village stays and questionnaire responses a group of relatively well-off households who smooth with rice in storage or with the purchase and sale of livestock and who are not linked to others. Such households might pass tests of the permanent income hypothesis, partially smoothing consumption against contemporary shocks, but such asset transactions are not enough to get their consumption to co-move if their incomes do not co-move also. Similarly, village stays and the questionnaires suggest there is a group of relatively poor households who smooth in part with increased labor supply and with borrowing and lending, either from friends and relatives or from a village rice bank. These may be enough to get consumption to co-move for this group. On the other hand, some said increased labor supply was linked to dwindling own storage, and own storage seemed to vary across households experiencing diverse income shocks. Thus labor supply would

not co-move. Labor supply linked to asset levels needs to be better documented. Incidentally, some poor households confirm that they use the rice bank first, while others go to friends and relatives. The cost and benefits of quasi-formal institutions versus informal networks needs to be understood, both in theory and practice. We are alerted in particular to the possibility of differential costs.

Another apparent fact from the village stays in Thailand and from the questionnaires is significant variation in arrangements across villages. In amphoe Maajaam, for example, three villages, Mae Wak, Sop Wak, and Maanajohn, all within walking distance to one another, vary considerably in their institutions and risk-response mechanisms.

Mae Wak, for example, has a credit union or PCG fund, a rice bank, a household wife fund, and various input-financing funds. All households in Mae Wak contribute savings to these funds, making them eligible to finance inputs if not year-to-year fluctuations in consumption. Unlike Yang Pieng, all households are linked to one another via these community institutions. No household in Mae Wak reported itself to be credit-constrained, and savings and rice have accumulated in these funds to the extent that the village has become a regional lender. Community measures of financial intermediation would appear to be high.

In contrast, the village of Sop Wak, down the road, was experiencing problems with both its rice bank and its savings funds. Defaults on unpaid loans were said to be a significant problem, and participation in these organizations, and the credit supplied by them, was much more limited than in neighboring Mae Wak. One wonders, of course, if there are local lenders or a broader informal market, as substitutes.

Maanajohn, also nearby, has virtually no community-level institutions. A previously established rice bank was said to have failed with the corruption of a previous headman. Indeed, village stays and the questionnaires turned up poor landless or small landholders responding to bad years with increased labor supply, only. As in Yang Pieng, described above, if incomes after labor supply do not co-move among this group of poor households, and they appear not to do so, then consumption could not co-move. Perhaps a rice bank or other local financial intermediary would prove useful. Yet the only community level "organization" apparent to this researcher was a traditional death benefit system, with all households contributing to a fund for any bereaved family. Nevertheless, the questionnaire did turn up a lively village credit market, both with "traditional" moneylenders and with some kind of network among friends and relatives (though interest is sometimes charged). Loans were frequently said to have provisions for risk. Maanajohn also suffers from land fragmentation. Many households have multiple, spatially separated plots. The adoption of

high-yield, high-risk rice varieties was also not in evidence, unlike for its two village neighbors. Perhaps less than adequate risk sharing is leading to costly fragmentation or to low-yield investment strategies, as the work of Morduch (1993) suggests.

In summary, then, there appear to be significant variations across villages even in similar environments. What is the source of this variation? Is it due to more subtle variations in the local ecology after all? Is it due to variations in the ability of the headman or in "human capital" more generally?

A final village of the northern Thai survey is of some interest. Village Ba Pai in amphoe Lee lies along both sides of a major highway to Bangkok and is much more involved in the commercial economy than any other village in this field research. No one was growing rice for subsistence. All were growing cash crops. Like Maanajohn, Ba Pai has no community organizations. More surprisingly, it lacks as well a village credit market. Ba Pai farmers to have access to BAAC loans, and despite diversity in production, few in the survey complained of a shortage of credit. Perhaps income movements are more uniform in this village, as in the ICRISAT village of Kanzara, and internal credit is not needed. Still, the questionnaires also turned up households having suffered loss of income from episodes of serious illness. No one came to their assistance. Indeed, the headman pointed to several "abandoned" elderly in the village, rare for the Thai society. These latter observations from Ba Pai are not inconsistent with the hypothesis that indigenous risk-systems might decline as an economy grows.

More generally, one needs to integrate more reliable facts at the local level or village level with patterns of growth and intermediation at the regional or national level. We need to take the geography seriously, as in the models of Krugman (1991) or Tae Jeong Lee (1994), for example. Specifically, we need to evaluate local, regional, and national financial institutions to see what role they do play or could play in the allocation of credit and risk. Are national systems coping well with the supposed demise of indigenous systems? How do local, informal systems of moneylenders or networks operate and do these resemble the operation of banks as we envision in formal models in Diamond and Dybvig (1983), Krasa and Villamil (1992), or Boyd and Prescott (1986), for example?

9 FINANCIAL SECTOR LIBERALIZATION, INFLATION, AND GROWTH

The BAAC is a rural development bank. It is quasi-autonomous; it does try to cover its costs. While the BAAC's loan rate ceiling is below market rates,

the BAAC long resisted (during the 1980s) recurrent political criticism that it does not lend at low enough rates and that its collateral and personal lending criteria are too stiff for the lowest-income (smallest holders, etc.) farmers. The BAAC's response to criticism has been that it must retain its spread between the (concessional) costs of these institutional deposits and the interest rates charged to borrowers in order to cover its loan administration costs and avoid decapitalization. But the BAAC is not completely independent of government fiscal policy. It is still partially funded by transfers from the Department of the Interior, and there are recurrent pressures to engineer transfers to poor regions or those hard hit in areas of distress. This is much in evidence in the recent monsoon flooding of 1995. The work on risk sharing reviewed earlier would suggest that this is not necessarily a bad thing to do.

Still, extrapolating from contemporary policy debates in African and Latin American countries, some policy analysts would surely argue that it would be optimal for the Thai government to reduce or eliminate any threat to the government budget, that the BAAC should be privatized or at least made completely autonomous, and that interest rate controls or subsidized credit be eliminated entirely. Many policy analysts in other countries argue that the elimination of the government's deficits and other macro stabilization programs should come first, before financial-sector liberalization is attempted. If this is done, or so the argument goes, then financial-sector liberalization will increase savings and credit, build financial infrastructure, and ultimately benefit the poor. Indeed, it is implicit in these policy circles that these proximate targets are adequate measures of economic welfare.

Here, however, consistent with the policy algorithm, none of these conclusions is taken for granted. Imagine, for example, a well-articulated model economy that gives rise to both credit and valued currency. In the model economy of Manuelli and Sargent (1994), for example, credit is used among agents in enduring relationships while currency is used among relative strangers, as in Townsend (1980). Specifically, itinerant agents traveling in one direction meet itinerant agents traveling in the opposite direction. At the trading posts where they meet they are paired for two periods, and after this each type resumes its travels to the next post. Because production opportunities change over time, it is worthwhile to enter into two-period loans, but because one of the agent types will enter the next trading post in a period of relatively low income, it is worthwhile to carry currency into that meeting.

This model offers some cautionary tales. First, it is Pareto improving for the government to end any transfers associated with a monetary expansion, but only up to a point. Specifically, one Pareto-optimal allocation is for the government to pay interest on currency and finance this with lump-sum

taxes, something akin to Friedman's well-known rule on the optimal quantity of money. But a movement to this equilibrium from a non-interventionist stable money equilibrium is not necessarily Pareto improving. The policy shift is associated with a redistribution which injures certain parties.

Second, suppose interest rates were set so low that credit markets were suppressed. Then financial-sector deregulation, allowing rates to rise to their equilibrium level, would be Pareto improving. But such liberalization can be associated with jumps in the price level (inflation), less real savings, and greater fluctuations in output. Proximate targets in this model economy are terrible indicators of real household welfare.

Unlike the model of Greenwood and Jovanovic described earlier, the model of Manuelli and Sargent envisions good intermediation locally, but not globally. Agents who meet for two periods equate intertemporal marginal rates of substitution, that is, get to some local optimum, but they are then thrown back into the larger national economy where they meet, temporarily, with relative strangers. This is no doubt contrived. We need to build up model economies around observed patterns of local and national exchange, that is, of observed patterns of credit and currency. This cannot be done without taking a good look at household data.

Indeed, the earlier discussion of risk-sharing within and across groups is relevant here. Perhaps the village is a local, stable unit, with an excellent system for sharing inputs and risks, but the village is more isolated in its dealings with outsiders, using currency, for example.

Lim and Townsend (1994) have found only limited evidence for these conclusions in the ICRISAT villages in India. The primary device appears to be crop inventory, consistent with a buffer stock model of the village economy. This is particularly true in the village of Shirapur. But currency changes do play a smoothing role in Kanzara and Aurepalle, spending down accumulated balances during deficits, though the levels are off. Still credit is non-zero, though it plays a somewhat erratic role. These somewhat complicated village-aggregate patterns deserve to be better modeled.

Within-village patterns are of interest as well. Relatively large landholders tend to use crop inventory while relatively small landholders tend to use currency. Again, models of currency and credit need to be built up around measured facts.

Deserving of special attention is the use of currency and national-level credit systems. Again, we imagine some households and some villages are imperfectly integrated into the larger national system, but we do know the facts. Of course one should keep track as well of informal systems, the family and kinship-related households, rather than villages *per se*. Rosenzweig (1988) has found that in India households may marry daughters out

over space. In that way, remittances can flow among areas, depending on who is suffering a negative shock. In the Côte d'Ivoire, Grimard (1992) sorted the data from the World Bank's Living Standards Measurement Survey by tribe and has argued that networks among tribes allow greater consumption smoothing than is apparent in the non-sorted data. Paulson (1994) has studied remittances from migrants in Thailand and has concluded that these play a role in where to go *ex ante* and what to send home *ex post*. Also, remittances in Thailand are large.

10 SUBSIDIZED CREDIT: INCENTIVE-COMPATIBLE TRANSFER SCHEMES

As noted, it is the goal of the Thai government to help the relatively poor, and it seeks to do this with subsidized credit through the BAAC. Similarly, the Temple Wat Ba does not try to break even; it relies on altruistically motivated transfers of the Thai and international communities. This flies in the face of conventional wisdom that financial organizations should be self-sustaining, that profitability be the sole criterion of ultimate success. Indeed, the conventional wisdom in economics is that altruistically motivated transfers be lump sum, separated if possible from the operation of credit and other markets.

In fact, when information is incomplete, an optimal information-constrained transfer system is not necessarily lump sum. That is, one cannot separate the operation of credit and insurance markets from the transfers of altruistically motivated donors. It follows that the BAAC and the Temple Wat Ba would show losses on their accounts, as more resources are passed through these organizations than are recovered. One needs other metrics to determine if transfer-cum-credit schemes are efficient.

Related, in an optimally designed information-constrained system, certain types of competition are not necessarily a good thing. One must distinguish *ex ante* competition in the right to provide financial contracts from *ex post* competition for customers and the rights of customers to unrestricted access to available markets and institutions.

Because these propositions are hardly self-evident, we explore one particular model economy in somewhat greater detail to illustrate results. Specifically, building on Phelan and Townsend (1991), consider a bank which acquires funds at an outside, competitive rate of interest or funds which are priced at this interest rate even if acquired without cost or obligation from an outside donor, as in the construction of Yaron's (1991) subsidy dependency index. The bank lends then onlends these funds to client borrowers. Each borrower has an investment project which yields

profits as a function of the amount of credit-financed input and of individual effort. More effort raises the likelihood of success, but effort is unobserved by the bank. But suppose profits and the use of credit-financed inputs are observed by the bank. Finally, unlike the models of Piketty (1994) and Aghion and Bolton (1992), suppose borrowers are risk averse.

A feasible loan contract is a standard loan contract in which the borrower promises to repay principal and interest no matter what. (Imagine default is simply impossible.) This might make the amount the client is willing to borrow quite small, and risk aversion has a similar effect. The client does not want to face the prospect of paying back a relatively large loan when profits are relatively low; consumption would suffer too much. Indeed, a risk-averse borrower would prefer consumption which is stable in the face of income fluctuations, and if the bank is "risk-neutral" or has a well-diversified portfolio of loans, it can provide this insurance at a price.

If there were full information on labor effort, the bank could provide full insurance. It would be possible in this circumstance to control labor effort and avoid moral hazard problems. Indeed, an altruistic bank, or a bank financed by donors, could raise the welfare of its client borrowers by simply raising the level of promised consumption. In effect the bank's operations would be separated into three components. First, the bank lends credit to client borrowers at the outside, competitive rate of interest, expecting complete repayment. Second, the bank also provides complete insurance to the borrower, covered by *ex ante* premia. Finally, the bank passes a transfer to client borrowers via a lump-sum payment. The financial accounts – for borrowing/lending and insurance at least – would show no losses.

If the effort of the borrower is known only to the borrower, however, then insurance causes an incentive problem. Faced with stable consumption, even when income is low, there is no incentive to work hard, to raise the likelihood of profits. To circumvent this, the bank offers a contract with a carefully tailored blend of credit and insurance. Consumption of the borrower would be higher if profits were higher, and this induces higher effort. But the bank would co-insure with the borrower, in effect taking in a premium when output is high in return for handing out an indemnity when output is low. The borrower does not incur all of the income risk.

Now, imagine in this context that the bank is making positive (or non-negative) profits and an altruistic donor takes over the bank, determined to increase the welfare of client borrowers. This can be done by passing resources through the bank. Now, however, the optimal information-constrained transfer need not be lump sum. At higher levels of wealth or average consumption, the borrower may be less risk averse, making the threat of low consumption when profits are low less effective. This is circumvented by cutting back somewhat on the level of insurance. Though

consumption of the borrower is higher than before in states of both high and low profits, the spread, the consumption difference between high and low profits, increases. The ultimate objective is to induce effort by controlling consumption, and lump-sum consumption transfers do not have this property.

If we make this model dynamic, with repeated financing of investment projects by a bank, then a corollary to the story emerges. In a multi-period setting the bank will try to induce high effort not only with high consumption in the event of high profits now, but also higher promised welfare in the future. In effect there is a long-term relationship of the bank with each client borrower, so that high profits and relatively high repayment are rewarded both in the present and in the future, with more favorable loan terms in the next loan cycle on. On the other hand, client borrowers with relatively low profits suffer not only diminished consumption in the present but also less advantageous terms in the future. It is the threat of disadvantageous terms which helps to induce higher effort now.

Still, underlying risk can cause profits to be low when the borrower has been diligent, so some clients experience diminishing welfare. Indeed, the discounted expected utility of these borrowers can fall so low that they would like to tear up the long-term agreement and start over. The bank would be making relatively high profits on these borrowers, and it would be tempting for a new bank to try to coax disgruntled customers away. This kind of *ex post* competition would drive profits to zero, and benefit customers *ex post*, but such competition is not optimal *ex ante*. Ironically, a competitive "safety net" causes banks to lose their ability to induce high effort, and both banks and the client borrower are made worse off *ex ante*.

Again, the above model is presented as an example. The particular scheme which might be optimal *ex ante* depends on the specifics of the environment and the information structure. If household data are available, econometric tests of efficiency are possible.

11 MECHANISM DESIGN AND MICRODATA

Precisely this model was taken to the village-level ICRISAT data by Ethan Ligon (1993). Following the logic of some earlier work by Rogerson (1985), the multi-agent, principal agent model yields a Euler equation or relationship among marginal utilities of present and future consumption. Yet this relationship is not the standard Euler equation of the permanent income literature, and with some (unpleasant) assumptions about aggregate uncertainty, it can be taken to data. Indeed, fixing risk-aversion parameters at a priori reasonable values one discovers that this particular private

information model fits the ICRISAT data better than permanent-income or full-insurance alternatives.

By construction the principal in this private-information model acquires full control over all household assets, in order to better control consumption and avoid shirking. Indeed, the above-mentioned Euler equation then implies a peculiar feature: households in the model economy are "saving constrained." They would like to save more but are not allowed to do so. This takes us back, of course, to the earlier liquidity-constrained models reviewed earlier, with the twist here that it is savings, not credit, that is the "problem." But again the allocations here are information-constrained Pareto optimal. One should not let households have full and complete access to savings accounts. Incredibly, even currency accumulation and decumulation should be controlled. There may be savings in the aggregate but again the principal has sole control over this.

One wonders, of course, about the plausibility of the model and auxiliary assumptions which allow the empirical tests. A related literature goes about testing in a different way. Specifically, the private information model under scrutiny allows households to be awarded and penalized based on past histories and contemporary realizations of project yields. This creates diversity in the population of borrowers, a diversity which only increases over the life cycle of borrowers. That is, the variance of the histogram of consumption in the population increases with the age of cohort borrowers. A similar kind of spreading occurs under versions of the permanent income and other private-information models, but quantitatively the mapping from parameters of preferences and technology to the variance of the consumption histograms is different for different models. Phelan (1990) works all of this out and compares his model with the actual spread in US PSID data. Deaton and Paxson (1994) document increasing consumption dispersion in Taiwan, the UK, and other countries.

A related empirical feature which deserves mention here is so-called segmentation of credit markets. As Siamwalla *et al.* (1990), Aleem (1990), and other observers noted, rural credit markets in Thailand and Pakistan have the feature that borrowers often have long-term relationships with one of the several lenders, rarely switching. We have seen above that long-term relationships are *ex ante* optimal under the private-information models under discussion here, and so the literature on segmentation would suggest that information-constrained model economies are good approximations to actual rural economies.

More directly, though, one needs to posit realistic models with information constraints and this can only be done if we measure information sets directly, as in the work of Udry (1990), Townsend (1995a), and Mueller and Townsend (1993).

Now let us turn to the details of credit arrangements with a focus on production. The key driving force in information-constrained optimal arrangements is the inference that the laborer or borrower was diligent or not, the so-called likelihood ratio. If this ratio is in turn influenced by a second credit-financed input, then that input can serve a role as monitor, quite beyond the impact of that input on output directly. Ongoing research (of the author with Ethan Ligon and Andreas Lehnert) has thus produced numerical examples where the principal wants to retain control of this second input, even if its application is fully observed. That is, it is Pareto optimal not to have the principal on-lend credit to the agent-borrower at the outside rate of interest applicable to the principal. The best arrangement is to specify the allocation of credit in advance. A second-best arrangement is to let the borrower choose, but possibly at a "subsidized" interest rate. Either way, the borrower might appear credit constrained, but it is Pareto optimal here that he be so.

A related point brings us at last to endogenous selection and to the distinction between formal and informal credit arrangements. Suppose the principal or local moneylender has access to outside funds, a major cost of doing business, but otherwise offers an information-constrained credit contract with the optimal blend of credit and insurance. Suppose further that competition among potential lenders drives any lender's expected *ex ante* profits to zero, and that at that level there are willing borrowers. In contrast suppose the principal or outside formal lender offers simple credit contracts, obligating the borrower to repay, or forcing bankruptcy. The consequent welfare loss in the second scheme can cause there to be a "missing market." At no welfare level for the borrower can the outside lender sustain positive profits. Ongoing research (mentioned earlier) thus delivers numerical examples of local arrangements separated from more formal markets.

Related, suppose information about project outputs can be acquired at a cost, and that these costs vary with the location of the potential client borrowers. Some villages may be near the bank's branch office, in some district town, and other villages may be quite distant. Then the bank may not make profits on distant villages and it may not select such villages as customers. In effect we have a model of banks which explains limited access. Distant villages may complain of being credit constrained in the sense of Feder *et al.*, but it would be Pareto optimal in the model economy that they be so. These kinds of models seem to have great promise.

A remaining issue in mechanism design has to do with groups and hierarchy in financial systems. Space does not permit an extensive review of the theoretical and applied literature on the subject. Suffice it to note that there are models of group formation based on internal monitoring

(Holmstrom and Milgrom (1990), Itoh (1988), E.S. Prescott and Townsend (1994)); on internal expertise (Varian (1990)); and on screening (Varian (1990)). There are also issues of limited commitment and default, by group members as in Besley (1992), or by bank officials as in Tirole (1985). There are larger enforcement and bargaining issues, as in the work on incomplete contracts in Hart and Moore (1988). There is work more in the "centralized," mechanism design tradition of Banerjee *et al.* (1992) on rotating credit associations, and of Besley, Coate and Loury (1993) on savings funds. There are models of banks based on delegated monitoring, of Boyd and Prescott (1986) and Krasa and Villamil (1992) and the models of bank regulation, of Diamond and Dybvig (1983) and subsequent literature. Some of these models make use of the coalition of the whole, raising the issue of how to define a bank both in theory and in practice.

APPENDIX A BACKGROUND ON FOUR THAI PROGRAMS

1 The Bank for Agriculture and Agricultural Cooperatives

The Bank for Agriculture and Agricultural Cooperatives (BAAC) is quite explicit about its policy goals, both in its annual report of 1990 and in descriptive documents. The major goals are:

- 1 The extension of credit to as many farmers as possible, to reduce dependency on informal-sector loans. Specifically: "Experience in Thailand and elsewhere shows that without government intervention, small-scale farmers have very limited access to credit. Left to themselves, commercial banks normally lend very little to agriculture because they consider the administrative costs and risks to be high. Private money lenders are willing to lend, but on terms which severely limit the benefits which farmers may derive from their loans, and which may cause a continuing cycle of indebtedness with no corresponding improvement in technology or productivity" ("Introducing BAAC").
- 2 Expand field units to District Branches—clients need not travel to towns for disbursement and repayment of loans nor for savings (see map, BAAC Annual Report 1990, figure 5.2).
- 3 To increase credit opportunities for poor and small-scale farmers. Specifically the relatively new "Whole Village" program lends to all eligible to borrow in selected villages, not just selected, narrowly qualified medium-scale clients. Still, the view persists in the organization that lending to the poor is

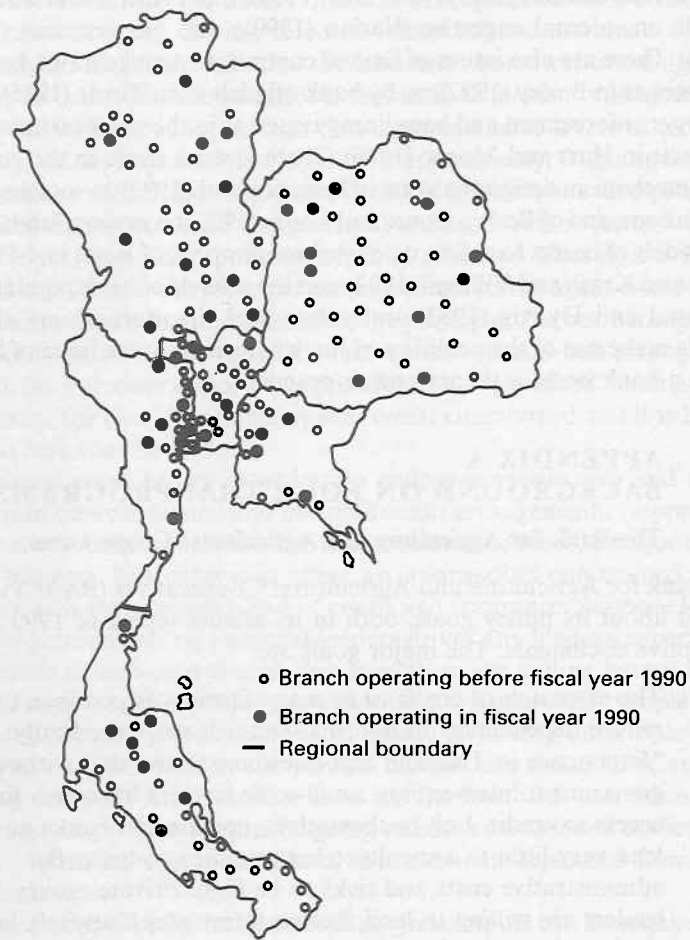


Figure 5.2 BAAC's operating area, 1990

expensive, and thus if lending to the poor had been the original objective of the Bank all along, the Bank would not cover its costs, that it would have failed or would have been taken over by another government agency.

- 4 Increase cooperative services such as agricultural marketing services to coordinate the purchase of supplies and the sale of products.

- 5 Promote modern farming techniques, in collaboration with the private sector.
- 6 Provide special loan facilities for farmers in distress, such as those experiencing tropical storms (IRA) and plant disease (brown plant hoppers).

In fact, the BAAC is a large and growing organization. It opened 50 new branches from 1989 to 1990, many upgraded from field office status but some in previously "remote" areas. The number of branches is now 168. It is reaching 3.1 million farm families, or about 59 percent of all Thai farmers, an increase of 10 percent in 1989–90. This has been accompanied by a large increase in savings (BAAC Annual Report 1990, figure 5.3), reaching 20,000 million baht, and large increases in dispersed loans (BAAC Annual Report 1990, figure 5.4), about an 18 percent increase overall from 1989 to 1990. The bank does this by lending to individual clients, to groups, to cooperatives and to farmer associations (BAAC Annual Report 1990, figure 5.5); and by lending for rice, maize, sugar, soybeans, cassava, livestock and poultry, tree crops and fishery (BAAC Annual Report 1990, figure 5.6); and by an array of short- and long-term loans (BAAC Annual Report 1990, figure 5.7).

Of particular interest here, rates on savings in Thailand, including those of the Bank, are without ceilings, and so the Bank is in competition with private-sector commercial banks for funds, at 8.5 percent at the time of this survey (summer 1989). However, rates on loans to individual client borrowers are still regulated, set at 12.5 percent, and it is from this spread that the Bank is supposed to cover its costs. In fact, the Bank can relend some of its "idle" funds at higher "market" rates. It also receives by law 20 percent of commercial bank deposits, if the banks themselves have not invested in agriculture and agriculture related business, though it pays close to the market rate of interest on these funds. Curiously, commercial banks can lend to farms at 14 percent, though they require collateral, and lend at a prime rate of 16.5 percent to merchants. Commercial banks claim they need 12 percent to cover costs. The Bank's ratio of operating expenses to the average value of loans is only 4.55 percent. It is thus seen that the BAAC is a lean organization intent on minimizing costs. And, in contrast to the world's experience with government development banks, most of the Bank's operating funds are from the public or from commercial banks; there is little dependence on foreign capital or on the Bank of Thailand. Finally, its repayment rates rank among the world's best, with overdue loans at about 8 percent of loans outstanding, and with intensive accounting and monitoring of past due loans (BAAC Annual Report 1990, figure 5.8).

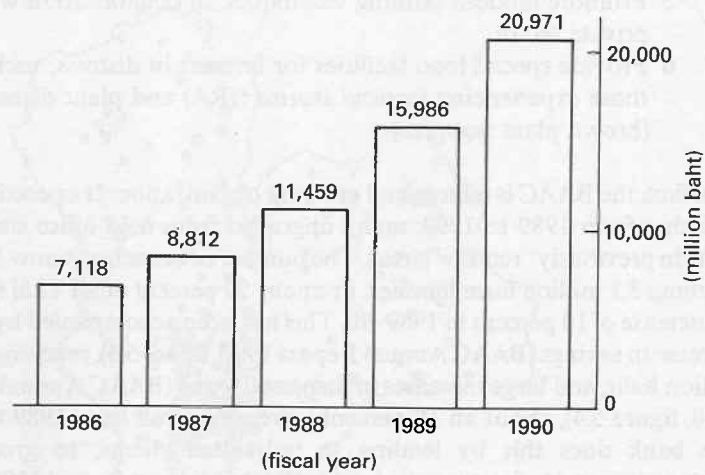


Figure 5.3 Deposit from the general public, fiscal years 1986–1990, BAAC

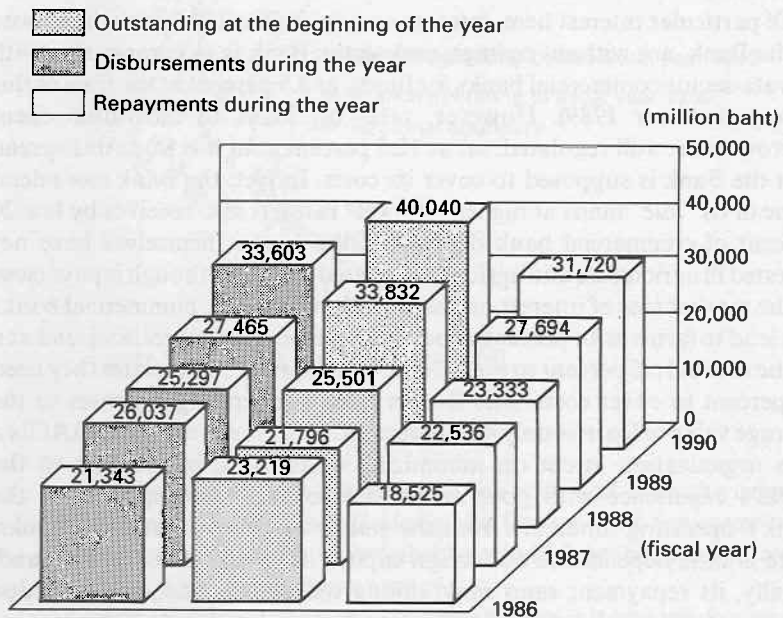


Figure 5.4 Lending operations (all categories), fiscal years 1986–1990, BAAC

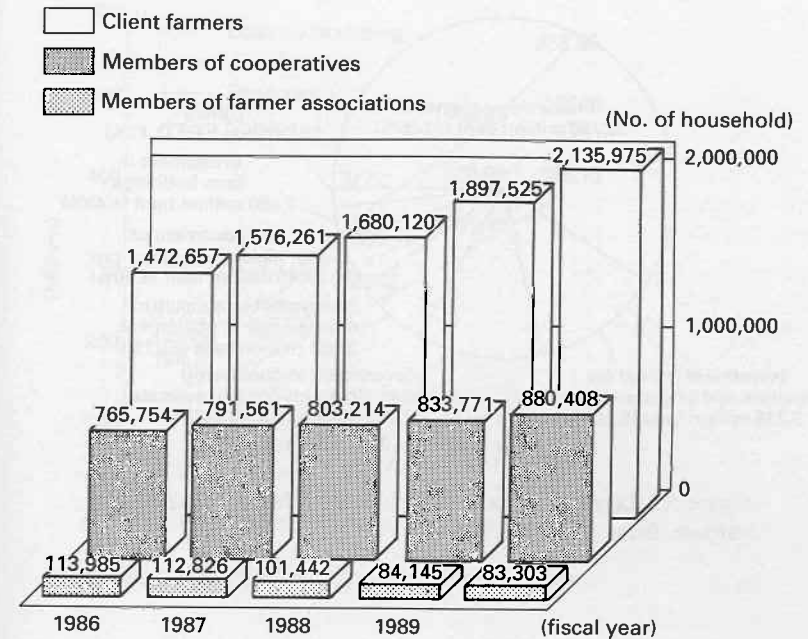


Figure 5.5 Farm households serviced by BAAC, fiscal years 1986–1990

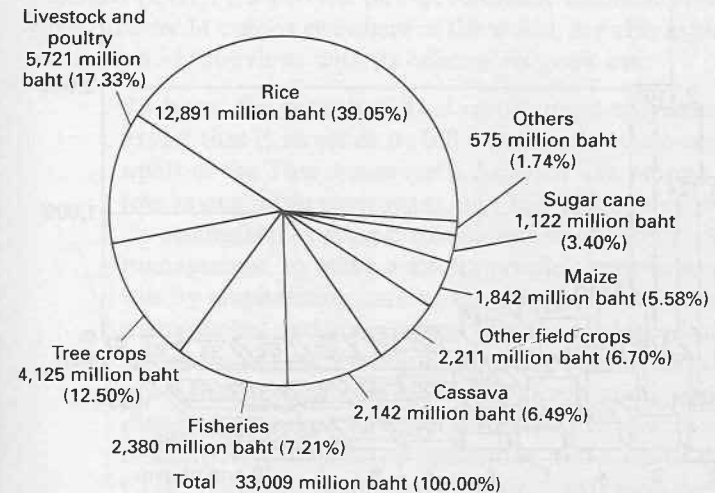


Figure 5.6 Lending operations with client farmers classified by production purpose, fiscal year 1990, BAAC

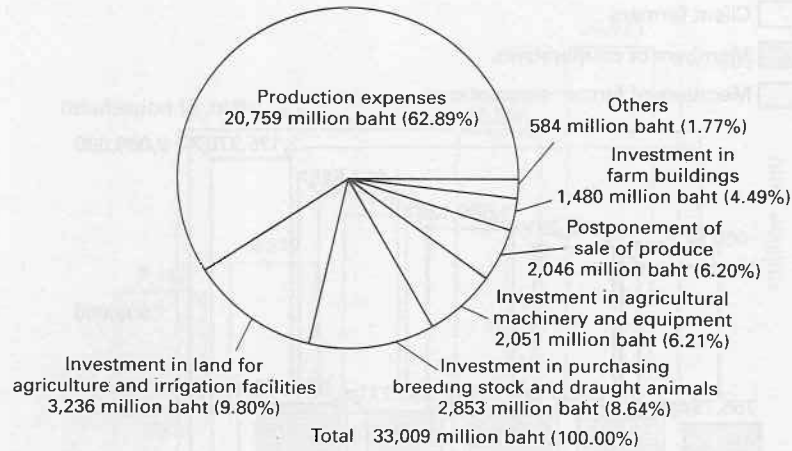


Figure 5.7 Lending operations with client farmers classified by purpose, fiscal year 1990, BAAC

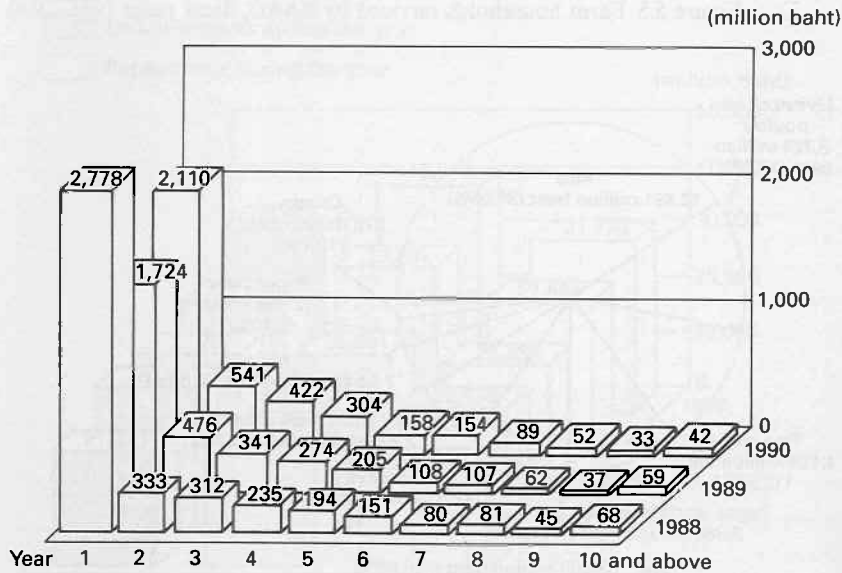


Figure 5.8 Age classification of past due loans (to client farmers), fiscal years 1988-1990, BAAC

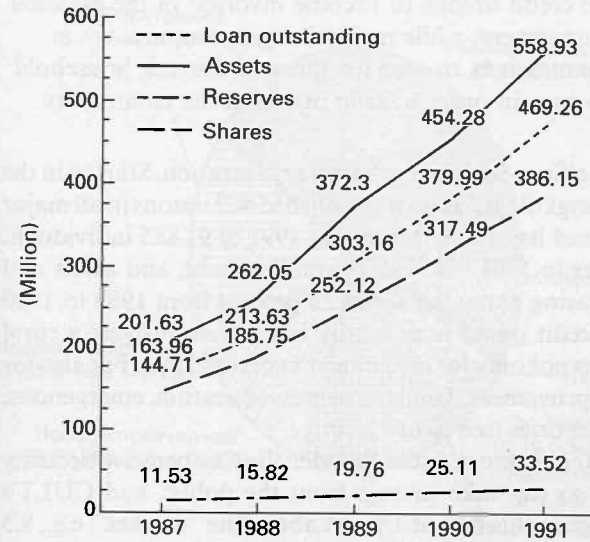


Figure 5.9 Financial growth of credit union

2 The Credit Union League of Thailand

A contrast in goals and size is provided by the Credit Union League of Thailand (CULT), a private, non-government financial organization. Its goals, like credit unions elsewhere in the world, are also explicit. From its literature and interviews with its officers, its goals are:

- 1 To boost the growth of Thai credit union movement to the extent that it serves at its full capacity the socio-economic uplift of the Thai community. Again, a link among low income, low saving, little investment, and bad technology is envisioned.
- 2 To strengthen existing credit unions in efficiency and management, to make a strong people's organization. It does this by emphasizing various programs for staff and members in management and accounting, with the goal of administrative autonomy for each union. It aims to reduce dependency on government, emphasizing self-help. Each union has a board of directors, an administrative committee, an education committee, a supervisory committee, and a credit committee. CULT is willing in principle to elicit savings in deposits and shares from the relatively well off in a given local community.

- 3 To encourage credit unions to become involved in the national cooperative movement, while maintaining autonomy.
- 4 To encourage members to save for times of distress, household needs, and to save in order to help others in the community.

In fact CULT is a medium-scale but growing organization. Started in the context of a slum in Bangkok, it has now established 482 unions in all major areas of the country, and has a membership in 1991 of 91,885 individuals. Total savings in shares in 1991 reached 386 million baht, and assets and loans have been increasing annually, about 25 percent from 1989 to 1990 (see figure 5.9). The credit union is primarily but not exclusively a rural lender and makes loans not only for investment in occupations, but also for debt release, home improvement, family expenses, education, emergencies, and other smaller categories (see figure 5.10).

Curiously, CULT unions are registered under the Cooperative Security Act of Thailand and so can take savings from the public, and CULT's explicit strategy is to keep this rate at 1 point above the "market," e.g., 9.5 instead of 8.5 percent. There is, in addition, an interbank lending program, and a local union can borrow from Bangkok at 14 percent. Unions in turn lend to their members at about 15–18 percent per year. Still, most funds are raised locally, in shares, paying dividends of about 5–10 percent. Interbank lending stands at 23 million baht, relative to members' own funds at 249 million baht. Initial generation of funds make typical CULT unions different from typical BAAC groups and typical agriculture cooperatives.

One may ask in all of this exactly what the "market rates" on savings and loans are supposed to be, were one to contemplate liberalization. More to the point, there seems to be significant interregional disparities in interest rates, and limits to instantaneous growth.

CULT's delinquency rate is at a low 2.40 percent in August 1993. It accomplishes this with incredibly few staff, for example, 52 overall. Administrative costs, if any, are borne locally. Nationally, the organization is largely self-sustaining, covering 90 percent of its funding; the residual comes from Germany and from the Canadian Cooperative Association (CCA).

3 The Northern Thai Temple Wat Ba – Foundation for Education and Development of Rural Areas

A third program, much different apparently from the first two, is run from the temple grounds of Wat Ba, in district Maa Rim, near Chiangmai. The founder of the Foundation for Education and Development of Rural areas

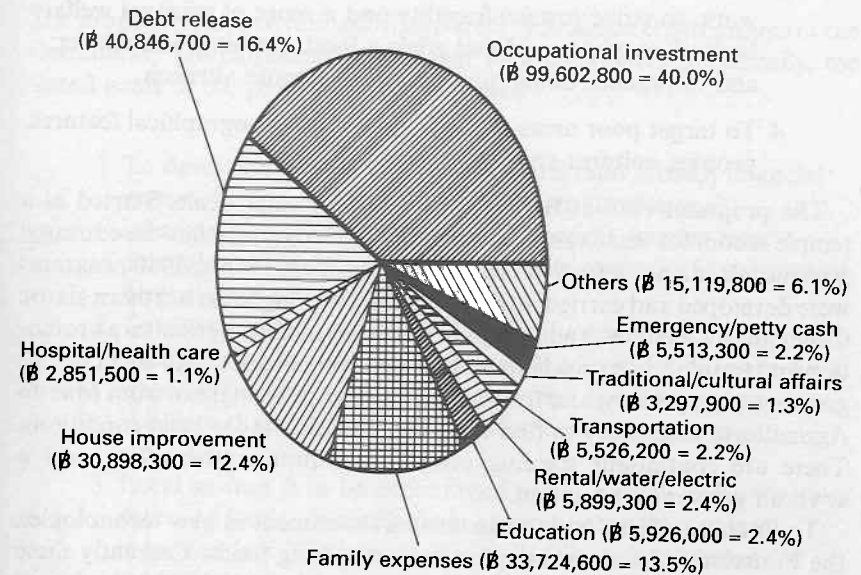


Figure 5.10 Loan granted to overall credit unions

is the well-known monk, Pra Thep Gawee. The goals of the organization are also explicit:

- 1 To encourage and support agriculture, that is, to develop people in their own occupation. Though people are to learn to solve their own problems, and those of the local area, the Foundation's programs are brought in to coordinate and help where needed.
- 2 To encourage education. The emphasis is on the acquisition of knowledge and modern technology to support the first goal. But the emphasis is also on practical application. For example, the foundation arranges for teachers and technicians to come in and diagnose local problems and propose appropriate local solutions.
- 3 To promote Buddhism. The idea is to develop each person's understanding of the reality of the world. Not suffering with delusions of self-importance or permanence, the mind is clearer, and so one can try to solve the larger problems of society and poverty. The specific goals are to promote diligence and hard

work; to strive toward frugality and a sense of spiritual welfare beyond necessary material goals – food, clothing, and shelter; and to practice doing good, that is, promote altruism.

- 4 To target poor areas, identifying diverse topographical features, peoples, cultures and traditions.

The programs of Wat Ba are on a relatively small scale. Started as a temple school for disadvantaged boys, it was recognized that the educated poor usually do not return to their villages. So from 1975 to 1988 programs were developed and carried into 39 villages, covering three northern states: Chiangmai, Chiangrai, and Lampun. Activities include agriculture promotion and training, improved input use, crop diversification, fish farming, rice growing, pigs, poultry, and fruit trees. Experts are brought in from Mae Jo Agricultural University to find technologies suitable for local conditions. There are continuous training programs, demonstration plots, and a soybean grower's association.

To finance training and the associated investment in new technologies, the Foundation has established various revolving funds. Currently these reach about 1,500 people in 21 villages, at a level of 1,225,000 baht. Loans are given in amounts of up to 1,000 baht per borrower, at about 12 percent per year. Much of the initial funds is brought in from the outside, from the Foundation.

With the idea that the poor lack access to plow animals, or can hire-in only at exorbitant rates, the temple has established buffalo bank programs. These rely on altruism, with a local donor providing an animal or new money to allow the purchase of a buffalo in the local market. This program operates in about 20 villages with 69 initial head plus 191 offspring. Borrowers pay for the animals in rice rentals.

This leads to the third financial program, rice banks. Currently there are about 600 members in 16 villages receiving loans of rice. Rice loans are targeted to the poor falling on especially hard times.

The temple also has day care centers and vocational training programs for women.

The temple makes no pretense that it should be self-supporting. It relies on the altruistic motives of the Thai and international community. It is currently receiving funds from UNICEF, The Asia Foundation, Bread for the World, and the Fredrich Newmann Stiftung Foundation.

4 Linking self-help groups with banks – a Thai-German project

The fourth program is a joint venture between the German government, on the one hand, and various branches of the Thai government, on the other.

The program is to link various village-level production credit groups of the Community Development Department with the BAAC. Specifically, the stated goals of the project as of 1993 were:

- 1 To develop a more integrated national (and formal) financial system, that is, to build the appropriate institutional infrastructure. The program would support interest rate deregulation, but asserts that if the infrastructure is not present, deregulation will not work.
- 2 To allow funds to be invested in rural areas using existing and strengthened groups. The idea is take advantage of lower costs when groups are used as intermediaries. It is mentioned implicitly that the BAAC does not use its own groups effectively.
- 3 Local savings is to be encouraged first. This will allow the poor access to funds, or access from sources other than unfair moneylenders. The borrower is to be allowed to borrow for more than agriculture.
- 4 To establish a management information system within the BAAC. For this (re)training of BAAC officers is envisioned.

The German donor is the GTZ, the technical foreign aid branch of the German government. Initial plans called for a survey of existing self-help groups and envisioned corroboration with several of them, including the Credit Union League mentioned earlier and various regional non-government organizations like (but not including) the northern Thai temple. In fact worries about sustainability and cooperation have led to the current choice of the so-called "production credit groups" (PCGs) of the Community Development Department, a branch of the Department of the Interior. In principle, that is on paper, these village level self-help groups are to be linked to banks, that is, to the BAAC, and the program is run out of the research department of the BAAC headquarters in Bangkok.

The program in 1993 was in its pilot stage, with choices of production credit groups in eight states total, two each in the north, north-east, central, and southern regions of the country. In all 184 out of 395 groups have been selected, comprising 51,000 individuals, and rated A, B, C, or D according to whether the group has been long established, whether it has accumulated ample savings, and whether these savings are used locally for lending. As currently measured in an initial survey, the production credit groups have some 125,215,840 baht in savings, of which about 5,477,031 is in accounts with the BAAC. However, Operation Link has been modified.

APPENDIX B RISK SHARING – AN INSTITUTIONAL ANALYSIS OF THE FOUR THAI PROGRAMS

The explicit insurance programs of SEWA, the group savings fund of Grameen, the implicit contingencies in BKK and other Indonesian programs are described in detail in Rashid and Townsend (1994). Similarly, the BAAC has incorporated risk contingencies of various kinds into its standard loan program, as theory and the environment might dictate. Most evident is the procedure for rolling over loans either with a penalty of 3 percent or without any penalty. In particular if a borrower goes bankrupt, uses money for wrongful purposes, intentionally defaults, is in jail, or is no longer a farmer, then a penalty is imposed. But if a borrower suffers from drought, flood, cyclone, pests, fire or theft of produce, difficulties in selling at reasonable prices, or fire or theft of other assets, then no penalty is imposed. All "defaults" are coded with numbers assigned to these events. There has been some discussion in the past in the Bank about whether this system might be expended. The possibilities it offers for explicit insurance, perhaps with high initial fees and greater indemnities, are evident.

Indeed, the Bank does offer low interest rate loans for those affected by natural calamities such as tropical storms (e.g., IRA) and pests (e.g., brown plant hoppers). It may waive interest in the first year altogether and offer "cheap" rehabilitation loans, at 8 percent per annum, for a subsequent year.

The Bank is promoting in various regions an "integrated farm production" plan, which encourages farmers to engage in a range of activities for diversification against price risk and natural calamities.

It offers loans for the postponement of sale produce, up to six months, with the unsold crop held in collateral. But it seems that unlike US farm programs with permanent subsidies, less than 1 percent of the collateral is forfeited.

The bank also offers special medium-term loans for disasters, for death of the borrower, and promotes voluntary death benefit funds, an indigenous Thai risk-sharing institution.

In conjunction with the establishment of village stores or cooperatives the Bank also offers consumption loans, and loan offices understand that a loan up to 60 percent of the gross revenue from cash crops may be used in part for consumption.

Ironically, though, the Bank does not seem to keep track of flows of funds motivated by insurance or consumption stabilization, though it has the records and accounts to do so. Indeed, insurance is not a metric it uses in its evaluation of branch performance. Rather, branches are given explicit beginning-of-the-year goals: number of new clients, number of new small-scale borrowers, designated lending amounts to individuals and to farmer

institutions, goals for repayments for loans not yet overdue, repayments already overdue, and savings mobilization. Bank performance is thus scored according to specific weights: to meeting these goals; to efficiency in the administration of credit, that is, to profits per assets, per earnings, and per unit of money received from Bangkok, and to repayments and reduction of past due loans; and to performance according to rules and regulations of the bank, e.g., in credit, accounting, secretaries, assets, and expenses. In fact, it seems most of the variation in scores across branches is in the last two categories, profits and efficiency in administration, not in meeting prespecified goals. Clearly, unusually large outflows or low repayments associated with idiosyncratic or aggregate shocks would lower accounting profits and hence lower a branch's score. Related, perhaps, several loan officers in the branches noted that the system favors "high performing regions," though each can identify counties in their control areas with agroclimatic problems and defaults not attributed to borrower negligence.

The apparent aversion to a formalization of insurance programs, many of which the bank already offers implicitly, is evident in a less-than-successful experiment with a large grain company, CCP. Insurance was offered through this company for BAAC clients, and though initially successful in the first year, there were large losses by the third. From this experiment the view persisted for many years that formal agriculture insurance is not feasible, though this researcher has not yet secured relevant details on the administration program, specifically, how premiums and indemnities were set and how payoffs were determined. The idea of more formal insurance has, however, recently resurfaced.

Ironically, given the appeal in theory and in practice of risk contingencies in loan contracts for poor high-risk borrowers, and given the intent of the Bank to expand its program to the poor farmers, the Bank appears insensitive to the appeal of insurance-like arrangements to potential clients. As noted above, even brief interviews with potential clients quickly reveal that would-be borrowers do not want to brave the risk of paying loans in bad years. This emerged as the reason for not seeking loans in the village of Lao Bao, Jawmtaung, Chiangmai a short 7 km from the main branch office and in a somewhat developed area. (Indeed, it seems hard to find areas not subject to high risk!)

Related, perhaps, is a need to understand better the role of small, joint liability borrowing groups within the BAAC. Surely screening of borrowers and repayments are important. But groups also offer the possibility of internal insurance among their members, even in the context of orthodox loans from the Bank. This could easily take the form of individual members paying off each other's loans, a practice which might be better documented. This researcher found individual members responding readily to questions

concerning the practice. Some definitely do it. Related would be the practice of one member borrowing from the BAAC and using the loan proceeds to pay off a second member's loan. More generally, one notes that BAAC borrowers are not supposed to (on)lend funds, certainly not at interest, though charity was said by one loan officer to be fine, nor are BAAC borrowers supposed to be borrowing elsewhere—at least this information is requested in applications for loans. The point again is that the BAAC appears ambivalent about internal insurance, not to mention village-level insurance generally, but theory argues that insurance is a good thing. The village of Lao Bao, for example, was said by its loan officer to have many, many borrowing groups. This researcher quickly uncovered a group of poor who do borrow and lend from each other, at no interest, and who do borrow from a big local lender, who might defer loans if the borrower were sick, but who are not borrowing from the BAAC for fear of risk. Ironically, it was said by these borrowers to be difficult to tell if more credit would be productive because yields are so variable, due to the risk! Still, one can offer the conjecture that BAAC borrowing groups do not automatically form around all "indigenous" groups in villages, groups which in turn may have inadequate risk reduction possibilities or groups which fear that the possibilities they do have may be limited once they join the Bank. One member of a group said that its members definitely do not help each other. These conjectures should be further tested.

A contrast with the BAAC is provided by a more detailed look at the credit program offered by the Credit Union League and its various subsidiary unions. First, credit unions lend explicitly for a variety of occupations, unlike the BAAC which is restricted to agriculture. This would be consistent, of course, with risk diversification. The issue of whether the Bank should expand its lending program beyond agriculture and related activities has come up formally at the BAAC and is favored by many of its program officials. Second, credit unions are explicit about consumption loans, viewed as definitely a good thing. As noted, unions lend for debt release, household improvement, and family expenses among others. Related, unions have special "emergency loan" procedures. In Shompuu, Sarapee, for example, there is a 1,000 baht, 30 day limit, but an emergency loan can be taken almost on demand from the chief clerk and accountant, confirmed quickly by the credit committee. Special blue accounting sheets earmark this as a special category of loan. More formally, the credit union offers life and disability insurance, called loan protection and loan saving insurance. For a relatively inexpensive premium, from 0.58 to 0.65 baht per thousand plus a membership fee of 15 baht per member, individuals in a union take out a policy which would forgive all debts (loan protection) and double all savings (live savings) on the death of the borrower. (It might be

noted that formal insurance from well-established companies is far more expensive.) This program is administered and underwritten by the CUNA Mutual Insurance Societies, headquartered in Madison, Wisconsin. Unions are also contemplating hospital insurance and other innovations. Finally, as noted, individual credit unions can participate in explicit intermediation, borrowing (and lending?) to Bangkok. The accounts which denote the flows are easy to read.

Of course what is true on paper is not necessarily true in practice. Unions do vary on the ground, so to speak. In the apparently successful union of Shompuu, Sarapee for example, residents were said to suffer prior to the coming of the union from inflexible moneylenders and relatively little charity. Curiously, some in the village would seem to have access to a local BAAC cooperative, if not the BAAC itself, but only six individuals in total participate in each of these. It was conjectured that collateral was an obstacle, but several members emphasized the strong attraction of the life insurance funds and the funds for emergencies. Current membership stands at 691, with about half the members borrowing, at 18 percent, and all purchasing shares. In principle one can borrow up to three times one's savings in shares. (Still borrowers often limit themselves to amounts which do not exceed their savings, especially the landless.) Two members of the Shompuu union had died last year, and their relatives received death benefit indemnities (oddly enough, there is also an indigenous death benefit fund in the village). Despite all the apparent flexibility, the committee expects timely repayment. In fact several members were in default, including merchants whose business had done poorly.

The village Jede Maglueu, Sansai has a three-year-old union, initially established by local school teachers. In fact, its efforts to attract potential farmer members seem mixed, with only about 20 percent of farmers in current membership despite promotional meetings emphasizing the life insurance benefits. Revealing, perhaps, the village has access to a cooperative, and there are BAAC groups, an agricultural credit group, and a potato group.

The third credit insurance program under consideration here, the Temple Wat Ba, has various risk features, noted earlier. Village rice banks stand ready to lend to those running out of rice, though there is perhaps confusion between stabilizing consumption around low levels, versus increasing levels. Revolving funds might similarly provide insurance, but there is mention of sick people in default, with no explicit insurance provision. The temple may be good at identifying inefficiencies in agricultural production and potentially profitable new technologies, but, again, this is not documented.

The fourth and final program under consideration, Operation Link,

makes passing reference to increased insurance in its program description, but few details are as yet filled in. The main emphasis is on increased intermediation, presumably with a focus on production efficiency, either with an increase in savings and these used locally, or flows across groups and regions, from high saving areas to areas with high efficient demand for funds. It seems unclear whether these flows are to be accomplished within the BAAC flow-of-funds system or with separate accounts as with credit unions. In any event, flow of funds to facilitate risk sharing would remain a strong possibility, with the pilot areas spanning all four diverse areas of the country. This depends, of course, on implicit or explicit contingencies in the loan contracts.

Surely an attraction of Operation Link is the possibility that it might use existing local groups with indigenous risk-sharing systems to smooth local risks from the standpoint of individual borrowers. Similarly the BAAC might lend to village organizations as groups, just as production credit groups have standing as independent legal entities for savings accounts. The plan seems reasonably straightforward. Identify strong local groups and link them together.

Indeed, the identification of local self-help groups has proceeded with the rating of Production Credit Groups in the Community Development Department. A disadvantage of this plan, however, is the potential to ignore the presence or absence of alternative organizations at the village level. A rather dramatic example of this came to this researcher's attention in talking to production groups of two villages, numbers 5 and 7 in the municipality of Lampun. Both had managed to accumulate some savings, but none was being used for local lending. More to the point, village 7 was relatively disorganized and appeared to have few funds other than its PCG savings funds. (It did have as well various BAAC borrowing groups, with overlapping membership.) But the other second village had a variety of funds, including an *indigenous* group fund which had been used for local lending and for emergencies (at zero interest), and money had accumulated to such an extent that the fund had been twice divided. Obviously, this second village was more successful than the rating of its PCG savings fund might have allowed. Related, this researcher was informed that BAAC borrowing groups in the second village had on occasion used the indigenous village fund to pay off the BAAC loans for individual members.

Notes

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- 1 These numbers do not reflect the experience of migrants. When the incomes of migrants are included, the dispersion of growth rates over regions is higher, that is, Bangkok would grow relatively faster with the inclusion. Related, the growth regional gross, domestic product indicates even greater disparities.
- 2 This allows consumption growth from t to $t + 1$ to be determined by idiosyncratic shocks at $t + 1$, and hence the growth of income from t to $t + 1$, in contrast to a full risk-sharing hypothesis.

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