

## Income change and saving in the Cote d'Ivoire

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### 0 Summary

0.1 The objective of the research is to add to the currently very limited knowledge of household saving in developing countries. By using the two successive panels of household data that are now available from the Cote d'Ivoire, we hope to avoid many of the data issues that have dogged previous research. By relating our research directly to the effects of government policy, we bring a new focus to the study of saving behavior in LDC's, a focus that explicitly relates savings research in LDC's to that in DC's. In developed countries, income tax and social security systems provide a direct channel from fiscal policy to household incomes, and through household incomes to household and national saving. In developing countries, the comparable link runs through agricultural pricing policies, where changes in procurement prices exert a major influence in household incomes. For example, in the Cote d'Ivoire in 1985, direct income from sales of cocoa and coffee accounted for more than 10% of all household income, and more than 22% of agricultural household income. Yet over the last thirty years, farmers have received only about half the world price of cocoa, and about a third of the world price for their coffee, the rest going in (implicit) taxes to the government, see Deaton and Benjamin (1988, Table 10, Figures 3 and 4). Similar figures could be quoted for other commodities and for other countries, particularly in Africa. Changes in pricing policy generate major changes in household incomes, cause major reallocations of income between private and public sectors, and most likely have an important effect on total national saving. The research will focus on the household part of this story, on how households respond to changes in income, particularly

changes in incomes from sales of agricultural commodities, and on how these income changes are diffused through the community. The main focus of research will be in the Cote d'Ivoire, where the Living Standards Survey data are ideal for the work and where pricing policy is a major concern. However, the project also includes a smaller scale study of household saving in Thailand, where export taxes on rice have been an important item in fiscal policy. While there are no panel data for Thailand, we have a succession of very good household surveys over time, and we are anxious to discover whether the research on the excellent but unusual data from the Cote d'Ivoire can be transferred to other situations. If so, it should be possible in later research to extend this kind of analysis to a number of countries.

0.2 The current proposal is for one year's research. There are four main stages in the work for the Cote d'Ivoire: (i) to process the third year (1987) data from the Ivorian LSS so that we have three years of consistent income and consumption data, and two successive panels, 1985-6, and 1986-7, (ii) to use other information from the LSS household and community surveys to examine the reliability of the income change data, (iii) to build up a picture of the process of income change in the Cote d'Ivoire over three years, at both the individual and community level, and (iv) to examine the links between different kinds of income change and household consumption and saving behavior. The work on Thailand will begin as soon as we receive the 1981-2 Socioeconomic Survey from Bangkok, probably in October 1988, and will begin by extending to that survey the work already done in Paxson (1988).

0.3 The proposal contains a subset of the research outlined in the earlier research proposal on "Aspects of saving behavior in developing countries," as well as some new material. However, the current proposal is new and self-contained, and should be read as such. There are parts of the current proposal that were not contained in the earlier one, and we hope that the underlying purposes of the research, to the extent that there is an overlap, are clearer in this proposal than they were in the previous one. It is our understanding that another Bank research proposal on saving is currently in preparation by Dr Ehtisham Ahmad, and that this project, if funded, will take up some of the work on Pakistan that was contained in the earlier proposal. We plan to keep in close contact with Dr Ahmad, and will share information. Depending on progress, it is possible that a joint project may be brought back to the Research Committee at some time in the future. If so, that project should benefit from the experience of this one. The project also bears some relationship to the work by Bevan, Collier, and Gunning on the effects of temporary trade shocks, as described, for example, in Bevan, Collier and Gunning (1986). However, that work, which is largely macroeconomic in nature, uses CGE models together with assumed parameters to study the effects of commodity price shocks. The research proposed here is concerned with more basic problems of measurement and is therefore complementary to that work. Our results will provide independent empirical confirmation or refutation of the sorts of assumptions that are necessary in the CGE approach.

0.4 The personnel involved in the project are as follows. The project will be led by Jacques van der Gaag of the WHR. Valerie Kozel, also of WHR, will

have primary responsibility for data preparation, and will share responsibility for the econometric analysis with Angus Deaton, of Princeton University. The work on Thailand will be carried out by Christina Paxson, also of Princeton University. We are currently exploring the possibility of involving collaborators, either from TDRI and the Central Statistical Office in Bangkok, or from the Direction General de Statistique in Abidjan. We have specific individuals in mind in both places, but we are still have to check whether the people that would be of real service are genuinely available. Nicholas Stern of London Economics will play a small role in the project and will collaborate with Angus Deaton on the analytical work in the Cote d'Ivoire. The consultants are all well-qualified to undertake this work. Valerie Kozel has already created the income and expenditure data for the first two years of the Ivorian data, and it would be close to impossible to carry out the project without her help. Angus Deaton has been a consultant to the Bank since 1979, has worked extensively on the Cote d'Ivoire, and has published several papers on the effects of taxes and pricing policy in both the Cote d'Ivoire and Thailand. Over the last twenty years, he has written widely on household saving behavior. Christina Paxson is an applied econometrician who has worked on labor supply and saving questions and who has recently completed a paper on the savings behavior of Thai farmers in response to fluctuations in income from rice. Nicholas Stern has undertaken numerous studies for the Bank, and is perhaps best known for his recent work on pricing and tax policy for developing countries.

0.5 The remainder of the proposal is organized as follows. Section 1 below, "Saving behavior in developed and developing countries: a focus for

research," explains the underlying motivation for the work. It provides the theoretical framework for the study, and explains the similarities and differences between research on household saving in developed and developing countries. Section 2, "Plan of the Research," explains what we plan to do. Section 3 contains the budget.

# 1. Saving behavior in developed and developing countries: a focus for research.

1.1 Saving behavior in developed countries has been a subject of intense academic and policy research for at least fifty years, see for example the survey papers by King (1985), Hayashi (1987), and Deaton (1987b). The dominant theoretical framework since the mid-fifties has been the permanent income or life-cycle model, whereby consumption is determined, not by current income, but by the present value of current and future anticipated incomes, so that saving is primarily motivated by the desire to "smooth" consumption over time. To motivate our own proposal, it is useful to distinguish in this research two main policy concerns, each with an associated line of enquiry, see also Boskin (1988). The first is the question of the effectiveness of fiscal policy. If the government alters income tax rates, and thus disposable incomes, the effect on real economic activity will depend on how consumption responds. If, as the theory predicts, consumers take a long view, then the response to the tax change is likely to be relatively small if the change is seen as temporary, as would be the case with attempts to fine-tune demand over the business cycle. Empirical work on these questions has focussed on the size of the marginal propensity to consume, on the differences between propensities to spend out of permanent

and transitory income, and most recently, on the relationship between changes in consumption and the expectations of future income under various hypotheses of expectation formation. Most of the work has been on macro time-series data, though there have been a few recent attempts to work with microeconomic data, in spite of serious problems with measurement error. In the United States, where much of the work has been done, there is a lack of adequate micro data, and several of the most cited studies, e.g. Hall and Mishkin (1982) have managed to estimate consumption functions without any data on total household consumption! The second major policy question concerns incentives to save, and in particular the influence of interest rates on the saving ratio. The issues are the standard ones of taxes, incentives, and deadweight loss, and particularly the effects of government behavior on total private saving and the capital stock. The theory here is somewhat less helpful in providing clear cut predictions; changes in interest rates have both income and substitution effects, so that, for example, higher real rates can encourage saving through the incentive effect, but discourage it if people save to meet fixed targets, as might be the case for retirement. The empirical work designed to measure interest rate effects has mostly used aggregate time-series data, if only because interest rates do not vary very much in the cross-section.

1.2 These two lines of research in developed countries have met with very different degrees of success. The first topic, on the relationship between income and consumption, has been empirically productive. Although areas of disagreement remain, there is a broad consensus that there is indeed a difference in the propensity to consume according to the degree of permanence

in the income change, and the difference is in the direction predicted by the theory. At the same time, it is clear that not all consumers are perfect "life-cyclers" and that some simply spend their incomes, behavior that makes good sense if they have inadequate access to credit. The second topic, on saving and interest rates, is much more controversial. Most careful examinations of the time-series data have been unable to uncover robust interest rate effects on saving. One specification will yield a "significant" effect, but the addition of a variable, or an alteration in sample period will remove it, see in particular Blinder and Deaton (1985). The most widely quoted study that found a strong interest rate effect, Boskin (1978) used non-standard data, and other researchers not been able to find similar results. Recent so-called "Euler equation" models, see for example Hansen and Singleton (1982) have had equally poor success. These models test the proposition that consumption should be increasing over time when the real rate of interest is greater than the rate of time preference, and falling when the opposite is true. But elementary plotting of the data shows that this did not happen; after-tax real interest rates in the U.S. have fluctuated a great deal in the post-war period, and have been negative as often as positive. There is no relation at all between these fluctuations and fluctuations in the rate of growth of consumption, a result that remains true even when appropriate allowance is made for the need to form expectations of interest rates and future prices, see Deaton (1987a).

1.3 It is important to understand the successes and failures of the work on savings in developed countries before embarking on similar research for LDC's. Although there have been some useful studies, notably the papers by

Bhalla (1979, 1980), Musgrove (1979, 1980), and Wolpin (1982), work in LDC's has not shared the remarkable successes of work in advanced countries. One problem lies with the data. Much of the best work in developed countries has used aggregate time series data, either quarterly data, or annual data over long periods of time, and comparable data are rarely available for LDC's. Research using micro household data has recently become more important in developed countries, but the focus has been on panel data, and again, and at least until the Living Standards Surveys, there has been very little panel data for developing countries. There are also severe problems of quality with microeconomic data, especially with the measurement of income, and these problems are likely to be exacerbated in the panel context, see Ashenfelter, Deaton, and Solon (1986). It is not clear that data from LDC's are any worse in this regard than data, for example, from the PSID; Altonji (1985) and Duncan and Hill (1986) give accounts of the sort of dramatic errors that occur in measuring wages in the PSID. Even so, household survey data from LDC's tend to report income levels that appear to be low relative to consumption levels, see for example Visaria (1980), so that there has been a great deal of skepticism about the usefulness of such data for the study of saving behavior.

1.4 There are other problems beside data. Possibly more important has been the fact that the policy concerns in developed countries could not be directly transferred to developing countries. Few LDC's have anything more than a semblance of an income tax, and indirect taxes typically cover only a small fraction of total expenditures, so that the question of the effectiveness of fiscal policy in combatting the business cycle simply does not



arise. As a consequence, the line of research that has produced the best results in the U.S. and in Europe seems to be a non-starter in the context of LDC's. By contrast, questions of interest rate policy, saving, capital formation and growth are of possibly of even greater concern in poor countries than in rich ones. In most LDC's, households do not have unrestricted access to capital markets, and many individuals are faced with artificially low interest rates. Although there is no theoretical presupposition that such situations depress saving, the possibility is real and is obviously worth investigating. Unfortunately, the problems that bedevil this line of research in developed countries are likely to be even worse in the context of LDC's. We have very little microeconomic data on the interest rates faced by individual households, while the aggregate data are less plentiful and of lower quality. Even if this were not true, there is no expectation that the results would be better than has been the case in the U.S. and elsewhere; as we argued above, the availability of good aggregate data in developed countries has not helped resolve the debate about the effects of interest rates on saving.

1.5 It is necessary to accept that some important questions are simply not researchable given current knowledge and data. While we recognize the importance of the interest rate issue, we have nothing useful to propose along these lines. Instead, we believe that, contrary to first impressions, the effects of fiscal policy on household savings are just as important in LDC's as in DC's, and can be productively researched along very much the same lines. While it is true that there is no system of personal income tax that extends to cocoa and coffee farmers in the Cote d'Ivoire nor to rice farmers

in Thailand, the fiscal policy in both countries has powerful direct and indirect effects on household incomes. The instrument is agricultural pricing policy, whether direct, through "marketing" or "stabilization" boards, or indirect, for example through taxation of exports. In the Cote d'Ivoire, cocoa and coffee prices are set directly by the government, and all farmers sell directly to the state marketing board at the announced prices, prices that have typically been a third to a half of world prices. In Thailand, there has been an export "premium" on rice for most of the last hundred years. These policies mean that in developing, as in developed countries, the state has a policy instrument that exerts a powerful direct effect on farmer incomes. And even for non-farmers, it can be expected that changes in crop prices will have effects elsewhere, through local labor markets, through changes in farmers' consumption, and through local activities that are related to agriculture. Of course, crop prices and agricultural taxation will also affect levels of production through their effects on relative prices. We do not wish to understate the importance of these substitution effects, but the primary focus of our research is on the income effects of the price changes.

1.6 In developed countries, consumers' response to policy induced changes in incomes is important because thereby hangs the effectiveness of counter-cyclical macro policy. In LDC's, the response is important for other reasons. We distinguish four of the most important:

1.7 First, there is the question of the effects of agricultural pricing policy and the implications for national saving. We are concerned not just

with the levels of prices, but with the policy regimes under which prices are set. Some countries, such as the Cote d'Ivoire, set procurement prices that aim to be fixed in real terms. As a consequence, farmers are insulated from changes in world prices for their product, and the savings and smoothing decisions that are called for in the face of fluctuations in world prices become the (unshared) responsibility of the government. In other cases, such as Thailand, where there has been an export tax on rice, or in Kenya where farmers receive close to world prices for their coffee, farm prices vary with world prices, and the responsibility for saving and consumption smoothing is either partially or totally in the hands of the private sector. If, as seems likely, government saving behavior is different from private saving behavior, the way in which countries handle temporary fluctuations in commodity prices is conditioned by the agricultural pricing regime. An important element in this story is the way in which saving behavior responds to the income changes associated with commodity pricing policy. At this stage, our concern is with the positive analysis of what happens. The further stage, of policy recommendation, requires an understanding of government saving and investment, which would be a research project in its own right.

1.8 Second, it is important to understand how commodity prices and the associated income changes are transmitted through the community. There has been considerable debate in the pricing literature about the distributional effects of various pricing rules, and a key issue is the extent to which non-farmers benefit from higher prices, see the volume by Newbery and Stern (1987) and, in particular the paper by Sah and Stiglitz (1987). In the Cote

d'Ivoire, most of the cocoa and coffee is grown by farmers who are close to the middle of the income distribution. The direct effects of cocoa and coffee prices on the distribution of income are therefore rather small, and the ultimate effect depends on what happens to other rural groups. Much the same is true for rice policy in Thailand where, once again, most rice is sold by farmers in the middle of the rural income distribution, see Deaton (1989).

1.9 Third, and independently of whether or not the income changes are policy induced, much depends on how individuals and communities handle the fluctuations in incomes that go with agricultural production. If households are good at accumulating and decumulating assets, they can prevent fluctuations in their consumption, and so are less vulnerable to seasonal shortages, to random fluctuations in weather, and to variations in the market for their produce. Individual saving is part of this story, as is the extent to which income changes are correlated between members of the same community. Communities with diversified production, or communities that specialize in activities where the returns are uncorrelated across individuals, as in some fishing communities, see Platteau (1988), are better able to provide local insurance than communities that specialize in a single crop. An important part of our research strategy will be to examine these patterns of income change.

1.10 Fourth, and although most economists would start from a presumption that farmers are capable of looking ahead and making provision for the future, other, "old-fashioned" views are far from dead. Government

officials in Africa often express skepticism about the rationality of farmers, and confiscatory pricing policies are sometimes justified in terms of the supposedly spendthrift behavior of farmers, and the need for a "custodial" role for government. Direct evidence on what farmers actually do is the best antidote to prejudice.

1.11 We believe that much can be learned by looking at the relationship between changes in household income and changes in consumption, particularly by tracing through the sources of the income change. As we argue below, another advantage of looking at income changes is that it will allow us to say something about the other major problem, which is data reliability. The Cote d'Ivoire survey, with three years of data, and two successive sets of panel households, is well suited to the task. We also believe that something useful can be learned from looking at successive cross-sections, and we plan to do this on a smaller scale in Thailand. Exactly what is proposed is detailed in the next section.

## 2 Research Design

### General Outline

2.1 Our starting point is the Living Standards Survey data from the Cote d'Ivoire. The three years of data from 1985 through 1987 give us two successive panels, so that, for two successive years, and for two different sets of 800 households, we have data not just on levels of income and consumption, but also on changes in income and consumption. A great deal of research over the last two years has proved that these surveys have yielded data of exceptionally high quality. Even so, the accurate measurement of

income is very difficult, and the accuracy of the estimates cannot be taken for granted. In this regard, an important feature of the LSS data is the fact that the survey questionnaire covers almost every aspect of household economic activity. In consequence, and as we detail below, it is possible to use internal evidence from the survey to check the quality of the data on incomes. Even so, and whatever the attractions of the LSS data, we recognize that the research will be more valuable if it is transferrable to other countries with similar policy concerns but without the same kind of data. The inclusion of a component on Thailand is designed to meet this need. Agricultural pricing in Thailand is an important policy issue, and although there are no panel data, there exist several high quality and closely comparable household surveys that can be used to examine the same issues. Again, the details are given below.

2.2 If saving research is to be convincing, it is necessary to face directly the issue of data quality. To some extent, this means careful cleaning of the data, something that we shall do. However, the data from the Cote d'Ivoire allow something more interesting, which is the construction of a detailed picture of the sources of income change from year to year. For each household, income changes will be tracked back through the questionnaire to the underlying changes in work patterns, wages, prices, harvests, or whatever. The results will be judged for plausibility in terms of internal consistency, and in relation to the similar experiences of other households in the same village or cluster. Some figures will be discarded, others will be corrected, and the rest will be graded for likely reliability. Of course, at this stage, no use will be made of the consumption

estimates; the concern is with the income figures, with their reliability, and with what they tell us about the causes of income change, and how incomes change across individuals and communities. Only at the final stage will the income data be confronted with the consumption data.

2.3 The details of the program are given below under four heads: (i) basic data preparation, (ii) describing patterns of income change, (iii) consumption analysis, (iv) saving behavior in Thailand. Each of these is described in turn.

2.4 Basic data preparation At present, the Welfare and Human Resources Unit has two years of data from the Cote d'Ivoire LSS, and the third year of data should be available later this summer. Calculation of income and expenditure figures requires a great deal of manipulation and checking. Individual records have to be checked for consistency and plausibility, and there is a good deal of imputation that needs to be done in order to construct comprehensive measures. This task has already been done for the first two years' data by Dr Kozel of WHR, and repeating the exercise for the third year of the data will be her first task. Since households do not remain in the panel for more than two years, the addition of the third year will double the number of panel households available for analysis. There are 1600 households in the survey at any given time, 800 of which are retained into the next year. Hence, the first two years generated a panel of 800 households for which we now have two years of data. The third year will give us two years data on a different set of 800 households. Even

though this part of the research is quickly described and is largely mechanical, it is neither quickly nor inexpensively done.

2.5 Accounting for income changes We already have the data on the first set of panel households, and have done some preliminary work on income changes for them. To the extent that it is possible to tell without doing the detailed work, these data look sensible; the relationship between incomes and consumption is the same between panel and non-panel households, it is consistent across time, and consumption changes are strongly related to income changes, albeit with a great deal of residual variation. Even so, it is clear that there are outliers, if only because there are a small number of very large changes. The data also display the standard "problem" with survey data from LDC's (and also possibly from many DC's), that consumption is apparently too high relative to income, so that saving appears to be negative for an implausibly large number of households. It is difficult to bring much evidence to bear on the reliability of estimated income levels, but more can be done with the changes, and we hope that the analysis of the latter will teach us something about measurement error in the former. We plan to work as follows:

2.6 Decomposition of income changes comes straightforwardly out of the basic data. The main categories are agricultural income, business income, wage income, transfer income, rents and dividend income, and other. For each category, the money amount will be decomposed into "price" and "quantity" components. For example, agricultural income consists of sales less costs, and comprises the return to land and to family labor. For most



households, costs are small. Sales can be broken down by crop. For some crops, notably cocoa and coffee, we have excellent data on quantity and prices, so that the corresponding change in income can be decomposed into a quantity change and a price change (and an interaction term when necessary). For other crops, for example food crops like yams, our quantity data are not very good, but we have community price information for most of the villages in the sample, so that, once again, it will be possible to make some estimate of the component of the change in income due to price change, and the component due to quantity change. For wage income, the change can be assigned to changes in the numbers of workers in the household, changes in the hours they work, and changes in the wage per hour. And so on for other components. Since the LSS is a very comprehensive survey of household activities, the changes can be followed through the different parts of the questionnaire, and a great deal of internal cross-checking is possible.

2.7 The aims here are twofold: first, to assess reliability, including the identification of outliers, and data cleaning, and second, to describe the patterns of income change over the three years of the survey. The first aim is an intermediate one, which feeds into the next stage, the analysis of consumption and saving. The second aim is of substantive interest in its own right, and is one of the classic reasons for collecting panel data, to study "income dynamics."

2.8 As an example under the first head, if there is a very large change in income from yams, and the price change of yams doesn't account for it, and there is no reported change in land devoted to growing yams, then we have at

least the suspicion that we have an outlier. Clearly, there is no way that such a procedure can get everything right, but much will be done, and it is very important that all large income changes be carefully examined before they are taken forward into further analysis. Internal consistencies can be ironed out, and doubtful data can be labeled as to likely accuracy.

2.9 As an example of the second aim, we want to know who benefitted from the increases in the coffee and cocoa prices, and where they were located. Did incomes of non-cocoa and coffee farmers rise in areas where coffee and cocoa are grown? Did the prices of food crops respond to the additional incomes generated from coffee and cocoa? How much of income change was due to weather, and how much to the direct and indirect effects of policy? The natural unit at which to examine these questions is the village or cluster. Households in the same cluster are located in the same place and are geographically separated from households in other clusters so that we should expect to find a number of common features within each. And we have direct data on clusters from the community questionnaire in the LSS survey. We already have some weather data, and we plan to collect more for a larger number of weather stations. By these means it will be feasible to build up a picture of the mechanisms for income change at both community and household levels. From this, we hope to learn a good deal about the nature of the problems facing individuals and communities, how large are the fluctuations, what is their source, and the extent to which they are correlated within and across communities. The correlation structure is important because, even if the fluctuations are too large for a household to handle by itself, low correlation within the cluster holds out at least the possib-

ility of community insurance schemes of one sort or another. Correlations are likely to be low when there is genuine diversification of income sources within each community, though it is important to recognize that many non-agricultural incomes may depend indirectly on agricultural incomes, and thence on pricing policies.

## 2.10 Analysis of household saving and consumption

Once the information on income is in place, we plan to take a fairly standard approach to modelling the relationship between changes in consumption and changes in income. In particular, we shall examine the propensities to spend out of the different components of income constructed at the previous stage. Permanent income theory tells us what to look for. Changes in income due to weather should be regarded as temporary, and should be mostly saved. Changes in procurement prices have typically been such as to keep the real price constant, and so should have been anticipated by farmers. Again, there should be relatively little effect on consumption at the time the price is set, since the information has already been discounted. Of course, if farmers are credit constrained, this may not happen, and consumption may move very directly with changes in income induced by price changes. Another useful test of the extent to which farmers plan ahead is to examine whether household saving in one year helps predict income changes in the next. The idea is that, for individuals who plan ahead, expected decreases in future incomes will show up in additional current savings. Such tests can be carried out on panel data, even for only one pair of observations. The LSS also collects data on assets. We have not yet done enough work to know how useful these figures are likely to be, but they are likely to be

useful both in checking the data, and in following through the processes by which households save and dissave.

2.11 The foregoing work should give us the best picture so far of the relevance of standard models of consumption for modelling household and farmer behavior in Africa. While tests of these hypotheses are interesting in their own right, a number of policy issues rest directly on the results. For example, if rural households seem to be able to save and dissave in the face of income fluctuations, the case for taxation and custodial saving by the government is much weakened, and we have real empirical evidence to counter proponents of such schemes. The same sort of arguments apply to genuine commodity price stabilization schemes (as opposed to taxes disguised as stabilization schemes). If farmers can save and dissave so as to smooth their consumption in the face of fluctuations in incomes, then it is less important for the government to try to stabilize their incomes. Conversely, if the results show consumption moving very directly with income, we would tend to question the adequacy of rural financial institutions, and schemes for stabilization, or custodial saving would seem more attractive. There is also the whole issue of what effects different pricing regimes have on national saving. There has been a good deal of argument that governments have not been very good at handling the savings and consumption smoothing problems associated with commodity price swings. If we can produce evidence that farmers can do better on an individual basis, then we have a further strong argument for not shielding individual agents from fluctuations in world commodity prices.

## 2.12 Saving behavior in Thailand

Although the main focus of the project is on the Cote d'Ivoire, we feel that a supplementary study from Thailand could add a useful dimension to the work. The policy issues are similar, although the government has set prices very differently, so that while there have usually been taxes on exports of rice, local prices have fluctuated in sympathy with changes in the world price. Thailand also offers us a "bridge" between the work on the Cote d'Ivoire and other potential applications. For Thailand, we do not have the sort of panel data that are available for the Cote d'Ivoire, but instead, there are three national household surveys available, for 1975-6, 1981-2, and 1985-6. This sort of survey availability is quite common in LDC's, so that there is a good chance that what can be done in Thailand can be done elsewhere. The disadvantage of having different households is partially compensated by the fact that the surveys are further apart in time, and, in the Thai case, the sampling structure is such that the same "amphoes" (subdistricts) appear in all three surveys. In consequence, we effectively have a panel, not of households, but of amphoes.

2.13 From the point of view of this project, and from the Bank's obtaining value for money, Thailand also has the advantage that savings in two of the surveys have already been analyzed by Dr. Christina Paxson, who will carry out this study. Dr. Paxson's earlier work, on rice farmers in 1975-6 and 1981-2, showed how the farmers save a large proportion of the income changes that are associated with fluctuations in weather. However, the price of rice was much the same in the second (1981-2) survey as it was in the first, so that there was little possibility in her work of looking at the way in

which saving behavior adapted to the changes in commodity prices. The availability of the third survey will remedy this deficiency and it will be possible, at the amphoe level, to detect the components of income change that are caused by weather and those attributable to changes in the price of rice. These data can be used, as in the Cote d'Ivoire, to measure the response of farmers to fluctuations in their incomes generated by price changes, and thus to estimate the effects of pricing policy on private saving.

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## DRAFT BUDGET FOR JACQUES VAN DER GAAG ONLY

## Budget:

Deaton, 80 days at \$450 per day	\$36,000
Paxson, 30 days at \$250 per day	\$7,500
Computing and research assistance, jointly	\$12,000
Kozel, half time for twelve months	\$20,000
Computing	\$10,000
Stern, London Economics, 8 days at \$450	\$ 3,500
One trip Stern to Princeton	\$1,000
Consultants in Bangkok and Abidjan	\$8,000
Total	\$ 98,000