# Households as Corporate Firms

## An Analysis of Household Finance Using Integrated Household Surveys and Corporate Financial Accounting

**Krislert Samphantharak**

**University of California, San Diego**

**Robert M. Townsend**

**Massachusetts Institute of Technology**

Chapters 1, 2, and 4

# Households as Corporate Firms

## An Analysis of Household Finance Using Integrated Household Surveys and Corporate Financial Accounting

This investigation proposes a conceptual framework for measurement necessary for an analysis of household finance and economic development. The authors build on and, where appropriate, modify corporate financed accounts to create balance sheets, income statements, and statements of cash flow for households in developing countries, using an integrated household survey. The authors also illustrate how to apply the accounts to an analysis of household finance that includes productivity of household enterprises, capital structure, liquidity, financing, and portfolio management. The conceptualization of this analysis has important implications for measurement, questionnaire design, the modeling of household decisions, and the analysis of panel data.

Krislert Samphantharak is an Assistant Professor and the Charles Robins Faculty Scholar in the School of International Relations and Pacific Studies at the University of California, San Diego. He is also an affiliate at the Bureau of Research and Economic Analysis of Development (BREAD). He received his doctoral degree in economics from the University of Chicago. In addition to his research on household finance, other research interests include family business groups, the effect of unpredictable corruption on firm investment, the effect of sales tax on gasoline prices, the effect of a firm's lobby spending on its effective tax rate, and the economic development of the economies in Southeast Asia.

Robert M. Townsend is the Elizabeth and James Killian Professor of Economics in the Department of Economics at the Massachusetts Institute of Technology. He previously was the Charles E. Merriam Distinguished Service Professor in the Department of Economics at the University of Chicago, where he remains a Research Professor. His contributions to economic theory include the revelation principle, costly state verification, optimal multiperiod contracts, decentralization with private information, money with spatially separated agents, financial structure and growth, and forecasting the forecasts of others. His contributions to econometrics include the study of risk and insurance in developing countries. His work on village India was awarded the Frisch Medal in 1998.

# Table of Contents

# Chapter 1

# Introduction

In his Presidential Address delivered to the American Finance Association, John Campbell argued for the importance of "household finance," an academic field that has attracted much interest but still lacks definition and attention within the finance profession. Analogous to corporate finance, household finance asks how households use financial instruments to attain their objectives. We argue further that the study of household finance is not only important for households as investors in developed economies; it is also crucial for households running businesses and farms in developing countries where financial markets are often problematic and household consumption, investment, and production decisions are likely nonseparable. Understanding the financial environment and financial behavior of these households should ultimately help researchers and policymakers gain a greater understanding of behavior, evaluate existing policies targeting poverty, and potentially help remove distortions in financial markets.

The study of the financial environment and household financial behavior occupies a large share of the growing literature on empirical development economics in the past few decades. Household surveys have been promoted by governments, international organizations, academics, and survey groups in many countries, providing useful data for research into various aspects of household finance. Although studies using data from household surveys have provided several important insights about the financial situation and behavior of households in developing countries, some challenges remain. Most

importantly, definition and measurement of variables used in these surveys and studies are sometimes inconsistent or unclear. This problem is acute for the studies using high-frequency data, even though such data are much needed for the analysis of short-term behavior of the households for understanding risks, liquidity management, and how they interact with the longer-term performance of household enterprises and wealth accumulation of household units.

This monograph proposes a conceptual framework for measurement that is widely accepted and used in other areas, namely corporate financial accounting and national income accounting. We modify the concepts of corporate financial accounting so that the accounts are more appropriate to the study of household finance in developing countries. We impose this modified accounting framework onto an integrated household survey and construct the three main household financial statements accordingly: the balance sheet, the income statement, and the statement of cash flows. Finally, we illustrate the use of the accounts for the analysis of household finance.

### 1.1 The Challenges

As emphasized by Campbell (2006), the study of household finance is particularly challenging because household behavior is difficult to measure and households face constraints not captured by standard finance literature, namely participation and diversification constraints. Households also have important non-traded assets, namely their human capital. They also hold illiquid assets, namely land and houses. Although

Campbell's argument is based on studies using data from developed counties, a similar argument applies to households in developing countries. Indeed, the study of household finance in developing countries poses yet even more challenges. Many households in developing countries are not simply consumers supplying factor inputs and purchasing and consuming outputs. They are also engaged in production in both farm and non-farm activities. There are often large timing differences between inputs purchased and outputs sold, as for farmers with infrequent harvests; and timing differences between inputs acquired and revenue received, as for businesses with trade credits. Thus high frequency data are important for the study of liquidity, the protection of consumption and investment from cash flow fluctuations, and how the households finance the operation of their business activities. We also wish to know the long-run underlying financial situation of these households. How effectively does the household as a business use its assets in productive activities to generate income? What are the rates of return on assets and credit relative to alternative uses?

These issues necessitate the distinction between cash flow as a measure of liquidity and net income as a measure of performance. While this distinction has been at the heart of financial economics for some time, recent events in the US and global financial markets more than remind us of the difference. For corporate firms, liquidity problems causing failures or capital injections are in principle distinct from poor performance, bankruptcies, and inefficient bailouts. In developing economies these problems are compounded by the fact that many households are also running small business, and their consumption and investment are likely nonseparable. How in practice

does one draw the distinction between liquidity and performance, even during routine times?

Definitions of income and cash flow are clear in the corporate finance and accounting literature, but how do we apply them to households running business? On the one hand, most surveys of firms do not consider the situation of the owners. Although consumption of shareholders is less relevant for decision making in large corporations with dispersed shareholders, it is tightly linked to the policies of private, closely-held businesses in which the shareholders are the owners and dividends largely contribute to their consumption. On the other hand, Living Standards Measurement Study (LSMS) surveys, Family Life Surveys, and other household surveys in developing countries do recognize both consumption and production activities. Although these surveys are remarkably detailed and ask many excellent questions, they are often unclear about the concept and measurement of income as well as consumption, investment, and financing: What do we mean by "income"? In other words, is income entered at the time of production or the time of sale? How do we treat multi-period production? What do we do with input costs that come substantially before the eventual output?

We illustrate with some examples. Although agricultural module in the World Bank's Living Standards Measurement Survey asks the households several useful questions, the wording or meaning of questions in the LSMS agricultural module is sometimes unclear. The survey asks about inputs used over a specified cropping season,

and the amount spent, equating the two. But for some households these are not equal.[1] If the households used inputs held in previous inventory, then expenditures during the specified season might be recorded as zero. Likewise, inputs purchased during the season may not have been used on the plot. Revenue raises similar timing issues. The LSMS agricultural module asks about production during the past 12 months or the past cropping seasons, and also about sale of any of that product, but sales from product inventory is typically not asked, or at least not clearly distinguished.[2] Other transactions commonly observed in developing economies are also sometimes nontrivial when it comes to an economic analysis of household behavior: How do we deal with consumption of household production, output which is never sold? How are input and output carry-overs entered in the accounts? Where do we put gifts, transfers, and remittances, which are typically thought of as income while they are not clearly associated with a production activity? Aside from measurement errors that naturally occur during any survey, it is crucial that we define variables in such a way that they are consistent with a logical framework, measured accordingly, and organized systematically. Indeed, several studies such as Singh, Squire and Strauss (1986) as well as Deaton (l997) discuss various important issues pertaining to the subject of household models and surveys, especially data requirements and implications for data collection.

[1] LSMS questionnaire from the Albanian Institute of Statistics (2005) asks "How much […] did you use during the past cropping season?" (Module 12: Agriculture, Part D: Inputs, Questions 2 and 3) and "How much did you spend in total for […] during the last cropping season? (Question 4).

[2] LSMS questionnaire from Reardon and Glewwe (2001) asks "How much of the […] you harvested during the last two cropping seasons was sold?" (Agricultural Module, Standard Version, Part C2: Disposition, Question 3) and "What price did you get for the […] you sold?" (Question 4).

## 1.2 Our Solution: Constructing Financial Statements from Integrated Household Surveys

We argue in this monograph that there is a need to impose an accounting framework on the survey data. As anticipated in the quote from Angus Deaton (1997), individual transactions need to be measured in order to construct the overall variables of interest. However, this procedure is not straightforward. Thus, we apply, and modify where appropriate, the standard corporate financial accounting to household survey data as it was invented to deal with various types of both trivial and nontrivial transactions. Corporate financial accounts are also a foundation of national income and product accounts, allowing researchers to link the study of household finance at the micro level to the aggregate macroeconomy.

Specifically, we create the balance sheet, income statement, and statement of cash flows for households in developing countries. The purpose is to better measure productivity, risk, and the short-run and long-run financial situations in an analysis of high frequency but long duration panel data. Although measurement errors from the survey still remain in the accounts, the accounting framework with bookkeeping and integrated accounts helps one detect errors and think through the multiple places where the errors would enter. For example, unreported cash expenditure on food implies that consumption in the income statement is underreported and cash holding and wealth in the balance sheet are overstated.

What emerges is an analogy between households and corporate firms. For example household wealth can be viewed as equity, consumption as dividends, gifts as equity issue, and the household budget constraint as the firm cash flow constraint. We distinguish savings as budget surplus in the cash flow statement versus savings as wealth accumulation in the balance sheet. Likewise we distinguish the liquidity management of the budget deficit from asset and liability management of wealth accumulation.

We use an existing high frequency household survey that contains a series of detailed questions to create the line items of each of the financial statements. We do this by identifying for every single transaction exactly how it enters into the balance sheet, income statement, and statement of cash flows. This procedure had to be done at least initially on a household-by-household and period-by-period basis. There are many nontrivial decisions concerning multiperiod production activities, storage, inventories, livestock aging, loan repayments, barter transactions, gifts and transfers, owner-produced consumption and other intra-household transactions, for example.

More specifically we use data from the Townsend Thai Monthly Survey, a monthly survey covering 16 villages and approximately 700 households in rural and semi-urban areas of Thailand. First, we deliberately selected two distinctive households with both typical and unconventional, challenging transactions. We created the accounts for these households by hand, as we conceptualized the problem and made decisions. Then, with our conceptualization, we automated the procedure for the entire households of the survey, using computerized codes to create the accounts. Much of this manuscript

contains a discussion of the issues and the particular decisions we have made. We place a great priority on clarity and a systematic treatment, though we are open about particularly challenging transactions and alternatives to what we have done. Essentially, for some of the nontrivial transactions, the financial accounting framework forces us to make and be clear about our arbitrary decisions. This is an important contribution of this monograph as otherwise there would be ambiguity in the concepts and measurement. Others may disagree with some of our arbitrary decisions. However, we still encourage them to impose the accounting discipline of bookkeeping onto the survey data, as we argue for its advantages below.

Obviously, creating household financial statements is not the only method that can be used to study financial situations and behavior of the households in developing countries. There are studies on consumption smoothing, financing of household investment, and productivity of household production activities that do not rely on an accounting framework. We argue however that using corporate financial accounting as a conceptual framework for an analysis of household finance does have several advantages.

First, corporate financial accounts help the researcher better define financial variables. As argued earlier, financial accounting clearly distinguishes between accrual income versus cash flows and savings as wealth accumulation versus savings as budget surplus. It also clarifies the distinction between household assets and household wealth (equity), hence leading to the difference between returns on assets and returns on wealth. Financial accounting also helps researchers systematically categorize many sub-items of

the main variables in each account. For example, total assets of a household consist of cash, account receivables, deposits at financial institutions, other lending, inventories, and fixed assets. Liabilities include account payables and other borrowing. Wealth is from cumulative savings and gifts received. Net income is the difference between total revenue and total expense, and is spent on consumption or savings. Financing comes from cash in hand, deposits at financial institutions, ROSCA, (recalls of) lending, borrowing, and gifts received. Clear definitions of the variables of interest in turn help improve the clarity of the survey questionnaire, especially for delicate issues that arise in the wording of the questions, e.g. the ambiguity in the LSMS agricultural module we discussed earlier. The accounting framework helps us design the questionnaires that distinguish between the timing of acquisition, uses, harvests, and sales of inventories.

Second, another advantage of corporate financial accounts is that, by definition, financial statements have to reconcile across accounts. Specifically, we use three accounting identities to confirm that the accounts are constructed correctly: (1) In the balance sheet, household total assets must equal the sum of household total liabilities and household wealth. (2) An increase in household wealth from the balance sheet must equal the sum of gifts received and household savings, where gifts received are from the statement of cash flows, and savings are the difference between accrual net income and household consumption from the income statement. (3) The net change in cash from the statement of cash flows must equal to the change in cash from the balance sheet. With these balanced accounts, we do not have a problem commonly encountered in other multi-topic surveys, that a variable generated from one set of questionnaire responses

yields a different value when computed from an alternative set of responses. For example, Kochar (2000) reports that household savings in the LSMS surveys computed as the household income minus consumption is different from household savings computed from the change in household assets. Obviously, one of the possible explanations is that the change in household assets could be financed from an increase in household liabilities in addition to household savings. Another is that the cash flow concept could be implicit in the first measure of savings while accrual income was used in the second. The rigorous accounting framework guarantees that various ways to compute the same variable give us identical result or makes clear that they are not the same variable after all.

Third, financial accounts provide us with a simple way to apply the standard financial accounting analysis to the study of household finance. In fact, we illustrate this financial analysis in chapter 5 with two case study households. We present returns on household assets and wealth, various measures of risk and liquidity, financing mechanisms of consumption and investment, as well as wealth management strategies of these two households. In addition, for economic modeling, financial accounts allow us to apply theories and empirical strategies in the finance literature to the study of parallel issues for households. These theories include capital structure and the financing of fixed investment, dividend payouts, liquidity management, portfolio allocation, performance of assets, and tradeoff between risks and expected returns. We present one of these possible applications in chapter 6, analyzing liquidity constraints, kinship networks, and the

financing of household investment. We also discuss other possible modeling of households as corporate firms in chapter 7.

Finally, although not explicitly illustrated in this monograph, applying standard corporate financial accounting to households and their business enterprises allows the researcher to have consistent metrics that can be used to compare and contrast the performance and financial situations of small and medium household enterprises with the performance and financial situations of larger corporations. For example, how representative of the business sector of an economy is the data from large corporate firms? To answer this question, the performance and financial situations must be measured in the same way. Moreover, as we argue in chapter 2, corporate financial accounting defines the measure of accrued income from household enterprises in such a way that the line items can be used to yield the value added from production. This measure is thus consistent with the definition of national income in the National Income and Product Accounts (NIPA). In fact, the private enterprise income account of NIPA is derived precisely from the standard corporate income statements of business enterprises. Therefore, these household financial accounts can be used to estimate contributions of small household enterprise to GDP and to study the microfoundations of the aggregate macroeconomy more generally.

### 1.3 What We Learn: Some Findings from the Townsend Thai Monthly Survey

As mentioned in the previous section, we apply our conceptual framework to the Townsend Thai Monthly Survey to illustrate how we construct financial statements, and how we use the accounts in an analysis of household finance. We demonstrate two different, but complementary, approaches to the analysis of household finance. First, in chapter 5, we conduct a financial analysis of two illustrative case study households: a relatively rich retailer and a relatively poor farmer. Second, we use regression analysis to study liquidity constraints and the financing of household investment in chapter 6. The case study approach is of course the one used by financial analysts and creditors, as one wants to know how well, or how poorly, a given firm or household is doing. The findings from case study method are likely to be specific and may not be general so we supplement each finding from these two households with the quartiles from their corresponding provinces. This supplementary statistics not only allow us to make comparative statements of the case study households relative to others in the same region, they also give us important summaries of key statistics in the Townsend Thai data. Regression analysis, on the other hand, provides us with some structure and hypothesis testing of neoclassical benchmarks using the entire sampled households, but of course this approach foregoes the details of individual household's behavior.

The application of the accounts reveals some interesting findings regarding households as entrepreneurs in a developing economy. Although the detailed discussions are in chapters 5 and 6 of this monograph, we highlight some of the findings here.

First, there is a relatively large dispersion of the average rates of return on assets across households (even after the returns are adjusted for household labor and risks, as discussed below). Relatively poor households seem to have higher rates of return. We can decompose rates of return into a profit margin ratio and an asset turnover ratio, to get a sense of different business strategies, as in industrial organization and microfinance literature.

Second, for some households, the rate of return on assets can be substantially different from the rate of return on wealth or equity of the household, especially for households with high levels of debt relative to wealth. For others, the small difference between return on assets and return on wealth would indicate that debt levels are relatively low, likely because either there are credit market imperfections or such households appear unwilling to borrow.

Third, the returns on assets drop dramatically when we subtract off imputed opportunity costs of household labor. The variation in the rates of return remains. Further adjusting for risk premia implied by the Capital Asset Pricing Model (CAPM) raises the return of some households relative to their position in the cross sectional distribution of households in the village, and lowers the return of other households if their returns are highly covariate with the village average. Poor households seem to have higher risk-adjusted return than rich households.

Fourth, income volatility is high. Cash flow highly fluctuates, much more so than accrued income. Consumption is smoother however, especially for owner-produced consumption. There is some evidence of smoothing, in the sense that correlations of consumption with either measure of cash or accrual income are less than unity and often low.

Fifth, some households appear to base their behavior more on accrued net income than cash flow, in the sense that the correlation of consumption and income is higher for the accrued income than for cash flow. Consumption of other households is more sensitive to liquidity in the form of cash flow rather than accrued net income. Investment of most households is usually either uncorrelated, or negatively correlated, with accrued net income. Consumption is negatively correlated with investment for some households, indicating that these households may finance their consumption by selling their assets, or finance their investment by reducing their consumption.

Sixth, cash is used to finance consumption and investment cash flow deficits. However, there are nontrivial fractions of households that use gifts and borrowing, particularly so in the less developed province. Also, there are nontrivial financial transactions that appear not directly or at least not immediately related to cash-flow budget deficits. For example, for the case study household, borrowing is put on deposit as financial savings; borrowing decreases with incoming gifts; and gifts are held as cash.

Seventh, in terms of wealth management, increases in equity of the household are associated with increases in cash in the more developed province, though for the case study household this is due in part to substitutability between cash and other assets in the portfolio as well as due in part to the fact that increase in accounts payable and fixed assets are negatively correlated with increases in net worth. For those households in the poorer province, change in inventories seems to be a nontrivial part of wealth management.

Eighth, investment cash-flow sensitivity analysis suggests that the rural and semi-urban households in our sample seem to face liquidity constraints. The constraints are partially mitigated by local kinship networks, i.e. having immediate relatives living in the same village. The network effect may come in both direct channels (gifts and borrowing from people within village) and indirect channels (signal of quality by being a part of the network).

Finally, our findings show that although investment-cash flow sensitivity implies liquidity constraints, the reverse may not be true. Households with low investment-cash flow sensitivity may be carrying a large stock of cash in order to avoid cash flow constraints. As stock of cash in hand is an internal fund, the result suggests that households may be liquidity constrained even when the cash flow sensitivity is low.

### 1.4 Plan of the Monograph

The monograph proceeds as follows. The remainder of part I consists of chapter 2, which provides a conceptual framework of this monograph. In particular, we draw the analogy between a typical household and a typical corporate firm, and discuss some differences between the two. Chapter 2 also presents the conceptualization underlying the standard financial accounting, as the background for our construction of household financial statements.

Part II of the monograph presents the actual construction of household financial statements from household surveys. Chapter 3 starts with a discussion on the features of generic integrated household surveys conducted in developing countries. We also discuss the tradeoffs regarding the details of the survey questionnaires and the frequency of the surveys in this chapter. The chapter ends with an overview of the Townsend Thai Monthly Survey as it will be the illustrative survey we use throughout this monograph. Chapter 4 shows how we apply the concepts from corporate financial accounting to a household survey. Most importantly, we discuss how we modify the standard corporate financial accounting to deal with transactions and situations that are unique to households in developing countries.

Part III of the monograph illustrates how we use the financial accounts constructed from an integrated household survey to the study of household finance. In chapter 5 we study household finance of two case study households. These are the households that were used to conceptualize the accounts, and we display them now as case studies that show how the accounting data can be used. We use the rest of the

database to provide background statistics, to give more meaning to these two case studies, coming from two distinct provinces. Chapter 6 presents an application of our accounts to economic modeling of household finance. Here we borrow the theoretical frameworks and empirical strategies from a corporate finance literature and apply them to the study of our households. In particular, we follow pecking-order hypothesis of firm's financing, and apply the investment-cash flow sensitivity analysis to the study of liquidity and financing of household investment. We also show how non-financial information gathered in a household survey, such as household and village demography, can be integrated into the analysis of household investment finance, looking at the role of kinship networks in mitigating liquidity constraints of the households. Finally, chapter 7 discusses what we have learned from applying the conceptual framework of corporate financial accounting to household surveys and how we can use financial accounting to improve the design of future surveys. This chapter also presents some limitations in the use financial accounts when analyzing household behavior. The chapter ends with a discussion on the implications of the conceptualization of this monograph for models of household decision making.

# Chapter 2

# Conceptual Framework

The purpose of this monograph is to better measure productivity, liquidity, risk, financing, and portfolio management in an analysis of high frequency panel data. What emerges is an analogy between households and corporate firms. This chapter provides a conceptual framework that allows us to apply and modify the concepts in corporate financial accounting to the households from high-frequency surveys in developing countries. We first argue for the analogy of households as corporate firms in section 2.1, and then provide the background on standard corporate financial accounting as well as discuss how conventional balance sheet, income statement, and statement of cash flows are related to household finance in section 2.2.

## 2.1 Households as Corporate Firms: The Analogy

Households in developing countries are not simply consumers supplying factor inputs and purchasing and consuming outputs. Many are also engaged in production in both farm and non-farm activities. In essence, these households function as a firm. To understand this analogy, we discuss first in what business activities a typical firm is engaged. Then we present the analogy of households as corporate firms. This analogy serves as our conceptual framework when we construct household financial accounts later in this monograph.

Following Hart (1995), we define a firm as a collection of assets. In order to obtain these assets, a firm has to get the necessary financing. Two main sources of funds are the creditors and the owners. The owners of a firm are the shareholders. Funds from the creditors are the liabilities of the firm, while funds from the owners are the contributed capital from the shareholders. The firm uses its assets in production activities that potentially generate revenue. After deducting all costs of production, including the corporate income tax, the firm is left with net income. The firm then uses its net income to pay dividends to the shareholders. The remainder of net income goes back to the firm in the form of retained earnings. Retained earnings add to contributed capital, constituting the total shareholders' equity, which is the total claim of the owners on the firm's assets.

Similarly, a typical household performs several activities. A household owns assets such as a house, farmland, livestock and tractors.[3] Again, to acquire these assets, a household gets funds from two main sources: the creditors and the owners. The owners of a household are the *household members*. Funds from the creditors, i.e. the household's debts, are the liabilities of the household. Funds from the owners are the contributed capital from the household members. The household uses its assets in production activities that potentially generate revenue. These activities could be cultivation, aquaculture, livestock, provision of labor services, or other business. Subtracting all costs of production and the personal income tax, the household is left with the after-tax net income, i.e. the household's *disposable income*. The household then uses its disposable income to pay "dividends" to the owners. The dividends come in the form of the

[3] More generally, household assets also include financial assets such as deposits at commercial banks and informal lending.

*consumption* of household members.[4] The remainder of the net income, i.e. the "retained earnings," is the household *savings*. Savings add to the contributed capital or initial wealth, making the total *wealth* of the household, which is the total claim of the household members over the household's assets. With positive savings, household's assets increase by the same amount as the increase in wealth. Wealth is the residual claim, a household's assets in excess of a household's liabilities to the creditors.

To be clear, households are by nature different from firms, especially in terms of their organizational structure and components. One difference is the definition of the household versus the firm. Usually, corporate financial accounting uses a legal definition to identify a corporate firm. A firm is a unit of business entity registered with the government and considered as a judicial person. Unlike a registered firm, a household consists of a collection of individuals. Although each individual does register with the government as a member of a given household, this criterion does not coincide with the definition of household in a typical household survey, where individuals are considered to be in the same household if they live in the same housing structure for at least a certain number of days or they share certain common expenses together.[5]

However, apart from the definition, a household could be viewed as an organization analogous to a corporate firm. Furthermore, we could view an extended household as a conglomerate with multiple divisions, and a nexus of households related by kinship as a business group. Also, the size of a household changes when household

[4] This could be viewed as a consumption motive to dividend policy as we discuss later in chapter 7.
[5] For example, the Townsend Thai Monthly Survey defines an individual as a household member if he or she lives in the same housing structure for at least 15 days since the previous monthly interview.

members migrate into or out of the household. Migration into a household, possibly by marriage, carrying personal assets that contribute to the total household assets is analogous to issuing and selling shares to new shareholders in order to capitalize or analogous to a merger or takeover. Likewise a divorce or dissolution of household could be seen as a spin-off.

Another difference concerns ownership and dividends. The ownership of a registered firm is well defined. Each shareholder owns the firm according to the number of shares she holds. Dividends are usually paid on or defined by the "per-share" basis. But ownership within a household may be ambiguous. Although we can think of household members as the owners of the household, typically it is not clear what proportion of the household's assets is owned by each household member. Similarly, "dividends" paid to each household member in the form of consumption is not typically measured and may not be determined by the member's ownership over the household assets. Note that the implication of considering a household as a monolithic entity is that we assume that the household is a decision-making unit and we ignore any within-household decision-making and bargaining process. This limits our analysis of distribution within the household although household size, gender ratio and other household demographic variables could be incorporated into the analysis of household finance, as we show in chapter 6.[6]

[6] There is extensive literature on household bargaining and within-household resource allocation. For the literature on resource allocation within a household, see Duflo and Udry (2004) and Thomas (1990, 1992) for example. Also, although consumption is difficult to measure at the individual or sub-household level, the study of intra-household behavior could rely on labor supply data and jointly-owned assets that could be viewed as household public goods. For example, Chiappori (1992) studies the collective labor supply of the households. Related, Beegle, Frankenberg and Thomas (2001) and Contrelas, Frankenberg and Thomas

Despite these differences, we believe that applying the concepts and methods commonly used in corporate financial accounting to households will help us better understand the behavior of the households, especially their consumption, investment, and financing decisions. Finally, in this monograph we do not consider a household as a separate entity from its business enterprise. We consider the household itself as a firm and construct the accounts for combined household-firm entity. The rationale behind this decision is that, in developing countries, markets are likely incomplete, hence household behaviors such as consumption may not be separable from production activities.

## 2.2 Overview of Financial Accounting

Once we have a conceptual framework that views households as corporate firms, the next step is to apply and modify corporate financial accounting to the households. Standard financial accounting presents the financial situation of a firm in three main accounts: (1) the balance sheet, (2) the income statement, and (3) the statement of cash flows. This section provides an overview of corporate financial accounting concepts, describing what they are and why we need each of them. We also discuss how each account is related to the study of household finance. This background is necessary for the construction of financial statements from a household survey that we present later in this monograph. Unless stated otherwise, the concepts and methods used in this monograph are standard and follow those presented in Stickney and Weil (2003).

(2004) look at household bargaining and its effects on health and welfare. Deaton (1997) discusses intra-household allocation and gender bias.

*2.2.1 Balance Sheet*

The balance sheet of a firm presents the financial position of the firm at a given point of time. The major items in the balance sheet are assets, liabilities, and shareholders' equity. Assets are economic resources with the potential to provide future benefit to a firm. Liabilities are creditors' claims on the assets of the firm. Shareholders' equity shows the amount of funds the owners have provided to the firm, which is also their claim on the assets of the firm. Claims on assets coming from shareholders' equity are the excess of assets beyond those required to meet creditors' claims. As a firm must invest somewhere the resources it gets from financing, the balance sheet shows the obvious identity that total assets must equal to the sum of total liabilities and shareholders' equity.

For households, the balance sheet consists of three major items—*household assets*, *household liabilities*, and *household wealth*. Examples of household assets are cash in hand, financial claims such as deposits at financial institutions or informal lending, various types of inventories, and fixed assets such as land and equipment. Household liabilities are debts, borrowed from both financial institutions and people, formally and informally. The residual claim of the household members over household assets in excess of liabilities is the wealth of the household. The wealth of the household changes over time due to either savings out of household's net income, or other transactions such as gifts. These savings and gifts could be positive or negative. Tables

A.1 and A.4 in the appendix show examples of households' balance sheets from our case study households that we will discuss in detail later in this monograph.

### *2.2.2 Income Statement*

The income statement is the statement of revenues, costs, gains, and losses over a period of time, ending with net income during the period. Net income is total revenue minus total costs. Revenues are in essence net assets flowing into a firm when it sells goods or provides services. Costs are in essence net assets utilized by a firm in the process of generating revenue. The income statement therefore presents the performance of the operating activities of a firm over a specified period of time.

There are two approaches to the income statement. The cash basis of accounting looks at the revenues and the expenses of a firm as it receives or spends cash.[7] This approach is acceptable when (1) a firm has small changes in inventories, and (2) the purchase of inputs, the production, and the sale of outputs occur in the same period. Otherwise, cash inflows from sales in one, given period could relate to the production and cash outflows from the purchase of inputs in preceding periods. An alternative approach is the accrual basis of accounting where revenues and costs are realized (charged) when the firm sells the output. Therefore, since the revenues and the costs of one period relate to the output from the same activity or asset, the accrual-basis income statement tells

[7] In this context, we broadly use the term "cash" to distinguish the "cash basis of accounting" from the "accrual basis of accounting." However, cash does not literally refer to currency. Both accounting methods could include non-cash, in-kind transactions.

more accurately the performance and profitability of the firm in its use of assets rather than the possibly more volatile cash-basis income statement.

Households engage in activities that take several months or years to complete. This is especially the case for households in developing countries where cultivation and livestock raising are common practices. Also, inventories could play an important role, particularly for agricultural production, which has high fluctuations of input and output prices over the year. These problems are more acute the more frequently the data are gathered. We thus choose to follow the accrual basis of income when we construct the accounts for the households in developing countries as in this monograph. Therefore, it is important to keep in mind that the net income of the household presented here is not necessary the *cash* income the household receives. However, we can retrieve the cash income from the statement of cash flows that we will discuss below. Tables A.2 and A.5 in the appendix are the income statements of two case study households that we will discuss in more detail later in this monograph.

### *2.2.3 Statement of Cash Flows*

The statement of cash flows is a schedule or record of cash receipts and payments over a period of time of the entity with outsiders. The basic idea is that each cash transaction implicitly involves either cash incoming or cash outgoing. The cash-inflow transactions are positively entered while the cash-outflow transactions are negatively recorded. Summing the values of all transactions yields the net change in the stock of

cash held by the firm over the period of time. Usually, the transactions are classified according to their functions: operating, investing, or financing.

There are two main reasons why we need the statement of cash flows in addition to the balance sheet and the income statement. First, as just noted, the net income from the income statement under the accrual basis of accounting is not equal to the net inflow of cash from operations. Usually firms have expenses on inputs (cash outflow) before the period of revenue from the sale of the associated outputs (cash inflow). These mismatched flows of funds could lead to a shortfall of cash, or in short a liquidity problem. The balance sheet and the income statement do not provide information on liquidity of the firm. Second, and related, cash inflows and cash outflows may not be from production. Investing and financing activities also involve in cash flows. Examples of these transactions include accumulation of fixed assets, lending and borrowing, dividend payouts, and capitalization by issuing new shares.

By identity, the total cash outflows must equal total cash inflows plus a decrease in cash holding of the firm, i.e. the firm's spending must be financed from somewhere. A firm's financing could be from either (1) internal sources such as operating income or cash on hand, or (2) external sources such as borrowing or the issue of new shares. This identity is commonly known as the cash-flow constraint in the corporate finance literature. Equivalently, we could say that total funds from internal and external financing must be spent somewhere.

Analogously, a household faces a similar constraint as stated in its budget equation. Household spending during a particular period must be financed from somewhere—internal or external. We classify each household transaction as falling into one of three categories: (1) production, (2) consumption and investment, and (3) financing. Equation (2.1) below illustrates a simple budget constraint of a typical household in period $t$:

$$C_t + I_t = Y_t + F_t \tag{2.1}$$

The left-hand side is the spending of the household, consisting of consumption expenditure, $C_t$, and investment in fixed assets or capital expenditure, $I_t$. The right-hand side is the source of funds of the household, consisting of the household's cash flow from production, $Y_t$, and various financing devices, $F_t$, such as cash, deposits at financial institutions, borrowing, and gifts.[8] As can be seen, it is sometimes ambiguous how to classify a transaction into these categories. Investment transactions deserve special attention. Conventionally, investment in real fixed assets is considered as a cash outflow in the investment category, called capital expenditure, while investment in financial assets, e.g. lending, are entered as cash outflows in the financing category. Note that an income-generating production activity is separate from financing actions. In other words, if we subtract the cash flow from production $Y_t$ from the left-hand side of equation (2.1), we define a budget deficit $D_t$, the excess of cash consumption and investment expenditures over cash flow from production, to be financed in some ways, $F_t$. We will return to this point in detail later.

[8] Interest revenues and expenses are included in the total net income, and hence cash flow from production.

In order to calculate the cash flow from production $Y_t$, we use household net income from the income statement and make the following relevant adjustments to compute cash flow from production. These adjustments are transactions that involve production activities but are not cash-related. First, we subtract any increase in inventory and any increase in account receivables from net income. An increase in inventory is a cost of multiperiod production (including storage activity) that typically involves cash outflow, but it is not yet entered the current period net income calculation. An increase in account receivables, on the other hand, is embedded in the revenue and net income, even though they are not yet paid in cash. Second, we add depreciation and an increase in account payables back into net income. Depreciation was deducted as cost of production even though there was no actual cash paid out. Similarly, an increase in account payables reflects the costs that the household has not actually paid to the suppliers yet. Third, we subtract unrealized capital gains and add unrealized capital losses to net income. Unrealized capital gains were a part of positive income although there was no actual cash inflow. Unrealized capital losses were a part of negative income while there was no actual cash outflow. Finally, we subtract household consumption of own-produced outputs from net income to separate within-household transactions from liquidity issue of transactions with the outsiders. Owner-produced consumption is income but it is not a cash inflow.

Tables A.3 and A.6 in the appendix show examples of households' statement of cash flows from our case study households that we will discuss in detail later in this monograph.

*2.2.4 Household Consolidated Financial Statements*

The household consolidated balance sheet represents the total wealth of the household. Total assets of the household consist of real assets used in agriculture, business, livestock (including the animals themselves), fish-shrimp farming, and other household activities. Financial assets such as informal lending and formal savings at financial institutions are, again, not logically allocated to any particular activity. The total liabilities of the household are its indebtedness, which mostly consists of borrowing. Household debts could be either for consumption or for production and in the consolidated account we need not distinguish. The household members' wealth is equal to the total assets of the household net of the household members' indebtedness.

The household consolidated income statement is the total net income of the household. Again, it is possible that a particular household may be involved in more than one production activity. For example, a farming household may grow crops and raise chickens at the same time. In this case, the household acts as a diversified conglomerate. In principal we could try to separate and estimate the return to each activity, but this would necessitate difficult estimates of the utilization of labor as well as the use of other household assets, i.e. the use of portion of a residence in business. Likewise common

properties such as trucks (mentioned earlier) or water pumps could be used in various activities—both for production and consumption. Expenses such as articles of clothing would also beg of the issue of their use in production vs. the utility from consumption.

Similarly, the household consolidated statement of cash flows presents the net flows of cash between the household and other entities outside the household. Again, we do not distinguish among transactions of family members within the household itself. We use three accounting identities to confirm that our aggregate accounts are constructed correctly: (1) In the consolidated balance sheet, household total assets must equal the sum of household total liabilities and household wealth. (2) An increase in household wealth from the consolidated balance sheet must equal the sum of gifts received and savings, where gifts received are from the statement of cash flows, and savings are the difference between accrual net income (from all production activities) and household consumption from the consolidated income statement. (3) The net change in cash from the consolidated statement of cash flows must equal to the change in cash from the consolidated balance sheet.

Construction of a separate financial statement for each production activity is also possible in principle and desirable in practice. However, in reality it is difficult to pin down the allocation of assets to each activity. For example, a household may own a pick-up truck that is used in transporting the harvested crop to the market, then buying food for livestock, possibly dropping off children to their school, and finally purchasing consumption goods in the market as well. Likewise, a household may borrow, even for a

stated purpose, but use the money elsewhere. We focus in this monograph on the accounts that are consolidated, aggregated over all activities. We thus determined overall income, rates of return to all assets, and aggregate ratios, and set aside for now the issue of rates of return and financing of a particular activity.

Finally, we argue that one of the important features of the household financial accounts constructed using the corporate financial accounting framework is that the measure of accrued income from household enterprises as value added from production (net of depreciation) is consistent with the definition of national income in the National Income and Product Accounts (NIPA). In fact, the private enterprise income account of NIPA is derived from the standard corporate income statements of business enterprises we discuss in this chapter. The saving-investment account of private enterprises is constructed from corporate balance sheets and statements of cash flows. Therefore, these household financial accounts can be used in a study of microfoundations of the aggregate macroeconomy.[9]

[9] For detailed methodology of National Income and Product Accounts, see U.S. Department of Commerce (1985) and Bureau of Economic Analysis (2007).

# Chapter 4

# Constructing Household Financial Statements from a Household Survey

We discussed in chapter 2 that we can view a household as a corporate firm. We also presented the standard corporate financial accounts and argued for the advantages of creating and using the accounts for the analysis of financial situations and behaviors of the households. However, there are some characteristics that make the household and the firm different. The objectives of the studies of household and firm behavior are also not identical. Several transactions are also unique to the households in developing countries. Therefore, some modifications of the financial accounts are needed. This chapter highlights some of the important issues where special attention is needed.

As mentioned earlier, the principle contribution of this monograph is the conceptualization of the accounts. We do this in order to avoid ambiguous and mis-measured variables that would otherwise contaminate subsequent analysis. This necessitates some difficult decisions on how to deal with some unusual transactions. When we make an arbitrary decision from several possibilities, we discuss the reasons why we prefer our method as compared to possible alternatives. We use the Townsend Thai Monthly Survey discussed in chapter 3 as our illustrative survey to address these issues although the discussion in this chapter is largely applied to other household surveys in developing countries as well.

## 4.1 Tangible Assets, Liabilities and Wealth

To construct a balance sheet for each household, we need information on tangible assets and liabilities. As argued by Stickney and Weil (2003), corporate financial accounting has never satisfactorily defined the distinction between tangible and intangible assets. Typically, accountants define intangibles by giving an exhaustive list, and everything not on the list is tangible. In this monograph, however, we explicitly define tangible assets to include physical and financial assets. Intangible assets are education and health human capital as well as other assets that are not tangible.

Many household surveys get information on initial assets from a baseline survey. For example, the Townsend Thai Monthly Survey questionnaires ask whether a household owns certain types of assets such as television, motorcycle, automobile, tractor, sprinkler, water pump, chicken coop, building, and other valuable assets. Households are asked when each asset was acquired and the value of the asset at acquisition. A depreciation formula can then be used to get current values. Exceptions are land and fishponds, which in the Townsend Thai survey are not depreciated. Alternatively, as in Living Standards Measurement Study (LSMS) surveys, respondents are asked how much they could obtain for an asset if it were sold today (at the time of the interview). Financial assets such as deposits in financial institutions and lending to other households are typically given nominal values as amounts owned or due, distinguishing principal from interest. Questions are also administered in the Townsend Thai baseline instruments about crop inventories and business inventories. A decision was made not to ask about initial cash holding or the value of jewelry or gold as this was viewed as too

intrusive and could put the rest of the survey at risk. As to liabilities, the household is asked in the initial baseline for an enumeration of principal and interest due.

The difference between assets and liabilities in the initial, baseline survey is the household's initial wealth. We treat this initial wealth as equivalent to contributed capital in the corporate accounts. Although we do not have the information on the source of this capital (in-coming gifts versus net savings) prior to the initial baseline survey, in the periodic resurveys we can make this distinction. The difference between net income and consumption, i.e. household savings, adds to the household wealth in the same way that retained earnings add to a firm equity. A deficit similarly subtracts from the household wealth.

With panel data, interviewers go back to the households and update more current information from the events since the last interview. In the Townsend Thai Monthly Survey households are asked about acquisitions of assets e.g. purchase, gift, the birth of livestock, and the disposal of assets e.g. sales, loss, giving out of assets, and the death of livestock. The survey also asks the associated values of each asset transaction. Deposits and withdrawals of savings are tracked. Questions are asked about changes in inventory. New borrowing since the last interview and repayment of previously-held debt are measured. If the resurvey questionnaires distinguish in-kind versus cash transactions, then one can estimate changes in cash holdings. If we make an additional arbitrary guess about initial balances, then we can enter cash in hand item for each month in the balance sheet.

Following a convention in corporate financial accounting, financial assets and liabilities appear on the balance sheet at their net present cash value. Non-monetary assets such as land, building, and equipment appear at acquisition cost. The acquisition value of land may underestimate the current value of household's total assets. However, this problem is minor in the Townsend Thai Monthly Survey as we do update the value of land when there is a major change on the plot such as new road constructed nearby or other land improvements (e.g. digging a pond, etc). We think that the approach we propose in this manuscript is less subject to measurement error as compared to estimating the present value of the land every month. The main reason is that the market for land is thin, making the current price for land unavailable or unreliable. This is also the reason why the standard corporate financial accounting adopts the acquisition value rather than evaluating the present value of land.[11] Finally, we adjust downward non-monetary assets (except for land) to reflect depreciation.

### 4.2 Human Capital and Other Intangible Assets

Balance sheets in standard corporate financial statements do not include some intangible assets such as patents, trademarks, and goodwill, as they are difficult to quantify and value. For households, intangible assets such as human capital are of potentially great importance. Human capital as an asset may generate a large share of

[11] In fact, we do ask the households in our survey about their assessment of the value of land. However, their assessment does not change much over time unless there are substantial improvements on land, which we have already taken into account. This is consistent to the fact that land market in rural area is not liquid so the current market price is not available.

household income. Households vary in size and gender composition. Household members also have different education attainments, work experiences, skills, and health conditions.

Unfortunately, to our knowledge there is no reliable way to measure directly the value of the *stock* of human capital. Many studies on human capital use the combination of headcounts, education, and experience as a proxy for the stock of worker's human capital.[12] Other studies focus on the *flow* of the service of human capital as measured by wage or earnings.[13] The closest attempt to estimate the monetary value of the stock of human capital and other intangible was an indirect approach used by the World Bank (2006), which defined the value of human capital and other intangible assets of a country as a residual of the total wealth of the country that was not accounted by the country's produced capital and natural capital. Total wealth was computed from the present value of future consumption; produced capital from a perpetual inventory model; and natural capital from country-level data on natural resource stock and estimates of natural resource rents, taking into account world prices and local costs. Although this approach allows us to estimate the value of total wealth, it is subject to specific assumptions on future consumption and discount rate, potentially creating measurement errors. In

[12] For example, Barro (2001) and Barro and Lee (2001) use education attainment as their proxy for human capital in cross-country growth regressions. Moretti (2004) uses the numbers of educated workers and uneducated workers as proxies for the stock of human capital in a city.

**[13]** For example, Abowd, Haltiwanger, Jarmin, Lane, Lengermann, McCue, McKinney and Sandusky (2005) suggests an empirical approach that incorporates labor data to estimating the contribution of human capital in firm production. They define human capital from wage regressions as the sum of the person specific fixed effect and the overall labor market experience of each worker captured by the experience component in the regression. They can then take into account the productivity component of the workforce of each firm, a measure that evolves over time with the worker-firm match. Related, recent work by Cunha and Heckman (2008) allows for a vector of unobserved skills, components that vary over time and states. But these are all measures of human capital and skills which are derived in analysis of measured variables such as wages in conjunction with a model At best, test scores are an indicator of skills but the underlying human capital vector is not measured directly. Rather it is inferred. These approaches can be taken to the Thai data, as well.

addition, the approach does not take into account that investment in capital could be financed not only by wealth or equity, but also by debts.

Without a reliable method to estimate the value of the stock of intangible assets, we follow the convention in corporate financial accounting and do not include human capital in our balance sheet. Although this is not an ideal solution, we believe that this approach is less vulnerable to measurement error than the alternative of quantifying the stock of human capital into a monetary value and adding it to other assets. Any alternative depends on the specific statistical, econometric, or structural model being used to make inferences about the stock.

The omission of intangible assets is a general problem in economics and finance and by no means specific to our approach. Again, it appears as a problem in corporate financial statements that fail to account for organizational assets, innovations, and goodwill. Although our financial accounts do not capture the value of human capital in the balance sheet, and this creates a bias in the estimate of the rates of return, the approach we use does help us identify the direction and the source of bias in such estimates. Likewise we take into account the omission of human capital when we interpret some of the results of the analysis.

We illustrate with one example here. In chapter 5 we compute the conventional return on total assets as the ratio between net income and total assets. We know that excluding human capital from total assets in the balance sheet while including wage

earnings in the statement of income leads to an overestimate of the return on total tangible assets. However, in many cases we are interested in a the rate of return on total tangible (physical and financial) assets or the rate of return on fixed assets of a given household. These cases include the study of household investment or establishment of household business enterprises. We use other information in the questionnaires that help us estimate the return to invested tangible assets by subtracting off the counter-factual opportunity cost or wage that household members would have earned in the external labor markets. Again, we discuss this adjusted rate of return in more detail in chapter 5 of this monograph.

## 4.3 Gifts and Transfers

Gifts and transfers received are special transactions since they contribute to the wealth of the household without being directly related to the production process. That is, gifts are not a part of the firm's net income from production activities per se. In this section, we first provide our general treatment of these transactions, and then discuss issues related to two special types of gifts and transfers to a household that deserve further attention, namely remittances and government transfers.

### *4.3.1 General Treatment of Gifts and Transfers*

In corporate financial accounting, donations received by a firm are credited to shareholders' equity under a special line item called *donated capital*.[14] They however do not enter the income statement of the firm since they do not impact the profits or losses of firm's production activities. National Income and Product Accounts (NIPA) treat gifts and transfers to a household differently. Although gifts are not related to production and are not included in national product calculation, they are a part of personal income of the household in the personal income and outlay account of NIPA. In this monograph, we decide to follow the guideline from corporate financial accounts, i.e. not treating gifts and transfers as income, for two reasons. First of all, we are interested in productivity of the household enterprise, which argues for using net income derived only from production activities. Also, gifts are commonly observed in developing economies as a financing mechanism, which argue for the treatment of gifts and transfers as cash inflow from financing. Therefore, we do not include gifts and transfers as part of our measure of household income. In other words, in the terminology of NIPA we view a household's accrued household income in this monograph as the value added from the household's production activities (net of depreciation) similar to the net national product (NNP) rather than personal income.

Specifically, when a household receives a gift, for example in the form of cash, we record it as a cash-inflow transaction in the statement of cash flow. Simultaneously,

[14] The term "donated capital" is used in order to distinguish donations from contributed capital. Gifts or donations involve assets flowing into the firm without issuing shares or other owners' equity interest in return. We do not distinguish contributed capital and donated capital in this monograph for two reasons. First, we define contributed capital as total initial wealth of the household without distinguishing whether the initial wealth was from past savings of the household or gifts received in previous periods. Second, as we discuss later in this section, a person to provides gifts to a household may have claims over the household assets, although the claims are implicit.

the cash in hand of the household increases by the same amount so we add the value of this gift to the cash in hand item on the asset side of the balance sheet. Unlike borrowing, the gift is not a household's liability as it is not a simple debt. Also, as noted, the gift is not a part of the household income from production so it is not the savings of the household either. Instead, we create a new line item under household wealth called cumulative net gifts received. Any gifts received are added to this item in the balance sheet. In the end, an increase in cash holding in the current period relative to the previous period on the asset side is identical to an increase in household wealth on the liability and wealth (equity) side. This increase in cash is also identical to the change in cash in the statement of cash flows as a cash inflow from financing. Likewise, giving cash to others is considered as cash outflow in the statement of cash flow and is also subtracted from cash holding and cumulative net gifts received in the balance sheet. Note again that this transaction never enters the income statement.

An in-coming gift is interpreted as an increase in wealth, and it is comparable to new equity issued to shareholders in a firm's capitalization activity. The new shareholders have claims on the (additional) assets of the firm. Similarly, non-altruistic gift providers, who naturally expect reciprocity, also have *implicit* claims on household assets. However, the claims of the gift providers may have less seniority than the claims from the creditors and the members of the household. They have such low seniority that laws do not protect them.[15]

[15] In fact, the household may provide gifts back voluntarily in expectation to receive more gifts in the future, or the household is forced to reciprocate by the social norms.

Note that since we list gifts and transfers as a separate item in the household's statement of cash flows (under financing activities), we can compute household personal income directly from our accrued net income plus net gifts received. Consequently, an increase in household wealth comes from two sources: gifts received and household savings. Again, in our context household savings are defined as accrued net income less household consumption expenditure. This definition of household savings for our entrepreneurs is therefore slightly different from what defined for households in NIPA, i.e. personal income less consumption expenditure. Our savings, however, is consistent with retained earnings in corporate financial accounts, which make a distinction between an increase in shareholders' equity from retained earnings versus an increase from donations or transfers.

*4.3.2 Remittances*

Remittances are resources given to a household by someone who lives in a distant location and does not reside in the same building structure as the household. By our definition of the household in the survey, the person could be a migrant and therefore is not considered as a household member even the person might well be a familial relatives. Examples of these individuals in the Townsend Thai Survey include children of household head who live and work in Bangkok or other provinces, and occasionally send money back to their parents living in the village. Consequently, we have to treat remittances in the same way as other gifts. They are not entered into household income

statement. They are recorded as an increase in contributed capital and assets in the balance sheet, and as cash inflow under financing category in the statement of cash flows.

Alternatively, some household surveys may attempt to follow individuals even when they have moved out and no longer live in the household's building structure. This will be the case for the Yale Economic Growth Center surveys in Ghana and Tamil Nadu. In such cases, the definition of a surveyed household could be changed so that the household would be still included a member who lives at a distance but sends money back home, given that they share the pool of resources and collectively make certain household decisions together. The remittances from this person would therefore be counted as a part of household labor income.[16] The bottom line is that the treatment of remittances as gifts versus labor income depends on the definition of households in the survey.

*4.9.3 Government Transfers*

Households in developing countries sometimes receive transfers from the government. These transfers could be cash or in-kind (such as free seeds, fertilizer, or other inputs). Government transfers also include education scholarship or medicine. Since these transfers are not compensation for output produced by the household, we treat them the same way as other gifts discussed earlier. Again, these transfers are not entered into household income statement. They are recorded as an increase in contributed capital and

[16] This is similar to remittances from a national citizen working abroad being counted as national income in NIPA.

assets in the balance sheet, and as cash inflow under financing category in the statement of cash flows.

There is an exception, however. Consistent with concepts in national income accounts, we treat retirement income of household members in the same way as household labor income. Actually if this is a payment for past services rendered and we view the household as a firm, then this payment is equivalent to a profit from business. After all, that is the way we are treating other labor income as compensation for labor services provided. We record this transaction under labor income in the income statement.[17] In the balance sheet, it is entered as an increase in assets and in cumulative savings, while it is cash inflow from production in the statement of cash flows.

## 4.4 Inventories and Multi-Period Production

### *4.4.1 Inventories*

Our treatment of inventory deserves a detailed discussion. In principle, an increase in finished goods inventory from production may be entered as a sale and then, simultaneously, a repurchase. If the latter is an inherent part of the business, then it is entered in the statement of cash flows as cash outflow associated with production. Alternatively, one can view inventory accumulation as the acquisition of a fixed asset, hence an outflow in the investment account. Finally, similar to financial assets, inventory can be viewed as a financing device. A household may purchase and store its inventory in

[17] Alternatively we could record it separately under transfers or (negative) taxes.

good times and use it to finance consumption expenditure in bad times. However, it is difficult in practice to know which part of an increase in inventory is to be used as input material in production activities like cultivation, which part is more like a fixed asset used as a machine in production, and which part is kept as the household's buffer stocks, i.e. as liquid assets.

For households that hold inventory as working capital (say retail business or even agricultural households with work-in-process inventory), changes in inventory are to some extent exogenous, and dictated by a product cycle, supply condition, or market demand. In this case, the ultimate sale of inventory should be considered as income. For households that hold inventory strategically (say, agricultural households that holds crops in inventory, waiting for the crop price to rise), the sale of inventory should also be considered as income-generating activity as that storage provides a risk bearing service. However, when a households holds inventory as a buffer stock, i.e. much like financial savings, then we should consider inventory as a deficit financing device, which is a transaction under financing and not production. Again, it is hard to draw these distinctions. We decide in our construction of the accounts to include the change in inventory as related to cash flow from production and to treat the capital gain or loss from holding inventory as a revenue or cost of a storage activity. This assumption implies that inventory change does not show up as a smoothing device, as net proceeds are already included in income. In other words, inventory is not treated as a buffer stock. One should thus be careful when interpreting the results regarding the smoothing of deficits in cash flow. Fortunately, with the accounting framework in hand, researchers can easily re-

adjust the way they want to deal with inventory. For example, if the sample consists of mostly subsistence households that use inventory as their buffer stock, the researcher may choose to include the change in inventory in the cash flow statement under financing rather than production, making the use of inventory as a smoothing device is explicit. We stress again that the accounting framework helps us systematically organize inventory transactions in the way that is precisely yet flexible in applications.[18]

Even for non-buffer stock households, it is sometimes unclear how to draw a sharp line between inventories and fixed assets. In standard financial accounting, the term inventory means a stock of goods or other items that a firm owns and holds for sale or for further processing as a part of its business operations. A merchandising firm acquires inventory items in a physical condition ready for sale while a manufacturing firm transforms raw materials into finished products often held for a time in its factory. Stickney and Weil (2003) give as an example tools that are inventory of a tool manufacturer, or of a hardware store, but not of a carpenter who uses the tools (assets) in his production activities. We use these criteria to separate inventory from fixed assets in our framework and include the following items in our inventory: cultivation input inventory (such as fertilizer), cultivation work-in-process inventory (such as not-yet-harvested crops), cultivation finished goods inventory (such as harvested rice grains), livestock input inventory (such as animal feed), livestock work-in-process inventory,

[18] There is also a related issue for inventory in the National Income and Product Accounts (NIPA). Investment in NIPA consists of three main components: investment in business fixed assets, investment in real estate and investment in inventory. That is, inventory is treated as an asset and the change as an investment. Usually inventory accounts for goods produced (value added) that are not yet purchased so that we have the identity $Y = C+I+G+(X-M)$. Y is aggregate output and the right-hand side is aggregate "demand" or expenditure. If output is greater than expenditure, then the unsold goods are recorded as increase in inventory, which is a part of aggregate investment.

livestock finished goods inventory (such as chicken eggs), fish input inventory, fish work-in-process inventory, fish finished goods inventory, business input inventory (such as cloth for a tailor), business work-in-process inventory (such as unfinished furniture for a carpenter), business finished goods inventory (such as pottery and local liquor), and business goods for resale (for a retail store). These inventories are a part of working capital of the business, and held for the purpose of business as usual, and are not considered as fixed assets.

### *4.4.2 Multi-Period Production: Cultivation, Livestock and Non-Retail Business Activities*

The LSMS and other integrated household surveys do not measure net income directly in a single module but gather information on revenues and costs in a series of activity modules: cultivation, aquaculture (fish and shrimp), livestock activity, personal or family business, and labor services. In order to take into account the difference in the timing of acquisition, uses, harvests, and sales of inventories, the Townsend Thai Monthly Survey asks first for the (value and quantity of) inputs acquired since the previous interview and then for the actual (value and quantity of) inputs used on land plots. Likewise, the survey asks for the (value and quantity of) outputs harvested since the previous interview and then the (value and quantity of) sales, household consumption, gifts, and storage. An inventory account can thus be constructed.

These issues of timing, input purchased and used, and output produced and sold, are not trivial and lie at the heart of the distinction between accrual income and cash

flows. Consider the following simple example. Suppose that a household purchases rice seeds, 100 dollars in cash in period 1, but has not yet planted them. On the balance sheet, the cash in hand of the household will decrease by 100 dollars while the input inventory will increase by the same amount. There is no change in the household's total assets or wealth. On the statement of cash flow, we record the 100-dollar-outflow transaction under the increase in inventories. This transaction does not affect the income statement. The seed expense is not yet treated as a cost of production as the household has not yet sold the output.

In the second period, the household plants the seeds carried from the previous period. On the balance sheet, the input inventory decreases by 100 dollars while a work-in-process inventory increases by the same amount. There is no change in total assets or household wealth. This transaction affects neither accrual income nor net cash flows. Note that even though the input is now employed in production, it is still not treated as an expense in production under the accrual income concept.

In the third period, the household spends 20 dollars to purchase chemical fertilizer and uses it on the rice plot. On the balance sheet, cash in hand decreases by 20 dollars while the value of the work-in-process inventory increases by the same amount. This 20-dollar-outflow does appear in the statement of cash flow under the increase in inventory item. Note that the total value of the work-in-process inventory is now 100 + 20 = 120 dollars. There is still no entry in the income statement.

In the fourth period, the household harvests the crops and gets 500 kilograms of rice. The household puts this rice in its storage facility. Under the typical standards of corporate accounts, on the balance sheet, work-in-process inventory decreases by 120 dollars while the finished-goods inventory increases by the same amount. This affects neither the income statement nor the statement of cash flows of the standard financial accounts. The output is not yet sold. The activity is still in progress. However, we decided to adopt an alternative approach by treating the total output from harvest as if it were sold for cash and subtract work-in-process inventory at that time.[19] For the portion of the output that was not actually sold, we treat it as if the household used cash to repurchase the output from the market and added it to finished-good inventory. The advantages of this approach: First, we can track the inputs and outputs of each crop/plot. Second, the value of the finished goods inventory under this approach is closer to the current market value because it is the contemporary value at the time of harvest. Finally, we can distinguish the net profit from production activity itself from the capital gain from inventory storage, as anticipated earlier. That is, we define storage as another production activity, separated from crop cultivation. The way we treat crop storage activity is also consistent to that of a retail shop holding goods-for-resale inventory.

To continue with our example, suppose the market price of rice is one dollar per kilogram at the time of the harvest (the fourth period) and all of the harvest is actually sold. Then there is a revenue of 500 dollars and a net income of 500-120= 380 dollars. In the statement of cash flows, this 380-dollar net income enters as a cash inflow (+). The

[19] Under conventional corporate accounting, this practice is allowed if there exists a competitive market for the product.

120 dollar decrease in work-in-process inventory is also entered as a cash inflow (+). Both inflows are under the production activity in the statement of cash flows. On the net, the statement of cash flow shows an increase in cash of 380+120=500 dollars, which is exactly the cash the household receives from selling the 500-kilogram rice in the market.

However, if the household actually sells only 400 kilograms of rice and keeps the remaining 100 kilograms in its inventory, we act as if the household uses cash to repurchase the 100 kilograms of rice from the market (after selling 500 kilograms to the market) and puts it in storage. Finished-good inventory then increases by 100 dollars, and is entered as a cash outflow in the statement of cash flows. In sum, during this period the household balance sheet records (1) a decrease of work-in-process inventory by 120 dollars, (2) an (actual) increase in cash by 500 - 100 = 400 dollars, and (3) an increase in finished goods inventory by 100 dollars. These lead to a total increase of total assets: -120 + 400 + 100 = 380 dollars. This increase is in turn exactly equal to an increase in the household's wealth from its savings out of the net profit recorded in the income statement, which records (1) a revenue of 500 dollars and (2) a cost of 120 dollars. Finally, the statement of cash flows shows (1) a cash inflow under work-in-process inventory of 120 dollars, (2) a cash inflow under net income of 380 dollars, and (3) a cash outflow under finished goods inventory of 100 dollars. Therefore, there is a net cash inflow of 120+380-100=400 dollars, which is identical to the increase in cash recorded in the balance sheet described above.

In the fifth period, the household consumes 20 kilograms and sells the remaining 80 kilograms to the market. Suppose that the sale is in cash and the market price of rice increases to 1.5 dollars per kilogram. On the income statement, there is the revenue of (20 + 80) · 1.5 = 150 dollars, and the cost of the output sold is (20 + 80) · 1 = 100 dollars supposing there are no other costs of production.[20] Note that the cost is calculated using the price of one dollar per kilogram, which was the price at the time of the harvest, or the input cost of the storage activity. The household earns a net income of 150 – 100 = 50 dollars. Note that this income is from crop storage activity, as opposed to the net income from crop cultivation earned and recorded in the fourth period. At the same time, the consumption of 20 · 1.5 = 30 dollars is recorded as the cash outflow. The asset side of the balance sheet shows an increase in cash of 80 · 1.5 = 120 dollars, and a decrease of 100 dollars in finished-goods inventory; therefore, the household's total assets increase by 20 dollars. This is identical to the increase in household's wealth on the other side of the balance sheet due to its savings, i.e. the household's net income in excess of consumption, 50 – 30 = 20 dollars.

### *4.4.3 Multi-Period Production: Merchandising Retail Business*

For the non-agricultural, merchandising retail business households such as local convenience stores, keeping track of the in-transactions and out-transactions of business inventory is very difficult, if not impossible. This is mainly due to the heterogeneous types of this inventory and a large number of transactions daily (and hence monthly).

[20] Here the cost of output sold is the cost of finished goods inventory, which is one dollar per kilogram. We treat consumption of household inventory as the consumption of owner-produced items as described later in this chapter. In this case the production technology is the storage technology.

These problems could exacerbate measurement errors if we adopt the transaction-based questionnaire described above. De Mel, McKenzie and Woodruff (2007) suggest that it is better to ask for the revenues and the average markups of sales over input costs to adjust for timing mismatch. With this information we can compute the gains and losses between acquisition and sale. By coincidence, this is essentially the method we use in the Townsend Thai Monthly Survey when we compute profits from a household's non-agricultural business. The difference is that the Townsend Thai Monthly Survey did not asked for the markups directly. We compute, however, the markups from the total revenue from sales over the past three months, divided by the total cost of input inventory over the same period. This calculation implicitly assumes that average number of days that goods are in inventory is less than three months.[21]

Although we advocate the use of markups over detailed questions for non-agricultural retail business, we believe that a detailed questionnaire is extremely useful for the activities that involve relatively homogenous inventory or for inventory that can be easily tracked such as crops and livestock, as we discussed in section 4.4.2.

### 4.5 Outputs from One Production Activity as Inputs in Others

A household is typically engaged in many production activities. Many households use outputs produced from one production activity as inputs in other production activities. We treat this transaction as if the household sold the outputs from one activity

[21] The Townsend Thai Monthly Survey did not ask explicitly the markups of household's retail business enterprises. Getting better estimate of the markups is one of the possible improvements that we discuss in chapter 7.

(in a market), and then repurchased the same commodity at the same value (from the same market) as the inputs for the other activities. For example, a household may raise chickens and use their eggs as input for food sold in its restaurant. If the net income from the second activity is realized in the same period, there is no change in both total household net income and total cash flow from production because the revenue from one activity is completely offset by the cost from the other activity.

However, the net income of the second activity may not be realized in the same period. For example, a household may use manure from livestock as fertilizer in crop production. For the income statement, the effect is nontrivial. We act as if the household sold the manure and therefore record the transaction in the current period income statement. The repurchase of the manure will not enter the income statement until the harvest period of the crop. There is no change in the total cash flow from production because there was no cash involved in these household transactions, or technically because the cash inflow from manure is offset by a cash outflow for increase in inventory held by the household, both in the statement of cash flows. Finally, in the balance sheet, this transaction is recorded simultaneously as an increase in household cumulative savings (income without consumption) and an increase in work-in-process inventory.

### 4.6 Consumption of Home-Produced Items and Other Consumption Expenditures

It is common for agricultural households to consume crops grown on their plot or consume animals raised on their farm. At a smaller scale, households usually grow

vegetables in the backyard. As already noted, in the household financial statements, consumption of home-produced items is recorded under both consumption and production activities as if the household produced and sold the product to the market, and then repurchased and consumed it. Thus output produced and eaten is treated both as income and consumption. Households also catch and consume fish, gather and consume herbs, and gather wood to produce charcoal. All of these are entered as income from other production activities as well as (food or non-food) consumption.

Households may purchase goods (such as rice) in large amounts, put them in inventory, and gradually consume them over time. As before, we view storage as another type of multi-period production technology, though in this case it is storage of purchased goods. When a household consumes goods from inventory, we treat the transaction as if the household sold the goods in a market and simultaneously repurchased them back as consumption goods, and we record the transaction in the income statement. If the value of the goods at the time of the consumption is the same as the value at the time of the purchase, then the net income (from storage) is zero. If the values are not the same, the difference will be reflected as a capital gain or loss. Note that purchasing goods and putting them in inventory in the earlier month is considered a cash outflow, as reflected by the increase in inventory during the month of the purchase. However, consuming out of inventory does not affect the total cash flow from production during the month of the consumption. This is because net profit (from capital gain and loss), decrease in inventory, and consumption of home-produced (stored) items completely cancel out.

Many consumption items do not require unusual treatment. Purchases within a month are equivalent with their uses. Examples of these expenses are purchases of perishable items and utility payments. Ideally consumption items distinguish value and quantity, so as to measure prices. Questions are asked about each item individually, at a fine level of disaggregation, depending on the survey. This disaggregation allows us to categorize food versus non-food items, and durable goods such as clothing versus non-durable commodities.[22]

Some items such as gasoline, electricity, and other utility bills are easy to record as expenditures but raise obvious issue. They could be considered as household consumption expenses or cost of production in household production activities like cultivation or business. With limited information in the Townsend Thai Monthly Survey, we treat all of these expenses as a household's non-food consumption expenditure in this monograph. However, the accounting framework provides us with guidelines for improvement should further information be asked in the survey. We could then apportion these expenses and allocate them accordingly to household consumption expenditure or to appropriate production activity as its cost of production.

### 4.7 In-Kind Transactions

Non-cash transactions are not included in the standard statement of cash flows for a corporate firm since they do not change cash holdings. These non-cash transactions are

[22] Recall that usually there is also a separate module for household fixed assets.

then reported in a separate note schedule.[23] In our framework, however, we decide to include both cash and non-cash transactions with outside entities in the statement of cash flows. We do this for several reasons. First, barter exchanges are common in developing economies. Frequent barter in rice is like commodity money. Other in-kind transactions such as in-kind loans and gifts are also observed. As we are interested in the overall financing of household budget, including both cash and in-kind transactions into the budget analysis seems essential. Dropping non-cash transactions would imply that we discard some useful information from our analysis. For example, if household consumption were entirely from gifts (maybe from relatives), the standard statement of cash flows would show both consumption and gifts of this household as zeros whereas in some sense both are positive. The problem is similar when the household uses inputs (such as fertilizer) acquired as gifts (say from the government). Second, the assumption of liquidity as reflected by cash alone is not entirely appropriate for households in developing countries. The ability to use commodities as a medium of exchange may help households mitigate the problem of a cash-only budget constraint.[24]

With these reasons in mind, we treat all outside-household transactions in the standard household budget equation as if they were in cash. In case that a transaction is not cash related, we view the transaction as a combination of two cash-equivalent transactions. For example, if a household consumes rice borrowed from its neighbor, we will act as if the household borrows cash from its neighbor and uses that cash to purchase the rice. In effect, there is a cash outflow for consumption and, simultaneously, there is a

[23] See Stickney and Weil (2003) p. 183.
[24] In practice, it is a judgment call as to which objects are commonly accepted and liquid enough to be used as medium of exchange. Lim and Townsend (1998) provide discussion on this issue.

cash inflow from borrowing. Therefore, despite changes in the entries in the statement of cash flows, there is no real change in the bottom line—the cash held by the household is unaltered.[25]

### 4.8 Depreciation of Fixed Assets

The common approach used for depreciation in corporate financial accounting is the straight-line method. Under this method, depreciation is deducted equally (in value) over time until the value of assets becomes zero. Applying this method to a large household survey is extremely complicated because it requires a separate account to trace the current value of *each* asset of each household in each period. To incorporate depreciation into our accounts, we decide to use a constant depreciation rate method instead. This method is relatively simple to implement in the household data. Specifically, one can assume a constant depreciation rate for a given category of assets, and then use it to compute depreciation value (in dollar) based on the value of the assets in the previous period. For the Townsend Thai Monthly Survey, we arbitrarily assume a 10% annual depreciation of fixed assets other than land.

As for the account entries, depreciation is simultaneously deducted from the assets and cumulative savings in the balance sheet, i.e. it is treated as an expense in income statement. As discussed earlier, depreciation does not involve any actual cash (or in-kind) flow out of the household so we add depreciation back, as a cash inflow, when

[25] Again, although the net change in cash is zero, the change in cash flows from consumption and investment, and the change in cash flows from financing are non-zero. They do exactly cancel each other out.

we adjust the net income to get the cash flow from production in the statement of cash flows.

### 4.9 Livestock

Livestock raises a unique issue. In some cases, household revenues are from selling the outputs produced by the animals (such as chicken eggs or milk) and in other cases revenues are from selling the animals themselves (such as chickens or cows). To address this issue, we consider the animals as one type of household asset and distinguish between the two different incomes generated by the livestock. For example, when a household sells milk, we treat the transaction as revenue from livestock activity. Likewise, spending on animal feed and vaccine is recorded as a cost of livestock activity. However, if the household sells the cows, alive or dead, we consider the income as capital gain (or loss, if the sale price is lower than the purchase price) to livestock assets.

Related, as we consider livestock as an asset, we depreciate the livestock as they age. The depreciation rate is computed from the average life expectancy of the animals. The rates we used are different for different types of animals, based on field experience and conversations with the villagers. For example, in this monograph we assume that a mature cow depreciates at a constant rate of 1% per month, or approximately 12% per year. This rate implies that an average mature cow lives for approximately 8 years. When an animal dies prematurely, we treat it as capital loss. When a new animal is born or

when a young animal becomes mature, we considered them as capital gain within the total livestock asset category.

### 4.10 Loan Payments, Principal Repayments, and Interest Payments

Unlike formal credits with financial institutions, much of lending and borrowing in developing countries is informal. Although household surveys usually ask detailed questions about repayment of loans, it is sometimes impossible to distinguish between the interest payment and the principal repayment in the compositions of the periodic payments of these loans. For example, a household may know just how much it has to repay the lender in a particular period and for how many periods, but the household does not know which portion of the payment is the interest and which portion is the principal repayment.

To our knowledge, there is no obvious way to deal with this problem. An alternative is that, for each loan, one could compute the total payment over the loan life and use it to infer the effective interest rate charged on the principal. This method allows a researcher to compute an amortization schedule for each loan, decomposing the periodic payments into interest payments and principal repayments. However, this method poses a problem for loans that have not yet reached maturity so we cannot compute the total payment. Instead, we follow another method and assume that all of the payments go to principal repayment first. Once the principal has been fully paid, the remainder is treated as interest payment. The obvious drawback of this approach is that

the interest payments will not enter the statement of income until the principal is fully repaid, making it lumpy. Note that the way we decompose the periodic loan payments also affects the net income and the cash flow from production because the interest payments are recorded period-by-period as interest expense (for the borrowers) or interest revenues (for the lenders). In sum, we should be very cautious when we analyze the households with interest revenues or expenses if these accounts form a large part of net income and cash flow.

Finally, our treatment of interests and principal repayments acts as if loans are simple debt, not state contingent securities. In practice the principal of a loan may be adjusted if the borrower is suffering from adverse events. In some data the lender gets repaid more if the lender is suffering from adverse events (Udry 1994). These contingencies are unfortunately not clearly enumerated before hand, and it is difficult to distinguish lower or higher total repayment due to adverse events on the part of the borrower or lender from interest rates which seem to vary over by loan and time. Nevertheless our method for treating interest expense category captures in part the premium (a higher than typical rate for the lender with adverse shocks) and the indemnity (a lower than typical rate for a borrower having difficulties) that is flows from implicit insurance arrangements.

**4.11 Examples**

We discussed our conceptual framework on households as corporate firms in chapter 2, background on household survey in chapter 3, and how to construct financial statements from household surveys earlier in this chapter. Finally, in this section we select some transactions commonly made by households in developing economies and show how to record them in the household financial statements. The examples are shown in Table 4.1. The first column describes the transaction. The second column shows an example of the questions in survey questionnaires associated with the transaction. These questions are taken from Townsend Thai monthly survey. The third, fourth, and fifth columns show the corresponding entries on the balance sheet, income statement, and statement of cash flows, respectively. The last column contains remarks crucial to understanding the entries of the transaction to various accounts.[26]

[Insert Table 4.1 around here]

[26] The detailed algorithm in constructing household financial statements for those surveyed in the Townsend Thai Monthly Survey is presented in Pawasuttipaisit, Paweenawat, Samphantharak and Townsend (2008).

**Table 4.1 Examples of Transactions and Their Records**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Receive wage income in cash | **JM4D** What is the total amount of cash payments that you received since the last interview for doing this job? Include the value of any cash tips, bonuses or overtime payments. If no cash payments were received, record 0. | Increase in cash; Increase in cumulative savings | Revenue from labor | Net income (Cash inflow) | |
| Use cash to pay telephone bill | **XM1A [6]** Since the last interview, have you or members of your household made any cash purchases of [telephone and telecommunication services]? If yes, what is the total amount that you and members of your household have spent on [telephone and telecommunication services] since the last interview? | Decrease in cash and cumulative savings | Consumption | Consumption (Cash outflow) | |
| Deposit cash with the production credit group | **SM3B** How much have you deposited to [the production credit group] in total since the last interview? | Decrease in cash; Increase in deposit at financial institutions | | Increase in deposit at financial institutions (Cash outflow) | |

**Table 4.1 (Continued)**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Sell calves for cash | **IM7C** What is the value of [the baby cows] you got rid of in this transaction?<br><br>**IM7E** What kind of transaction was this? (1=sell live animal for cash or credit)<br><br>**IM7F** How much cash did you receive in total for this livestock? (If no cash was received, record 0.) | Increase in cash, decrease in fixed assets*; Increase in cumulative savings+ | Revenue from livestock; Cost of livestock activity** | Net income (Cash inflow) ***; Negative investment (Cash inflow)+++ | * We consider milk cows as fixed assets.<br>+, *** Increase in cumulative savings = Net income = Profits from sales<br>** Cost of production of livestock = Decrease in fixed assets<br>+++ Total cash inflows = Total cash revenue |
| Lose in value of mature milk cows due to their depreciation (from getting older)* | *See last column of this row* | Decrease in fixed assets; Decrease in cumulative savings | Depreciation expense (Costs of livestock activity) | Negative net income (Cash outflow); Decrease in fixed assets*** | * We assume a constant depreciation rate, computed from the fact that a regular mature milk cow lives for about 10 years.<br>*** No net change in cash holding |
| Lose mature cows due to their death | **IM7C** What is the value of [the mature cows] you got rid of in this transaction?<br><br>**IM7E** What kind of transaction was this? (13=animal died and was not eaten/sold/etc.) | Decrease in fixed assets; Decrease in cumulative savings | Capital loss | Negative net income (Cash outflow); Decrease in fixed assets (Cash inflow)*** | *** No net change in cash holding |

**Table 4.1 (Continued)**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Cash purchase of chemical fertilizer for rice plot | **CM5Q** How much cash did you pay in total to acquire [chemical fertilizer]? (If no cash was used, record 0) | Decrease in cash; Increase in input inventory | | Increase in input inventory (Cash outflow) | |
| Use of chemical fertilizer on rice plot | **CFO4F1** What is the approximate total cash value of [chemical fertilizer] you used on this crop-plot since the last interview? | Decrease in input inventory; Increase in work-in-process inventory | | Decrease in input inventory (Cash inflow); Increase in work-in-process inventory (Cash outflow) *** | *** No net change in cash holding |
| Harvest rice and put in inventory | **CFO10E** What is the total value of [rice] that you have harvested since the last interview? *Enumerator: Be sure to include this product in the Inventory of Storable Crop Module.* | Decrease in work-in-process inventory; Increase in finished goods inventory | | Decrease in work-in-process inventory (Cash inflow); Increase in finished goods inventory (Cash outflow)*** | *** No net change in cash holding |
| Consume rice from household's inventory | **MM4A1** Since the last interview, have you or members of your household eaten any of [rice stored in inventory]?<br><br>**MM4A2** If so, how many kilos did you eat? | Decrease in rice inventory; Decrease in cumulative savings | Consumption | Decrease in rice inventory (Cash inflow); Consumption (Cash outflow)*** | *** No net change in cash holding |
| Use rice to feed household's chickens | **MM4B1** Since the last interview, have you or members of your household fed any of [rice stored in inventory] to livestock?<br><br>**MM4B2** If so, how many kilos did you feed to livestock? | Decrease in finished goods inventory; Increase in work-in-process inventory | | Decrease in finished goods inventory (Cash inflow); Increase in work-in-process inventory (Cash outflow)*** | *** No net change in cash holding |

**Table 4.1 (Continued)**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Purchase animal feed on credit from suppliers | **VM3P** How did you acquire this [animal feed]?<br><br>**VM3S** If acquired other than through purchase, what is the approximate total cash value of the [animal feed] you acquired? | Increase in inventory; Increase in account payables | | Increase in inventory (Cash outflow); Increase in account payables (Cash inflow)*** | *** No net change in cash holding |
| Resell animal feed on credit | **LF3E** Which of the following describes this loan? (E=sold goods on credit)<br><br>**LF3J** What is the total value of [the animal feed that you sold on credit]? | Decrease in inventory, increase in account receivables; Increase in cumulative savings | Revenue from business; Cost of business product | Net income (Cash inflow); Decrease in inventory (Cash inflow); increase in account receivables (Cash outflow)*** | *** No net change in cash holding |
| Receive cash repayment for credit sales of animal feed | **LM6B** What is the total amount of repayment that you received on [credit sales of animal feed]?<br><br>**LM6H** How much of the total amount repaid since the last interview was principal?<br><br>**LM6I** How much of the total amount repaid since the last interview was interest? *Enumerator: If the borrower has made an "extra payment" please include that amount here.* | Increase in cash; Decrease in account receivables | | Decrease in account receivables (Cash inflow) | |

**Table 4.1 (Continued)**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Receive cash as gifts | **GM4C** Since the last interview, how much have you received in total from this type of organization?<br><br>**GM5C** Since the last interview, how much have you received in total for this type of event?<br><br>**GM6A3 (GM6B3)** [Besides the gifts and contributions from organizations and those that are related to specific events that we have already talked about,] what is the total value of the gifts or remittances that you or members of your household have received since the last interview from people in (outside) the village? | Increase in cash; Increase in contributed capital | | Gift (Cash inflow) | |
| Receive rice as gifts | **MM3E1** Since the last interview have you or members of your household received any of [rice] as a gift?<br><br>**MM3E2** If so, how many kilos did you receive as a gift? | Increase in finished goods inventory; Increase in contributed capital | | Increase in finished goods inventory (Cash outflow); Gift (Cash inflow)*** | *** No net change in cash holding |

**Table 4.1 (Continued)**

| Transaction | Example of Corresponding Survey Questions | Balance Sheet | Income Statement | Statement of Cash Flows | Remarks |
|---|---|---|---|---|---|
| Use of charcoal made from wood gathered from nature | **XM1C [3]** Since the last interview, have you or members of your household [produced and consumed (i.e. not purchased) wood and charcoal]? If yes, what is the total value of the home produced [wood and charcoal] that you and members of your household have consumed since the last interview? | | Other revenue; Consumption | Net income (Cash inflow); Consumption (Cash outflow)*** | *** No net change in cash holding |

**Remarks**: Examples of corresponding questions are based on the Townsend Thai Monthly Survey. The code in front of each question indicates the number of the questioned referred.