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Benefits of Creating Financial Accounts from Household Surveys

An Introduction for Policymakers

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INTRODUCTION

Financial accounts are a well-developed tool for analyzing and managing corporations. Balance sheets, income statements and cash flow statements enable businesses to get a handle on how effectively assets are being used and to make adjustments to become more efficient. They are the basis as well for deriving national income accounts that help governments formulate fiscal and macroeconomic policy.

This CSFP Concept Note describes a method to create financial accounts for households based on a series of ongoing surveys in Thailand. It applies the relatively new concept of "household finance" to developing countries. Until now the term was used largely when examining how households in developed economies used financial instruments to attain their objectives. This type of study is crucial for households running businesses and farms in developing countries, where financial markets are often problematic and household consumption, investment, and production decisions are difficult to parse out between business and personal.

WHY ARE THEY IMPORTANT FOR POLICY?

Using these tools to study the financial environment of households can help policymakers gain a greater understanding of consumption, investment and saving behavior, evaluate existing policies targeting poverty, and potentially help remove distortions in financial markets. This initial effort also will help refine questions for future household surveys.

Household surveys

Household surveys are an important method of research into various aspects of household finance. Studies using data from these surveys have resulted in insights about financial behavior in developing countries, but several challenges remain.

The most important one is that the definition and measurement of variables in the surveys are sometimes inconsistent or unclear. This is especially true in cases relying on high-frequency data, which are the most helpful in analyzing short-term behavior of households regarding risks and liquidity management, and how these affect the longer-term performance of household enterprises and wealth accumulation.

The purpose of this work is to adapt the conceptual framework of corporate financial and national income accounting to the study of household finance in developing countries. This enables investigators to construct three household financial statements—balance sheet, income statement, and the statement of cash flows—and to use these in analyzing household finance.

HOW ARE THESE ACCOUNT STATEMENTS CONSTRUCTED?

Modifying standard accounting

Some concepts in standard finance accounting need to be modified because certain types of household behavior are difficult to measure and households face challenges not normally encountered by corporations, such as participation and diversification constraints. In addition, households have important non-traded assets, such as their human capital, and other intangible assets like education that are difficult to account for in traditional financial statements.The study of household finance in developing countries faces further challenges, because often these households are not simply consumers but are also small enterprises, whether in farming or other types of activities. In the case of farming, for instance, this can mean long gaps between the time when inputs are purchased and outputs from harvests are sold. Or in the case of a business with trade credits, there will be a gap between when inputs are acquired and revenue received.

In Thailand, households often run multiple businesses and the operations for these businesses are comingled with household consumption, making the accounting somewhat complex. A fisherman, for instance, will use profits from the previous season to buy a new boat, an investment that increases his assets. The fish he catches will be production. The fish he sells represent income, or cash inflow, while the fish his family eats will be similar to a payout, or a dividend, in a business. If the household also operates a restaurant, the fish that go to the restaurant will be an output, or a revenue, for the fishing business, but an input, or cost, for the restaurant business. The cooked fish sold to a diner then becomes income or cash inflow for the restaurant.

For this reason, high-frequency data are needed to study household liquidity, how to protect consumption and investment from cash flow fluctuations, and how to finance business operations. Researchers also need to study how effectively assets are being deployed—what is the rate of return? To do this, it is necessary to distinguish between cash flow, for measuring liquidity, and net income, for measuring performance. While these concepts are well defined in corporate finance, it is not so clear how they should be applied to household businesses, where it is not always easy to separate household income and business cash flow. Is "income," for instance, entered at the time of production or the time of sale? What about production over several periods? How should input costs that come significantly ahead of a much later output be counted?

These distinctions are not always made clear in household surveys in developing countries. The agricultural module in the World Bank's Living Standards Measurement Survey, for instance, equates inputs used over a cropping season with the amount spent, but these may not be the same in a household. Inputs may come from inventory, requiring no expenditures; by the same token, some inputs purchased during the season may not be used right away. Likewise, the module does not distinguish between revenue from sales of new production or product inventory. And households may use some of their production, so it is never recorded as a sale. What about gifts, transfers, and remittances, which are considered income in these households even though they are not associated with a production activity?

By imposing an accounting framework on survey data, researchers are able to bring some conceptual clarity. This offers a method to measure individual household transactions and construct tools that will enable

TABLE 1A

*2011 Balance Sheet

	JAN-11	FEB-11	MAR-11	APR-11	MAY-11	JUN-11	JUL-11	AUG-11	SEP-11	OCT-11	NOV-11	DEC-11
Cash in Hand	565895	635737	676735	713263	730704	759566	762232	873590	883821	1033744	986544	974626
Account Receivables	0	0	0	0	0	0	0	0	0	0	0	0
Deposits at Financial Institutions	3883	3051	3841	4331	3721	4811	4701	2111	2431	2851	3221	3251
ROSCA	0	0	0	0	0	0	0	0	0	0	0	0
Other Lendings	0	0	0	0	0	0	0	0	0	0	0	0
Inventories	413071	416611	416662	418864	418627	441003	437060	436459	429993	431940	455735	470694
Livestock	500	488	71475	71588	68267	66555	64886	282	271	1259	37224	36289
Fixed Assets	362767	354487	346959	344113	336061	329505	321707	323305	329117	327377	319874	312352
Household Assets	329306	321540	314517	312167	304603	298527	291200	293262	299529	298237	291175	284086
Agricultural Assets	33461	32947	32442	31946	31458	30978	30507	30043	29588	29140	28699	28266
Business Assets	0	0	0	0	0	0	0	0	0	0	0	0
Land and Other Fixed Assets	2118512	2119112	2119312	2119512	2119512	2119512	2119512	2119712	2119912	2120112	2120312	2120312
Total Assets	**3464629**	**3529486**	**3634985**	**3671672**	**3676893**	**3720952**	**3710098**	**3755460**	**3765545**	**3917284**	**3922910**	**3917524**
Total Liabilities	244280	320280	387680	385080	382480	379880	377280	377980	375050	372120	369190	366260
Account Payables	241980	241980	241980	241980	241980	241980	241980	245280	244950	244620	244290	243960
Other Borrowing	2300	78300	145700	143100	140500	137900	135300	132700	130100	127500	124900	122300
Total Household Net Wealth	**3220349**	**3209206**	**3247305**	**3286592**	**3294413**	**3341072**	**3332818**	**3377480**	**3390495**	**3545164**	**3553720**	**3551264**
Contributed Capital	3560695	3561945	3563795	3567335	3569440	3570490	3573090	3610613	3612113	3727463	3727863	3727463
Cumulative Savings (Retained Earnings)	-340345	-352738	-316489	-280742	-275026	-229417	-240271	-233133	-221618	-320418	-312263	-314318
Cumulative Insurance Indemnity	0	0	0	0	0	0	0	0	0	138120	138120	138120
Total Liabilities and Net Wealth	**3464629**	**3529486**	**3634985**	**3671672**	**3676893**	**3720952**	**3710098**	**3755460**	**3765545**	**3917284**	**3922910**	**3917524**

**Real data from a household in the Lop Buri Province of Thailand. Units are in Thai Baht with no seasonal adjustment.*

researchers to link the study of household finance at the micro level to the aggregate economy.

Analogies between households and corporate firms

By adapting these concepts, it is possible to establish analogies between households and corporate firms. 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. Distinguishing between two kinds of surplus—a budget surplus in the cash flow statement and wealth accumulation in the balance sheet—allows researchers to distinguish the liquidity management of the budget deficit from asset and liability management of wealth accumulation.

This note features financial statements constructed using data from the Townsend Thai Monthly Survey, which covers approximately 700 households in 16 villages in rural and semi-urban areas of Thailand. Initially two distinctive households with a wide range of transactions were selected. Each transaction was manually identified as to how it was entered into the balance sheet, income statement, or statement of cash flows. This allowed researchers to automate the procedure for all the households in the survey, using computerized codes to create the accounts.

Inevitably, some decisions on how to categorize transactions were arbitrary, but one characteristic of this work is that it is clear which decisions were made and why, thus eliminating any ambiguity in concepts and measurements.

TABLE 1B

*2011 Income Statement

	JAN-11	FEB-11	MAR-11	APR-11	MAY-11	JUN-11	JUL-11	AUG-11	SEP-11	OCT-11	NOV-11	DEC-11
Cultivation Revenues	144275	0	11125	20425	0	42500	6000	25000	15550	16625	17250	5500
Livestock Revenues	31700	28828	40600	39700	43200	44800	31600	37120	38080	50430	38280	42840
Livestock Capital Gain	500	1500	1000	500	0	0	0	0	0	1300	0	0
Livestock Produce	31200	27328	39600	39200	43200	44800	31600	37120	38080	49130	38280	42840
Fish and Shrimp Revenues	0	0	0	0	0	0	0	0	0	0	0	0
Business Revenues	0	0	36000	30600	12000	16000	0	0	0	0	0	0
Labor Revenues	10700	7500	4500	4000	0	0	0	0	0	0	0	0
Other Revenues	0	40	0	200	0	200	0	0	0	0	0	0
Total Revenues	**186675**	**36368**	**92225**	**94925**	**55200**	**103500**	**37600**	**62120**	**53630**	**67055**	**55530**	**48340**
Cultivation Expenses	35246	0	3060	6598	0	4069	1398	4284	2557	3196	1932	2572
Livestock Expenses	15251	13921	20572	20594	20094	20909	15243	17098	17113	19896	14734	18252
Livestock Capital Loss	0	0	0	0	0	0	0	0	0	0	0	0
Depreciation of Livestock	0	13	12	1787	1821	1712	1669	1627	12	11	36	935
Other Livestock Expenses	15251	13908	20560	18807	18273	19197	13574	15471	17101	19885	14698	17317
Fish and Shrimp Expenses	0	0	0	0	0	0	0	0	0	0	0	0
Business Expenses	0	0	0	0	0	0	0	0	0	0	0	0
Labor Expenses	2300	1800	1000	500	0	0	0	0	0	0	0	0
Other Expenses	110	310	160	60	160	60	60	60	110	60	60	160
Total Cost of Production	**52908**	**16031**	**24792**	**27752**	**20254**	**25038**	**16701**	**21443**	**19780**	**23153**	**16726**	**20984**
Interest Revenues	0	0	0	0	3600	0	0	0	0	0	0	0
Interest Expenses	7025	4000	4130	4130	4130	4130	4130	4130	4303	4300	4300	7300
Other Expenses	8771	8630	8428	8246	8152	7956	7798	7609	7588	7740	7703	7522
Depreciation of Fixed Assets	8771	8630	8428	8246	8152	7956	7798	7609	7588	7740	7703	7522
Extraordinary Items	0	0	0	0	0	0	0	-200	0	0	0	0
Capital Gain	0	0	0	0	0	0	0	0	0	0	0	0
Cash Capital Gain	0	0	0	0	0	0	0	0	0	0	0	0
Non-cash Capital Gain	0	0	0	0	0	0	0	0	0	0	0	0
Capital Gain from Land	0	0	0	0	0	0	0	0	0	0	0	0
Capital Loss	0	0	0	0	0	0	0	200	0	0	0	0
Cash Capital Loss	0	0	0	0	0	0	0	0	0	0	0	0
Non-cash Capital Loss	0	0	0	0	0	0	0	200	0	0	0	0
Capital Loss from Land	0	0	0	0	0	0	0	0	0	0	0	0
Insurance Indemnity	0	0	0	0	0	0	0	0	0	0	0	0
Property Tax	0	0	0	0	0	0	0	0	0	0	0	0
Income Tax	0	0	0	0	0	0	0	0	0	0	0	0
Total Net Income	**117971**	**7707**	**54875**	**54797**	**26264**	**66376**	**8971**	**28739**	**21959**	**31862**	**26801**	**12535**
Consumption	21005	20100	18626	19050	20548	20767	19825	21600	10445	130663	18646	14590
Consumption of Household Production	900	2440	900	2000	1674	1467	1417	2240	667	1800	1128	450
Consumption Expenditures	20105	17660	17726	17050	18874	19300	18408	19360	9778	128863	17518	14140
Food	7145	9200	9081	9271	9843	9937	9971	11726	3927	9550	9978	5430
Non-food	9660	10800	9345	9679	10605	10730	9754	9774	6518	120913	8528	9140
Insurance Premium	4200	100	200	100	100	100	100	100	0	200	140	20
Savings (Change in Retained Earnings)	96966	-12393	36249	35747	5716	45609	-10854	7139	11515	-98801	8156	-2056

**Real data from a household in the Lop Buri Province of Thailand. Units are in Thai Baht with no seasonal adjustment.*

FINDINGS FROM THE TOWNSEND THAI MONTHLY SURVEY

When this framework is applied to case studies from the Thai Monthly Survey in tandem with regression analysis of similar cases, researchers are able to make some interesting observations about household finance.

Among the findings, there is a relatively large dispersion of the average rates of return on assets across households. Relatively poor households seem to have higher rates of return than their wealthier counterparts. One can drill down further to get a sense of different business strategies by breaking down rates of return into a profit margin ratio and an asset turnover ratio.

In addition, the return on assets can differ substantially from the return on equity (wealth), indicating more debt (big difference) or less (small difference). There may be less debt simply because credit markets don't function well or this household doesn't want to borrow.

Subtracting an imputed opportunity cost for household labor reduces the return on assets dramatically, though the variation in the rates of return remains. Applying risk adjustments as called for in the capital asset pricing model (CAPM) raises the return on some households, particularly the poorer ones, while lowering those more in line with the village average.

Consumption correlations

Another observation is that income volatility is high, particularly cash flow, which fluctuates much more than accrued income. Consumption, especially owner-produced consumption, is smoother. Correlations of consumption with either cash or accrual income are less than unity and often low, indicating some smoothing.

Correlation of consumption in some households is higher for accrued income, indicating that they prefer to base their behavior on this measure rather than cash flow. In other households, consumption is more sensitive to liquidity in the form of cash flow. 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.

Cash is used to finance consumption and investment cash flow deficits. However, a significant portion of households, particularly in the less developed province, use gifts and borrowing. On the other hand, there are some financial transactions that appear not directly or at least not immediately related to cash-flow budget deficits.

Increases in cash translate into increases in household equity in the more developed province. Wealth management in the poorer province depends more on changes in inventories.

Analysis of the sensitivity of investment to cash flow sensitivity analysis suggests that these rural and semi-urban households face liquidity constraints. Having immediate relatives living in the same village can mitigate this constraint, either directly from gifts and borrowing or indirectly as a signal of quality by being a part of the network.

Finally, even households where investment is not so sensitive to cash flow may be liquidity constrained because they maintain a large internal fund to avoid cash flow constraints.

ADVANTAGES OF CORPORATE FINANCIAL ACCOUNTING

While there have been a number of alternative ways to study the finances of households in developing countries—consumption smoothing, financing household investment, and productivity of household business activities—using corporate financial accounting has several advantages.

Better defining financial variables

Using corporate financial accounting is a better way to define financial variables. As mentioned earlier, financial accounting makes a clear distinction between accrual income and cash flows and between savings as wealth accumulation versus savings as budget surplus. It also clearly distinguishes between household assets and household wealth (equity), enabling us to compute the difference between returns on assets and returns on wealth.

This in turn allows many sub-items of the main variables to be categorized. 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 derives from cumulative savings and gifts. 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, a rotating savings and credit association (ROSCA)—a type of poor man's bank based on individuals pooling resources—and recalls of lending, borrowing, and gifts received.

Reconciling across accounts

Financial statements, by definition, have to reconcile across accounts, providing a way to verify the accuracy of each. There are three accounting identities that enable us to confirm 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 (from the cash flow statement) and household savings (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 the change in cash from the balance sheet.

Applying standard financial analysis

Financial accounts enable us to easily apply standard methods of financial analysis to the study of household finance. These include returns on household assets and wealth, various measures of risk and liquidity, financing mechanisms of consumption and investment, as well as wealth management strategies. In addition, financial accounts allow us to apply theories and empirical strategies in the finance literature for economic modeling to 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

Finally, applying standard corporate financial accounting to households and their business enterprises enable us to compare the performance and financial situations of small and medium household enterprises with those of larger corporations on an apples-to-apples basis.

LIMITATIONS OF FINANCIAL ACCOUNTS

This construction of financial statements considers the household as the unit of decision making and as a result cannot be used to study allocation of resources or bargaining within the household. However, it could be used with individual labor supply data from household surveys to test whether poor households consist of risk-averse or risk-loving individuals.

As previously mentioned, financial accounting fails to measure human capital and other intangible assets. It might be tempting to put education and health maintenance expenses into a separate category measuring the flows of human capital investments while leaving underlying conditions unmeasured. But that would make the statement of cash flows disconnected from the balance sheet. The World Bank suggested computing the value of human capital and other intangible assets as a residual of the total wealth of the household not accounted for by the tangible assets, with total wealth defined as the present value of future consumption. But this relies on assumptions about future consumption and discount rate that could create measurement errors.

In addition, the financial accounting framework helps in the design of survey questionnaires and the organization of survey data, but it is subject to the same tension

TABLE 1C

*2011 Statement of Cash Flows

	JAN-11	FEB-11	MAR-11	APR-11	MAY-11	JUN-11	JUL-11	AUG-11	SEP-11	OCT-11	NOV-11	DEC-11
Net Income (+)	117971	7707	54875	54797	26264	66376	8971	28739	21959	31862	26801	12535
Depreciation (+)	8771	8642	8441	10032	9973	9668	9467	9236	7600	7751	7739	8457
Change in Account Receivable (-)	0	0	0	0	0	0	0	0	0	0	0	0
Change in Account Payable (+)	0	0	0	0	0	0	0	3300	-330	-330	-330	-330
Change in Inventory (-)	34946	-3540	-51	-2202	237	-22376	3943	601	6466	-1948	-23794	-14959
Change in Other Current Assets (-)	0	0	0	0	0	0	0	0	0	0	0	0
Consumption of Household Production (-)	0	-40	0	-200	0	0	0	0	0	0	-200	0
Net Capital Gains (-)	-500	-1500	-1000	-500	0	0	0	200	0	-1300	0	0
Cash Flows from Production	**161188**	**11270**	**62264**	**61928**	**36474**	**53669**	**22381**	**42075**	**35696**	**36036**	**10216**	**5702**
Net Cash Capital Gain (+)	0	0	0	0	0	0	0	0	0	0	0	0
Consumption Expenditure (-)	-21005	-20060	-18626	-18850	-20548	-20767	-19825	-21600	-10445	-130663	-18446	-14590
Capital Expenditure on Fixed Assets (-)	-2900	-350	-900	-5400	-100	-1400	0	-9407	-13400	-6000	-200	0
Capital Expenditure on Livestock (-)	0	1500	-70000	-1400	1500	0	0	62977	0	300	-36000	0
Capital Expenditure on Land (-)	-500	-600	-200	-200	0	0	0	-200	-200	-200	-200	0
Cash Flows from Consumption and Investment	**-24405**	**-19510**	**-89726**	**-25850**	**-19148**	**-22167**	**-19825**	**31770**	**-24045**	**-136563**	**-54846**	**-14590**
Change in Deposit at Financial Institution (-)	-440	832	-790	-490	610	-1090	110	2590	-320	-420	-370	-30
Change in ROSCA Position (-)	0	0	0	0	0	0	0	0	0	0	0	0
Lending (-)	0	0	0	0	0	0	0	0	0	0	0	0
Borrowing (+)	-50166	76000	67400	-2600	-2600	-2600	-2600	-2600	-2600	-2600	-2600	-2600
Change in Contributed Capital (+)	3000	1250	1850	3540	2105	1050	2600	37523	1500	115350	400	-400
Insurance Indemnity (+)	0	0	0	0	0	0	0	0	0	138120	0	0
Cash Flows from Financing	**-47606**	**78082**	**68460**	**450**	**115**	**-2640**	**110**	**37513**	**-1420**	**250450**	**-2570**	**-3030**
Change in Cash Holding (from Statement of Cash Flows)	89177	69842	40998	36528	17441	28862	2666	111358	10231	149923	-47200	-11918
Change in Cash Holding (from Balance Sheet)	89177	69842	40998	36528	17441	28862	2666	111358	10231	149923	-47200	-11918

**Real data from a household in the Lop Buri Province of Thailand. Units are in Thai Baht with no seasonal adjustment.*

between clarity and arbitrariness as accounting rules for corporations. Many decisions are arbitrary: Are changes in inventories a production, investment, or financing activity? Is lending by a moneylender a production of financial services or financing activity? How should researchers depreciate fixed assets? Should assets be valued at the acquisition cost or marked to market values? The Generally Accepted Accounting Principles (GAAP) used by corporate auditors is constantly being revised and updated because of this tension.

Finally, although information from household financial statements and simple financial ratios are useful, economic models are still needed to help researchers formulate hypotheses when studying household behavior.

IMPROVING THE DESIGN OF FUTURE HOUSEHOLD SURVEYS

Among the lessons from applying corporate financial accounting to household surveys is how this conceptual framework can help improve the design of future sur-

veys. There are some limitations in the use of financial accounts for analyzing household behavior. Finally, there are implications for models of household decision making from this type of conceptualization.

Issues with survey data

Investigators are not able to keep track of the price changes and market value of fixed assets well enough. The value of land is updated when there is a major improvement, but the market value of other fixed assets are not adjusted until they are sold. The value of fixed assets (excluding land) are depreciated every period, though there is probably room for improvement on the rates used. One solution, though still not perfect, would be a standardized approach such as the General Depreciation System from the U.S. Internal Revenue Service instead of a straight 5 percent depreciation.

Further, value of inventory is not adjusted each period, even though market prices fluctuate. Such changes in prices and market values of inventory could be crucial if the household times its purchases of inputs and sales of output according to market price. Under conservative accounting practices, assets are valued at historical costs, but the mark-to-market requirements in the financial industry may be more appropriate in these cases, given that volatility is not excessive. Median observed prices from a survey sample can be utilized, but market prices, an improved measure, would have to come from some external source because those derived from the small sample in the survey may be quite different.

Markups in retail businesses are not tracked. Researchers impute a figure by dividing revenues over the past three months by expenses on inputs over the same period. This assumes that, on average, goods stay in inventory for less than three months, though in practice it can vary quite a bit. Directly asking for markups and revenue may provide more accurate information for computing the profit of household enterprise. Another method would be to ask about the average time that inventories stay in the household, and then compute the markup on that basis. This might be more appropriate if the household is not familiar with the concept of profits and markups.

Further, there is not enough differentiation made between household fixed assets used for production and those used for consumption activity. This may make estimates of return on assets too low because some assets that are not used full time or at all for production are taken into account. A related issue is that households may incorrectly categorize fixed assets among agriculture, business, and household activities; only household fixed assets are treated for consumption so calculations for return on assets may again be misleading.

Another challenge is that the treatment of spending on household durables as non-food consumption makes the overall consumption figure lumpier than it should be. Items such as clothing last for more than one month and so should be treated as fixed assets providing a service flow. Making this adjustment would improve the accuracy of the financial accounts.

Because researchers do not distinguish point of sale or purchase other than inside or outside the village, we have no way of knowing whether the higher revenue and lower expenses for transactions outside the village means the household is subtracting transport costs or not.

In addition, the practice in some agricultural households of exchanging labor should be expressed in the financial accounts. When the household receives this kind of help, it should be recorded as an expense—that is, a cost of production financed by a gift received—and net income should be reduced accordingly. This would make retained earnings lower, but cumulative net gifts would be higher and there would be no net change in household's total wealth in the balance sheet. Alternatively, exchange labor could be viewed as income compensated by in-kind labor—i.e., labor paid for by labor rather than labor as a gift for both parties.

TABLE 2

Examples of Transacts and Methodology

TRANSACTION	BALANCE SHEET	INCOME STATEMENT	STATEMENT OF CASH FLOWS	REMARKS
Receive cash as gifts	Increase in cash; Increase in cumulative gifts received		Gift (Cash inflow)	
Receive wage income in cash	Increase in cash; Increase in cumulative savings	Revenue from labor	Net income (Cash inflow)	
Use cash to pay electricity bill	Decrease in cash; Decrease in cumulative savings	Consumption	Consumption (Cash outflow)	
Deposit cash with commercial or government bank	Decrease in cash; Increase in deposits at financial institution		Increase in deposits at financial institutions (Cash outflow)	
Sell livestock for cash	Increase in cash; Decrease in livestock assets; Increase in cumulative savings	Capital gain from livestock	Net income (Cash inflow); Decrease in livestock assets (Cash inflow)	1. We consider livestock assets similar to fixed assets 2. Increase in cumulative savings = Capital gain from livestock 3. Total cash inflows = Total cash revenue
Lose value of mature livestock due to their depreciation (from getting older)	Decrease in livestock assets; Decrease in cumulative savings	Livestock depreciation	(Negative) net income (Cash outflow); Depreciation (Cash inflow)	1. We assume a constant depreciation rate computed from average lifespan 2. No net change in cash holding
Lose mature livestock due to their death	Decrease in livestock assets; Decrease in cumulative savings	Capital loss from livestock	(Negative) net income (Cash outflow); Decrease in livestock assets (Cash inflow)	No net change in cash holding
Purchase animal feed on credit from suppliers	Increase in inventory; Increase in account payables		Increase in inventory (Cash outflow); Increase in account payables (Cash inflow)	No net change in cash holding
Purchase animal feed in cash from suppliers	Decrease in cash; Increase in inventory		Increase in inventory (Cash outflow)	
Repay credit from suppliers for animal feed by cash	Decrease in account payables; Decrease in cash		Decrease in account payables (Cash outflow)	
Cash purchase of fertilizer for agriculture	Decrease in cash; Increase in input inventory		Increase in input inventory (Cash outflow);	
Use of fertilizer for agriculture	Decrease in input inventory; Increase in work-in-process inventory		Decrease in input inventory (Cash inflow); Increase in work-in-process inventory (Cash outflow)	1. No net change in cash holding 2. No net change in total inventory
Harvest crop and put in inventory	Decrease in work-in-process inventory; Increase in finished-goods inventory; Increase in cumulative savings	Revenue and cost from cultivation	Net income, decrease in work-in-process inventory (Cash inflow); Increase in finished-goods inventory (Cash outflow)	1. No net change in cash holding
Consume crop from households' inventory	Decrease in inventory; Decrease in cumulative savings	Consumption	Decrease in inventory (Cash inflow); Consumption (Cash outflow)	1. No net change in cash holding
Use crop to feed household's animals	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)	1. No net change in cash holding 2. No net change in total inventory

Some of the classifications are arbitrary. For example, electricity is treated as a consumer expense, whereas, part of it should be treated as a cost of production. Similarly, all inventories are treated as working capital in production activities although it would be better if these inventories were distinguished by their objectives.

Spending on education is treated as non-food consumption whereas it should be seen as an investment in human capital. Unfortunately, it is very difficult to put an accurate value on the stock of human capital of the household. The treatment of investment in human capital, and intangible assets in general, deserves more attention.

Another topic that deserves more attention is the formation, migration, and dissolution of households. New household members might bring in assets while outgoing members possibly take some assets with them or rely on revenue for outgoing gifts. Gifts play a significant role in wealth accumulation and depletion. Likewise, on the liability side, the borrowing from outgoing members should be eliminated just as the borrowing of new members is added. One possibility would be to treat these changes as mergers and spin-offs of corporate firms.

The baseline figure for initial cash holding is just a guess, and that figure is adjusted upwards if subsequent cash holdings go negative in the statement of cash flows. In short, there may be a low estimate regarding the amount of cash in hand.

MODELING HOUSEHOLDS AS CORPORATE FIRMS

The conceptualization and measurement in the financial accounts help in the study of household finance: production, consumption, investment, liquidity, financing, and wealth management. There are also implications for modeling choices.

The first choice is to specify the assets and activities in which a household is involved. This could be an exogenous specification—that is, simply stated as a given—but ideally it would be an endogenous choice, one that is explained by the model. Household assets may be financed by outsiders, either by debt or gifts, giving them contingent claims on household income generated from these assets.

Conceptualization of gifts as equity issue presents a relatively new way of modeling this common financing method in developing economies. Also, viewing debt and wealth as components of household assets will allow us to draw on corporate finance research on the capital structure of firms.

Finally, previous studies on household consumption tend to assume that household income is exogenous. The better defined measures of consumption and income discussed here make it possible to study how factors included in the model—occupational choice, production, investment, and income—affect household consumption behavior.

This categorization of consumption as dividends enables us to model payout policies along the lines of closely held corporations or those with a block majority shareholder. Consumption-based dividend policies are characteristic of the small-enterprise households in developing economies. Researchers can consider consumption as a motive for dividend payouts and link up existing research on consumption smoothing and investment.

By viewing the household as a collection of productive assets, researchers can study investment decisions that are at the core of the corporate finance research but often overlooked in development economics. Purchase of a big piece of machinery, for instance, representing an increase in the stock of assets, can be rightly seen as an investment rather than a consumption expense.

Empirical development economics often intertwines household liquidity and household performance. By distinguishing between cash flow and net income, these two different phenomena can be studied separately. Cash flow shows many small negative entries (purchases) and occasional large positive ones (sales). Accrual net income shows lower volatility because it is less sensi-

tive to inconsequential timing in these transactions. So researchers get a better view of risk associated with productivity and a clearer view of productivity itself.

The decision to treat savings as retained earnings (net income less consumption) under the net income measure rather than cash flow may seem strange, but this is exactly what is done in standard national income and business accounts. It is also the basis of standard flow of funds analysis. So this framework ties micro and macro data together in a natural way, which is crucial for modeling the micro foundations of macroeconomics.

Other considerations

There are some final important points that need to be emphasized regarding modeling households as corporate firms.

First, this construction of financial accounts does not assume either complete markets or neoclassical decision making. In fact, these concepts are used to identify aspects of household behavior that deviate from standard neoclassical predictions. For example, it has been determined that household consumption smoothing is imperfect. Also that consumption and investment are interdependent and not separable.

Second, because it is believed that household behavior is closely linked to financial decisions, there is hope that the corporate finance research will provide some insights to the study of household finance—e.g., consumption, investment, financing, liquidity, risk and portfolio management. This does not mean that other ways of modeling household behavior in developing countries should be excluded; they are complementary.

Finally, the potential of the Townsend Thai Monthly Survey with these accounts is untapped because much more data is available. For example, the survey data contain the households' estimates of future crop harvests, which, in combination with related questions, might help to forecast future productivity or to analyze decision making in agricultural households.

REFERENCES

Krislert Samphantharak and Robert M. Townsend, *Households as Corporate Firms: An Analysis of Household Finance Using Integrated Household Surveys and Corporate Financial Accounting.* Cambridge: Cambridge University Press, 2009.

Concept Note

ABOUT

CFSP Concept Notes are designed to support policymakers and researchers by providing reputable summaries of key literature on select topics in the field of development economics.

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