Measurement in development

- Measurement in development is extremely important, albeit sometimes neglected topic. this is summarized by two quotes, one old and one new:

- Lord Kelvin: In physical science a first essential step in the direction of learning any subject is to find principles of numerical reckoning and practicable methods for measuring some quality connected with it. I often say that when you can measure what you are speaking about and express it in numbers you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of *science*, whatever the matter may be.

Bill Gates' quote removed due to copyright restrictions.

To read his comments, visit the article on the Wall Street Journal.
http://online.wsj.com/article/SB10001424127887323539804578261780648285770.html.

Fortunately economists have development a common coherent set of measurement tools which achieve this objective. Further they do not require a distinction between microeconomics and macro economics but rather, can be applied at the household, village, regional, national, and international level . In a sense one size fits all so a little investment in learning these tools goes a long way. They are useful for a variety of sub disciplines and, further, allow integration across sub fields.

The basis unit is the set of financial accounts: the balance sheet, income stmt, and stmt of cash flow. These are typically thought of as relevant as they are applied to corporate firms but they are highly useful as applied to households, especially those running business and enterprise, as is typical in developing countries. Below in this lecture we outline the steps for doing this.

As a result we can make the distinction between the income statement (on an accrual basis of accounting) and the stmt of cash flow allow , which in turn allows us to separate out long run productivity, return on assets/projects versus short run liquidity problems. We can thus measure how a given entrepreneur or household manages is wealth, its portfolio of assets and liabilities, and how it manages if it can to smooth short term financial deficits, the difference between consumption plus investment less income.

As changes in the balance sheet and net worth are linked mechanically to savings as measured from the income statement plus incoming gifts and remittances, we can use the tool to understand where increases and decreases in net worth are coming from (in addition to poverty dynamics and inequity, changes in households relative standings in the community, in the cross sectional distribution of wealth.) Growth of net worth may come from incoming gifts, but for many the larger part is due to savings rates and productivity (return on assets). For the most part return on assets is persistent and indeed, those with high rates of return self-invest back into their own business/ household enterprise. Others prefer financial assets. The point is the savings and productivity are to breakdown performance into key factors, and thus one can assess the impact of changing circumstances or policy interventions on these components.

Aggregating up to larger units, the household financial accounts allow us to create for villages (or collections of villages in a region), the village (regional) income and product accounts" : production accounts, appropriation accounts, savings/investment accounts. Finally we can get the village (regional) balance of payment accounts, and use the tools of international economics to study trade and financial flows within a country.

Finally, that part of savings which is financial rather than real investment, by construction is associated with changes in financial assets. We can thus create the flow of funds and measure financial intermediation across sectors (household, business, government, financial firms, and foreigners), where useful by particular asset/instrument. We can do this at the regional and village level, as well. This is a key component in the constructing models with financial underpinnings, so that we are not in ignorance, our knowledge is not meager, and we can measure the role of the financial system in times of growth and macro instability, including regional disparities, and assess the need for and impact of regulatory and macro policy.

Households as Corporate Firms: An Analysis of Household Finance Using Integrated Household Surveys and Corporate Financial Accounting

Krislert Samphantharak, UC San Diego

Robert M. Townsend, MIT

Objectives

- 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 financial situation in an analysis of high frequency panel data.

Unfortunately,…

"… The only way to obtain … [these] measures is by imposing an accounting framework on the data, and painstakingly construct estimates from myriad responses to questions about the specific components that contribute to the total…" Angus Deaton, l997

The Problems

- 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 credit.
- Thus high frequency data are important for the study of liquidity, the smoothing of consumption, the protection of investment from cash flow fluctuations, and the financing of budget deficits.
- This necessitates the distinction between cash flow as a measure of liquidity and net income as a measure of performance.

What We Do

- Apply, and modify where appropriate, the standard financial accounting, as these were invented to draw this distinction.

Households as Corporate Firms: Finance

- Assets
- Household debt as Firm's liabilities
- Wealth as Equity
  - Initial wealth as Contributed capital
  - Savings as Retained earnings
- Consumption as Dividends
- Gifts as Equity issue
- Household budget constraint as Firm cash flow constraint

Corporate financial accounts help us distinguish…

- Assets vs. Wealth
- Accrual income vs. Cash flow
- Savings as budget surplus (as in cash flow statement) vs. Savings as change in wealth accumulation (as in balance sheet)
- Liquidity management (of budget deficit) vs. Asset & liability management (of wealth accumulation)

1. Asset, liability and wealth

- Assets
  - Cash in hand
  - Account receivables (Trade credits)
  - Deposit at financial institutions
  - ROSCA (Net position)
  - Other lending
  - Inventories
  - Fixed assets
    - Household assets
    - Agricultural assets
    - Business assets
    - Land and other fixed assets
- Liabilities
  - Account payables (Trade credits)
  - Other borrowing
- Wealth
  - Initial wealth
  - Cumulative net gift received
  - Cumulative savings (Retained earnings)

2. Multi-period production, storage and inventory

- LSMS agricultural module asks about inputs used over a specified cropping season, and the amount spent, equating the two
- However if the household 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
- Though perhaps not overly inaccurate in annual crop cycles, the problem can become more acute in monthly or quarterly data

2. Multi-period production, storage and inventory, Cont.

- Townsend Thai monthly survey asks first for the (value and quantity of) inputs acquired since the previous interview and then for actual (value and quantity of) inputs used on land plots
- An input inventory account can thus be constructed (inputs acquired but not yet used)
- Revenue raises similar timing issues

3. Outputs from one production activities as inputs in others

- Example: Household may raise chickens and use their eggs as input for food sold in its restaurant
- We treat this transaction as if the household sold the output from one activity (in a market), and then repurchases the same commodity at the same value (from the market) as the input for the other activity
- If the net income from the second activity is realized in the same period, there is no change in both the total household net income and total cash flow from production because revenue from one activity is completely offset by cost from the other activity
- Net income of the second activity may not be realized in the same period if the input is used in multi-period production process (See previous slide)

5. In-Kind Transaction

- Non-cash transactions are not included in the standard statement of cash flows for a corporate firm since they do not change cash holdings
- However, we decide to include both cash and non-cash transactions with outside entities in the statement of cash flows
- Reasons:
  - Barter exchanges are common in developing economies
  - 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 the households mitigate the problem of a cash-only budget constraint

7. Livestock

- In some cases, household revenues are from selling the outputs produced by the animals (such as chicken eggs or milk) and in other cases the revenues are from selling the animals themselves (such as chickens or cows)
- we consider the animals as one type of household assets and distinguish between the two different incomes generated by the livestock

  (1) Livestock Activity

  – Sale of milk = Revenue from livestock activity
  – Spending on animal feed and vaccine = Cost of livestock activity

  (2) Livestock Assets

  – Sale of cows (alive or dead) = Income as capital gain (or loss, if the sale price is lower than the purchase price) to the livestock assets
- We depreciate the livestock as they age
- When an animal dies prematurely, we treat it as capital loss; when a new animal is born, it is considered as capital gain within the total livestock asset category

8. Gift & Transfer

- Gifts are special transactions since they contribute to the wealth of the household without being directly related to the production process so it is not the savings of the household
- Unlike borrowing, the gift is not a household's liability as it is not a simple debt
- we create a new line item under household wealth called cumulative net gifts received
- In this way the gift received is interpreted as an increase in wealth and it is comparable to new equity issued to new shareholders in a firm's capitalization activity
- Labor exchange: If the household receives this help we consider it as a labor cost of production—thus net income is lower than it otherwise would be, without the subtraction, and retained earnings are lower; at the same time, cumulative net gifts received goes up by the amount as the incoming gift

Tables removed due to copyright restrictions.
See table 4.1 and table 7 in Samphantharak and Townsend (2009).
http://www.cambridge.org/us/academic/subjects/economics/econometrics-statistics-and-mathematical-economics/households-corporate-firms-analysis-household-finance-using-integrated-household-surveys-and-corporate-financial-accounting.

Liquidity Management

- Statement of Cash Flow

$$D = F1 + F2 + \ldots + Fn$$

- Variance decomposition of deficit

$$D_t - \bar{D} \equiv [F_{1,t} - \bar{F}_1] + [F_{2,t} - \bar{F}_2] + \ldots + [F_{n,t} - \bar{F}_n]$$

$$\sum_t [D_t - \bar{D}]^2 \equiv \sum_t [F_{1,t} - \bar{F}][D_t - \bar{D}] + \sum_t [F_{2,t} - \bar{F}][D_t - \bar{D}] + \ldots + \sum_t [F_{n,t} - \bar{F}][D_t - \bar{D}]$$

$$\text{Var}(D) \equiv \text{Cov}(D, F_1) + \text{Cov}(D, F_2) + \ldots + \text{Cov}(D, F_n)$$

$$1 \equiv \frac{\text{Cov}(D, F_1)}{\text{Var}(D)} + \frac{\text{Cov}(D, F_2)}{\text{Var}(D)} + \ldots + \frac{\text{Cov}(D, F_n)}{\text{Var}(D)} \qquad (2)$$

Cash Flow Deficits and Mechanisms

- What deficits?
  - Overall deficit C + I – Y, or C-Y, I-Y alone

    Mechanisms
    - Decrease in deposits at financial institution
    - Decrease in net ROSCA position
    - Lending (e.g. Loan recall)
    - Borrowing
    - Net gift received
    - Decrease in cash holding

Tables removed due to copyright restrictions.
See table 4.1 and table 7 in Samphantharak and Townsend (2009).
http://www.cambridge.org/us/academic/subjects/economics/econometrics-statistics-and-mathematical-economics/households-corporate-firms-analysis-household-finance-using-integrated-household-surveys-and-corporate-financial-accounting.

Asset & Liability Management

- In the previous section, we looked at different devices that the households use to finance their cash shortfall, i.e. their cash flow deficits
  - "Liquidity management"
- In this section, we turn to another related but different issue: how the households manage their asset and liability composition when they accumulate (or decumulate) wealth (net worth) from savings out of net income and gifts received
  - Analogous to firm's asset and liability management out of its equity (retained earnings and new equity issues)

Portfolio Management continued

- Again, looking at the variance decomposition
  - Similar to what presented in the previous section
  - Main difference is that we would like to explain the co-movements of household's wealth accumulation (from retained earnings out of net income plus net gifts received) and changes in the position of different types of household assets and liabilities (as reflected in the balance sheet)

Samphantharak & Townsend (2012)“Measuring the return on household enterprise: What matters most for whom?” forthcoming *Journal of Development Economics*

Table 2
Various definitions of income and assets used in the analysis.

	Definition of Income	Definition of Assets
ROA 1	*Income 1*: Accrued enterprise income, which is the difference between the enterprise revenue and the associated cost of inputs used in generating that revenue. Revenue includes the value of all outputs the household produces for sale, own consumption, or giving away, as well as rental income from fixed assets. Revenue does not include the wages earned outside the household or gifts and transfers received by the household. Cost includes (imputed) compensation to the labor provided by household members, all utility expenses of the household, and depreciation of assets.	*Assets 1*: All fixed assets recorded in Agricultural Assets, Business Assets, Livestock Inventories, Household Assets, and Land Modules in the Townsend Thai Monthly Survey.
ROA 2	*Income 2*: Same as Income 1, but including total compensation of household labor in total revenue.	*Assets 2*: Same as Assets 1.
ROA 3	*Income 3*: Same as Income 1, but excluding household consumption of its own outputs.	*Assets 3*: Same as Assets 1.
ROA 4	*Income 4*: Same as Income 1, but excluding total utility expenses.	*Assets 4*: Same as Assets 1.
ROA 5	*Income 5*: Same as Income 1, but adding the service flows from household fixed assets. The service flows is assumed to be 20% of the value of household fixed assets (excluding land).	*Assets 5*: Same as Assets 1.
ROA 6	*Income 6*: Same as Income 1.	*Assets 6*: Same as Assets 1, but do not include assets listed in the Household Assets Module in the Townsend Thai Monthly Survey.
ROA 7	*Income 7*: Same as Income 1, but including the net gifts and transfers received by the household.	*Assets 7*: Same as Assets 1.
ROA 8	*Income 8*: Cash income, which is the difference between the cash inflows from production activities and the cash outflows from production activities, but adding household consumption of its own outputs (as if they sold the outputs in the market and repurchased them back), and household's own labor.	*Assets 8*: Same as Assets 1.
ROA 9	*Income 9*: Same as Income 1.	*Assets 9*: Total fixed assets and working capital, i.e. assets defined in Assets 1, plus inventories and account receivables, and minus account payables.
ROA 10	*Income 10*: Same as Income 1, plus net interest income of household's financial assets.	*Assets 10*: Total assets, i.e. assets defined in Assets 9, plus financial assets.

Remark: The detailed description of each measurement is presented in the Appendix.

Wealth Accumulation and Factors Accounting for Success

Anan Pawasutipaisit and Robert M. Townsend

April, 2010

Wealth distribution and growth in the survey

- Top 1% households own about 1/3 of the total wealth. Top 5% households own about half of the total wealth. Bottom half own less than 10%.
- The least wealthiest group at the beginning seems to be the one that rises most rapidly while share of top 10% is going down. The gap between rich and poor has been decreasing over time.

Table 5. % of Net Worth Held by Various Groups Defined by Percentiles of the Wealth Distribution in each year

	Year												
Percentile	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
0-50%	5.58	5.99	6.43	6.81	7.24	7.70	8.75	9.22	9.62	9.94	10.07	10.40	10.67
50-90%	28.31	28.08	28.03	28.29	28.70	29.03	31.25	32.18	32.70	33.45	34.28	34.88	35.42
90-95%	11.99	11.58	11.66	11.23	10.96	11.46	11.43	11.25	11.46	11.32	11.34	11.26	11.23
95-99%	19.52	19.67	18.75	18.29	17.90	17.86	17.88	17.60	17.20	17.04	16.91	16.47	16.13
99-100%	34.60	34.69	35.12	35.38	35.19	33.95	30.70	29.76	29.02	28.25	27.40	26.99	26.55

- Growth is decreasing in initial wealth

Table 6. Growth of Net Worth by the Initial Wealth Distribution in 1999

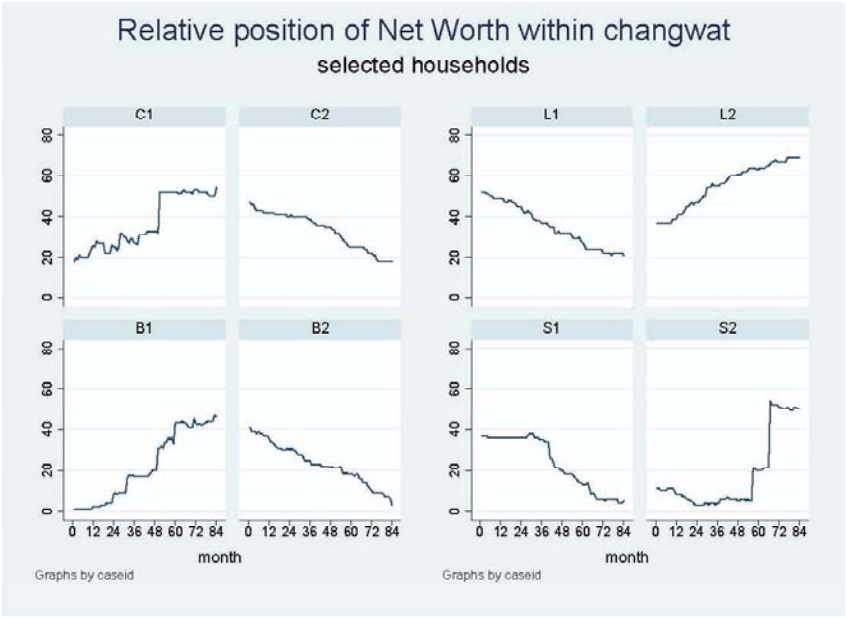
Initial Wealth in 1999	1 quartile	2 quartile	3 quartile	4 quartile
Growth of Wealth(Mean)	17.36	7.51	5.07	2.95
Growth of Wealth(Median)	20.36	7.28	4.31	2.53

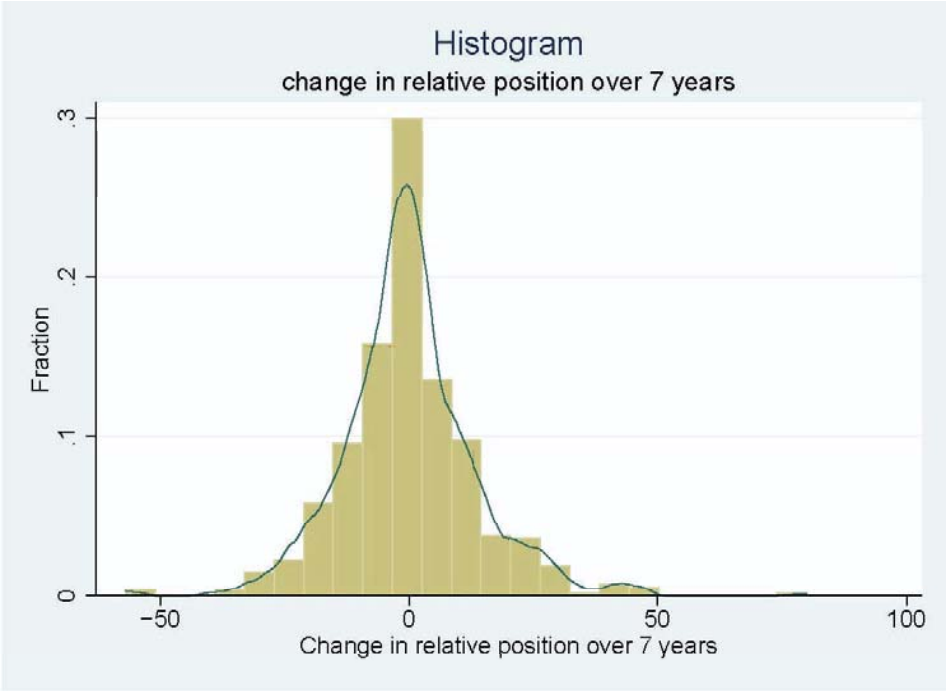
- Taking the advantage of the long monthly panel, we can track relative position of net worth within changwat for each household.

- Example of some households who experience large increases and decreases in their relative position.

- Some household fall down.

- Histogram of change in relative position over 7 years, center is at zero but (std. dev. =13.75, min=-57, max=80).





Growth of net worth: a decomposition into productivity and savings rate

- Saving can be thought of a combination of savings rate, productivity and assets level

$$\begin{aligned} S_t^i &= \frac{S_t^i}{\pi_t^i}\frac{\pi_t^i}{A_t^i}A_t^i \\ &= \left(s_t^i ROA_t^i\right) A_t^i \end{aligned}$$

- This interpretation is suitable for households that use assets to generate income, but harder to interpret for households that have labor earning as primary source of income.

- When we look at ROA, look only at non-labor households.

- In term of growth

$$\frac{\Delta W_t^i}{W_{t-1}^i} = \left(s_t^i ROA_t^i\right)\frac{A_t^i}{W_{t-1}^i} + \frac{G_t^i}{W_{t-1}^i}$$

Table 18. Correlation of Growth of Net Worth and Savings Rate for Non-labor Hou

	All	Chachoengsao	Buriram	Lopburi	Sisaket
HH-month	0.0035	0.0292*	0.0398	0.0102	0.0031
	(0.6532)	(0.0542)	(0.1113)	(0.4446)	(0.8246)
HH-year	0.0314	0.1049**	0.1768**	0.0719**	0.0171
	(0.1722)	(0.0291)	(0.0144)	(0.0782)	(0.6586)
HH	0.2016	0.3790**	0.2142	0.4887***	0.1367
	(0.0006)	(0.0017)	(0.2472)	(0.0000)	(0.1773)

Notes: number in parenthesis is the signi□cance level

*,**,*** represent signi□cance at the 10, 5, and 1 percent level, respectively

Table 19. Correlation of Growth of Net Worth and Savings Rate for Labor Househ

	All	Chachoengsao	Buriram	Lopburi	Sisaket
HH-month	0.0013	0.0113	0.0021	0.0107	0.0007
	(0.8747)	(0.4253)	(0.8971)	(0.5042)	(0.9730)
HH-year	0.0257	0.1742***	0.0455	0.0722	0.0527
	(0.3253)	(0.0003)	(0.3565)	(0.1633)	(0.4094)
HH	0.1710**	0.5161***	0.1589	0.0855	0.1672
	(0.0107)	(0.0000)	(0.2099)	(0.5350)	(0.3089)

Notes: number in parenthesis is the signi□cance level

*,**,*** represent signi□cance at 10, 5, and 1 percent level, respectively

ROA and growth of net worth

- A standard accounting concept for financial analysts, but here is for household.

- There is significant and positive correlation between growth of net worth and ROA at all levels.

- Correlation tends to be higher when we average overall 7 years.

Table 20. Correlation of Growth of Net Worth and ROA for Nonlabor Households

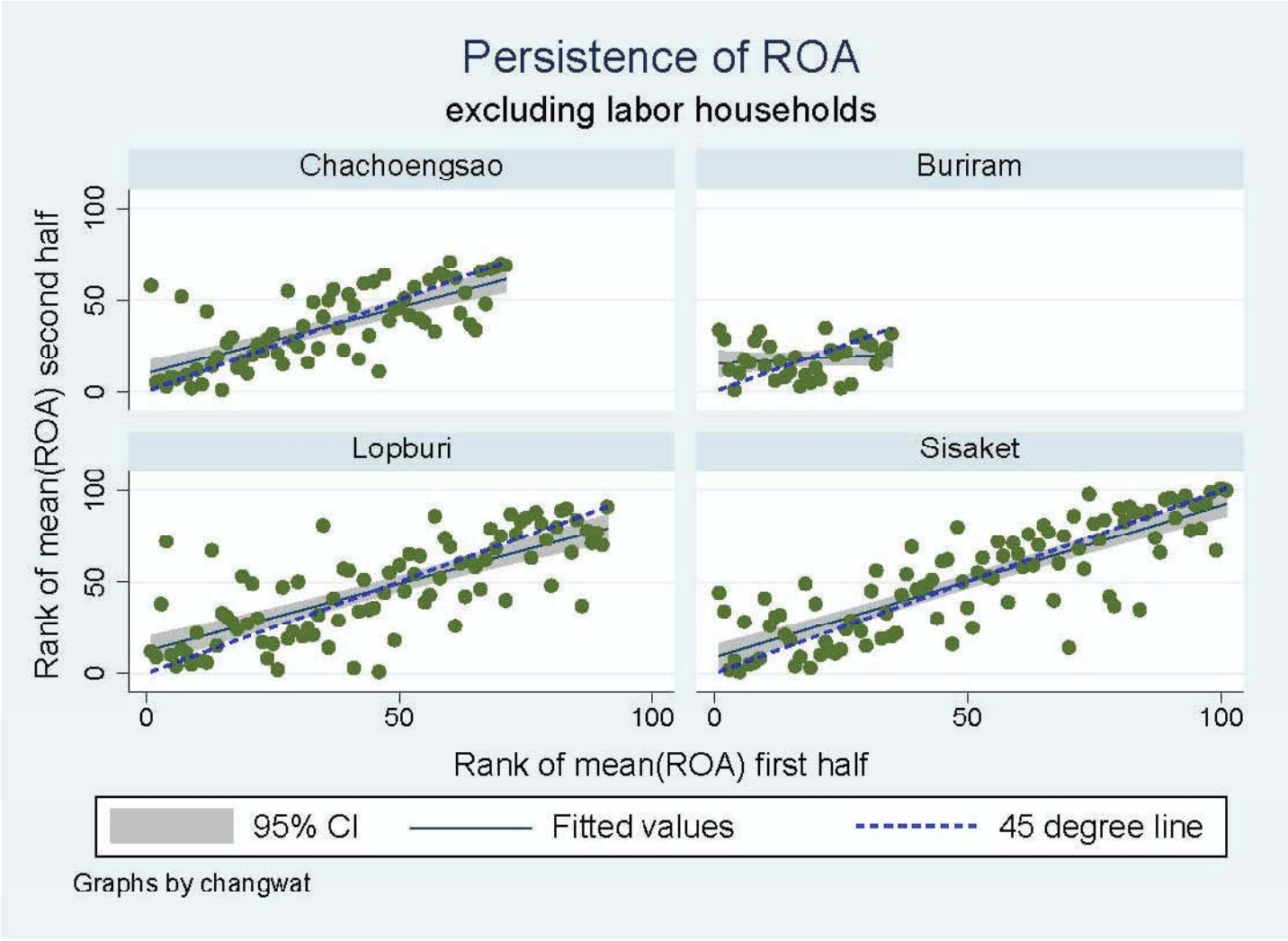
	All	Chachoengsao	Buriram	Lopburi	Sisaket
HH-month	0.3576***	0.5664***	0.7394***	0.5497***	0.2665***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
HH-year	0.4040***	0.5081***	0.7661***	0.5270***	0.3301***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
HH	0.5256***	0.6830***	0.7366***	0.6853***	0.4423***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Notes: number in parenthesis is the significance level

*** represents significance at 1 percent level

- There is considerable persistence, especially for households in the three provinces except Buriram.

- Households successful over the □rst half of the sample are likely successful over the second, or luck per se is not an explanation for success.



- In Buriram, persistence is much lower (correlation is 0.07 and not statistically signi□cant).

- There are two pieces of evidence that offer some explanation for Buriram: change in occupation and change in household composition.

- For change in occupation, households in the survey typically have multiple sources of income.

- Households in the Northeast change occupations more often than those in the Central region, and the highest average number of changes is for Buriram.

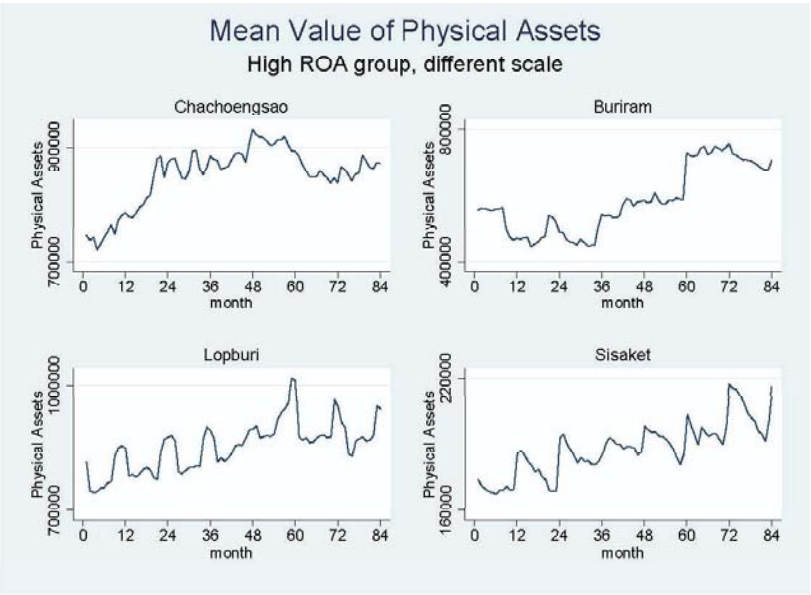
- To see whether household tends to switch into an occupation that gives it a higher rate of return, we compare ROA before and after switching occupation.

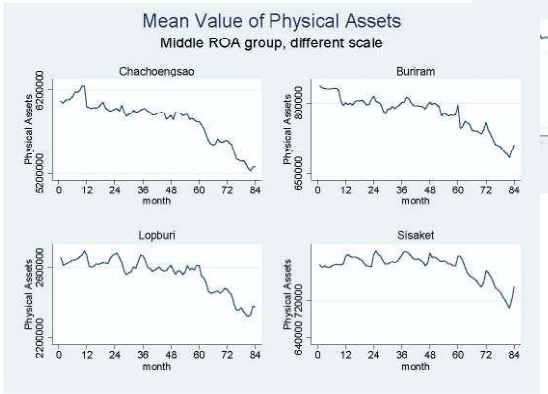
Table 27. Mean-comparison tests H_0: difference in ROA = 0, H_1: difference in RO

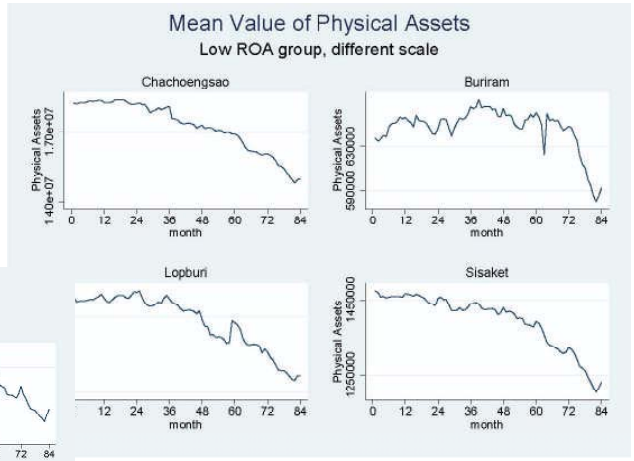
	Obs	Mean	Std. Err.	Std. Dev.	Lower	Upper	Pr(T > t
Chachoengsao	170	-.0283	.0904	1.1797	-.2069	.1503	0.6227
Buriram	179	.4188	.1259	1.6847	.1703	.6673	0.0005
Lopburi	130	.0776	.1006	1.1479	-.1215	.2768	0.2211
Sisaket	238	.0618	.1106	1.7068	-.1561	.2798	0.2883
All	717	.1324	.0562	1.5049	.0221	.2427	0.0094

Predictive power of ROA

- Classify households into 3 groups by ROA: high, middle, and low
- Whether there is any difference in financial and physical assets accumulation?
- Physical assets of high ROA group fluctuates but with an apparent increasing trend.
- One interpretation could be that high ROA households put their wealth back to their income generating activities to get a high return.







Villages as Small Open Economies

Archawa Paweenawat and Robert M. Townsend

Dual Roles of Households

- In village accounting, households play two roles, as producers and as consumers
- In the production account, only the transactions related to products sold by one HH in the village and used as inputs by other HH in the village would cancel
- If the products sold by one household in the village are consumed by other households, the transactions will remain in the production account

Sampling and Measurement Errors

- Sampling error can also create the residual in intra-village transaction
- One might miss a pivotal household of which transactions are a big part of the village average
- Measurement error should be small if the number of sampled households is large and the error is i.i.d. over households

Consumption of Village Products

- We can categorize most transaction in our survey into intra-village and inter-village
- Unfortunately, this is not the case for consumption
- However, we can indirectly estimate the consumption of village products from the net sale of village products less the investment of village products

Labor Income

- In Thai villages, most households also play the role of business firms and engage in production activity as single proprietors
- The distinction between household and business sectors is difficult to make
- Therefore, we consider all labor income as the income from household production as if the household were a proprietor supplying labor services

Village Economic Accounts

- We create village economic accounts by aggregating the economic accounts of every household in the village

Production Account

Statement of Income

Uses	Sources
Production expenses	Production revenues
Interest expenses	Interest revenues
Depreciation	Capital gains
Insurance premium	*Less:* Capital losses
Property tax	Insurance indemnity
Net income before tax	
Charge against revenue	**Total revenue**

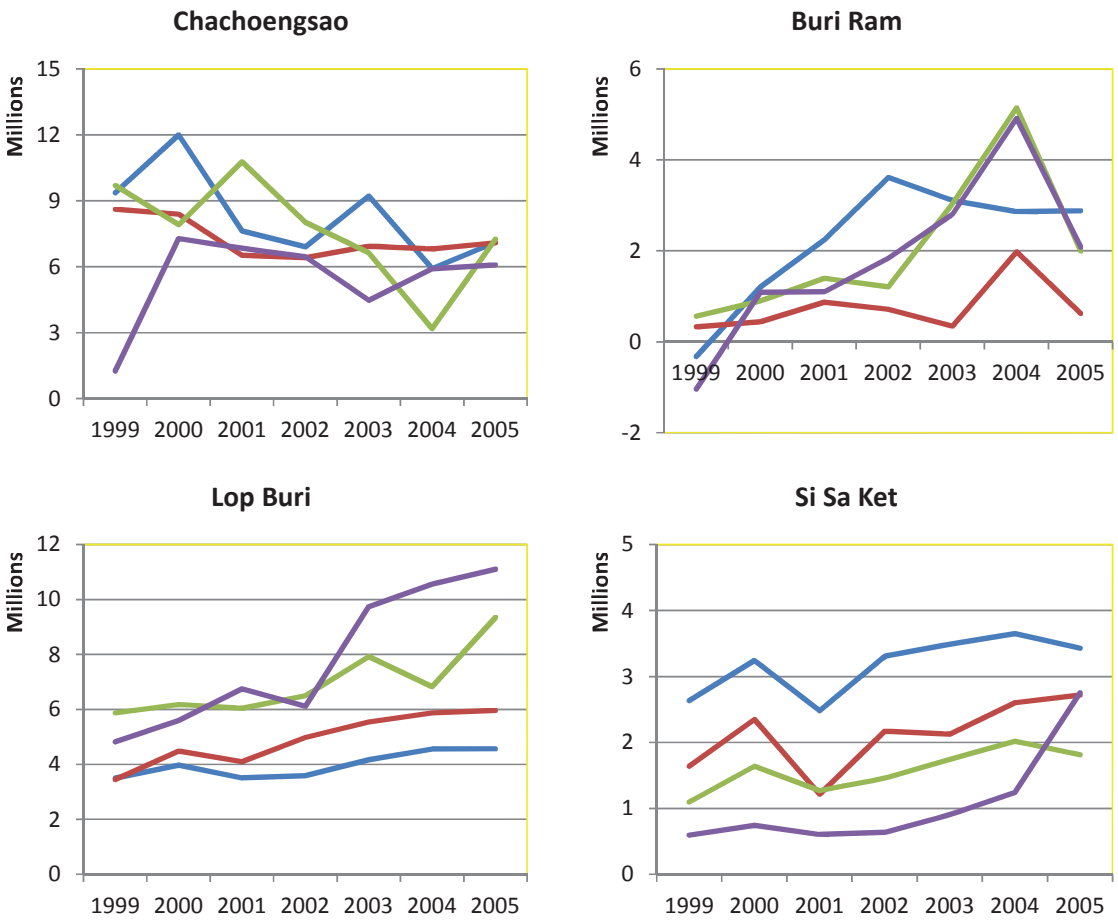
Production Account

Uses	Sources
Interest expenses	Production revenues
Less: Interest revenues	*Less:* Production expenses
Depreciation	
Insurance premium	
Property tax	
Profit	
Net income before tax	
Less: Capital gains	
Plus: Capital losses	
Less: Insurance indemnity	
Charge against output	**Output**

Villages' Outputs

- Over time, the outputs of villages in Chachoengsao have been decreasing
- The outputs of other villages have been increasing

Villages' Outputs



Courtesy of Consortium on Financial Systems and Poverty. Used with permission.

Appropriation Account

- The appropriation account shows how a household distribute its profits
- The profits is defined as the total income from production
- Villages in the Northeast region consume most of their profits and have smaller share of retained earnings

Saving-Investment Account

- The saving-investment account considers the changes in a household's assets and liabilities
- The saving-investment account can be created by the change of items in the balance sheet

Saving-Investment Account

Changes in Balance Sheet

Uses	Sources
Change in financial assets	Change in liabilities
Change in inventories	Change in net worth
Change in livestock assets	Contributed capital
Change in fixed assets	Current retained earnings
Change in total assets	**Change in liabilities and net worth**

Saving-Investment Account

Uses	Sources
Change in financial assets	Change in net worth
Change in inventories	Contributed capital
Change in livestock assets	Current retained earnings
Change in fixed assets	Depreciation
Plus: Depreciation	
Less: Change in liabilities	
Gross investment	**Gross saving**

Saving-Investment Account: Central vs. N.E.

- Changes in net worth of villages in the Central come mostly from current retained earnings
- Changes in net worth of villages in the Northeast come mostly from gifts

Village Balance of Payments

- **Trade balance** records the exports net of the imports of goods and services between village residents and nonresidents

  Current account = Trade balance + net interest income + net transfer – tax payments

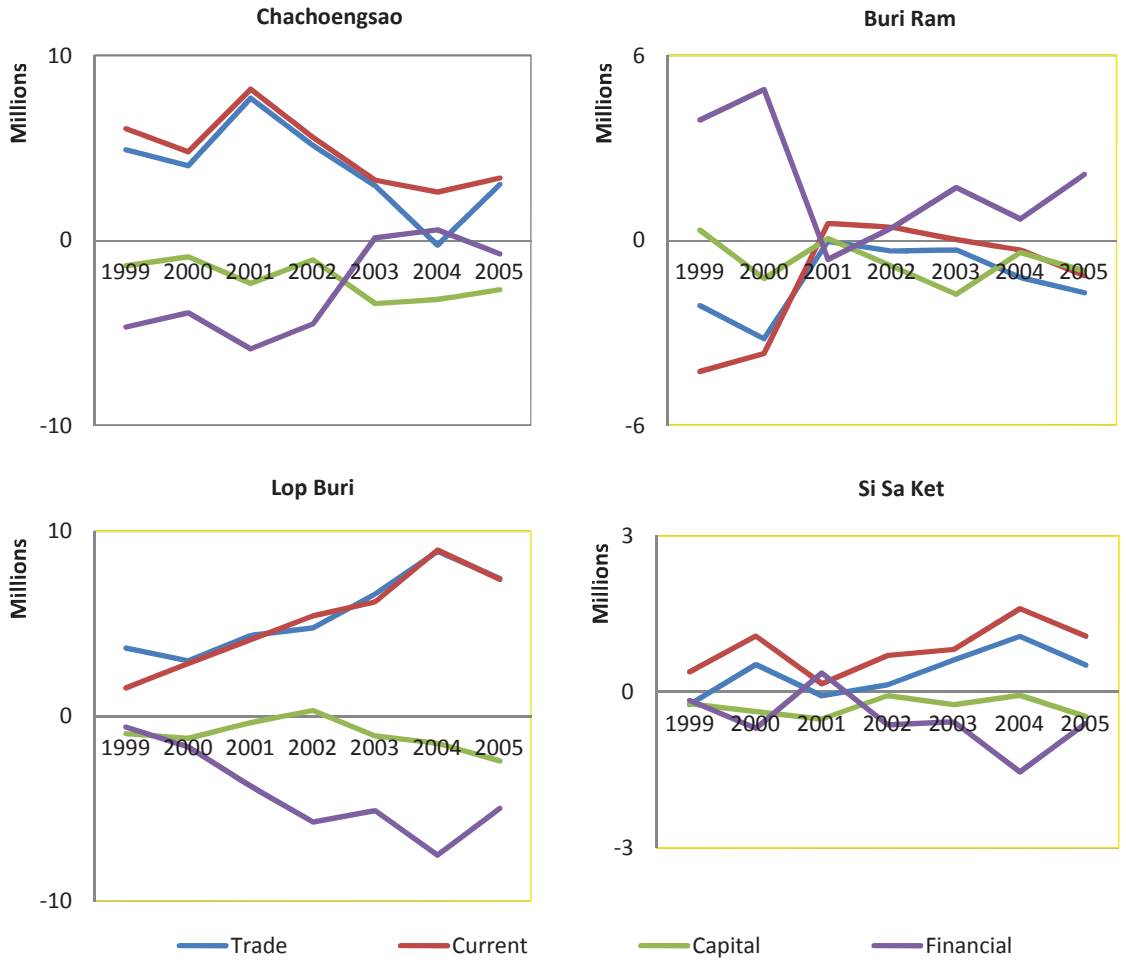
- **Capital account** measures the change in ownerships of livestock and fixed assets between village residents and nonresidents
- **Financial account** measures the transaction of financial assets between village residents and nonresidents
- We have the balance of payments identity

$$\text{Current Acc} + \text{Financial Acc} + \text{Capital Acc} = 0$$

- This can be summed up in the relationship:

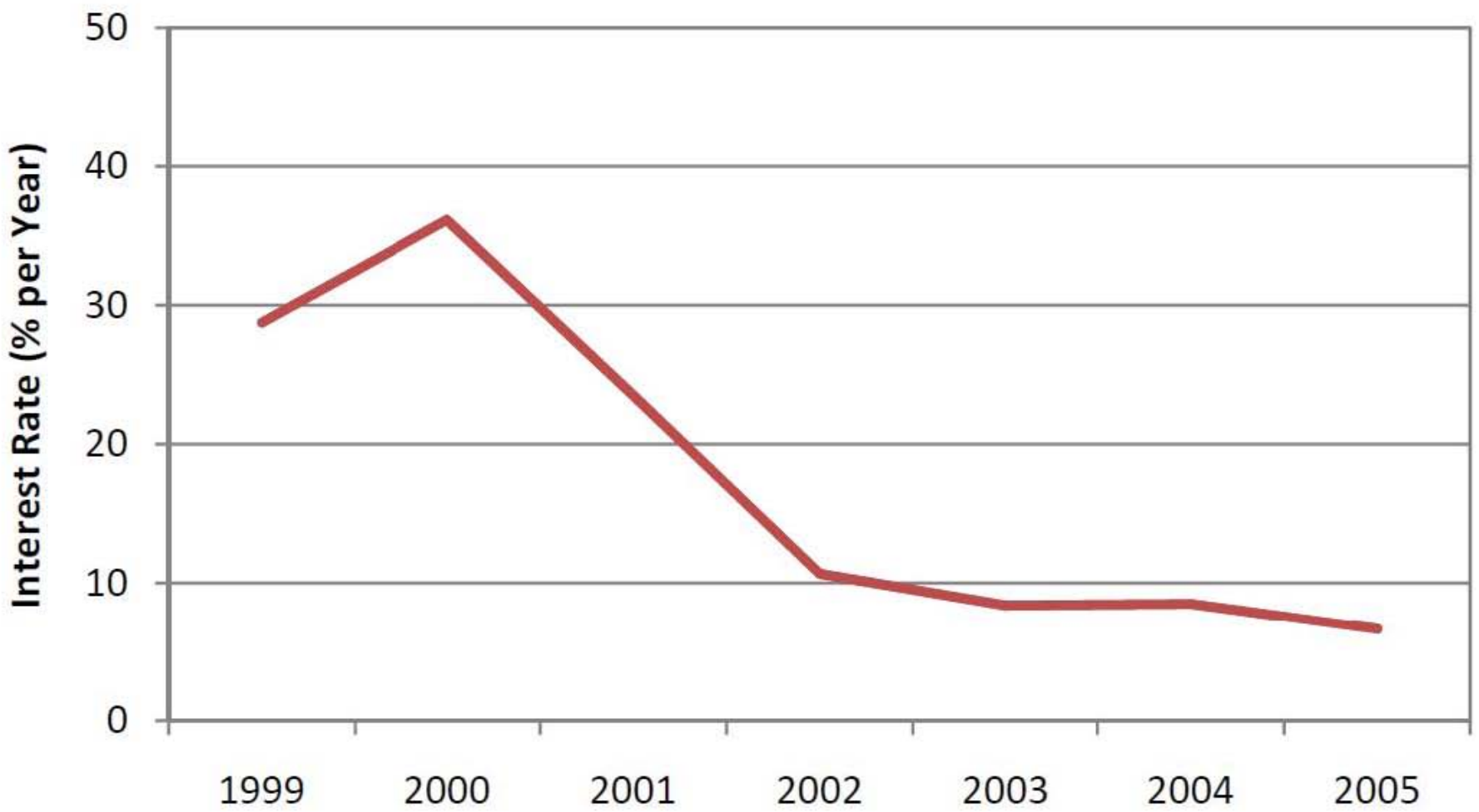
$$Y - C - I + T = (X-M)_{\text{Trade}} + (X-M)_{\text{Capital}} + \Delta\text{Inv}$$

Balance of Payments for Representative Villages

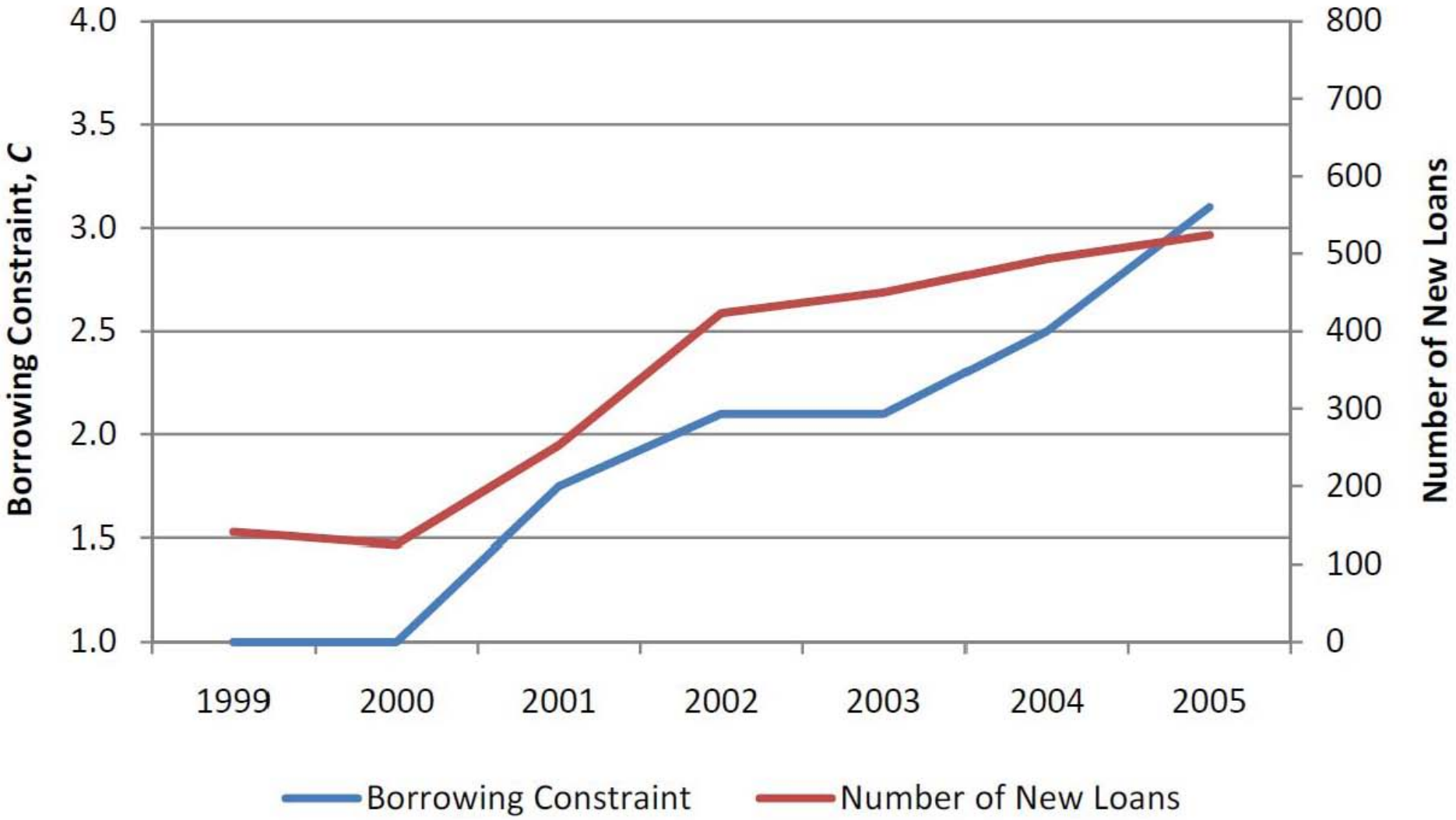


Courtesy of Consortium on Financial Systems and Poverty. Used with permission.

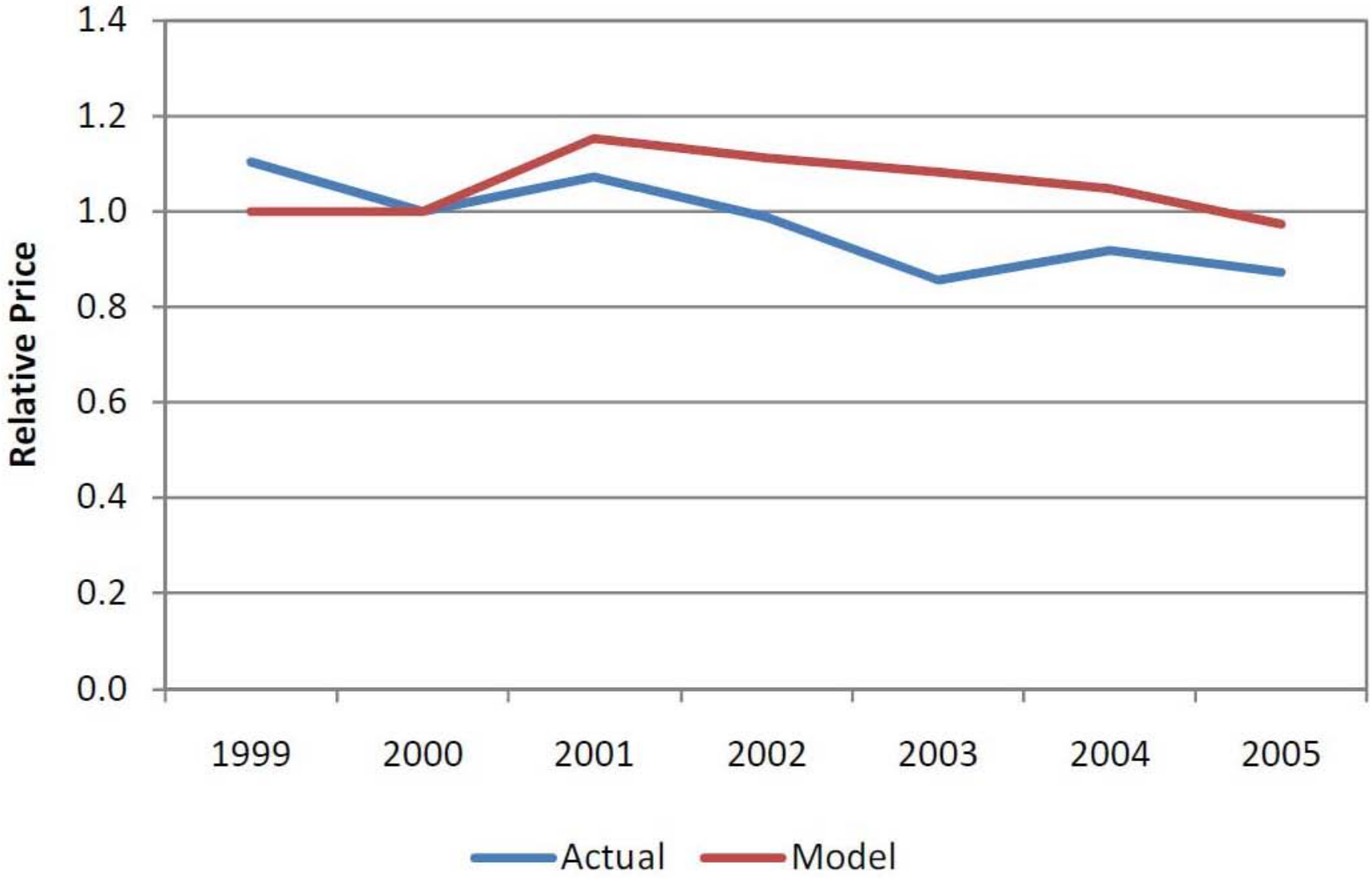
Median interest rate in Buri Ram



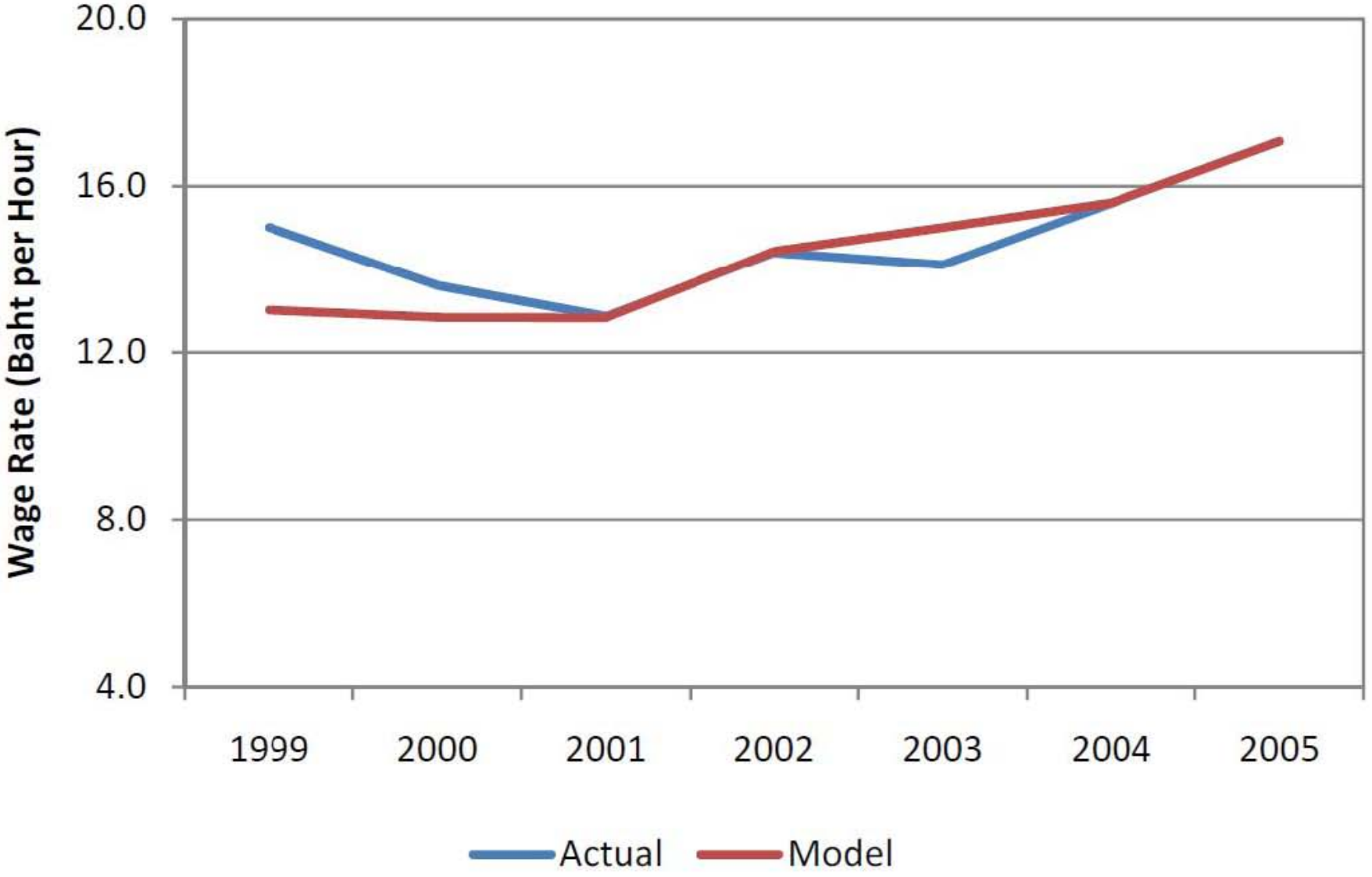
Borrowing constraint and the number of new loans in Buri Ram



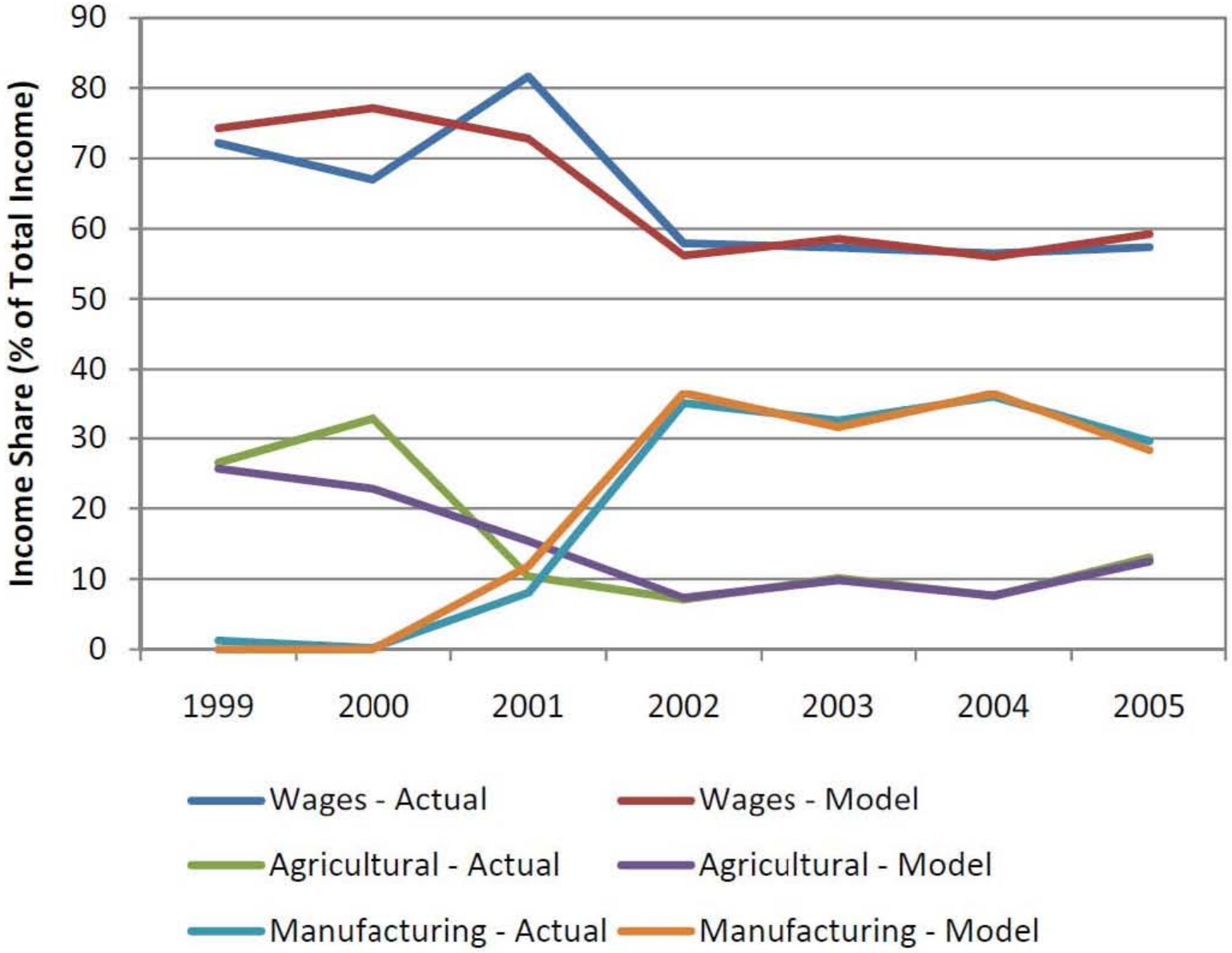
Relative price in Buri Ram



Actual and calibrated real wage rates in Buri Ram



Actual and calibrated income shares in Buri Ram



Introduction to

Flow of Funds Account

Example: Thailand's FFA in 2008

	NFC	FC	GG	HH & NPISH	RoW	Total
I. NET ACQUISITION OF FINANCIAL ASSETS	517,747	1,019,188	78,301	1,153,686	135,587	2,904,509
1. MONETARY GOLD AND SDRs	0	811,849	0	0	0	811,849
2. CURRENCY AND DEPOSITS	148,222	(371,180)	(15,961)	584,889	4,924	350,894
3. SECURITIES OTHER THAN SHARES	(69,925)	172,814	35,525	128,674	38,666	305,754
4. LOANS	332,958	459,270	(5,136)	(10,361)	10,739	787,470
5. SHARES AND OTHER EQUITY	78,197	(72,816)	44,052	255,037	155,469	459,939
6. INSURANCE TECHNICAL RESERVES	0	0	0	125,792	0	125,792
7. OTHER ACCOUNTS RECEIVABLE	28,295	19,251	19,821	69,655	(74,211)	62,811
II. NET INCURRENCE OF LIABILITIES	1,031,686	922,709	134,122	346,887	469,105	2,904,509
1. MONETARY GOLD AND SDRs	0	0	0	0	811,849	811,849
2. CURRENCY AND DEPOSITS	0	698,463	2,975	0	(350,544)	350,894
3. SECURITIES OTHER THAN SHARES	39,426	201,349	82,587	(159)	(17,449)	305,754
4. LOANS	611,578	(173,632)	40,208	299,042	10,274	787,470
5. SHARES AND OTHER EQUITY	308,030	74,149	0	0	77,760	459,939
6. INSURANCE TECHNICAL RESERVES	976	124,816	0	0	0	125,792
7. OTHER ACCOUNTS PAYABLE	71,676	(2,436)	8,352	48,004	(62,785)	62,811
III. FINANCIAL SURPLUS OR DEFICIT (I-II)	(513,939)	96,479	(55,821)	806,799	(333,518)	0

(Data from Office of the National Economic and Social Development Board of Thailand)

	NFC	FC	GG	HH & NPISH	RoW	Total
A. NON FINANCIAL ACCOUNT						
1. GROSS SAVING	1,460,961	194,301	419,694	675,801	(49,830)	2,700,927
2. GROSS CAPITAL FORMATION	2,134,522	7,660	336,241	141,933		2,620,356
3. PURCHASE OF LAND (NET)	23,747	306	11,797	(35,850)		
4. STATISTICAL DISCREPANCY	(9,285)	89,856				80,571
5. TOTAL SURPLUS OR DEFICIT (-) (1-2-3-4)	**(688,023)**	**96,479**	**71,656**	**569,718**	**(49,830)**	**0**
B. FINANCIAL ACCOUNT						
I. NET ACQUISITION OF FINANCIAL ASSETS	**517,747**	**1,019,188**	**78,301**	**1,153,686**	**135,587**	**2,904,509**
1. MONETARY GOLD AND SDRs		811,849				811,849
2. CURRENCY AND DEPOSITS	148,222	(371,180)	(15,961)	584,889	4,924	350,894
3. SECURITIES OTHER THAN SHARES	(69,925)	172,814	35,525	128,674	38,666	305,754
4. LOANS	332,958	459,270	(5,136)	(10,361)	10,739	787,470
5. SHARES AND OTHER EQUITY						
6. INSURANCE TECHNICAL RESERVES				125,792		125,792
7. OTHER ACCOUNTS PAYABLE						
II. NET INCURRENCE OF LIABILITIES	**1,031,686**	**922,709**	**134,122**	**346,887**	**469,105**	**2,904,509**
1. MONETARY GOLD AND SDRs					811,849	811,849
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7. OTHER ACCOUNTS PAYABLE	71,676	(2,436)	8,352	48,004	(62,785)	62,811
III. FINANCIAL SURPLUS OR DEFICIT (I-II)	**(513,939)**	**96,479**	**(55,821)**	**806,799**	**(333,518)**	**0**
C. SECTOR DISCREPANCY (A5-BIII.)	(174,084)	0	127,477	(237,081)	283,688	0

Notice:

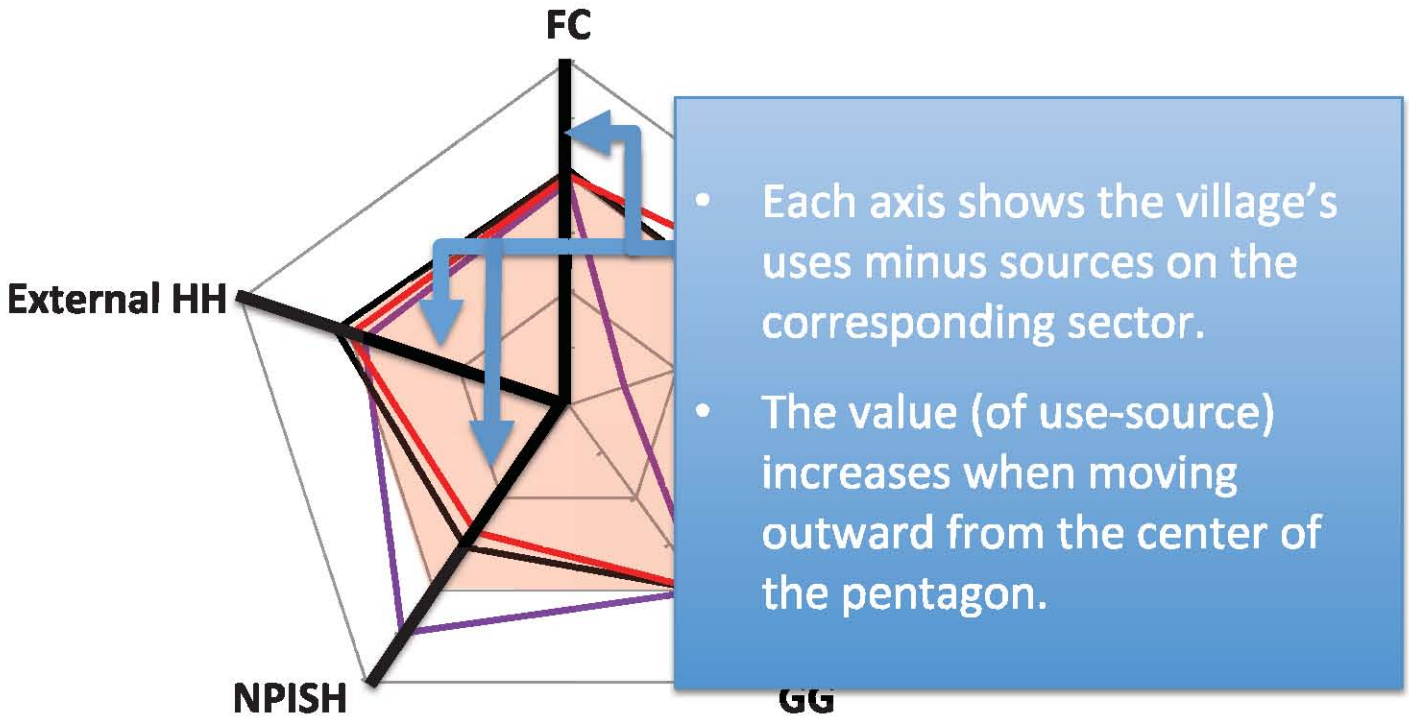
- Discrepancies between surpluses from NIPA and from FFA are quite large for all sector but FC whose financial statements are usually available.
- Sum of surplus and deficit across all sectors is zero by identity

FFA and the Townsend Thai Survey Data

- We have seen that FFA is linked to BS and NIPA (which is an income statement). So, with the framework to construct household BS and IS from the Townsend Thai survey data, we can compile flow of funds data for the households in the survey as well.
- Note that this is possible also because the survey data contain information about the other party that households transacted with.
- Example of how each household's transaction enters FFA

FFA and the Townsend Thai Survey Data

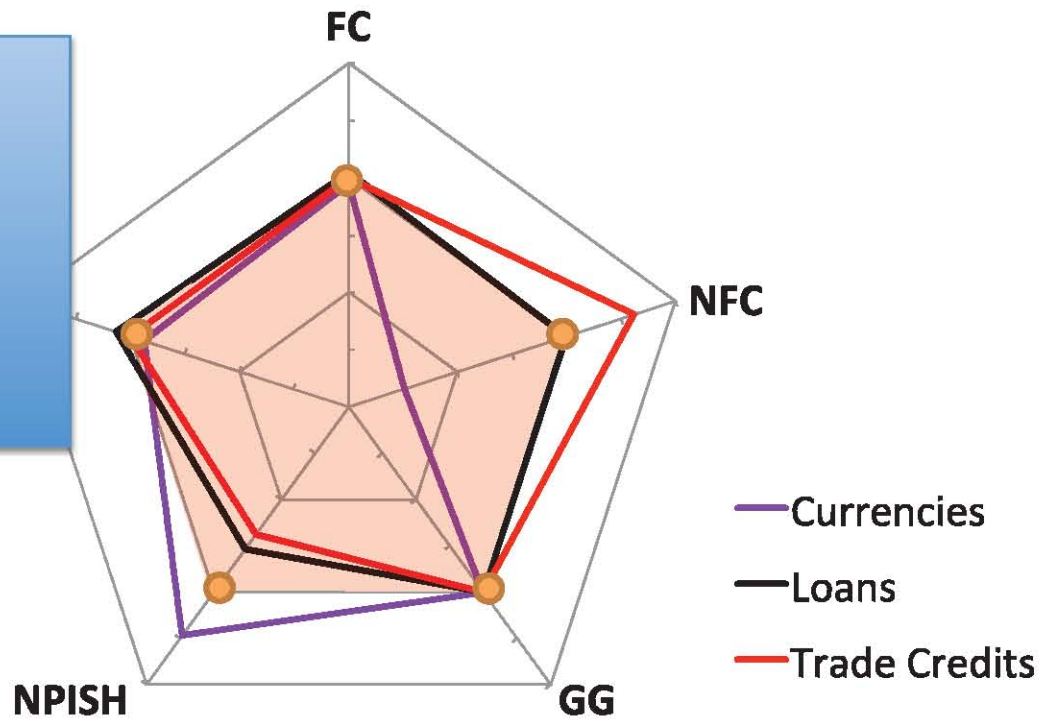
- Flow of funds between a village in Chachoengsao and the other sectors in November 2009. (data from previous slide)



FFA and the Townsend Thai Survey Data

- Flow of funds between a village in Chachoengsao and the other sectors in November 2009. (data from previous slide)

- Corners of the red polygon indicate zero value on the axes.



- **FLOW OF FUNDS THROUGH THE FINANCIAL SYSTEM IS A KEY, NATURAL MEASUREMENT FOR THE CONSTRUCTION OF FINANCIAL MODELS:** Flow of funds accounts (FFAs) use the traditional sectors of the NIPA (firms, household, government, and the rest of the world) and measure financial flows among them. There is, however, a heavy reliance on flows of the sectors with financial corporations and financial markets, as these are best measured given typical reporting requirements. But that is a limitation in the measurement, which can be improved, and not a limitation in the conceptualization of accounts and their link to standard national income. The latter, NIPA, is the basis for most of the models considered previously (CGE, DSGE). Better measurement adds the mechanics of assets and adjustments as a key part of the story. This can and should be done at the micro level (firm, household, financial institution) as well as aggregated up to key sectors, depending on the model or application.
- **WHAT ARE FLOW OF FUNDS ACCOUNTS:** Essentially, savings comes from income statements and, via an identity, savings (plus gifts and remittances) are put as a flow into real and financial investments. The portion which is not retained earnings creates a financial flow. Adjustments are made so that income is on a cash flow rather than accrual basis. Roughly, a flow is created by difference over time of the line items in the balances sheets (adjusting for capital gains and losses). Flows of funds do often feature the balance sheet directly as well, not just differences and flows. The point: we can see directly the use of financial markets and institutions by asset type.
- **TWO TRADITIONS OF FLOW OF FUNDS IN THE LITERATURE:**
  - **VAR and FFAs-** There is relatively recent work by Christiano, Eichenbaum & Evans (2006) which uses VAR with FFAs at a detailed level to gauge the impact of monetary policy in the U.S. This digs a bit deeper than the imposed sectors and measured flows in their macro financial models, reviewed earlier. Ridhwan et al. (2011) is a VAR study of the regional impacts of monetary policy in Indonesia using provincial level data on GDP and trade. As the authors note, Indonesia is a diverse, heterogeneous set of islands and a good place to expect to find geographic or sectorial variations in impact and to try to distinguish the interest rate channel from the bank lending channel of Bernanke, Gertler, & Gilchrist (they have data on firm size).
  - **Demand Equations-** There is an older tradition emanating from the seminal work of Brainard & Tobin (1968) understanding the financial systems through demand equations and costs of adjustment (supply equations or policy variables match the demand). In short, that paper emphasizes the interconnectedness across assets and sectors which the flow of funds make explicit. An example of a demand equation approach that takes this into account for policy is a study of Green et al (2012), using flow of funds accounts from the Reserve Bank of India.

- **MODELING:** The interest in this lecture is the use of FFAs for modeling. We can focus on the household side, as in some literature, and on the firm side, in other literature. Recent work of Guerrieri & Lorenzoni (2011) and Piazzesi & Schneider (2010) uses the flow of funds data from the household sector to model financial crisis and to determine the impact of shifts in inflation expectations, respectively.

  - **HOUSEHOLD SECTOR AND FINANCIAL DECISIONS:** The focus of Guerrieri and Lorenzoni's paper is on the household sector and financial decisions (though the instruments and choices are typically restricted, exogenously, as in borrowing constraint models). Households consumers solve dynamic stochastic optimization problems by their choice of consumption (durables and nondurables), labor supply (at a wage determined by exogenously variation productivity, subject to a Markov process), and saving and borrowing (up to a limit). An unexpected, permanent tightening in a consumer borrowing capacity forces borrowers to deleverage and savers to accumulate more buffers, as future borrowing is more limited. This direct and indirect net increase in saving forces the interest rate on bonds (saving accounts) down. In fact, the interest rate overshoots due to the nontrivial distribution of wealth; there is a strong adjustment for those with low wealth. Cuts in consumption and increases in labor supply move output in opposite directions. The consumption effect is stronger when there are nominal rigidities. Durable goods adds another asset and another margin of adjustment. This model is as applicable to macro as it is to financial access, where, presumably, the process runs in reverse, toward liberalization rather than tightening.

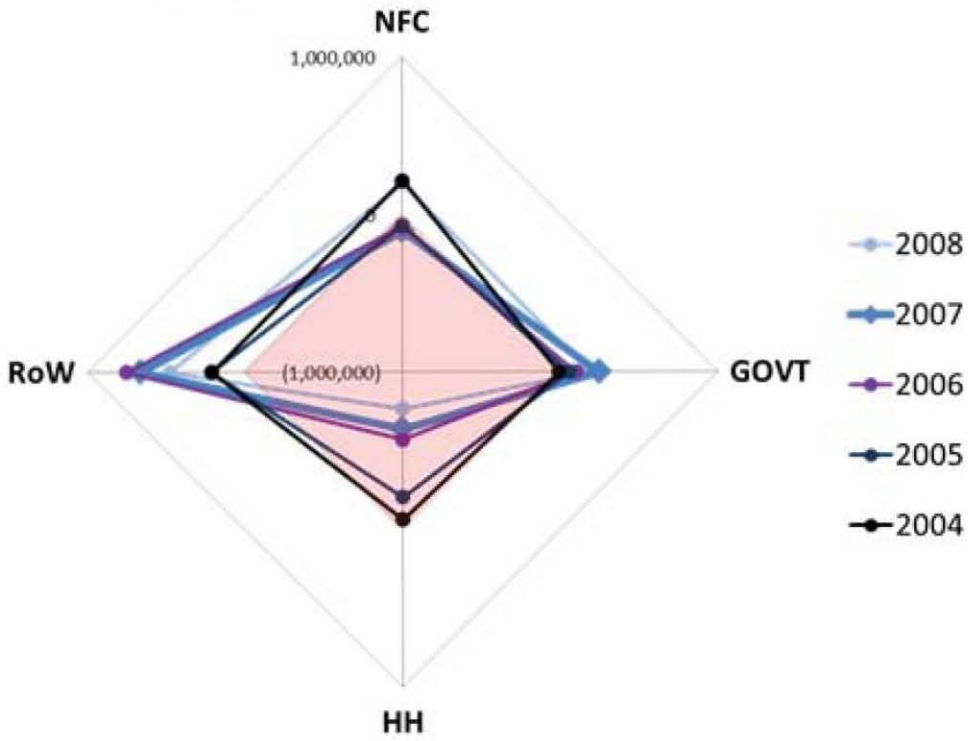
  - **FLOW OF FUNDS AND CHANGES IN WEALTH:** Piazzesi and Schneider's paper draws explicitly on flow of funds for studying large changes in the size and composition of net wealth driven by demographics and expectations. In the U.S. in the 1970's, net worth dropped by 25% on average and the portfolio shifts from equity to real-estate dropped by about 20%. The authors attribute these to entry into the market by baby boomers, lower aggregate saving, increased price of housing, changed expectations, and the erosion of bond portfolio by surprise inflation. The key state variables are the joint distribution of asset holdings and incomes as well as heterogeneous expectations. All these are taken from the Survey of Consumer Finances micro data and the Michigan Survey of Expectations of Prices and Income. The authors adopt a temporary equilibrium framework so that they can equate asset demands to supply (coming from the other sectors in the FFAs) without solving forward looking optimization problems.

- **OTHER PAPERS IN THE HOUSEHOLD TRADITION:** Chatterjee et al. (2007) model consumers and their borrowing subject to understood contingencies that allow them to default on lenders. They use the model to match both micro statistics on bankruptcy and unsecured credit as well as macro aggregates, earnings, and the distribution of wealth. Livshits et al. (2007) use a life cycle model and directly parameterize expense shocks.

- **FIRMS:** A firm financing literature begins with the key financing constraint in representative firm models of macro (reviewed earlier in this lecture). As reviewed in Chari et al. (2008), there are supposed to be binding collateral constraints, wedges between internal and external funds, and fluctuations in these which impact investment. But looking at the U.S. flow of funds, the typical non-financial firm sector is not a net borrower seeking to finance investment or other activities; in fact, the firm is paying dividends. Chari et al. (2008) thus argue that we need data on non-financial firms. This is crucial to an understanding of how financial market disturbances affect the broader economy and for learning how to design appropriate regulatory policy for financial markets.

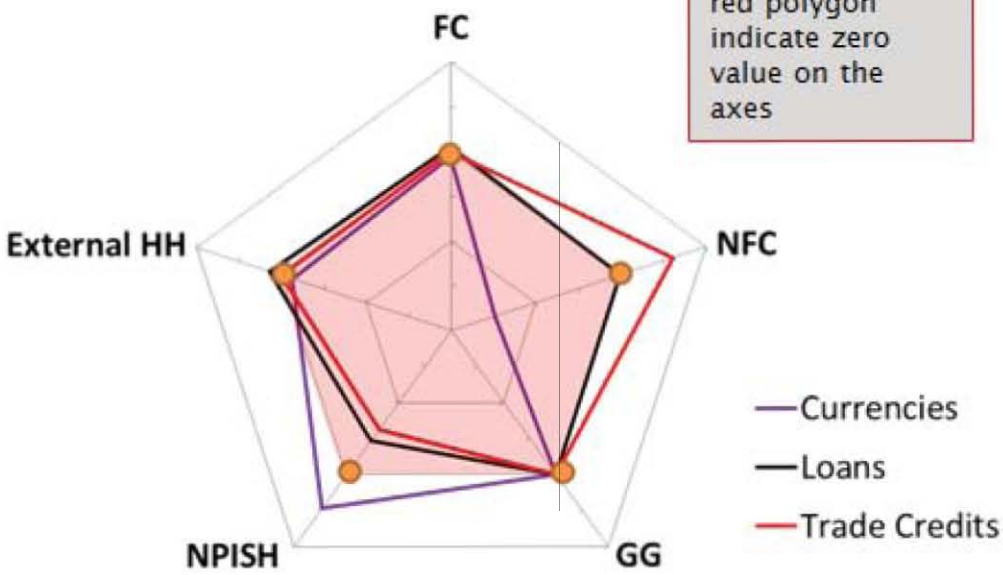
- **CONSORTIUM ON FINANCIAL SYSTEMS AND POVERTY (CFSP):** CFSP is a research organization that features a working group on flow of funds with the goal of enhancing measurement and using FFAs in models. Many of the papers discussed on this page were featured at a recent conference. More information on this event, including the proceedings and presentations, can be found at http://www.cfsp.org/research/workshops/flow-funds-accounts-and-savings-workshop. The Consortium has also entered into partnerships with developing countries, including Mexico and Thailand, to improve flow of funds and their use in models and in policy making. For more information on the project with Mexico, please visit http://www.cfsp.org/research/research-projects/regional-approach-financial-savings-and-intermediation#.UJGZvG8mToE.

- Flow of funds from financial corporate sector



- Flow of funds between a village in Chachoengsao and the other sectors, in November 2009

Corners of the red polygon indicate zero value on the axes



- **MEANING OF THE FIGURES:** FFAs can be used within a country at various levels of aggregation. Traditional FFAs are illustrated by the figure on the left for Thailand, and unconventional FFAs (as in the future) are on the right for Thai villages. Both of these pictures are possible due to the standardization of measures through NIPA. These figures come from Srivisal (2012).

- **WHAT THE FIGURES SHOW:** In both figures, deficits and surplus are measured relative to diamonds. On the left, net flows of each traditional sector with the formal financial system are shown for various years. Typically, there is a surplus generated from the household sector (HH) and deficits from the rest of the world (ROW). The dividing line between a surplus and a deficit is the edge of the pink diamond. We see variation at the national level over time. On the right, a village in the Townsend Thai Data is running a deficit with the village fund (NIPISH) in cash and a surplus in trade credit with outside nonfinancial corporations (NFC).

- This measurement tells us that economies at various levels are interacting with each other, but the exercise is not a substitute for modeling. For example, cash plays a large role in mediation in the relationship between a village economy with the outside world. Alvarez et al. (2012) study the transaction demand for cash, i.e. when to hold and when to go to the bank. Cash is, as observed, a financial transaction on center stage. Holding a lot of cash might suggest transaction costs are high. Ultimately, the impact of monetary policy on the village economy will be determined.

14.772 Development Economics: Macroeconomics

Spring 2013