

Financial Deepening, Macro- Stability, and Growth in Developing Countries

Keynote speech

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Questions Raised by the Conference Title

- Implementation of monetary and fiscal policy
- Risk-sharing
- Risk-taking incentives
- Transmission of financial shocks/contagion
- Regulation impedes innovation ?

Financial
deepening

- Relaxation of borrowing constraints
- Improved formal intermediation, monitoring, transaction services
- Unbalanced financial development
- Negative impact on local systems

Promotes OR
hinders?

Macro-
stability



Growth

- More stability, less growth?

Questions we are discussing today

- ▶ What prevents financial depth in the first place?
 - Adverse selection, hidden states, moral hazard problems, limited commitment?
 - What is the role of political economy factors? Institutions?
 - Do we take these as given? If so, is there still room for efficiency gains?
- ▶ Consequences of credit/savings/payments expansion?
 - How beneficial is it for welfare? (taking into account the costs of building financial systems)
 - How do you promote financial access while preserving financial stability?
 - What are the policies that achieve the right balance?
 - How involved should the government, monetary authority, regulators be?
- ▶ Distributional effects of financial deepening?
 - Across categories of population, sectors

Methods for Answering these Questions

- ▶ Historical studies
 - Reinhardt and Rogoff (2009), Schularick and Taylor (2012)
- ▶ Reduced-form studies (with identification)
 - Cross-country: King and Levine (1993), Rajan and Zingales (1998)
 - Within-country: Jayaratne and Strahan (1996), Guiso, Sapienza, Zingales (2004)
- ▶ Models
 - (Tell a story) Development, financial deepening and growth: Greenwood and Jovanovic (1990), Lloyd-Ellis and Bernhardt (2000), Acemoglu and Zilibotti (1997)
 - (Tell a story and provide reduced-form identification restrictions) Macro-stability and growth: Rancièrè, Tornell, Westermann (2008)
 - (Tell a story but can be calibrated and tested with micro data)

The model-based approach

- ▶ Financial Deepening, Macro-Stability and Growth: how do we achieve balance?
 - These are proximate targets
 - Welfare (efficiency, possibly distribution) is what should ultimately matter
 - General Equilibrium modeling with micro data allows us to judge policy based on well-defined welfare criteria

Outline

- ▶ Models
- ▶ Measurement
- ▶ Featuring General Equilibrium models with measured micro underpinnings
- ▶ Applications (with policy implications)
 - E-money
 - Credit
 - Insurance
 - Micro underpinnings and policy

Class of Widely Used Models

- ▶ Contrast with “standard” macro general equilibrium models with only implicit micro financial underpinnings

- ▶ **AGE: Applied General Equilibrium**

- To compute Walrasian outcome: Scarf (1967)
- U.S. taxes on capital gains: Shoven and Whalley (1972, 1973)

- ▶ **CGE: Computable General Equilibrium**

- Predecessor: Johansen (1960) (Monash, Australia and Cambridge, U.K.)
- Reviews: Kehoe and Kehoe (1994); Dawkin, Srinivasan and Whalley (2001)
- Applications: World Bank policy assessments, climate modeling
- **Measurement**
 - Drawing on, integrated with, NIPA (HH, Firms, etc.), input/output matrix
- Key underpinning: Complete markets or equivalent
 - What if not true ⇒ Separation of households/firms fail

Advantage	Disadvantage
Lots of realistic sectors	Static
	No uncertainty

- ▶ **DSGE: Dynamic Stochastic General Equilibrium**

- RBC: Real Business Cycles. Kydland and Prescott (1982)
 - Review: Cooley (1995)
 - **Measurement** (drawing on NIPA)
- Key Underpinning: Gorman aggregation with complete markets
- Method does generalize
 - With Pareto weights: Negishi (1960)
- But what if as-if-complete-markets fail? Then separation fails
- Where is the financial modeling?

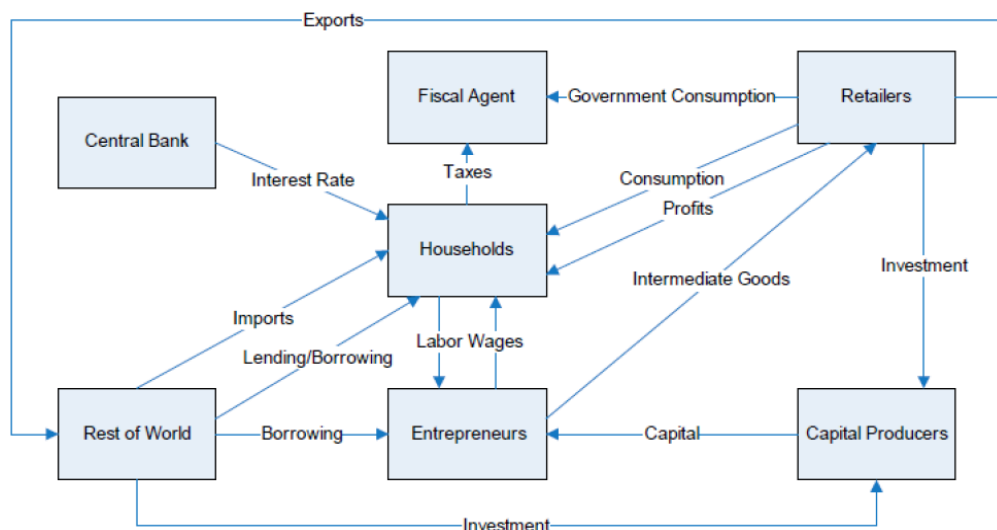
Advantage	Disadvantage
Dynamics	Assumes representative consumer
Shocks	No redistributive wealth effects

Continuing With the Contrast: Financial-Frictions “Augmented” DSGE Models

Persistence, Amplification, Monetary Phenomena, Credit Channel, Bank Lending Channel

- ▶ Bernanke and Gertler (1989, 1990); Bernanke, Gertler and Gilchrist (1998); Kiyotaki and Moore (1997); Christiano, Motto and Rostagno (2003)
- ▶ Surveys: Brunnermeier, Eisenbach and Sannikov (2012)
- ▶ Sweden: Jacobson, Linde and Roszbach (2005)

Application of CMR 2003 to Indian Economy, RBI





- ▶ Recent directions: **Moving toward incorporating micro development**
 - Christiano, Motto, Rostagno (2012)

Advantages	Limitations
Built on micro underpinning	Initially addressing only aggregate micro data
Costly State Verification (Townsend 1978)	Retains and adds actors
Key is credit, financial accelerator	Micro assumptions not tested

Advantages	Disadvantages
Using more micro data	Still creating economic actors not intending to match to data
Firm size data: Influence of development (Hsieh and Klenow 2009)	Implicitly assuming separation
Financial variables	Households, separate from firms, even with financial imperfections
Bankruptcy	

Applied General Equilibrium Development Economics : Using Measured Micro Underpinnings

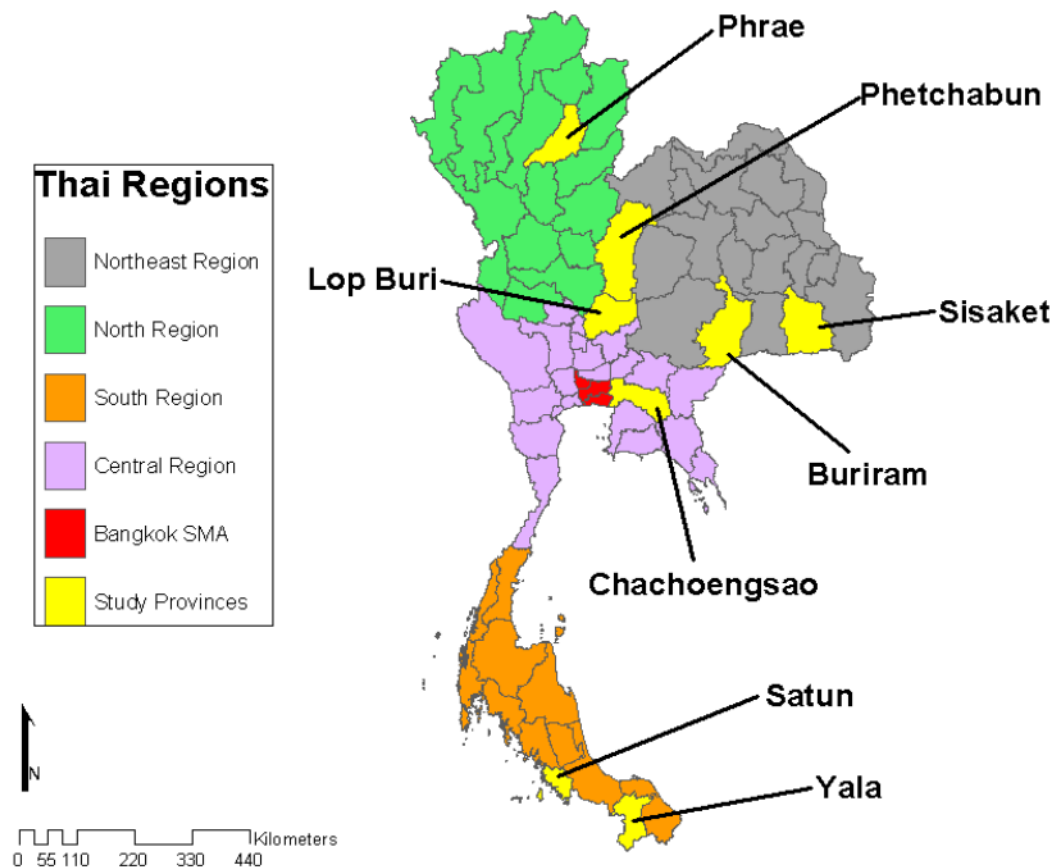
- ▶ Background: Empirical relationship between finance and growth
 - Reduced form: King and Levine (1993); Levine (1997); Rajan and Zingales (1998); Beck, Demirguc-Kunt and Levine (2004)
- ▶ Qualitative theory becomes quantitative, theories now estimated in data
 - Occupation choice, investment and credit
 - Lloyd-Ellis and Bernhardt (1993); Galor and Zeira (1993); Banerjee and Newman (1993); Aghion and Bolton (1997) 
 - Big wage effects on poverty reduction, wage more than doubles: Gine and Townsend (2004)
 - Endogenous TFP in transition 78%: Jeong and Townsend (2005)
 - Risk sharing, insurance and endogenous financial deepening
 - Greenwood & Jovanovic (1990); Bencivenga and Smith (1991) 
 - Cannot run regressions on transition data: Townsend and Ueda (2006)
 - Welfare losses from government takeover of banking, up to 28% gain from liberalization: Townsend and Ueda (2010)
- ▶ Next wave of models: The literature takes off
 - Financial reforms and the persistence of history: Buera and Shin (2010), Peters (2012)
 - Distinguishing two sectors: Kaboski, Buera and Shin (2009)
 - Inequality and growth: Blaum (2012)
- ▶ Transient misallocations: Moll (2010); Banerjee and Moll (2010)
- ▶ Financial intermediation, technological progress and costly-state verification: Greenwood, Sanchez and Wang (2012)
- ▶ Private and public sectors, growing like China: Song, Storesletten and Zilibotti (2011)

Outline

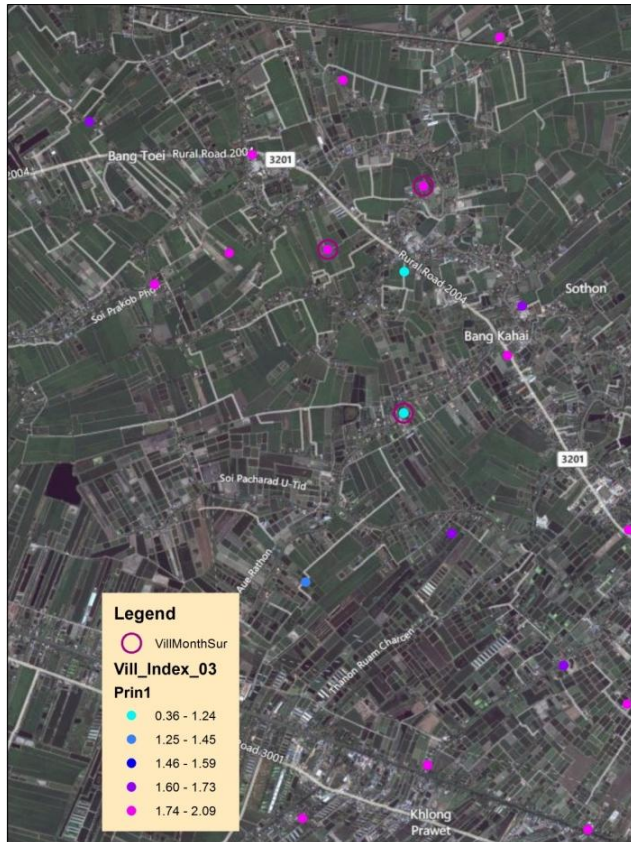
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Townsend Thai Project: Data From Regions, Villages/cities, 15 Year Panel

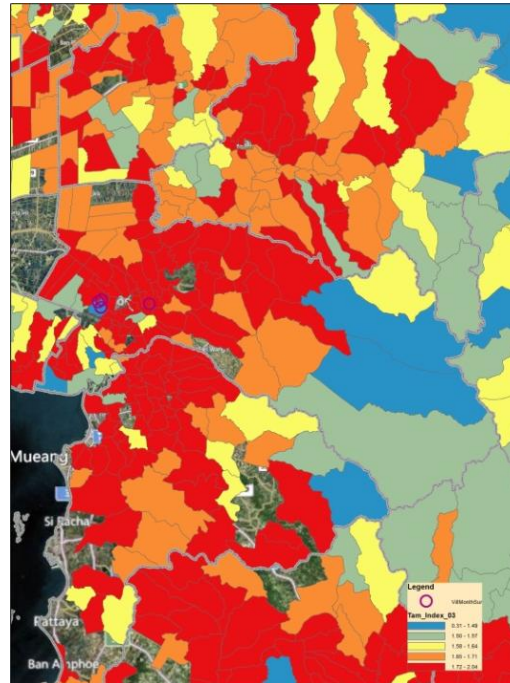
- Monthly survey: 180 months for selected villages
- Annual Rural Survey and Urban Survey: wider cross-section
 - In 2009, surveyed 3,184 households across 200 villages, towns and cities
 - New Enterprise Survey, including medium and large
 - (includes city neighborhoods, as in earlier work on Chicago ethnic neighborhoods)
- There are other data gathering projects: Mexico, Chile, ...
- Even one year of cross-sectional data can be useful



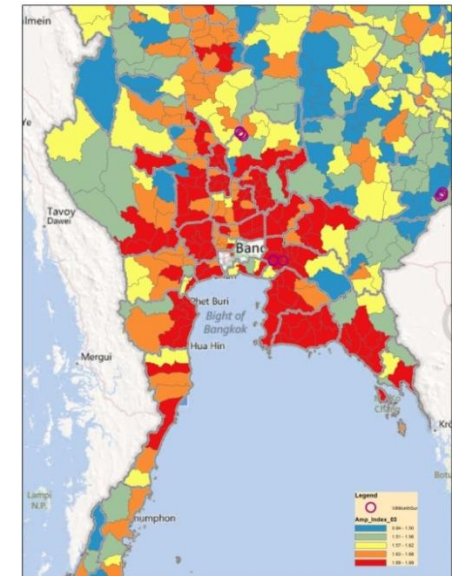
Measurement: From Local to Global



Featuring villages surveyed monthly,
(and others) with roads:
Townsend Thai Project
Advantage of additional surveys



(High wealth in red)



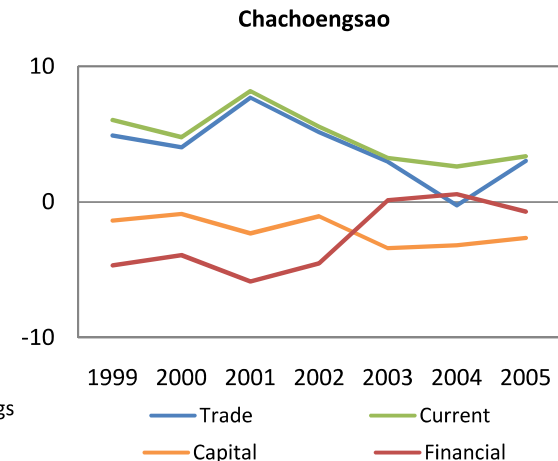
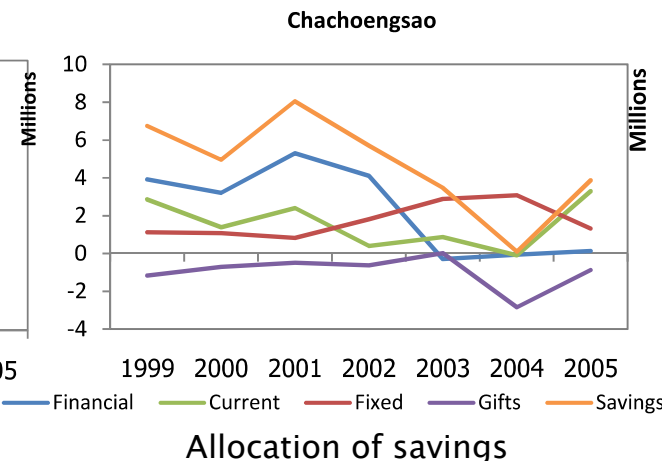
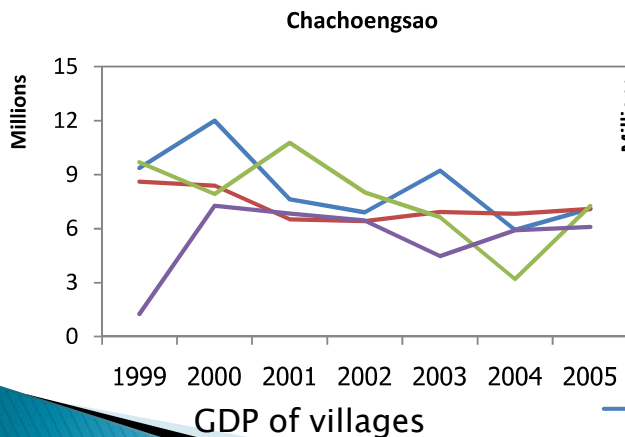
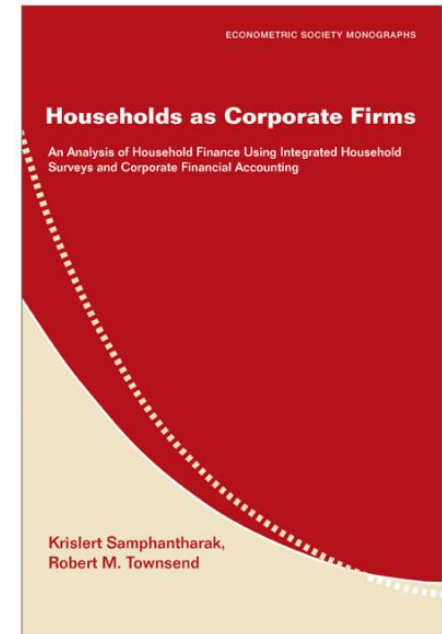
(High wealth in red)

- Featuring other existing secondary data on GIS database archive with auto search
 - Here wealth from CDD, archive includes SES, Labor Force Survey, Population Survey, bank location, surveys of industry
 - These should be assembled for each country and easily available for analysis

Measure Micro and Build up, all with Standard NIPA

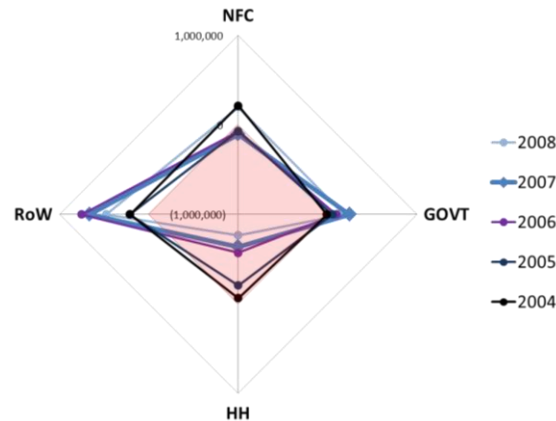
Use corporate financial accounting but apply to households: (households run enterprises and make high contribution to GDP)

- Income statement, balance sheet, cash flow
- Standard basis for NIPA and Flow of funds
- Can be applied to surveys more generally
- Paweenawat and Townsend (2012): using the language of international, cross-country economics to think about villages (and regions) as open economies

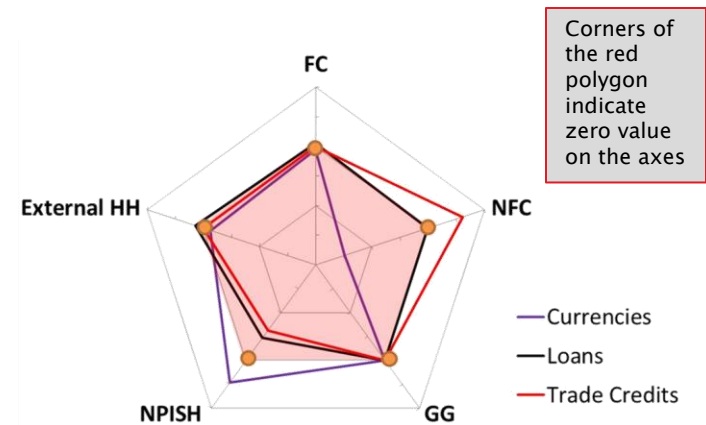


Bringing Flow of Funds back into Macro Modeling

- ▶ Adjustment and equilibrium in asset demand and supply (or policy) equations
 - India: Green, Moore, Murinde and Suppakitjarak (2012) building on Brainard and Tobin (1968)
- ▶ VAR's distinguish firms, households in response to monetary shocks: Christiano, Eichenbaum and Evans (2006) – looking at particular financial instruments
 - Indonesia: Ridhwan, de Groot, Rietveld and Nijkamp (2011)
 - Thailand: Srivisal (in progress)
- ▶ Distribution within firm/sector, self-finance and dividends vs. borrowing firms:
 - Chari, Christiano and Kehoe (2008); Armenter and Hnatkowska (2011)
- ▶ CFSP projects underway: Researchers and policymakers in collaboration to measure and model:
 - Flow of funds in Thailand (NESDB), Mexico (CNBV), Brazil
 - But distinguish SME's from large corporations, urban vs. rural, geographic flows
 - Transactions outside formal banking system



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

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How To Do Policy with General Equilibrium: Research Policy Algorithm

▶ Algorithm

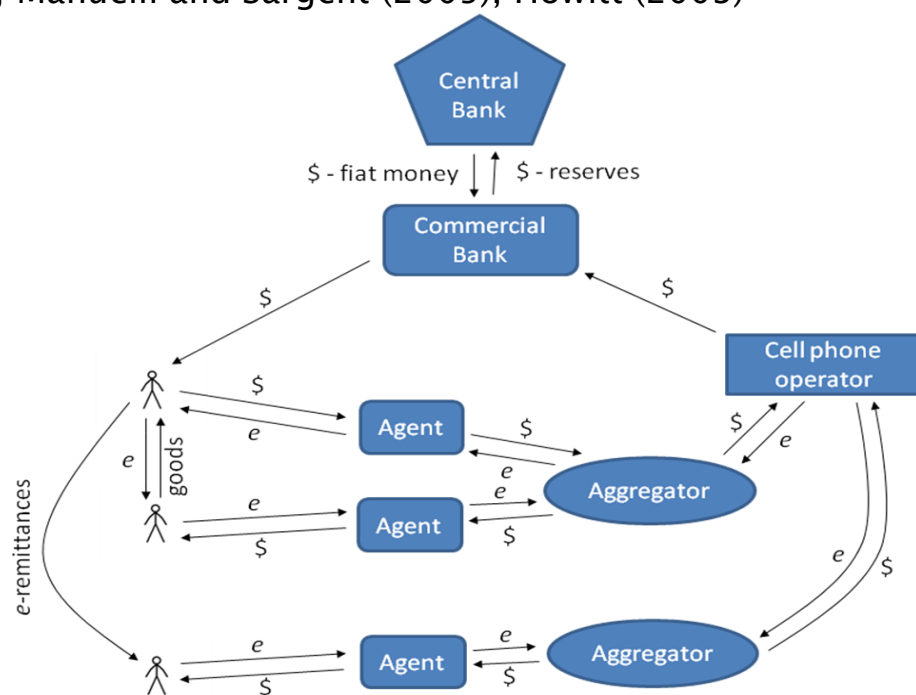
- Tests of benchmark standards (full or constrained-efficient)
 - If do not reject \Rightarrow leave it alone or build on this base
 - e.g., build formal/national on informal/village
 - If with obstacles to trade (constrained-efficient)
 - \Rightarrow reject full efficient
 - but accept constrained-efficient and leave it alone
 - \Rightarrow or, alleviate constraints
 - collateral constraints \Rightarrow legal reforms might help
 - moral hazard constraint \Rightarrow possibility of more monitoring
- ▶ If distortion comes from ill-designed regulation \Rightarrow Fix the policy
- ▶ Not as unlikely as it might seem
- Regulation can lack theoretical/empirical underpinnings
 - A patchwork to fix perceived problems or symptoms when things go wrong
 - Not based on fundamentals
- ▶ The Welfare Theorems
- can apply in settings with private information, moral hazard, nonconvexities
 - Give guidance to optimal market/institutional design to fix externalities, adverse selection, collateral constraints
 - Or correct liquidity shortages via model-guided monetary policy.

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Application : Kenya, e-Money: Regulation and Monetary Policy in Economies Where Spatial Separation is Real and Matters

- ▶ Financial deepening with e-money causes economic growth
 - Wicksell (1935); Cass and Yaari (1966); Lucas (1980); Townsend (1983)
- ▶ Real bills vs. quantity theory, inside and outside money; inflation and growth are not appropriate welfare targets–
 - Townsend (1980); Sargent and Wallace (1982); Manuelli and Sargent (2009), Howitt (2003)
- ▶ Circulating private debt, liquidity but need for a coordinating device
 - Townsend and Wallace (1982)
- ▶ Models of settlement, limited market participation, monetary policy
 - Lucas (1990); Grossman and Weiss (1983); Rotemberg (1984); Romer (1987); Christiano and Eichenbaum (1992); Fuerst (1992); Lacker (1997); Perez-Verdia (2000)
 - Actual optimal liquidity management
 - Friedman and Schwartz (1963)
 - Interest rates and agricultural cycle in the U.S. prior to and need for Federal Reserve
 - Freeman (1996); Green (1999)



Jack, Suri and Townsend (2010)

Outline

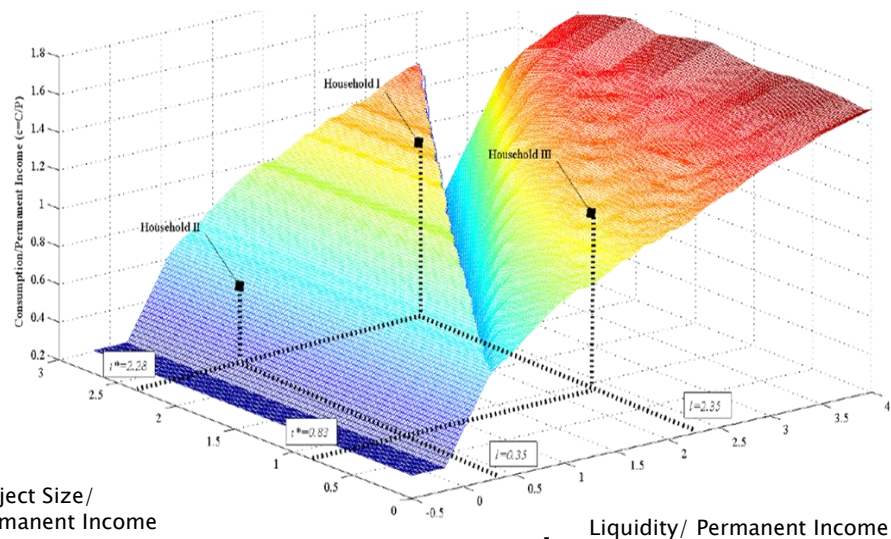
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Tests of Credit, Savings, Investment, Rates of Return

- ▶ This is a test of financial intermediation
 - GE efficiency of entire economy – our main theme
- ▶ Unlike consumption smoothing (see next), here there are dramatic failures
 - Certainly in Thai data
 - And failures robust to heterogeneity, geography, formal/informal institutions
- ▶ Benchmark standard
 - Equalizing rates of return on assets (better, estimated marginal product)
 - Literature review: Banerjee and Duflo (2005)
 - Persistence of (some) high rates of return
 - High dispersion in rates
 - Money is not flowing from low to high productivity firms

Modeling Interventions with Imperfect Markets

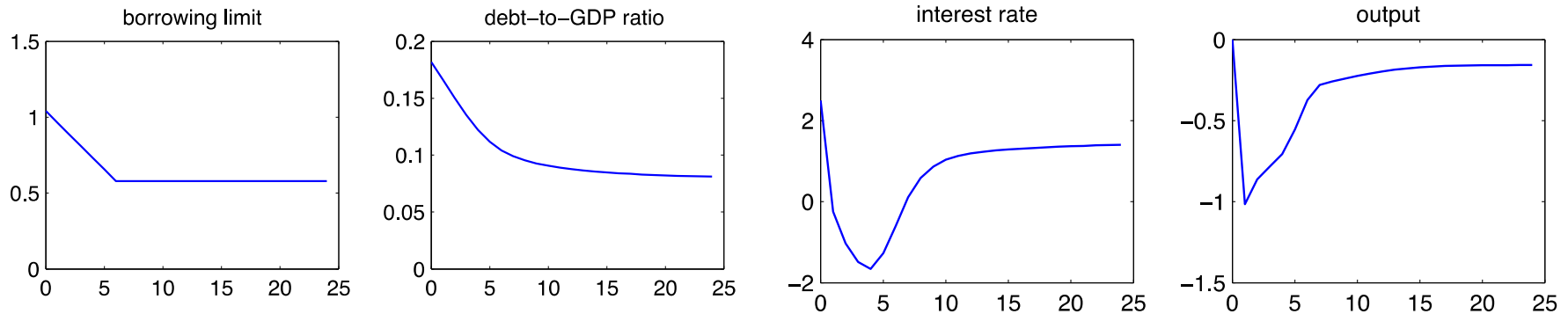
- ▶ Kaboski and Townsend (2012, *Econometrica*)
- ▶ Studies the Thai Million Baht Village Fund program: in 2001 / 2002, each of 80,000 villages received the same amount (irrespective of size)
 - ⇒ Borrowing constraints loosened more for households in small villages
- ▶ Structural model to understand and evaluate the impact of this quasi-experimental microcredit intervention program
- ▶ Features buffer stock saving/borrowing, default, indivisible investment
- ▶ Heterogeneous impact:
 - Near default ⇒ consumption flat
 - Binding liquidity ⇒ consumption up
 - Near investment threshold ⇒ consumption drops
- ▶ Advantage of structural model:
 - Can quantify distribution of welfare gains
 - Can do counterfactual policies
- ▶ Example: model tells us the intervention was on average less cost-effective than a simpler transfer program



Similar approaches, with U.S. focus

▶ Guerrieri and Lorenzoni (2012)

- Study the impact of credit tightening in a financial crisis (with interest rate effects)



▶ These models can be used to study strategic consumer default: Chatterjee, Corbae, Nakajima, Rios-Rull (2007); Livshits, MacGee, Tertilt (2007)

- CCKR: Introducing means-testing for households contemplating Chapter 7 filing yields large welfare gains

▶ Wealth distribution and international capital flows: Mendoza, Quadrini and Rios-Rull (2009)

- Assess the impact of financial liberalization between countries that have different initial levels of financial development

Outline

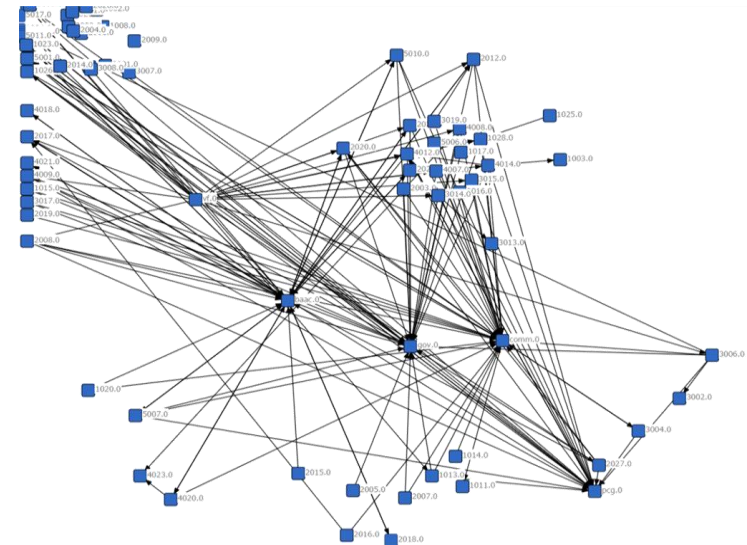
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Tests of Insurance : Financial Access

- ▶ Test of benchmark standard– idiosyncratic/pooled vs aggregate risk shared
- ▶ Geography: Key building block
 - Individual vs. household vs. village, region, nation, cross–countries
 - Kenya: Suri (2011); Cote d’Ivoire; Deaton (1990); Pakistan: Rashid (1990)
 - Thailand: Paweenawat and Townsend (2012) and Kilenthong, Phongthientham and Townsend (in progress)
- ▶ Battery of tests all in one country: Needed, become part of policy toolkit
 - Shocks
 - Rainfall: Paxson (1992); Rubber: Townsend and Vickery (2004)
 - “Macro markets: Creating institutions to manage society, greatest economic risks” Shiller (1995)
 - But what is really missing? Need these micro tests!
- ▶ A priori targeting, financial access vs. theory/data tests
 - Within village but poor with family ⇒ do well
 - Across village still quite good ⇒ remittances and rainfall
 - Despite safety net literature, groups not actually vulnerable ⇒ female, elderly: Alem and Townsend (2008)
 - Rainfall insurance: Gine (2010); Cole, Gine, Tobacman, Topalova, Townsend and Vickery (2012)
 - Take up is mixed: Lack of underlying test of benchmarks haunts the discussion

Evaluation of Existing Institutions: Formal and Informal

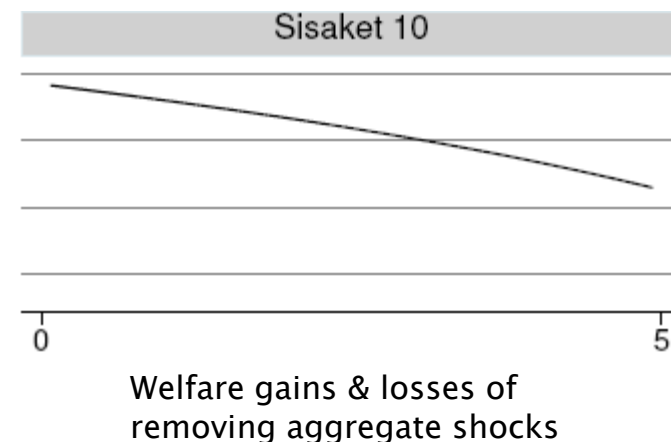
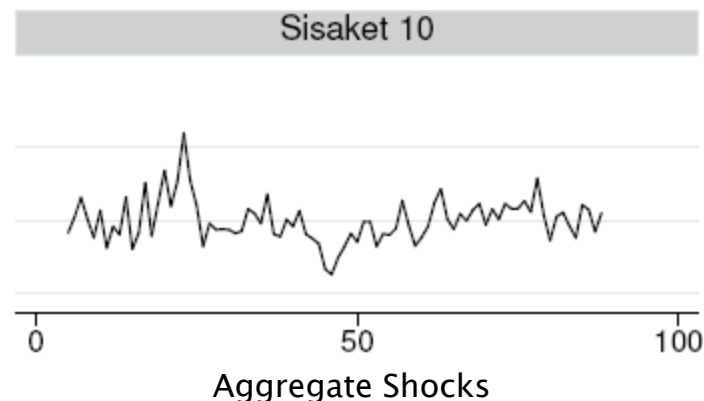
- ▶ Formal Institutions: Alem and Townsend (2012)
 - Joint tests, consumption, cash flow, investment
 - Score card for formal institutions
 - commercial banks, BAAC, credit cooperatives
 - Not what is done in “international best practice”
- ▶ BAAC risk contingency systems, part of operating system, misdiagnosed in Asia crisis
 - ⇒ inappropriate capital adequacy ratios (Townsend and Yaron 2001)
- ▶ Informal networks: Hot topic, rightly so
- ▶ Interaction of formal/informal: Gine (2001), Mobarak and Rosenzweig (2012), Kinnan and Townsend (2010)
 - Indirect connection is as good as direct
 - Those not connected at all ⇒ shown to be much more vulnerable
 - Difference between consumption and investment
 - Modeling investment requires kinship, penalties for renegeing



Networks: Measured Connections Across Households and with Outside Financial Institutions (Kinnan–Townsend, 2010)

Managing Risk: Implications from General Equilibrium

- ▶ Insuring aggregate shocks can be damaging to most risk tolerant who were providing insurance to others
 - Chiappori, Samphantharak, Schulhofer-Wohl and Townsend (2012)
- ▶ Shadow banking in developing countries
 - Good to have indirect connection
 - financial access
 - Bad to allow re-trade
 - externalities, stability issues
- ▶ Need to put the two together
 - ⇒ new directions
 - Shadow banking (macro) meets risk sharing (micro)
 - Joint liability loans: Default rates will increase or decrease with interest rates or loan size, depending on which model captures reality best=
 - Ahlin and Townsend (2007)
- ▶ Cooperative or competitive behavior will vary over time and with the level of wealth and inequality among participants (Madeira and Townsend (2008))



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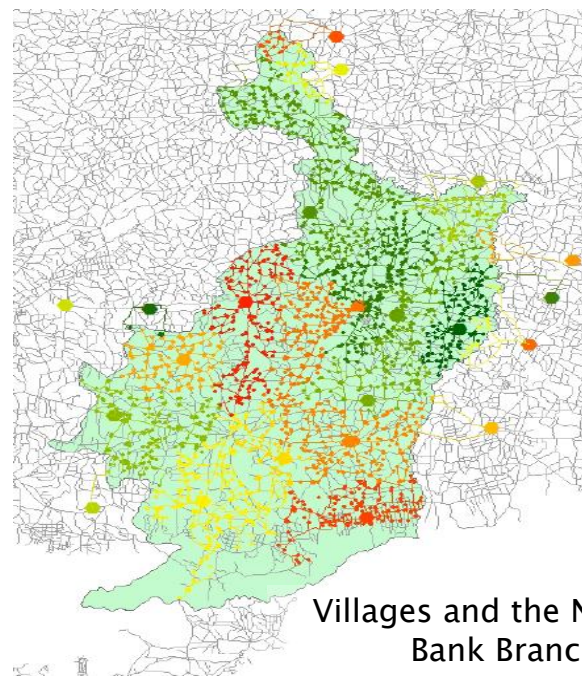
Micro Underpinnings Matter for Policy

- ▶ Tests of financial regimes: Karaivanov and Townsend (2011)
- ▶ Behavior of Financial Service Providers – Assunção, Mityakov and Townsend (2011), Townsend and Zhorin (in progress)
 - Inefficient equilibria?
 - Distributional consequences
- ▶ Moll, Townsend and Zhorin (2012)
 - Urban vs. rural, moral hazard vs. limited commitment
 - Matters for aggregate TFP, etc.
 - Variables are not convex combos
 - Direct and indirect, general equilibrium effects

$$\text{Difference} = (\text{S gains} - \text{B gains})$$



	First-Best	Moral Hazard	Limited Comm.	Mixed MH-LC Regime	
GDP	1	0.582	0.614	0.684	
TFP	1	0.704	0.720	0.760	
Capital Stock	1	0.533	0.623	0.676	
Wage	1	0.583	0.641	0.663	
Interest Rate	0.007	-0.046	0.006	-0.010	
% Entrepreneurs	0.089	0.170	0.133	0.133	0.118



Conclusion

- ▶ Important questions raised by the conference
- ▶ Benefits of general equilibrium modeling with measured explicit micro underpinnings
 - Possibility of conducting counterfactual policy experiments
 - Welfare analysis– efficiency and distribution
 - Finding the “financial possibility frontier” amounts to finding the constrained–efficient allocations respecting the economic environment with real obstacles taken into account
- ▶ Clear operational agenda
 - For measurement in surveys and improved flow of funds
 - For tests using benchmark standards
 - for the construction of models using existing data