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

Keynote speech

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IMF – September 24th, 2012
Financial deepening

Promotes OR hinders?

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

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

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)**

- **Models**
  - (Tell a story and provide reduced-form identification restrictions) Macro-stability and growth: Rancière, 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
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**
- 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 \(\Rightarrow\) Separation of households/firms fail

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

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
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<tbody>
<tr>
<td>Lots of realistic sectors</td>
<td>Static</td>
</tr>
<tr>
<td>Dynamics</td>
<td>Assumes representative consumer</td>
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<tr>
<td>Shocks</td>
<td>No redistributive wealth effects</td>
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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

Advantages | Limitations
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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

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

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

8
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)
  - Risk sharing, insurance and endogenous financial deepening
    - Greenwood & Jovanovic (1990); Bencivenga and Smith (1991)
  - Big wage effects on poverty reduction, wage more than doubles: Gine and Townsend (2004)
  - Endogenous TFP in transition 78%: Jeong and Townsend (2005)
  - 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
  - Distinguishing two sectors: Kaboski, Buera and Shin (2009)
  - Inequality and growth: Blaum (2012)
  - Transient misallocations: Moll (2010); Banerjee and Moll (2010)
  - Private and public sectors, growing like China: Song, Storesletten and Zilibotti (2011)
Outline

- Models
- **Measurement**
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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 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

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

(High wealth in red)
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:
  - Indonesia: Chari, Christiano and Kehoe (2008); Armenter and Hnatkovska (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
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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
  - 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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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
  - 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)
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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
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
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
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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, Phongthiengtham and Townsend (in progress)
- Battery of tests all in one country: Needed, become part of policy toolkit
  - Shocks
  - “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
  - 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 reneging

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

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<tr>
<th></th>
<th>First–Best</th>
<th>Moral Hazard</th>
<th>Limited Comm.</th>
<th>Mixed MH–LC Regime</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>1</td>
<td>0.582</td>
<td>0.614</td>
<td>0.684</td>
</tr>
<tr>
<td>TFP</td>
<td>1</td>
<td>0.704</td>
<td>0.720</td>
<td>0.760</td>
</tr>
<tr>
<td>Capital Stock</td>
<td>1</td>
<td>0.533</td>
<td>0.623</td>
<td>0.676</td>
</tr>
<tr>
<td>Wage</td>
<td>1</td>
<td>0.583</td>
<td>0.641</td>
<td>0.663</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>0.007</td>
<td>-0.046</td>
<td>0.006</td>
<td>-0.010</td>
</tr>
<tr>
<td>% Entrepreneurs</td>
<td>0.089</td>
<td>0.170</td>
<td>0.133</td>
<td>0.133 0.118</td>
</tr>
</tbody>
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Welfare gains of a reduction in the interest rate

Villages and the Nearest Bank Branch
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