# Monetary Transmission in Developing Countries

## IGC Workshops on Fiscal and Monetary Policy, November 2-3, 2012

**Prachi Mishra**

Ministry of Finance,

Government of India

The views expressed are those of the authors.

# List of Papers

- Monetary Transmission in Low-Income Countries: Effectiveness and Policy Implications (with Peter Montiel (Williams College) and Antonio Spilimbergo (IMF): IMF Economic Review, 2012

- Monetary Policy and Bank Lending Rates in Low-Income Countries: Heterogeneous Panel Estimates (with Peter Montiel and Peter Pedroni (Williams College) and Antonio Spilimbergo (IMF)

- How Effective is Monetary Transmission in Developing Countries? A Survey of the Empirical Evidence? (with Peter Montiel, Williams College)

Available at

*http://www.prachimishra.net/research.htm*

# What is monetary transmission?

- How do monetary policy instruments affect aggregate demand?
  - Output
  - Inflation

- What are the mechanisms?

# Main challenge

- All happy families resemble one another, each unhappy family is unhappy in its own way [Tolstoy]

- All happy monetary transmission mechanisms resemble one another, each dysfunctional economy is dysfunctional in its own way

# Main challenge (contd.)

- Plenty of books/articles on just a few happy families (mainly advanced countries)
- Scattered information on many unhappy families
- Challenge: how could we describe/characterize so many “unhappy families”?

# Preview of findings

- A priori reasons to believe that monetary transmission should work differently in developing countries

- Indeed some empirical evidence to show that developing countries exhibit weaker transmission of monetary policy shocks to bank lending rates than do advanced countries.

# Outline of the talk

- Describe the “typical” happy family (i.e. the characteristics of the “ideal” monetary transmission) as a benchmark
- Compare to characteristics of unhappy families (derived from about 90+25 family pictures)
- Argue that most unhappy families share some characteristics (contrary to Tolstoy’s quote)
- Show some econometric evidence comparing happy and unhappy families.
- Develop a simple analytical framework to understand unhappiness (and its implications)

# Benchmarking happiness

- Short-term interest rate channel
  - Interbank market to interest rates on short-term government securities
- Bank lending channel
  - Interbank rate to bank lending rates
- Exchange rate channel
  - Short-term interest rate to exchange rate

# Benchmarking happiness (contd.)

- Long-term interest rate channel
  - Short-term to long-term interest rate
- Asset channel
  - Long-term interest rates to asset values
- Balance sheet channel
  - Asset values to external finance premiums

# Benchmarking happiness (contd.)

- Strong institutional environment:
  - loan contracts are protected;
  - financial intermediation conducted almost exclusively through formal financial markets
- Independent central bank.
- Well-functioning/highly liquid
  - interbank market for reserves.
  - secondary market for government securities with broad range of maturities.
  - markets for equities and real estate.
- High degree of international capital mobility.
- Floating exchange rate.

# Benchmarking unhappiness

- The formal financial sector is small
- Central banks have less independence
- Quality of institutional and regulatory environment is poor
- Money and interbank markets are poorly developed
- Secondary markets for government securities are also poorly developed
- Competition in the banking sector is weak
- Restrictions on the role of the market in setting bank loan rates are more prevalent

# Benchmarking unhappiness (contd.)

- Governments cannot issue long-term domestic currency-denominated bonds
- Small number of listed firms and minimal turnover in stock market
- Poorly-defined property rights inhibit the buying and selling of real estate
- Small degree of *de facto* integration with international capital markets
- Little exchange rate flexibility

| Groups | Securities market | | | |
|---|---|---|---|---|
| | Arnone-Laurens-Segalotto 2003 | Private bond market capitalization / GDP : Beck et al. | Public bond market capitalization / GDP: Beck et. al. | Security Markets Index |
| **Advanced** | | | | |
| Mean | 0.73 | 0.51 | 0.46 | 1.00 |
| # countries | 29 | 22 | 22 | 21 |
| **Emerging** | | | | |
| Mean | 0.58 | 0.12 | 0.29 | 0.86 |
| # countries | 27 | 24 | 24 | 28 |
| **LIC** | | | | |
| Mean | 0.55 | 0.00 | 0.43 | 0.56 |
| # countries | 89 | 3 | 3 | 42 |

Sources. Beck et. al., 2009; IMF Structural Reform Database

| Groups | Stock market | | | |
|---|---|---|---|---|
| | Stock market capitalization / gdp | Stock market total value traded / gdp | Stock market turnover ratio | No. Of listed companies per 10k population |
| **Advanced** | | | | |
| Mean | 0.90 | 0.79 | 0.77 | 0.43 |
| # countries | 29 | 29 | 29 | 29 |
| **Emerging** | | | | |
| Mean | 0.82 | 0.53 | 0.61 | 0.24 |
| # countries | 28 | 28 | 28 | 28 |
| **LIC** | | | | |
| Mean | 0.27 | 0.02 | 0.11 | 0.23 |
| # countries | 51 | 52 | 51 | 51 |

Source. Beck et. al., 2009

| Groups | International Financial Integration |
|---|---|
| **Advanced** | |
| Mean | 4.40 |
| # countries | 20 |
| **Emerging** | |
| Mean | 1.03 |
| # countries | 20 |
| **LIC** | |
| Mean | 0.92 |
| # countries | 61 |

Source. Dhungana, 2008.

# Upshot

- Expect interest rate, asset and exchange rate channels to be weak.
  - Absence/poor development of securities markets
  - Small/illiquid markets for assets
  - Imperfect integration with international financial markets and fixed exchange rates
- Bank lending channel should take center stage (in relative terms)
- But effectiveness depends on the extent to which central bank policy actions affect commercial bank lending rates

# Methodologies to study the bank lending channel

- Simple correlations
- Panel VAR methodology (Mishra, Montiel, Pedroni and Spilimbergo)

# Bank lending channel: two steps

- From policy rate to money market rates

- From money market rates to bank lending rates

# Simple country-by-country estimating equation

$$y_{it} = \alpha_i y_{it-1} + \beta_i y_{it-2} + \gamma_i x_{it} + \delta_i x_{it-1} + \eta_i x_{it-2} + \varepsilon_{it}$$

Short-term effect: average of estimated $\gamma_i$

$$\text{Long - term effect} = \frac{\hat{\gamma}_i + \hat{\delta}_i + \hat{\eta}_i}{1 - \hat{\alpha}_i - \hat{\beta}_i}$$

# Data

- Discount rates, money market rates and lending rates
- International Financial Statistics, IMF
- Monthly frequency
- Jan 1960-December 2008

**Table 2. Correlation between changes in discount rate and changes in money market rate**

| | Short-term Effect | Long-term Effect | Number of countries |
|---|---|---|---|
| Advanced | 0.82 | 0.95 | 25 |
| Emerging | 0.72 | 0.59 | 26 |
| LICs | 0.29 | 0.40 | 29 |

**Table 3. Correlation between changes in money market rate and changes in lending rate**

| | Short-term Effect | Long-term Effect | Number of countries |
|---|---|---|---|
| Advanced | 0.19 | 0.35 | 25 |
| Emerging | 0.38 | 0.61 | 27 |
| LICs | 0.09 | 0.29 | 42 |

**Table 4. Transmission mechanisms and bank concentration**

Dependent variable: monthly changes in lending rate

| | [1] | [2] | [3] |
|---|---|---|---|
| Change in discount rate | 0.309*** | 2.935*** | 1.443 |
| | [0.092] | [0.393] | [1.278] |
| Concentration * Change in discount rate | | -2.393*** | -1.155 |
| | | [0.452] | [1.525] |
| Concentration | | -0.938 | -1.388 |
| | | [0.818] | [1.215] |
| Transparency * Change in discount rate | | | 0.642** |
| | | | [0.309] |
| LIC * Change in discount rate | | | |
| Country fixed effects | X | X | X |
| Number of observations | 33,296 | 14,480 | 9,650 |
| Number of countries | 140 | 116 | 67 |
| R squared | 0.03 | 0.51 | 0.53 |

# Structural panel VAR methodology

- Transmission from monetary policy innovations to bank lending rates
- **Whether effects of monetary policy differ systematically in LICs?**
- Panel methodology that allows individual country responses to be heterogeneous (Pedroni, 2008).
- Use long-run restrictions (Blanchard-Quah, 1989) to identify the effects
  - Long-run money neutrality

# Data

- 63 countries (20 advanced, 14 emerging and 29 LICs)
- 1960-2008
- Quarterly data
- Nominal money base or M0 (line 14 of IFS)
- Commercial bank lending rate (line 60 of IFS)

**Figure 2: Response of log(lending rate) to country-specific nominal shocks**

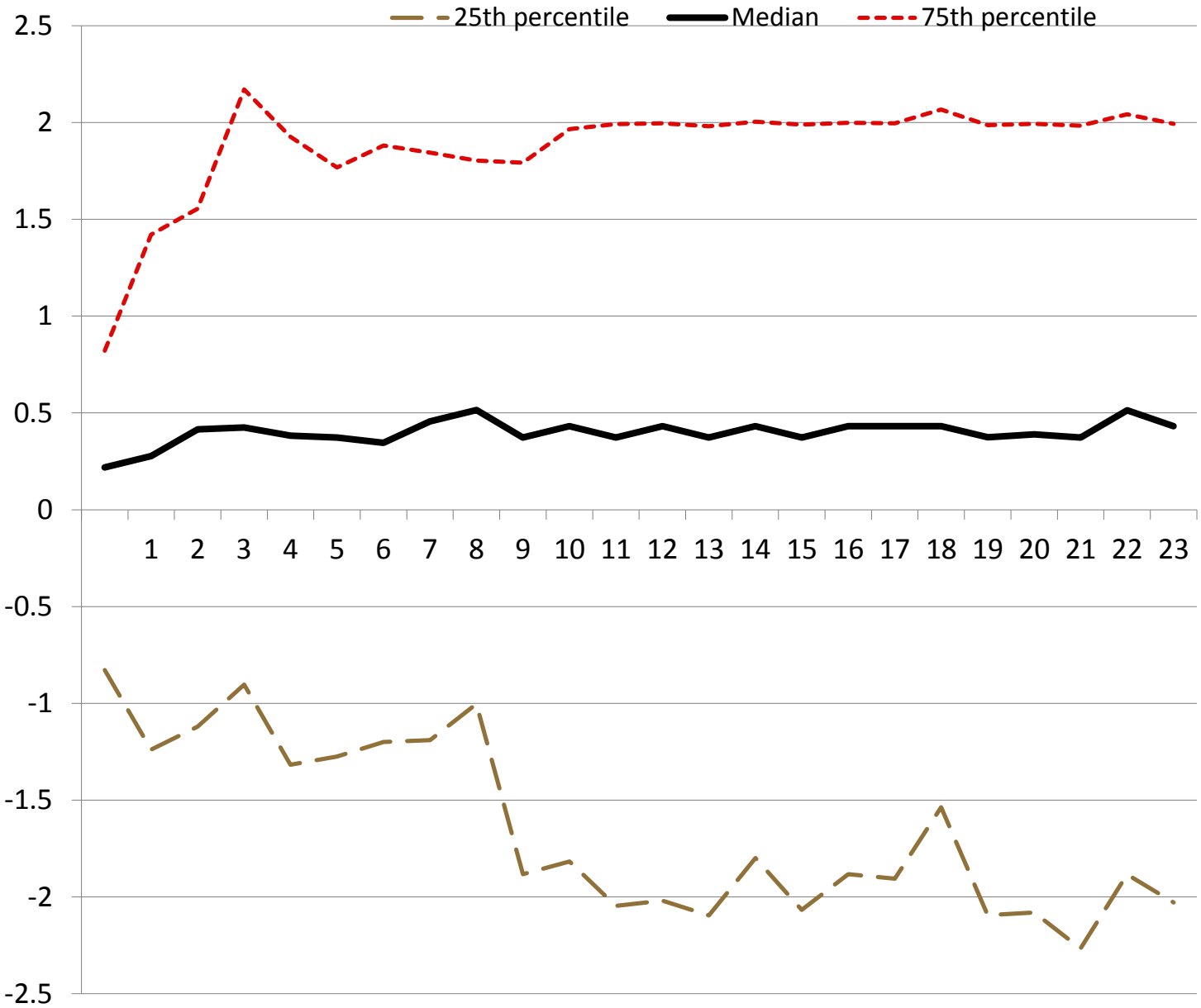
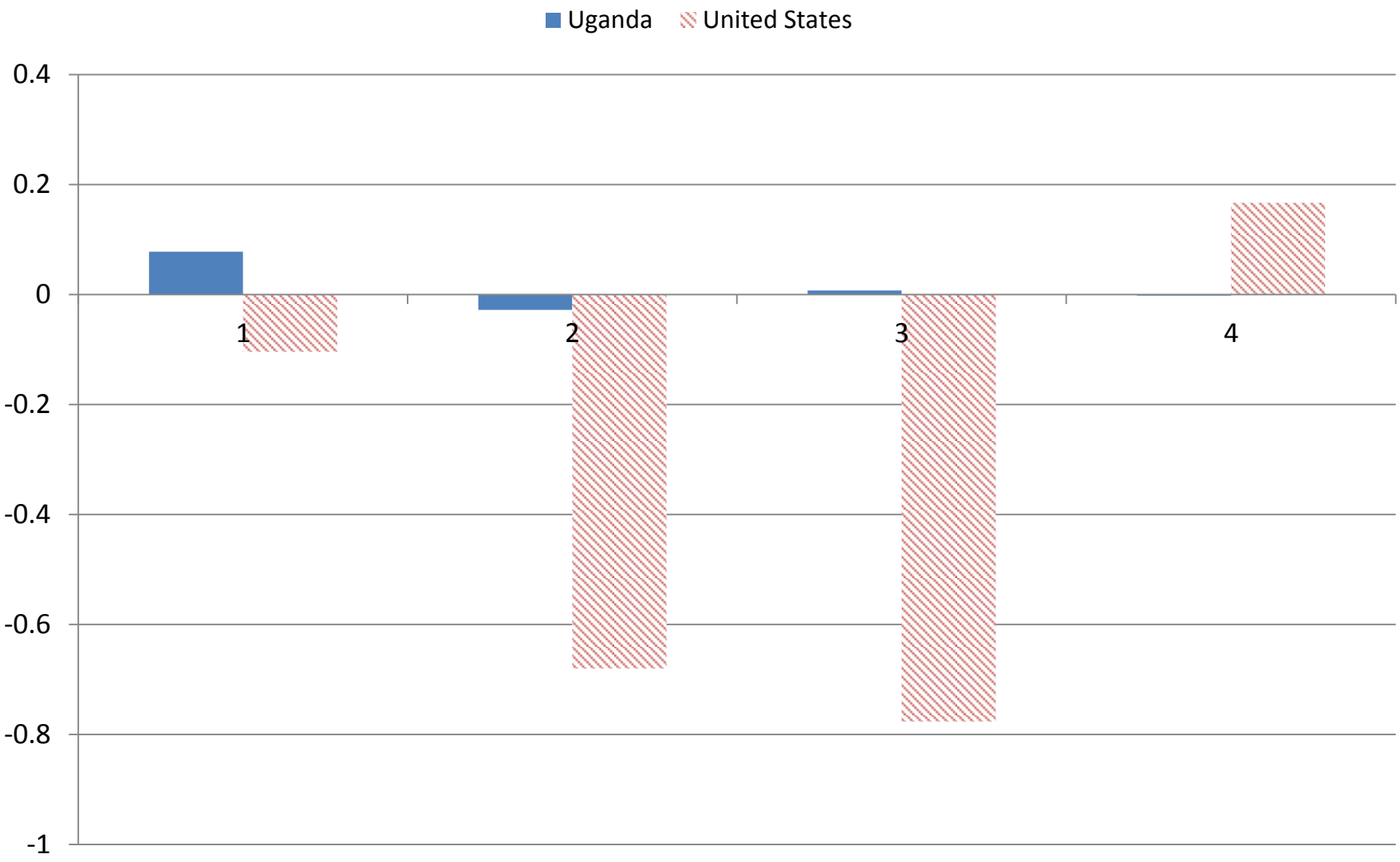


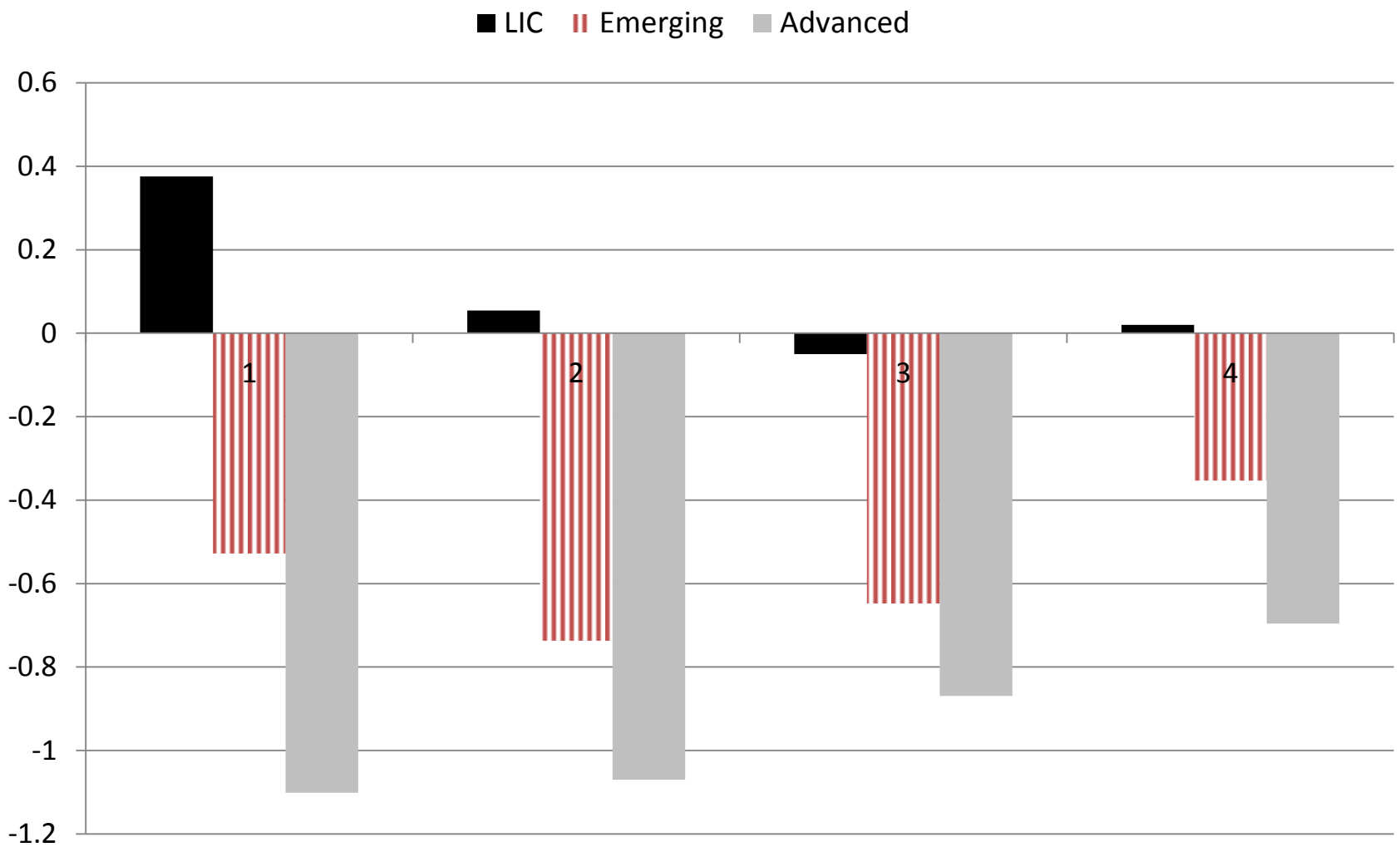
**Figure 1. Impulse Responses of Log Lending Rate to a One-Unit Nominal Shock. U.S. and Uganda**



## Table 1. Impulse response of log(lending rate) to nominal shocks: Correlates

| | 1st quarter | 2nd quarter | 3rd quarter | 4th quarter | Average | Minimum |
|---|---|---|---|---|---|---|
| Regulatory quality | -0.465 | -0.226 | -0.109 | 0.063 | -0.184 | 0.006 |
| | [0.409] | [0.326] | [0.245] | [0.196] | [0.278] | [0.325] |
| Deposit money bank assets/ GDP | -0.219 | -0.279 | -0.397 | -1.135** | -0.507 | -0.24 |
| | [0.876] | [0.700] | [0.526] | [0.419] | [0.596] | [0.696] |
| Stock market capitalization / GDP | -1.532* | -1.311** | -0.807* | -0.054 | -0.926* | -1.569** |
| | [0.756] | [0.604] | [0.454] | [0.362] | [0.514] | [0.601] |
| Bank concentration | 0.919 | 1.508 | 1.406 | 0.167 | 1.0000 | 0.987 |
| | [1.541] | [1.231] | [0.926] | [0.738] | [1.048] | [1.224] |
| International Financial Integration | 0.623** | 0.455** | 0.366** | 0.295** | 0.435** | 0.493** |
| | [0.255] | [0.204] | [0.153] | [0.122] | [0.173] | [0.202] |
| Number of observations | 36 | 36 | 36 | 36 | 36 | 36 |
| R-squared | 0.26 | 0.28 | 0.30 | 0.31 | 0.28 | 0.29 |
| p-value for the F-stat | 0.09 | 0.06 | 0.05 | 0.04 | 0.07 | 0.06 |

## Figure 5. Predicted Four-Quarter Impulse Responses Conditional on Country Specific Characteristics




Notes. The predicted responses are based on the coefficient estimates in Table 1 (including the constant) and country-group means shown in Table 2.

# Bottom-line

- Wide variations in impulse response of lending rate to a domestic MP shock across countries

- Countries with better institutional environments, more developed financial structures, and more competitive banking systems are those where MP is most effective in influencing lending rates.

# Policy Implications

- Simple framework based on Blinder (1998) adaptation of Brainard (1967)

- Structure of economy:

$$y = y_0 + am + \varepsilon$$

$y$ Aggregate demand

$m$ Monetary policy instrument

$$E(a) = \mu_a$$

$$V(a) = \sigma_a^{\,2}$$

$$E(\varepsilon) = 0, V(\varepsilon) = \sigma^2$$

- Central Bank has to set MP before it realizes the values of $a$ and $\varepsilon$

- Central Bank objective: stabilize aggregate demand around a desired value y*

$$L(m) = E(y - y^*)^2$$

$$m_s^* = (y^* - y_0)/(\mu_a + \sigma_a^2/\mu_a)$$

Under no uncertainty

$$m_N^* = (y^* - y_0)/\mu_a$$

Under uncertainty

$$\frac{m_s^*}{m_N^*} = \frac{1}{1+(\sigma_a^2/\mu_a^2)} < 1$$

Optimal monetary policy is less activist under uncertainty

# Intuition under uncertainty

- Cost: more aggressive monetary policy increases the ex ante variability of aggregate demand
- Benefit: closing the gap between actual and desired aggregate demand
- Weaker the effect (smaller mu) and more uncertain (larger sigma): less activist the monetary policy

# Implications – under weak and unreliable monetary transmission

- Inflation targeting framework less desirable
- Case for flexible exchange rate regimes weakened
- Case for capital account restrictions weakened

# Conclusions

- Standard description of monetary transmission in advanced countries assumes strong institutional environment, not likely to hold in developing countries
- Relatively, bank lending channel could be the most relevant
- Evidence on bank lending channel weak
- Need more carefully executed country case studies

# Thank you!

| Groups | A. Size of banking sector | | B. Central Bank Independence | C. Governance Indicators 2008 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Deposit money bank assets / gdp | Other financial institutions assets / gdp | | Voice and accountability | Political Stability & Absence of Violence/Terrorism | Government Effectiveness | Regulatory Quality | Rule of Law | Control of Corruption |
| **Advanced** | | | | | | | | | |
| Mean | 1.24 | 0.55 | 0.96 | 1.08 | 0.92 | 1.44 | 1.34 | 1.47 | 1.54 |
| # countries | 28 | 5 | 28 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| **Developing** | | | | | | | | | |
| Mean | 0.48 | 0.12 | 0.46 | -0.19 | -0.33 | -0.06 | -0.04 | -0.21 | -0.21 |
| # countries | 117 | 29 | 117 | 146 | 146 | 146 | 146 | 146 | 146 |
| **India** | **0.55** | **…** | | **0.5** | **-1.0** | **0.0** | **-0.2** | **0.1** | **-0.4** |

| Groups | D. Securities market | | | | E. Bank competition | | | F. Degree of financial repression |
|---|---|---|---|---|---|---|---|---|
| | Arnone-Laurens-Segalotto 2003 | Private bond market capitalization / GDP : Thorsten-Beck | Public bond market capitalization / GDP: Thorsten-Beck | Security Markets Index | Net interest margin | Bank concentration | Entry barriers/pro-competition measures index: SR Database | Interest rate controls index |
| **Advanced** | | | | | | | | |
| Mean | 0.73 | 0.51 | 0.46 | 1.00 | 0.02 | 0.67 | 1.00 | 1.00 |
| # countries | 29 | 22 | 22 | 21 | 28 | 28 | 21 | 21 |
| **Developing** | 0.57 | 0.06 | 0.36 | 0.71 | 0.05 | 0.65 | 0.88 | 0.89 |
| Mean | 116 | 27 | 27 | 70 | 113 | 115 | 70 | 70 |
| # countries | | | | | | | | |
| **India** | | **0.01** | **0.32** | | **0.04** | **0.34** | **0.33** | **0.67** |

| Groups | G. Stock market | | | | H. International Financial Integration |
|---|---|---|---|---|---|
| | Stock market capitalization / gdp | Stock market total value traded / gdp | Stock market turnover ratio | No. Of listed companies per 10k population | |
| **Advanced** | | | | | |
| Mean | 0.90 | 0.79 | 0.77 | 0.43 | 4.40 |
| # countries | 29 | 29 | 29 | 29 | 20 |
| **Developing** | | | | | |
| Mean | 0.55 | 0.27 | 0.36 | 0.24 | 0.98 |
| # countries | 79 | 80 | 79 | 79 | 81 |
| **India** | **0.59** | **0.54** | **0.78** | **0.04** | **0.28** |

| | I. Exchange Rate Classification (IMF) | | | | J. Exchange rate classification (Ilzetzki, Reinhart and Rogoff) | | | |
|---|---|---|---|---|---|---|---|---|
| **Groups** | ***1*** | ***2*** | ***3*** | ***4*** | ***1*** | ***2*** | ***3*** | ***4*** |
| **Advanced** | | | | | | | | |
| # countries | 19 | 0 | 0 | 10 | 19 | 0 | 7 | 3 |
| **Developing** | | | | | | | | |
| # countries | 67 | 4 | 55 | 19 | 46 | 54 | 23 | 5 |
| **India** | | | **x** | | | **x** | | |

*Happiness relies on effective arbitrage along several margins*

Between*:*

- domestic short-term securities
- domestic short-term and long-term securities
- long-term securities and equities
- domestic and foreign securities
- domestic financial and real assets

| Groups | Size of banking sector | |
|---|---|---|
| | Deposit money bank assets / gdp | Other financial institutions assets / gdp |
| **Advanced** | | |
| Mean | 1.24 | 0.55 |
| # countries | 28 | 5 |
| **Emerging** | | |
| Mean | 0.63 | 0.17 |
| # countries | 26 | 11 |
| **LIC** | | |
| Mean | 0.32 | 0.06 |
| # countries | 91 | 18 |

Source. Beck, et. al., (2009)