# Financial Spillovers and Macroprudential Policies

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# The debate begins

Hélène Rey @ Jackson Hole, 2013: *"Dilemma not Trilemma"*

- "Whenever capital is freely mobile, the global financial cycle constrains national monetary policies <u>regardless of the exchange rate regime</u>."
- It is a dilemma between capital controls and/or macroprudential regs and monetary policy independence, not trilemma
- Restricting capital mobility is the only way for non-CE to retain monetary autonomy

# Aizenman, Chinn, and Ito (*JIMF*, 2016)

The center economies (CE's) are influential

- For both policy interest rates and the REER, the link with the CE's has been dominant for developing and emerging market economies in the last two decades

The type of exchange rate regime does matter; the trilemma still dictates open macro policy choices

- An economy that pursues greater exchange rate stability and financial openness faces a stronger link with the center economies through policy interest rates and real effective exchange rate (REER) movements

# Aizenman, Chinn, and Ito (*JIMF*, 2017)

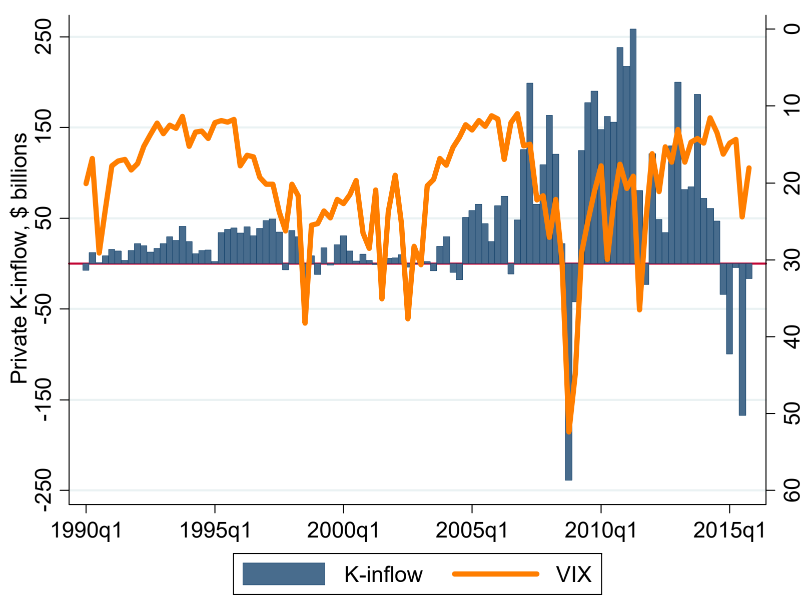
The following affect the degree of financial sensitivity

- The extent of belonging to a currency zone (i.e., USD- or euro-zone)
- Exposure to external debt also matters
- Currency composition in int'l debt securities → the more reliant on the dollar for debt issuance, the more likely to be more vulnerable to shocks occurring in the U.S. (or other CEs)

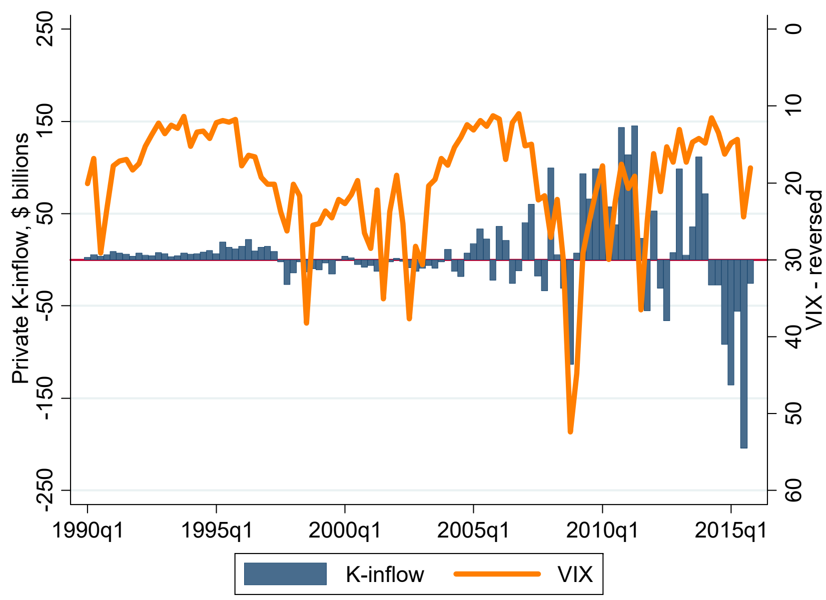
# EMEs are vulnerable

**VIX and Net Capital Flows to EMEs**

(a) EME Total




(b) Asian EMEs



# Do Macroprudential Policies (MaPs) Affect Financial Sensitivity?

- We may now live in a world of "quadrilemma" – the trilemma constraint *plus* financial stability
- Recently, some EMEs have relied upon MaPs to sustain financial stability (in addition to pursuing greater institutional development, retaining fiscal space, and/or holding IR)
- Brazil, Indonesia, Korea, Russia, and Thailand implemented MaPs
- Can developing and emerging market economies delink themselves from the sphere of influence of the CEs by implementing macroprudential instruments? To what extent?

# In this paper …

We empirically investigate how the financial link through policy interest rates between the center economies and peripheral economies can be affected by the implementation of macroprudential policies by the peripheral economies

# Is financial sensitivity affected by extensity of MaPs?

A more extensive implementation of macro-prudential policies leads periphery countries [PH] to gain greater monetary independence from the Center Economies [CEs]

- when the CEs implement expansionary monetary policy
- when PHs run current account deficit
- when they hold lower levels of international reserves (IR)
- when their financial markets are relatively closed
- when they are experiencing an increase in net portfolio flows
- when they are experiencing credit expansion

# Two step approach

**Step 1:**

- Investigate the extent of sensitivity of policy interest rate while controlling for global factors for the sample period of 1986 – 2015

**Step 2:**

- Examine the association of these sensitivity coefficients with the extensity of macroprudential policy implementations while controlling for country's trilemma choices, the real and financial linkages with the CE, etc.
- Focus on the impacts of the extensity of MaPs on the transmission of shocks from the ECs

# Step 1 – estimate $\gamma$'s

$$Y_{it} = \alpha_{it} + \sum_{g=1}^{G} \beta_{it}^{g} Z_{t}^{g} + \sum_{c=1}^{C} \gamma_{it}^{c} X_{it}^{c} + \varepsilon_{it}, \qquad (1)$$

$\boldsymbol{Y_{it}}$ : policy interest rate of local country (PH) *i*

$\boldsymbol{X^{c}}$ : a vector of policy (shadow) interest rates of the center economies (CE = U.S., Euro area, and Japan)

$\boldsymbol{Z^{G}}$ : global factors

- **Real**: PC of oil & commodity prices
- **Financial**: VIX, Ted-spread

Rolling est. w/ 36-month windows for each of about 100 countries, 1986-2015

# Step 2 – Basic Exercise:
# Relate $\gamma$'s to Policies, Conditions, and Institutions

$$\hat{\gamma}_{it}^{C} = \theta_0 + \theta_1 OMP_{it} + \theta_2 MC_{it} + \theta_3 LINK_{it} + \theta_4 INST_{it} + \theta_5 MPI_{it} + \theta_6 CRISIS_{it} + u_{it} \quad (2)$$

**OMP**: Open Macro Policies – Exchange rate stability, financial openness (Chinn-Ito), Int'l reserve accumulation

**MC**: Macro conditions – infl. volatility, CA balances, gov't gross debt

**LINK**: Import Demand by CEs, bank lending by CEs, degree of trade competition wrt CEs

**INST**: Financial Development = Svirydzenka's (2016) index

**CRISIS**: currency and banking

1986-2015, 3-yr panels, about 60 countries (*i* x 3 x *t*) $\gamma$'s

With time (panel) fixed effects

# Macroprudential Policy Index (Cerutti *et al.*, 2015)

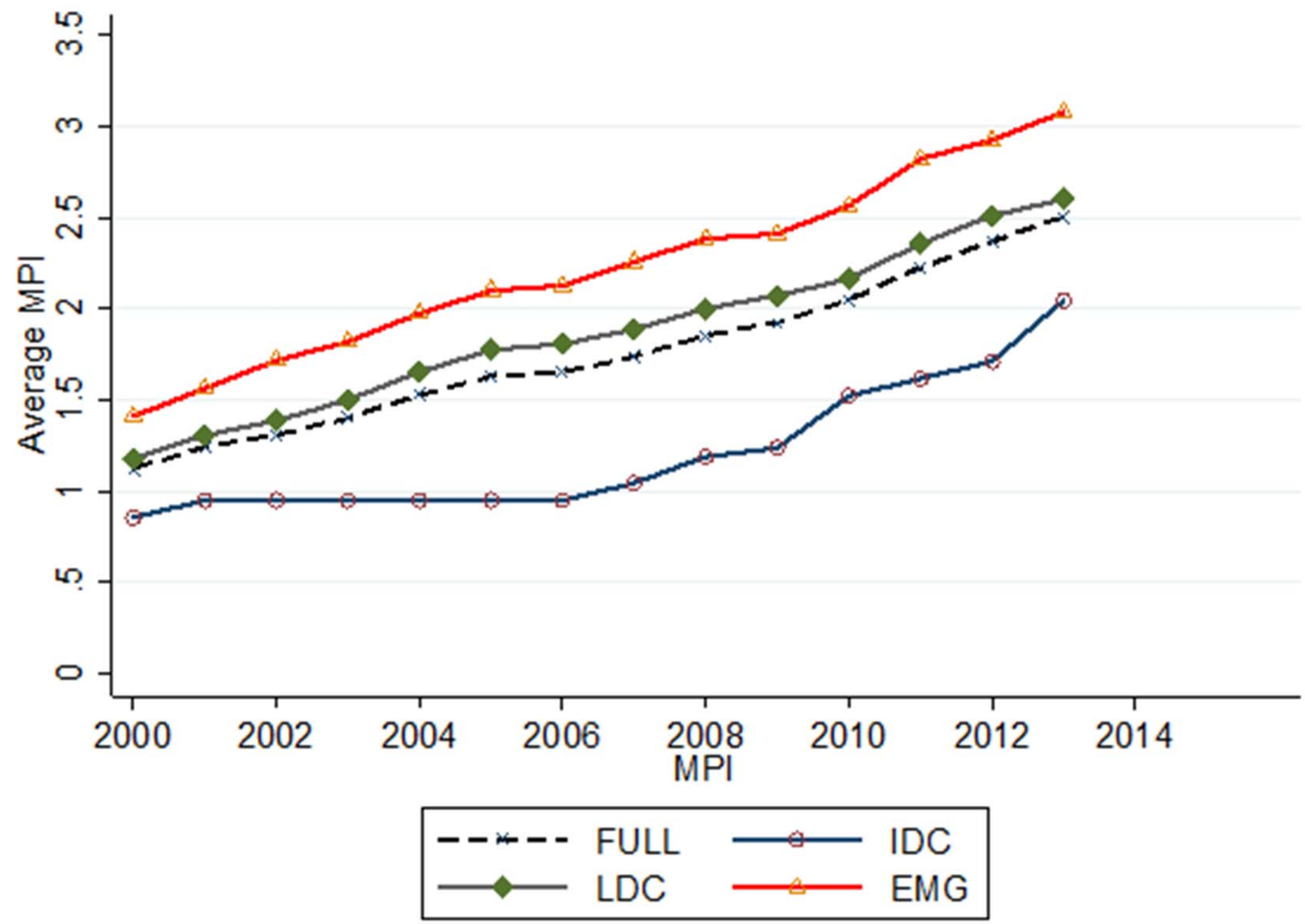
- Measures the *extensity* of macroprudential policies
- Is the sum of the following 12 dummies variables

**Appendix 1: Macroprudential Policy Index**

| Variable | Variable Name | Definition |
|---|---|---|
| *Broad-based capital tools (CAPITAL)* | | |
| DP | Time-Varying/Dynamic Loan-Loss Provisioning | Dummy for the use of a policy that requires banks to hold more loan-loss provisions during upturns |
| CTC | General Countercyclical Capital Buffer/Requirement | Dummy for the use of a policy that requires banks to hold more capital during upturns |
| SIFI | Capital Surcharges on Systematically Important Financial Institutions | Dummy for the use of a policy that requires Systematically Important Financial Institutions to hold a higher capital level than other financial institutions |
| INTER | Limits on Interbank Exposures | Dummy for the use of a policy that limits the fraction of liabilities held by the banking sector |
| *Sectoral capital and asset-side tools (ASSET)* | | |
| LTV_CAP | Loan-to-Value Ratio | Dummy for the use of LTV measures used as a strict cap on new loans as opposed to a loose guideline or merely an announcement of risk weights |
| DTI | Debt-to-Income Ratio | Dummy for the use of a policy that constrains household indebtedness by enforcing or encouraging a limit |
| LEV | Leverage Ratio | Dummy for the use of a policy that limits banks from exceeding a fixed minimum leverage ratio |
| CONC | Concentration Limits | Dummy for the use of a policy that limits the fraction of assets held by a limited number of borrowers |
| *Liquidity-related tools (LIQUIDITY)* | | |
| FC | Limits on Foreign Currency Loans | Dummy for the use of a policy that reduces vulnerability to foreign-currency risks |
| RR_REV | FX and/or Countercyclical Reserve Requirements | RR is a policy that limits credit growth. It can also be targeted to limit foreign-currency credit growth. RR_REV is a subset of RR that restricts to reserve requirements which i) imposes a specific wedge on foreign currency deposits or are adjusted countercyclically |
| CG | Limits on Domestic Currency Loans | Dummy for a policy that limits credit growth |
| TAX | Levy/Tax on Financial Institution | Dummy for taxes on the revenue of financial institutions |
| | | |
| MPI | Macroprudential Policy Index (0 – 12) | LTV_CAP+DTI+DP+CTC+LEV+SIFI+INTER+CONC+FC+RR_REV+CG+TAX |
| BORROWER | Borrower-targeted instruments (0 – 2) | LTV_CAP+DTI |
| FINANCIAL | Financial Institution-targeted instruments (0 – 10) | DP+CTC+LEV+SIFI+INTER+CONC+FC+RR_REV+CG+TAX |

Source: Table 1 of Cerutti, et al. (2015), IMF-FSB-BIS (2016

# Macroprudential Policy Index (MPI)



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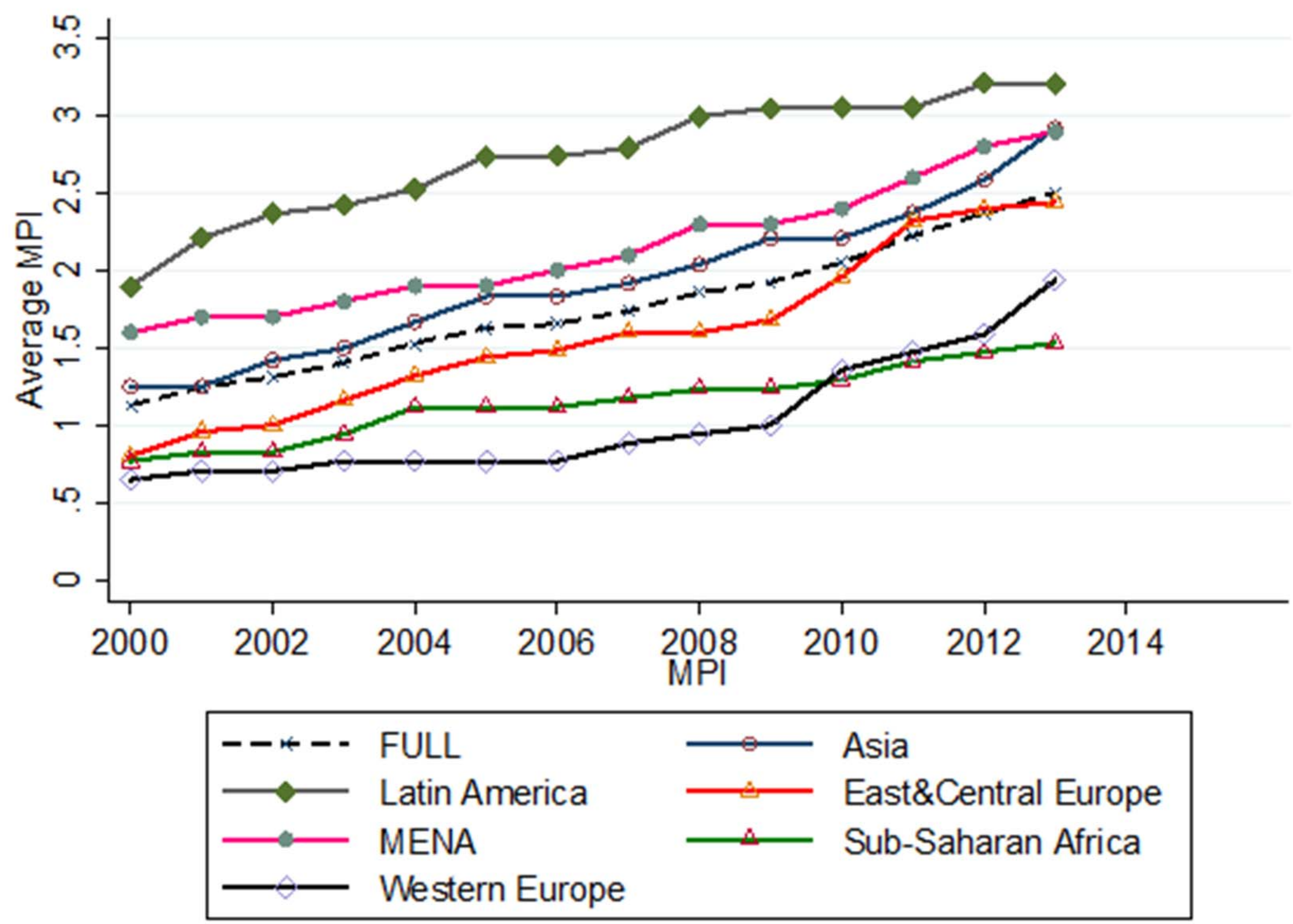

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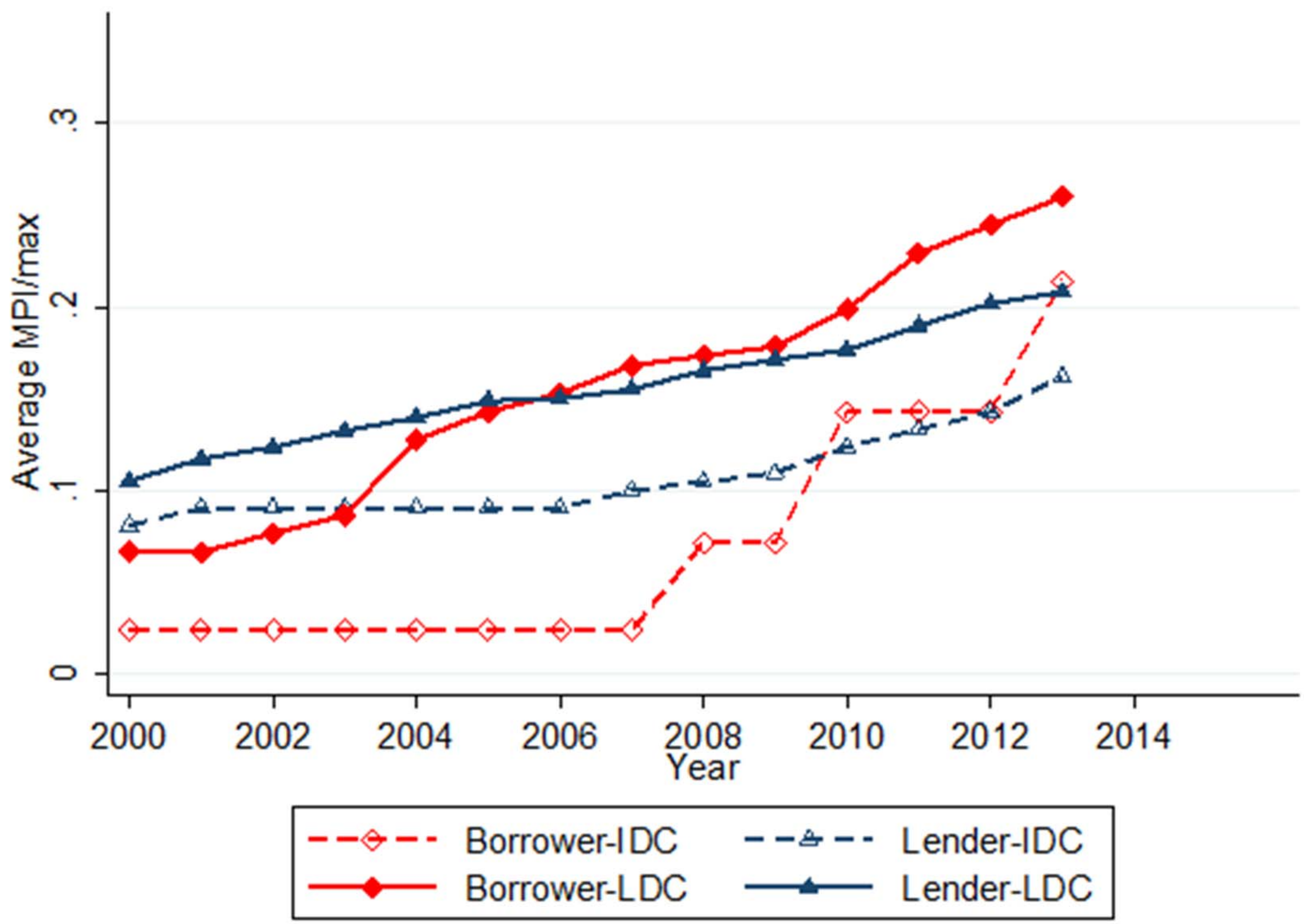

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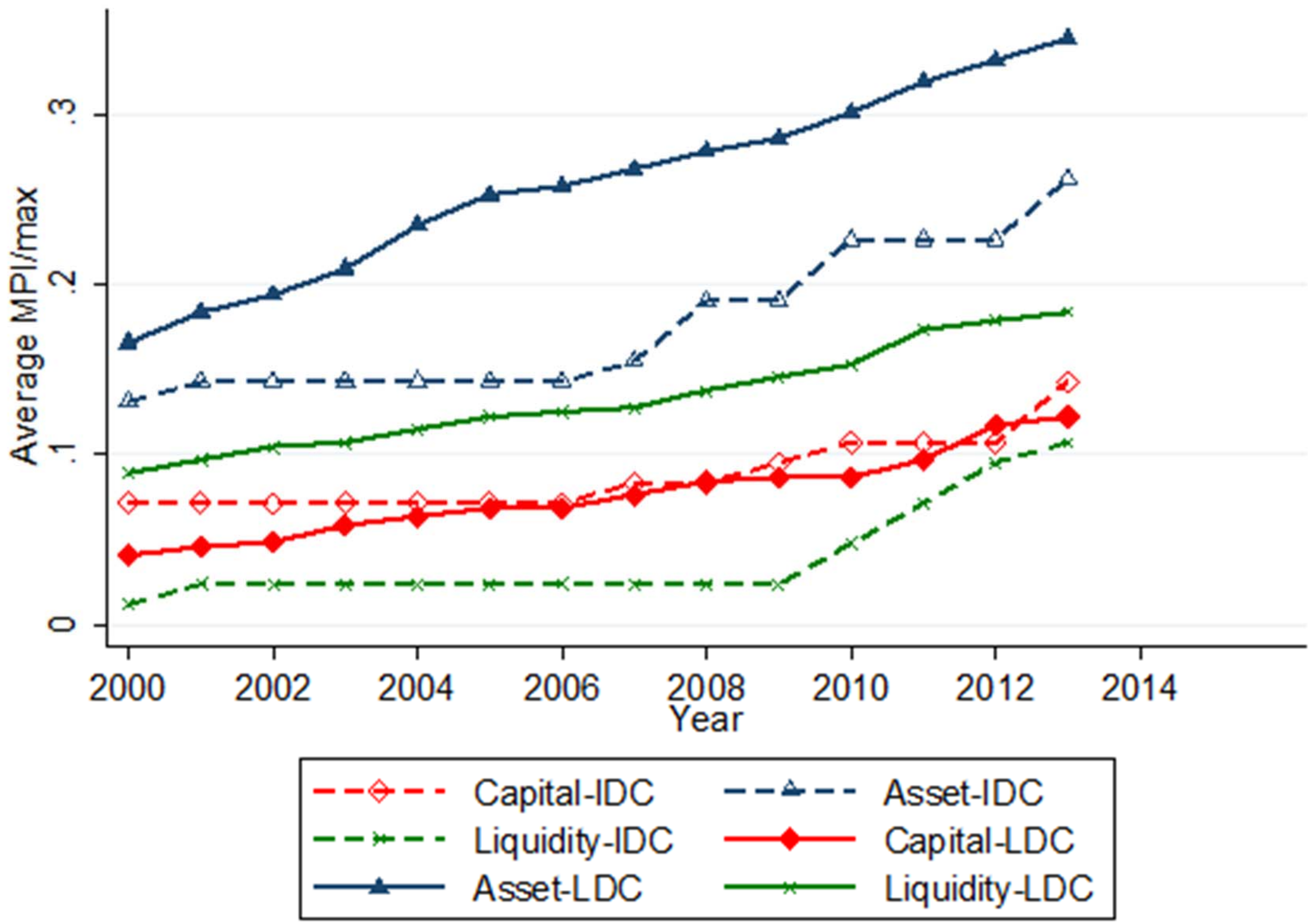


# Subsets of MPI: BORROWER and FINANCIAL

- ***BORROWER*** is a subset of MPI focusing on MaP's intended to affect the behavior of borrowers (0 – 2)

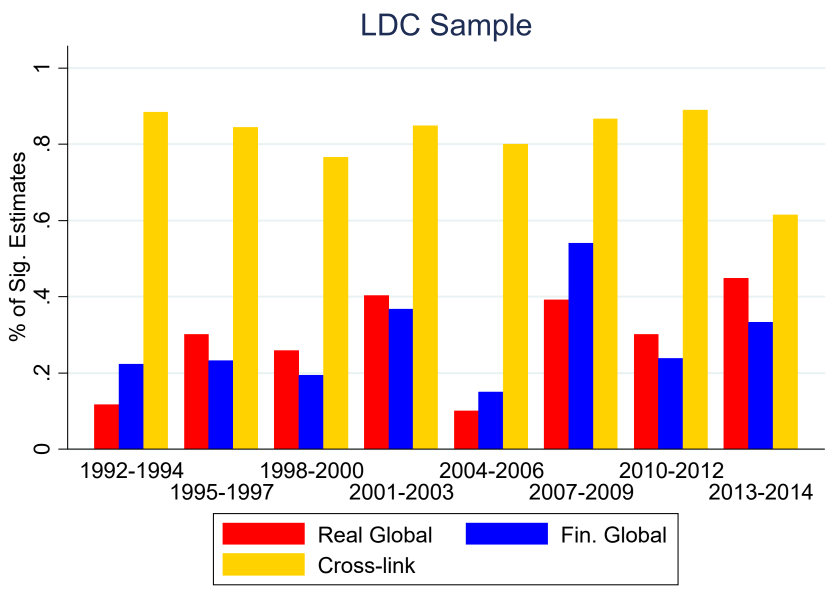
  ***BORROWER*** = Loan-to-value ratio caps (LTV_CAP) + Debt to income ratio (DTI)

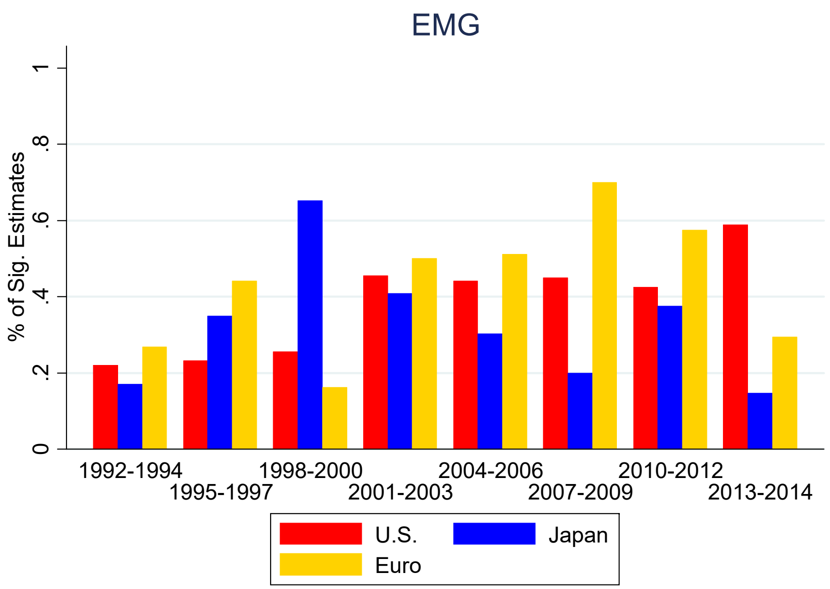
- ***FINANCIAL*** is a subset of MPI focusing on MaP's intended to affect the behavior of financial institutions (0 – 10)

  ***FINANCIAL*** = Dynamic Loan-loss Provision (DP) +Countercyclical capital buffer/requirement (CTC) + Leverage (LEV) + Capital surcharges on SIFIs (SIFI) + Limits on interbank exposures (INTER) + Concentration limits (CONC) + Limits on foreign currency loans (FC) + FX and/or countercyclical reserve requirements (RR_REV) + Limits on domestic currency loans (CG) + Levy/tax on financial institutions (TAX)

# Proportion of Significant F-Tests: ST rate in CE → ST rate in PH

The Core Economies are influential

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# MPI does not affect the degree of financial sensitivity

**Table 2: Factors Affecting the Estimated Financial Sensitivity, 1998-2015**

| | LDC<br>(1) | EMG<br>(2) |
|---|---|---|
| Exch. Rate Stability | -0.016 | -0.070 |
| | (0.263) | (0.335) |
| Financial Openness | 0.386 | 0.493 |
| | (0.212)* | (0.239)** |
| IR Holding | 0.167 | 0.135 |
| | (0.611) | (0.846) |
| CA balance (%) | -0.318 | -1.140 |
| | (0.829) | (1.348) |
| Gross debt (%) | 0.107 | 0.182 |
| | (0.121) | (0.138) |
| Inflation Vol. | 2.443 | 0.938 |
| | (1.431)* | (1.594) |
| Trade Comp. | -1.897 | -1.318 |
| | (0.896)** | (1.048) |
| Trade demand | 2.365 | 1.265 |
| | (1.093)** | (1.080) |
| Bank Lending | 0.324 | 0.347 |
| | (0.619) | (0.582) |
| Fin. Dev. | 0.755 | 0.638 |
| | (0.447)* | (0.526) |
| Currency crisis | 1.091 | 0.075 |
| | (0.275)*** | (0.284) |
| Banking crisis | -0.208 | -0.024 |
| | (0.229) | (0.253) |
| **Macro-prudential** | **-0.039** | **-0.029** |
| | **(0.044)** | **(0.044)** |
| *N* | 851 | 532 |
| Adj. R2 | 0.05 | 0.01 |
| # of countries | 61 | 35 |

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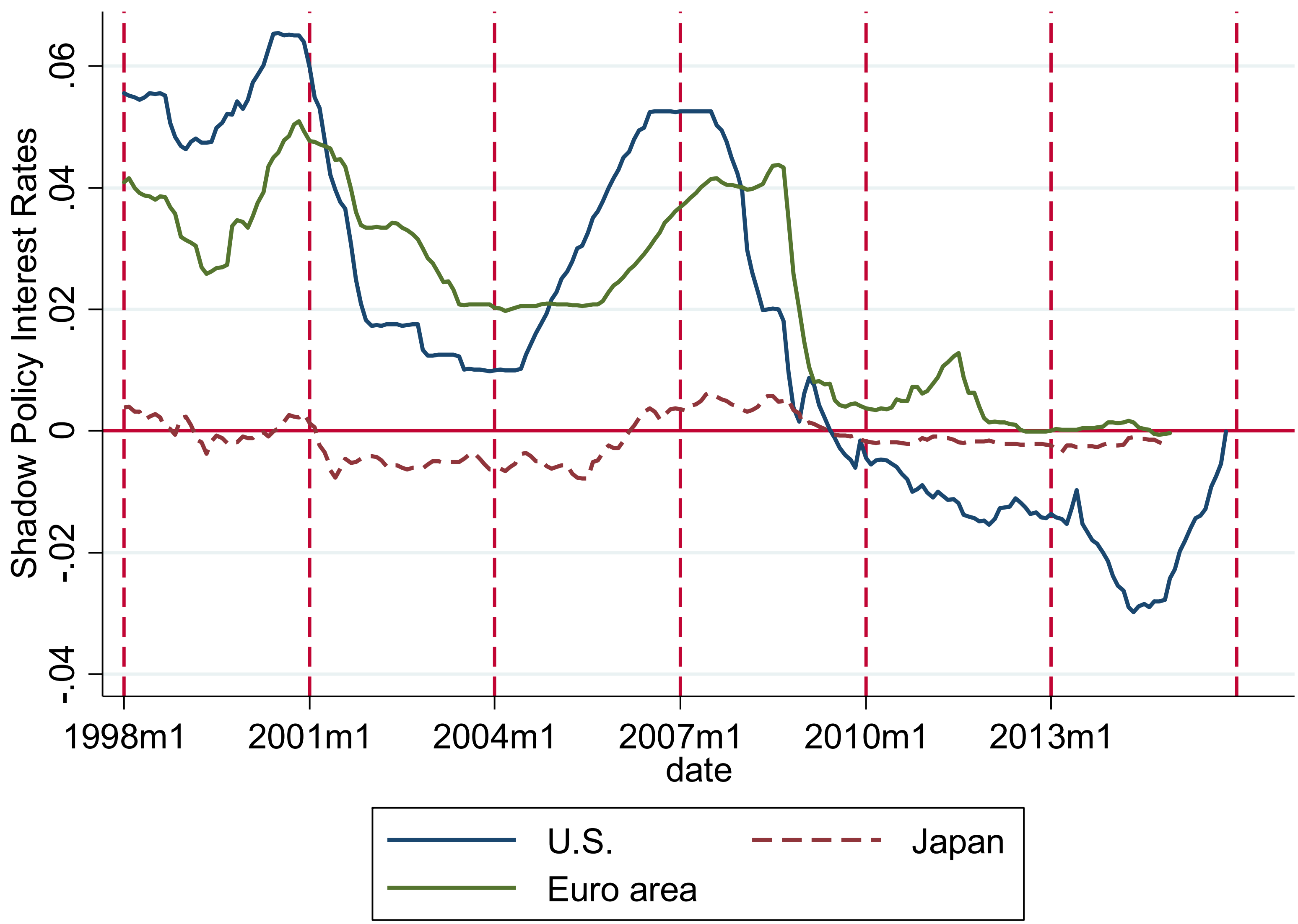
# Focus on period of expansionary Core Economy monetary policy?



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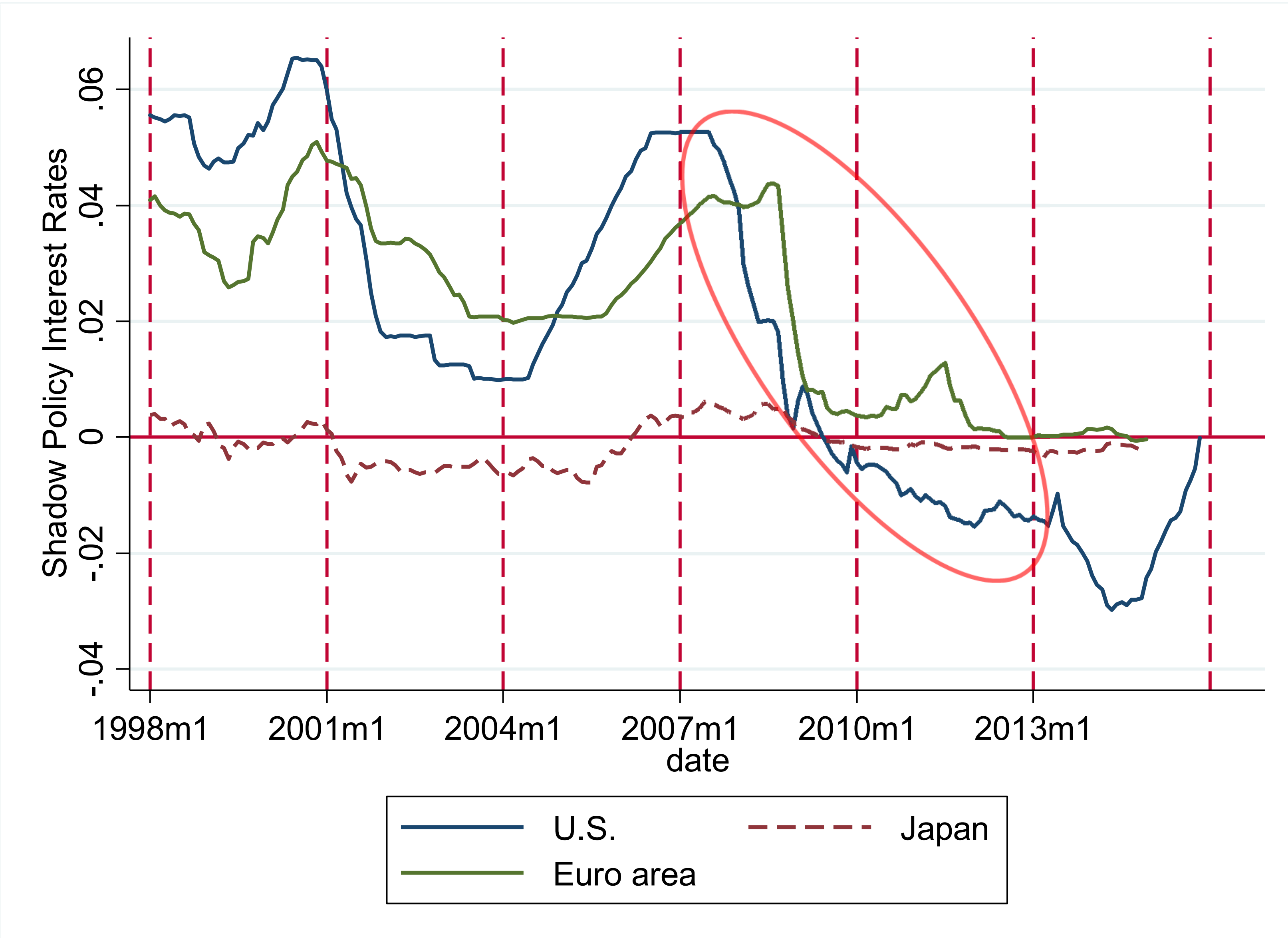

# Impact of MaP when CEs implement expansionary – but not contractionary -- monetary policy

This evidence is consistent EME implemented macro-prudential policies in response to capital inflows in the aftermath of the GFC.

**Table 4: Factors Affecting the Estimated Financial Sensitivity, 1998-2014 When CEs' Monetary Policy Is "Loose"**

| | LDC (1) | EMG (2) |
|---|---|---|
| Exch. Rate Stability | 0.080 | -0.247 |
| | (0.361) | (0.475) |
| Financial Openness | 0.097 | -0.009 |
| | (0.280) | (0.324) |
| IR Holding | -0.107 | 0.216 |
| | (0.741) | (1.056) |
| CA balance (%) | 0.031 | -0.989 |
| | (1.046) | (1.736) |
| Gross debt (%) | 0.067 | -0.007 |
| | (0.157) | (0.187) |
| Inflation Vol. | 5.976 | 6.094 |
| | (2.450)** | (4.242) |
| Trade Comp. | -0.639 | -0.234 |
| | (1.191) | (1.407) |
| Trade demand | 0.863 | 0.056 |
| | (1.463) | (1.530) |
| Bank Lending | 0.565 | 0.819 |
| | (0.690) | (0.662) |
| Fin. Dev. | 0.219 | -0.487 |
| | (0.570) | (0.712) |
| Currency crisis | 0.792 | 0.318 |
| | (0.384)** | (0.375) |
| Banking crisis | -0.085 | -0.081 |
| | (0.289) | (0.342) |
| Macro-prudential | -0.104 | -0.055 |
| | (0.057)* | (0.060) |
| *N* | 471 | 288 |
| Adj. R2 | 0.04 | 0.01 |
| # of countries | 61 | 35 |

# Impact of MaP when CEs implement expansionary – but not contractionary -- monetary policy

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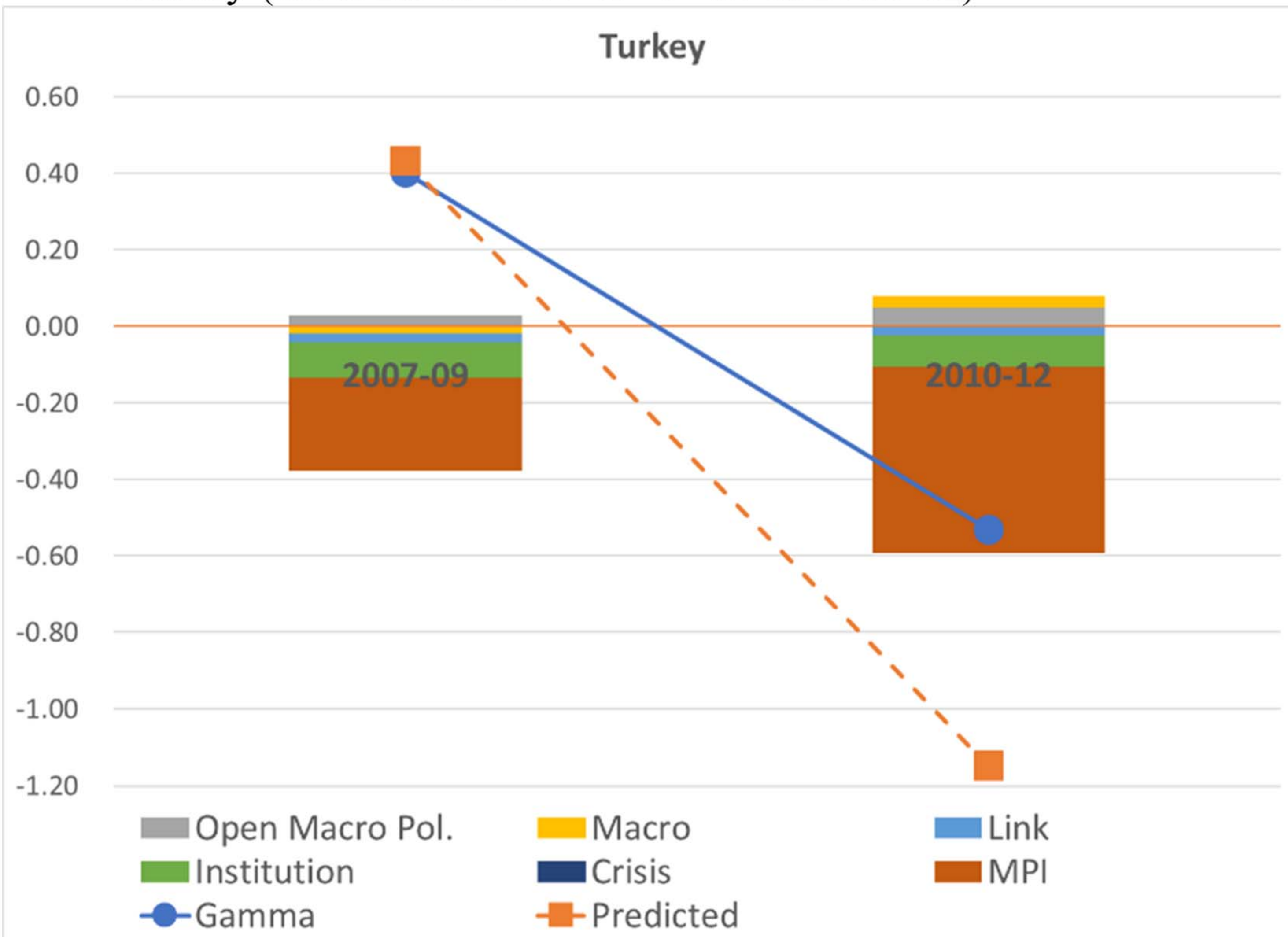
# MPI effect is econometrically, economically significant

**Figure 5: Estimated Contributions to the Gamma**

Turkey (MPI: 2.3 in 2007-09 → 4.7 in 2010-12)



# Impact is mainly driven by lender-targeted macroprudential policies

**Table 5: The Effects of Disaggregated MPI, LDC vs. EMG, “Loose Time”**

| **Dependent Variable: Estimated Measure of Financial Sensitivity through Policy Interest Rates between CEs and PHs** | | | | | | |
|---|---|---|---|---|---|---|
| | LDC | LDC | LDC | EMG | EMG | EMG |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Borrower-targeted | -0.111 | | -0.017 | -0.184 | | -0.180 |
| MPI | (0.158) | | (0.167) | (0.151) | | (0.171) |
| Financial Institution- targeted | | -0.136 | -0.134 | | -0.041 | -0.004 |
| MPI | | (0.070)* | (0.073)* | | (0.079) | (0.090) |

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# Liquidity based MPI's Matter

(Table 6 from newest revision of paper)

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| | (0.391) | | | (0.168) |
| Asset-based MPI | | -0.085 | | 0.043 |
| | | (0.111) | | (0.125) |
| Liquidity-based MPI | | | -0.323 | -0.322 |
| | | | (0.127)** | (0.138)** |

Notes. The estimations are conducted with the robust regression method due to the existence of outliers. * $p$<0.1; ** $p$<0.05; *** $p$<0.01. The second estimation is conducted for the estimates $\hat{\gamma}_{it}^{C}$ from the first-step estimation. However, this table only reports the estimates on the capital-based, asset-based, or/and liquidity-based macroprudential policy index. The same set of controls variables as reported in Table 4 are included in the estimation, including time fixed effects and the constant.

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# Macro-pru policies allow PHs to retain monetary independence when net capital recipients

**Table 6: Current Account Surplus Countries vs. Current Account Deficit Countries**

| | LDC | | EMG | |
|---|---|---|---|---|
| | CA Surplus (1) | CA Deficit (2) | CA Surplus (3) | CA Deficit (4) |
| Macroprudential Policy Index | -0.051 | -0.220 | 0.009 | -0.264 |
| | (0.071) | (0.110)** | (0.072) | (0.113)** |
| *N* | 181 | 289 | 132 | 156 |
| Adj. R2 | 0.07 | 0.36 | 0.20 | 0.06 |
| # of countries | 48 | 54 | 32 | 30 |

**Table 7: Countries with High IR vs. Those with Low IR**

| | LDC | | EMG | |
|---|---|---|---|---|
| | High IR (1) | Low IR (2) | High IR (3) | Low IR (4) |
| Macroprudential Policy Index | -0.060 | -0.168 | 0.036 | -0.272 |
| | (0.072) | (0.109) | (0.074) | (0.129)** |
| *N* | 268 | 203 | 154 | 135 |
| Adj. R2 | 0.00 | 0.13 | -0.01 | 0.06 |
| # of countries | 43 | 38 | 23 | 22 |

For EM countries which do not hold high levels of IR, macro-prudential policies function as alternative buffer to external shocks

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# Macropru policies more effective when PH economy relatively financially closed.

**Table 8: Financially Open Countries vs. Financially Closed Countries**

| | **LDC** | | **EMG** | |
|---|---|---|---|---|
| | Open<br>(1) | Close<br>(2) | Open<br>(3) | Close<br>(4) |
| Macroprudential Policy Index | -0.111<br>(0.082) | -0.146<br>(0.089)* | -0.104<br>(0.106) | -0.044<br>(0.083) |
| *N* | 237 | 234 | 144 | 143 |
| Adj. R2 | -0.01 | 0.12 | -0.05 | 0.04 |
| # of countries | 33 | 34 | 19 | 20 |

When a PH country tries to shield itself from capital, having more closed financial markets increases macroprudential policy efficacy

# Macropru policies more effective when PH economy relatively financially closed.

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|---|---|---|---|---|
| | Open (1) | Close (2) | Open (3) | Close (4) |
| Macroprudential Policy Index | -0.111 | -0.146 | -0.104 | -0.044 |
| | (0.082) | (0.089)* | (0.106) | (0.083) |
| *N* | 237 | 234 | 144 | 143 |
| Adj. R2 | -0.01 | 0.12 | -0.05 | 0.04 |
| # of countries | 33 | 34 | 19 | 20 |

When a PH country tries to shield itself from capital, having more closed financial markets increases macroprudential policy efficacy

# Macro-pru policies effective when the PHs are experiencing an increase in net portfolio inflows, or credit expansion

**Table 9: Portfolio Inflow Growing vs. Capital Inflow Contracting**

| | LDC | | EMG | |
|---|---|---|---|---|
| | K-inflow Expanding (1) | K-inflow Contracting (2) | K-inflow Expanding (3) | K-inflow Contracting (4) |
| Macroprudential Policy Index | -0.214 | 0.092 | -0.145 | 0.090 |
| | (0.091)** | (0.116) | (0.102) | (0.106) |
| *N* | 230 | 198 | 150 | 130 |
| Adj. R2 | 0.06 | 0.45 | -0.02 | 0.03 |
| # of countries | 47 | 46 | 28 | 28 |

**Table 10: Credit Growing vs. Credit Contracting**

| | LDC | | EMG | |
|---|---|---|---|---|
| | Credit Expanding (1) | Credit Contracting (2) | Credit Expanding (3) | Credit Contracting (4) |
| Macroprudential Policy Index | -0.259 | -0.027 | -0.155 | -0.044 |
| | (0.087)*** | (0.089) | (0.092)* | (0.109) |
| *N* | 210 | 261 | 122 | 167 |
| Adj. R2 | 0.19 | -0.02 | 0.12 | -0.01 |
| # of countries | 51 | 57 | 29 | 33 |

# Macro-pru policies effective when the PHs are experiencing an increase in net portfolio inflows, or credit expansion

**Table 9: Portfolio Inflow Growing vs. Capital Inflow Contracting**

| | LDC | | EMG | |
|---|---|---|---|---|
| | K-inflow Expanding (1) | K-inflow Contracting (2) | K-inflow Expanding (3) | K-inflow Contracting (4) |
| Macroprudential Policy Index | -0.214<br>(0.091)** | 0.092<br>(0.116) | -0.145<br>(0.102) | 0.090<br>(0.106) |
| *N* | 230 | 198 | 150 | 130 |
| Adj. R2 | 0.06 | 0.45 | -0.02 | 0.03 |
| # of countries | 47 | 46 | 28 | 28 |

**Table 10: Credit Growing vs. Credit Contracting**

| | LDC | | EMG | |
|---|---|---|---|---|
| | Credit Expanding (1) | Credit Contracting (2) | Credit Expanding (3) | Credit Contracting (4) |
| Macroprudential Policy Index | -0.259<br>(0.087)*** | -0.027<br>(0.089) | -0.155<br>(0.092)* | -0.044<br>(0.109) |
| *N* | 210 | 261 | 122 | 167 |
| Adj. R2 | 0.19 | -0.02 | 0.12 | -0.01 |
| # of countries | 51 | 57 | 29 | 33 |

# Take-aways

More extensive implementation of macroprudential policies lead PHs to (re)gain monetary independence from the CEs

- when the CEs implement expansionary monetary policy
- when PHs run current account deficit
- when they hold lower levels of international reserves (IR)
- when their financial markets are relatively closed
- when they are experiencing an increase in net portfolio flows
- when they are experiencing credit expansion