Moving forward with macroprudential frameworks

Stijn Claessens, Head of Financial Stability Policy & Deputy Head, Monetary and Economic Department

SUERF/Narodowy Bank Polski Conference Challenges of Interactions between Macroprudential and other Policies, Warsaw, 15 February 2019

Disclaimer: The opinions expressed are those of the author and do not necessarily reflect views of the Bank for International Settlements.
“Old” framework of macroeconomic and prudential policies

- **Macro**
  - Macroeconomic Policies (monetary/fiscal/external)
  - Price Stability
  - Economic Activity

- **Prudential**
  - Microprudential Policy
  - Idiosyncratic Risk
“New” framework of macroeconomic and microprudential and macroprudential policies

Macroprudential Policy

- Macroeconomic Policies (monetary/fiscal/external)
- Price Stability
- Economic Activity
- Financial Stability
- Systemic Risk
- Idiosyncratic Risk

Microprudential Policy

- Macroeconomic Policies
- Financial Stability
- Systemic Risk
- Idiosyncratic Risk
Growing popularity of the terms “macroprudential” and “financial cycle”
Use of macroprudential measures growing over time with ACs “overtaking” EMs and LIC

Mean number of MaPs activated by income group

Nine issues...

1. Finance is special, but can come with problems
2. As MaPs are being used, empirical evidence is accumulating
3. MaP and monetary policy (MoP) may need to be coordinated
4. MaPs are used in a globalised world
5. Need to consider risks within non-bank markets
6. Data on systemic risks is still incomplete, and market discipline on system is limited
7. Financial structures affect stability and growth
8. Communication and political economy
9. Design of the overall system
Issue 1: Finance is special, but can come with problems

- Finance is important to economic growth and other goals. **But:**
- Finance is **Procyclical**, subject to booms/busts, and crises
  - Runs often through asset values and leverage
- Finance displays much **Interconnectedness**
  - Contagion within financial system (eg, TBTF, common exposures)
- Procyclicality interacts with interconnectedness

- Calls for policy response, including macroprudential policies (MaPs)
- Much research supports need for MaPs (Claessens, 2016 reviews)
Microprudential policies (MiPs) do not address (all) systemic and procyclicality issues

- Microprudential takes partial equilibrium view, looks at risks in isolation, does not consider system, ignores:
- MiPs can also “distort,” systemic risks
  - Capital adequacy requirements, margins; deposit insurance, safety net; diversification vs diversity; etc.
  - Also remuneration, agency issues can lead to procyclicality
- Both: possible adverse general equilibrium outcomes
  - Excessive systemic risk, herding, creation of tail risks, etc.
Need for MaPs supported by research

  - Highlighted procyclicality of/in financial systems
- Brunnermeier, et al 2009; Hanson, Kayshap, Stein, 2011; De Nicolò et al, 2012; de la Torre et al, 2011; Farhi, Werning, 2015; Korinek and Simsek, 2014, etc.
  - Conceptual motivations for MaPs
  - Classify sources of systemic risks and related MaPs
- IMF, 2012; Ostry et al 2011; Sandri, Jeanne, Korinek, ‘14
  - Motivate and frame capital flow management (CFM) tools
- Acharya 2011; Shin, 2011; IMF, 2014; some others
  - Adaptations to EMs and DCs
Question 1: Why exactly are MaPs needed?

Microprudential, monetary, other policies do not suffice $\rightarrow$ MaPs

- But MaPs need justification
  - Externalities, market failures; but which exactly?
  - To compensate for other policies, eg, poor resolution, tax deduction; but to what degree?

- Need better theory, esp. booms
  - What are the causes of booms?

- Applies to both domestic and international dimensions (ie CFMs)
- And need to adapt to country circumstances
Country characteristics, policies, and circumstances to affect (use of) MaPs: complex

- Financial system structure
  - Banks vs markets, shadow banking: circumvention
  - IO: Domestic, foreign, state-owned banks; concentration

- Openness of capital account, financial integration
  - Domestic financial cycle ↔ international/capital flow cycle
  - Effectiveness of MaPs ↔ links between CFM and MaPs

- Policy environment
  - Exchange rate peg, monetary policy – Fiscal policy/space

- Institutional capacity, other tools available
  - Quality of data, know-how, ability to calibrate
  - Reforms (eg, TLAC, resolution) – Other tools, eg, stress tests
Issue 2: As MaPs are being used, empirical evidence is accumulating

- More MaPs in place over time (AC now close to EMEs DCs)
- Evidence accumulating. So far:
  - Borrower-based (“LTVs”, “DTIs”)
    - Work for real estate, harder to circumvent
    - But can be politically “costly”
  - Financial institutions’
    - Better known
    - But easier to evade. FI costly
  - All:
    - Temporary cooling, not always sustained, buffers insufficient
    - Need to differentiate by country and MaPs
How effective have MaPs been? Cross-country analyses

- **Aggregate (boom, bust, leverage, risks, prices)**
  - LTV and DTI caps, credit growth, reserve requirements, dynamic provisioning mitigates procyclicality
  - MaPs can reduce risks of credit booms, bad booms

- **Overall analyses**
  - Capital, RRs lower credit; LTV, capital reduces house prices; RR reduces portfolio inflows; effects on GDP growth, sectoral allocations
  - LTVs, housing taxes, FC: curb housing prices, equity flows, credit, bank leverage
  - MaPs lower bank and housing credit growth, and house price inflation; more targeted is better
  - Borrower-based effective for credit growth, financial institutions-based reduces impact of capital flows on domestic credit
  - MaPs induce some substitution bank to non-banks; quantity-stronger effects than price-based do, but more substitution
Borrower-based macroprudential measures have some impact on bank credit; less so for bank-based

Impact of tightening

<table>
<thead>
<tr>
<th></th>
<th>One-year effect, % pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum loan-to-value</td>
<td></td>
</tr>
<tr>
<td>ratios</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>-1</td>
</tr>
<tr>
<td></td>
<td>-2</td>
</tr>
<tr>
<td></td>
<td>-3</td>
</tr>
<tr>
<td></td>
<td>-4</td>
</tr>
<tr>
<td></td>
<td>-5</td>
</tr>
</tbody>
</table>

| Maximum debt service-to-|
| income ratios           |                        |
|                        | 0                      |
|                        | -1                     |
|                        | -2                     |
|                        | -3                     |
|                        | -4                     |
|                        | -5                     |

| Loan provisioning rules|
|                        | 0.00                   |
|                        | -0.25                  |
|                        | -0.50                  |
|                        | -0.75                  |
|                        | -1.00                  |
|                        | -1.25                  |

| Countercyclical capital|
| buffers                |                        |
|                        | 0.00                   |
|                        | -0.25                  |
|                        | -0.50                  |
|                        | -0.75                  |
|                        | -1.00                  |
|                        | -1.25                  |

- Statistical significance at the 5% level
- No statistical significance
Further evidence from cross-country analyses

- **Real estate specific**
  - Cyclical LTV can curb real estate booms
  - Emerging Europe: capital ratio requirements, non-standard liquidity lowers housing prices
  - DSTI limit lowers housing credit growth, and housing-related taxes reduce house prices

- **Banking risks**
  - LTVs, CG, FC reduce growth in leverage, assets, noncore; asymmetric effects

- **Regional and international aspects**
  - Latin America: reserve requirements (also) serve as MaP, ie, control credit growth
  - In Asia-Pacific, MaPs and CFMs both help, MaP more effective when complement, not substitute monetary policy
Country case studies and other

- More micro (loans, house prices, bank credit)
  - **Spain**: dynamic provisioning tame credit supply and help smooth downturn, uphold credit
  - **Korea**: LTV/DTI limit mortgage credit
  - **Hong Kong SAR**: targeted at real estate borrowing reduce real estate cycles
  - **Uruguay** (2008): RR lower credit, but riskier firms get more. Less for larger banks
  - **UK**: higher capital adequacy requirements can help mitigate lending booms
  - **Israel**: quantity effects only for six months, with LTVs more than DP, CTC. Limit on transactions
  - **Sweden**: mostly financial institutions based; mixed effects; challenges on borrower-side, coordinating MaPs w/ monetary policy
  - **Ireland, UK**: LTVs reduce leverage, but can increase other risky lending
Question 2: What are open empirical issues?

- Know too little on:
  - Rarely explicitly aimed at externalities/market failures
    - What are (best) intermediate targets and effectiveness?
  - Interactions among MaP tools, with other policies (eg MiP)
  - Rules vs discretion. Calibrations (eg in busts). Adaptations
  - Costs, financial and economic
    - Side-effects. Potential new distortions. Evasion. Migration
    - Political risks

- Partly due to limited cases, data and research
Need to go beyond aggregate, more case-study/micro-data

- **Aggregate: advantages/disadvantages**
  - Can consider overall effects and some country differences
  - But identification of channels, endogeneity of MaPs harder

- **Case/micro: advantages/disadvantages**
  - Better identification, control for specifics (eg, banks’ capital)
  - But no ability to investigate role of country circumstances

- **All: little on costs and risks of MaPs**
  - Adjustment costs to the financial industry: phase-in ok?
  - Do MaPs direct resources, interfere too much with markets?
    Reduce credit flows, but lower (sectoral) output?
  - Create false security, expose policymakers? Politics?
Example: regional house price differences: is or is not a macroprudential concern?

- House prices have increased in many advanced economies and emerging markets. Prices have increased especially in big cities.
- Questions:
  - What may drive these price increases, esp. in cities?
  - Are there reasons to treat booms in cities as special?
    - What are the specific drivers?
    - What are systemic risks, economic and financial?
  - What is the best policy response?
    - What types of (changes in) (macroprudential) regulations?
    - Of a “structural” or cyclical nature?
House price increases in many economies, with large disparities nationally, as cities outstrip regional house price differences.

<table>
<thead>
<tr>
<th>Region</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>London vs all other regions</td>
</tr>
<tr>
<td>FR</td>
<td>Île-de-France vs Province (INSEE)</td>
</tr>
<tr>
<td>AU</td>
<td>Sydney vs a weighted average of Sydney, Melbourne, Brisbane, Adelaide, Perth, Hobart, Darwin, and Canberra</td>
</tr>
<tr>
<td>SE</td>
<td>Simple average of Stockholm, Malmö and Göteborg vs a simple average of the other regions of the country (SCB)</td>
</tr>
<tr>
<td>CN</td>
<td>7 largest cities vs the whole country (Bundesbank)</td>
</tr>
<tr>
<td>US</td>
<td>Simple average of Beijing, Shanghai, and Guangzhou (CEIC) vs an average of 70 cities</td>
</tr>
<tr>
<td>IE</td>
<td>Dublin vs the rest of Ireland</td>
</tr>
<tr>
<td>JP</td>
<td>Tokyo vs entire country</td>
</tr>
<tr>
<td>MX</td>
<td>Mexico City vs entire country</td>
</tr>
</tbody>
</table>

1 For DE, cumulative nominal price growth over the period 2012-2015.
What are potential drivers of house prices in cities?

- **Cyclical**
  - Low interest rates in many advanced economies
  - Improving economies, after great financial crisis

- **Fundamentals and structural factors**
  - Limited supply
  - Bias in external financing rules
  - Links to rise in inequality

- **Cities’ house prices could have specific drivers**
  - Greater presence of income- and interest-sensitive homeowners
  - Urbanisation, conglomeration economics, combined with supply limits
  - Global investors, safe haven, etc, esp. for cities and small open economies
When might rising house prices in cities be a concern?

- Key question: do localised house prices create significant systemic risk?
- A priori, local booms less likely to be a concern
  - House price growth differentials might be temporary as capital and labour adjust
  - But costs, backwards-looking beliefs about future house prices, and agglomeration externalities can prolong adjustment
- However, busts might have regional spillovers with macroeconomic and financial stability impacts
  - Eg United States, 2009: regional shocks nation-wide effects; crises (Texas, New England) spillovers; Ireland and Spain affected euro area
  - Links through consumption, income transfer, production/trade
  - Financial links via concentrated funding, interbank exposures, undiversified investor base, informational contagion, sovereign risk
What roles for (local) macroprudential policies?

Scope for macroprudential policies in cities?

- Have been targeted at specific markets/objectives (eg Korea, Hong Kong SAR)
- Pragmatic and discretionary within existing frameworks. But likely:
  - More (regulatory) arbitrage
  - Quicker spillovers
  - (Even) harder to sustain

MaP at early stage when applying to localised markets

- What are the relevant externalities, and how strong are they?
  - Can one proxy them?
- What are the costs of macroprudential policies?
  - Eg in terms of lost agglomeration benefits?
- Need granular data and models to assess objectives, risks, calibration, etc
  - Can one capture spillovers? How to calibrate cost-benefits?
Issue 3: MaP and monetary policy (MoP) need to be coordinated
Interest rates can affect financial stability via various channels

The effects of a monetary loosening on financial stability, including through risk-taking

Monetary Loosening

Static effect
Impact on net worth given the balance-sheet structure

Positive
- ↑ aggregate demand, ↑ earnings
- ↓ interest burden
- ↑ asset prices

Leverage effect
Changes to the liability structure

Negative
- ↓ borrowing costs, ↑ leverage
- ↓ resilience to future shocks
- Occurs gradually

Dynamic effect

Risk-taking effect
Changes to the asset structure

Ambiguous
- Portfolio reallocation towards risky assets...
- ... but risky portfolio can become less risky
- With limited liability, ↓ risk shifting
- With rigid liabilities, ↑ search for yield
Asset allocation and leverage in a simple CAPM framework. A decline in rate induces moving from point D to C: less risky assets, but higher leverage.
Question 3: How to coordinate MaP and MoP in practice?

- When policies operate perfectly, no major challenges
  - Complement each other, eg, business and financial cycles phases overlap
  - Both: clear mandate, decision-making, accountability

- But constraints on one can imply other has to do more
  - With imperfect MaP, MoP has to act some ("getting into the cracks")
  - With constraints on MoP (fixed exchange rate, ZLB), MaP has to do more

- Yet: much more work needed for clear-cut policy advice
  - How much to adapt each policy to the other? How to inform each other?
  - How to coordinate? What is governance? Where does MaP best reside?
When business and financial cycles are not always aligned, conflicts can arise

Economic and financial gaps based on credit growth and house prices

Note: The "economic gap" is the average between the output gap and the deviation of the 2015 inflation forecast from target. The “financial gap” is the average between the credit-to-GDP gap and the property-price gap. Data are reported in Table 1.

Key input: are real effects of macroprudential policy outweighed by financial stability benefits?
MaPs also interact with other policies, raising more coordination questions.
Issue 4: MaPs are used in a globalised world

1. MaPs less effective in open economies
   - Globalisation, Global Financial Cycle: less control domestically

2. MoPs and MaPs hard to coordinate (gains small/uncertain, cooperation difficult, limited forums, or just ex-post, in crises)
   → Need to consider MaPs together with CFM tools

Challenges

- Spillovers of MaPs, while generally small, very heterogeneous
- Also MaPs less impact with more developed finance
  → More developed financial markets, tap alternatives, circumvent
Impact of US monetary policy shocks: non-peggers’ interest rate affected too (reaction to 100 bp US shock)

Response of non-peggers

Response of peggers

0 lag*

1st-lag

2nd lag*

0

10

20

30

40

50

60

BIS
MaPs less effective in open economies, suggesting “evasion” or circumvention

- Higher use of MaPs $\rightarrow$ increases cross-border claims
  - One standard deviation increase in MaPs increases cross-border ratio in open countries by 6 pp, about 1/3rd its standard deviation
  $\Rightarrow$ Consider MaPs together with CFM tools (next...)

- Country characteristics matter
  - MaPs not more effective with higher GDP/capita or development. Less impact with more developed finance, more flexible exchange rate
  $\Rightarrow$ More developed financial markets, tap alternatives, circumvent MaPs

- Overall spillovers of MaPs generally small, but can greatly vary
Monetary policy and MaPs are hard to coordinate internationally

- Monetary policy
  - Gains from cooperation are small in many models
    - Even when larger, uncertainty can preclude cooperation
  - Central banks are independent, accountable locally
- MaPs
  - Supply side: inward leakages, outward spillovers
  - Demand side: incomplete coverage, arbitrage
  - Very few methods (to date) to coordinate policies
    - So far only countercyclical buffers, CCyB
    - In times of stress, even harder (eg, ring-fencing)
International dimensions especially important for small open economies

- Monetary (MoP) and exchange rate policies in small open economies do not always follow a standard model
  - Partly in response to spillovers
- MoPs and MaPs hard to coordinate internationally (gains small/uncertain, cooperation more difficult, with limited forums, or just ex-post, when in crises)
  - Some countries may therefore benefit from CFMs

How to use, balance, interface MaPs and CFM tools?
Question 4: How to balance, coordinate MaPs and CFMs?
How to distinguish MaPs and CFMs? How to guide their use? MaPs ⇔ CFMs of interest

**Macroprudential policies (MaPs)**
- Loan-to-value (LTV) limit
- Debt-to-income (DTI) limit
- Dynamic provisioning (DP)
- Countercyclical capital buffer (CCyB)
- Leverage ratio (LEV)
- Credit growth (CG) limit

**FX-based MaPs**
- Limits on FX loans
- FX-based reserve requirements
- (Limits on banks’ open FX positions)
- (Limits or taxes on banks’ FX borrowing)

**Capital controls (CCs)**
- Equity inflow restrictions
- Bond inflow restrictions
- Money market inflow restrictions
- Collective investment inflow restr.
- Derivatives inflow restrictions
- Commercial credit inflow restrictions
- Real estate inflow restrictions

“Capital flow management measures” (CFM)
In practice, many countries use both MaPs and CFM measures

Correlations between MaPs and CFM measures
How do macroeconomic and financial stability concerns and policies fit together?

- **Capital inflow surge**
  - **Macroeconomic concerns**
    - Macro policies: exchange rate appreciation, reserves accumulation, fiscal and monetary policy mix
  - **Financial-stability risks**
    - Prudential policies: Strengthen/introduce prudential measures (Microprudential and MPP)

Primary responses

- Macro policy options exhausted? Residual risks?
  - Impose/intensify CFMs (or measures that act like them) subject to multilateral considerations and macro test
Choice of instruments: flows intermediated through domestic banks

Flows to domestic banks

- Fragile external liability structure (maturity mismatch/sudden-stop risk)
  - CFMs / FX-related prudential
    - CFMs on banks (esp. short-term debt), eg, taxes/reserve requirements
      - Legal or other impediments to CFMs?
        - FX-related prudential

- Currency risk (due to open FX position) or credit risk (due to unhedged borrower)
  - FX-related prudential
    - Open FX limits/higher capital requirements on loans to unhedged borrowers
      - Concerns about access to finance/distortions?
        - CFMs

- Credit boom/asset price bubble
  - Other prudential
    - Cyclical capital requirements, LTV limits

1/ Once macro policy space exhausted, and taking due account of multilateral considerations.
Choice of instruments: flows not intermediated through financial sector

Direct flows or through unregulated financial sector

- Fragile external liability structure (debt, especially short-term)
  - CFMs\(^1/\)
    - CFMs to discourage debt instruments

- Currency risk (due to lack of natural or financial hedge)
  - CFMs\(^1/\)
    - CFMs to discourage FX borrowing by unhedged entities

- Asset price bubble
  - CFMs\(^1/\)
    - Broad-based CFMs

Legal or other impediments to CFMs?

Borrower-based FX-measures

\(^1/\) Once macro policy space exhausted, and taking due account of multilateral considerations
Empirical results of cross-country analysis (Jon Frost, Hiro Ito and René van Stralen)

- Macropudential policies (MaPs)
  - FX-based MaPs
  - Non-FX-based MaPs

- Prudential policies (MiPs)
  - FX-based MiPs
  - Non-FX-based MiPs

- Capital controls
  - Capital inflow restrictions
  - Capital inflow liberalisation
What does this mean?

- **FX-based MaPs (and MiPs) seem to work**
  - MaPs and MiPs – especially those that target FX mismatches – may affect influence volume, composition of capital inflows
  - Results consistent with Forbes and Warnock (2012) for effect of FX-based measures on probability of capital flow surges

- **Capital controls look disappointing**
  - Little effectiveness in aggregate
  - Circumvention ... maybe aiming at flows directly not useful

Jon Frost, Hiro Ito and René van Stralen
Issue 5: Need to consider risks within non-bank markets

- Non-bank financing can be procyclical, create tail risks
  - Much of it built-in (eg margins, MTM, collateral)
  - Some of it tail-risk type (eg privately produced safe assets)

- Can have adverse real sector consequences
  - Fire-sales, asset price busts, recessions; booms leading to misallocations

- No comprehensive conceptual approach to such risks

- Challenges
  - Financial innovation: needs a dynamic, system view of risks and productivity
  - Instability of complex systems: needs new modelling, eg agent-based
## NBFI activities: economic functions and risks

<table>
<thead>
<tr>
<th>Economic Function</th>
<th>Definitions</th>
<th>Key financial stability risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF1</td>
<td>Management of collective investment vehicles with features that make them susceptible to runs</td>
<td>Public funds: Liquidity and maturity transformation Private funds: Leverage and maturity transformation</td>
</tr>
<tr>
<td>EF2</td>
<td>Loan provision that is dependent on short-term funding</td>
<td>Liquidity and maturity transformation, leverage</td>
</tr>
<tr>
<td>EF3</td>
<td>Intermediation of market activities that is dependent on short-term funding or on secured funding of client assets</td>
<td>Liquidity and maturity transformation, leverage</td>
</tr>
<tr>
<td>EF4</td>
<td>Facilitation of credit creation</td>
<td>Imperfect credit risk transfer</td>
</tr>
<tr>
<td>EF5</td>
<td>Securitisation-based credit intermediation and funding of financial entities</td>
<td>Liquidity and maturity transformation, leverage</td>
</tr>
</tbody>
</table>

Source: [FSB Global Monitoring Report on Non-Bank Financial Intermediation 2018](https://www.bis.org/publ/rpfx18.htm)
Addressing financial stability risks from NBFI: progress to date

Regulating the evolving system of Non-Bank Financial Intermediation (NBFI)

In trillions of US dollars, 29 jurisdictions

<table>
<thead>
<tr>
<th>Economic Function 1</th>
<th>Economic Function 2</th>
<th>Economic Function 3</th>
<th>Economic Function 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMF reforms</td>
<td>Change in regulatory status (eg acquisition by banks)</td>
<td>Change in regulatory status (eg to bank holding companies)</td>
<td>Accounting rules on consolidation of off-balance sheet SPVs</td>
</tr>
<tr>
<td></td>
<td>Identification of non-bank non-insurer SIFIs</td>
<td>US tri-party repo market reform</td>
<td>Basel III and guidelines on step-in risk</td>
</tr>
<tr>
<td></td>
<td>BCBS guidelines on step-in risk</td>
<td>FSB haircut framework for SFTs</td>
<td>Securitisation reforms on transparency and incentives</td>
</tr>
</tbody>
</table>

- Management of collective investment schemes that are susceptible to runs (EF1)
- Lending dependent on short-term funding (EF2)
- Market intermediation dependent on short-term funding (EF3)
- Facilitation of credit intermediation (EF4)
- Securitisation-based credit intermediation (EF5)

Note: The bubbles show examples of policy measures applied to the relevant economic functions since the crisis. Additional policy measures may have been introduced at national/regional and international levels. Measures in bold are in force. Economic Function 4 (EF4) was not represented in this graph as it is only 0.3% of total shadow banking assets.

Source: Adapted from FSB Global Monitoring Report on Non-Bank Financial Intermediation 2018 and FSB Assessment of Shadow Banking Activities.
Question 5: What is the best MaP approach for risks within non-bank markets?

- Regulate intramarket-based financing, using an activity-based approach?
  - Indirect, as in higher capital, liquidity for securities financing transactions?
  - Direct, as in minimum margins, early redemption fees, gates, limits on redemptions?
  - State-contingent policies, as in “through the cycle” rules, akin to CCyB?
    - Eg through the cycle margin and risk approaches

- Adapt mandates for regulators to allow non-bank system oversight?
  - How to adapt governance of toolkit? How to cover capital markets?
    - Cannot aim for full predictability, some ex-post, discretionary actions necessary
    - How to combine with need in capital markets for certainty, property rights?
Traditional theory of financial intermediation

- **Banks**
  - Soft information, delegated monitoring

- **Investors**

- **Savers**

- **Markets**
  - Hard information, direct financing
Shadow banking role in intermediation (theory “TBD”)
Issue 6: Data on systemic risks is still incomplete, and market discipline on system is limited

- System-risk measures still incomplete
  - Vary greatly as scope, institutional coverage, methodology are not uniform

- Better use and more data needed
  - Improved measurement: start with better use of existing data
  - Even with significant progress using existing data, more data needed

- Markets cannot be expected to monitor systemic risks
  - Cannot rely solely on financial (investor) disclosure
  - Need better information on system risks, vulnerabilities
  - And better incentives to use these data
Measuring systemic risk is always a challenge
How to monitor NBFI? FSB: from macro to credit to risks

Monitoring aggregates
At end-2017

Narrowing down¹

<table>
<thead>
<tr>
<th>Total Financial Assets</th>
<th>Size ($USD trillion)</th>
<th>Share (%)</th>
<th>Change in 2017² (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$382 trillion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUNFI $184 trillion</td>
<td>36.7</td>
<td>71.2</td>
<td>9.1</td>
</tr>
<tr>
<td>OFIs $117 trillion</td>
<td>3.5</td>
<td>6.7</td>
<td>5.8</td>
</tr>
<tr>
<td>EF3 ($market intermediation dependent on short-term funding)</td>
<td>4.2</td>
<td>8.2</td>
<td>5.2</td>
</tr>
<tr>
<td>EF4 ($facilitation of credit intermediation)</td>
<td>0.2</td>
<td>0.3</td>
<td>4.4</td>
</tr>
<tr>
<td>EF5 ($securitisation-based credit intermediation)</td>
<td>5.0</td>
<td>9.6</td>
<td>9.1</td>
</tr>
<tr>
<td>Unallocated</td>
<td>2.0</td>
<td>4.0</td>
<td>9.7</td>
</tr>
<tr>
<td>Total</td>
<td>51.6</td>
<td>100</td>
<td>8.5</td>
</tr>
</tbody>
</table>

¹ Total financial assets, MUNFI and OFIs are based on the 21+EA-Group, due to its broader sample. The narrow measure is based on data from the 29-Group, as the data from eight participating euro area jurisdictions are more granular than the aggregate euro area data from the European Central Bank (ECB). For the 29-Group, the corresponding aggregates are: total global financial assets ($377.8 trillion); MUNFI ($185.0 trillion); and OFIs ($117.0 trillion). ² For additional details on these categories, please see Section 4. ³ Some exchange rate effects have been netted out by using a constant exchange rate (from 2017). Net of prudential consolidation into banking groups.

Triangulating entities and activities that pose risks

Narrow measure of NBFI decomposition

29 Jurisdictions

Evolution of the narrow measure by economic function (EF)

Breakdown of main entity types (at end-2017)

Percent of economic function (of 100%)

1 Net of entities prudentially consolidated into banking groups. EF1 = Economic Function 1; EF2 = Economic Function 2; EF3 = Economic Function 3; EF4 = Economic Function 4; EF5 = Economic Function 5; Unallocated = assets of entities that were included in the narrow measure, but which could not be assigned to a specific EF. Some exchange rate effects have been netted out by using a constant exchange rate (from 2017). Others includes hedge funds, consigned financial planning, equity funds, currency funds, asset allocation funds, closed-ended funds, funds of funds and other investment funds (including jurisdiction-specific fund types). Others includes credit unions and venture capital firms. Others includes custodial accounts and pension funds. Others include investment firms, broker-dealers, financial guarantors and other OFIs. EF5 includes other entity types such as synthetic ETFs that are immaterial.

Question 6: How can market discipline complement MaPs?

- What data to collect and disclose (more)?
  - More on banks? Stress tests? Intra-financial system exposures?
  - Financial stability reports to include more of market activities?
    - Collect, publish margins, overall exposures?
    - Net or gross activities, stock or flows, including re-use?

- How to assure market and regulatory discipline complement?
  - How to allow and encourage for more analyses? What incentives for market participants to collect and use system information?
  - Would greater use of mutual insurance mechanisms help?
Issue 7: Financial structures affect growth and financial stability

- Financial structures affect growth, innovation, productivity
- Level of financial development can affect growth
  - Positive, but revisited: declining over time and maybe peaking at high depth

- Financial system diversity affects financial stability
  - Crises more likely, recovery from busts worse for bank-dominated systems
    - Especially real estate booms and busts are bad
  - Diversity ("spare wheel") helps, for various reasons
  - But: Procyclicality over shorter run higher with market-based financing
As income rises, structures shift away from bank-based towards market-based financing

- At higher levels of income, more market-based financing
- Over time, supply-side complementarities between banks and markets – at individual institution and system level – have been increasing
- Overall, a rise in market-based financing, but still not dominant in all G4

![Composition of financial assets](chart.png)

- Bank Assets
- Insurance
- Stock Market
- Bond Market
As income rises, contribution to growth of banks declines, stock markets’ increases
But...while markets increasingly complement banks, growth impact may be declining...

- Many complementarities, at financial institutions’ and systems’ level
  - Sources of funds, securitisation, risk management, economies of scope...
- But growth benefits of complementarities may have declined

Average GDP per capita growth

Recessions with credit crunches longer, deeper in bank-based. Equity busts’ not so in market-based

- Driven by real estate booms
  - Are more likely followed by banking crises, low growth
  - Recessions deeper, recoveries slower
  - Housing debt predicts lower future growth
- Spare tire benefits
  - Not just diversity

But... volatility, procyclicality greater with more market-based finance and more diversity...

- Dark side of more market-based financing
  - Procyclicality in bank balance sheets (leverage ↔ asset growth) in market-based systems double that in bank-based systems

- With more fragmentation and diversity, also greater volatility
  - Easier and more trading, shorter investment horizons, less HTM
  - More peak pricing (also FinTech)
  - More collateral, safety demands
Question 7: Should MaP aim for a “preferred” financial structure?

- For greater financial stability, like to see →
  - Less bank-based, more markets, more diverse, less TBTF
  - Fewer perverse links banking ↔ shadow systems
  - Not much more volatility and procyclicality
    - Preferably also lower costs, more productive financing (less housing finance, more intangible, productive investments)

- Questions
  1. Do regulatory trends support these objectives?
  2. Is there a role for MaP?
# Longer-run regulatory trends

Less structure and conduct; more disclosure, capital based

<table>
<thead>
<tr>
<th>Structural Regulations</th>
<th>Conduct Regulations</th>
<th>Prudential Regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional separation of institutions</td>
<td>Regulations of bank’s deposit and lending rates</td>
<td>Deposit insurance</td>
</tr>
<tr>
<td>Entry restrictions</td>
<td>Regulation of fees and commissions</td>
<td>Discount window</td>
</tr>
<tr>
<td>Ownership restrictions</td>
<td>Credit quotas</td>
<td>Restriction on asset</td>
</tr>
<tr>
<td>Discriminatory rules against foreign</td>
<td>Branching limitations</td>
<td>Information disclosure</td>
</tr>
<tr>
<td>investors</td>
<td></td>
<td>Solvency ratios</td>
</tr>
</tbody>
</table>
How do MaPs fit in with other, recent “reversals” in regulatory trends?

“Structural” measures
- More formal separation
  - Vickers, Volcker, Liikanen, etc
- Derivatives on exchanges, CCPs
  - Explicit structure (+conduct) regulation
- Shadow banking
  - Less puts, regulatory arbitrage, higher costs for banks’, securities-financing

“Conduct” measures
- LCR, NSFR
  - Away from capital-based only
- Mutual funds, hedge funds, etc
  - MtM, NAV, redemption gates, fees, other approaches
- MaPs
  - Affect credit allocation, FIs
How to adjust financial structures, also dynamically?

- Ideally a system view that is more dynamic. “What delivers less systemic risks and procyclicality, and more productivity?” Examples:
  - If procyclicality of some financing a problem in one part, how not to migrate it where it becomes subject to regulation w/ same issues (eg, Solvency II)?
  - If liquidity risk is a major concern, how to move liquidity-sensitive to part of the system best able to absorb such risks (eg, limit reverse maturity)?
  - If systemic risk externalities are key, how to seek more “mutual insurance”? If through asset prices, then greater through the cycle capital, provisioning, etc…
  - If productivity is low, how to encourage “right” forms of financing, ie, not debt?

- General equilibrium and dynamics very hard. Still, more can be done, including with what role for MaPs
Issue 8: Communication and political economy

- Internal: eg between MaPs and MoP functions
  - Silos in the past, now work in progress. But still:
  - Institutional barriers, staffing, perspectives
  - Asymmetry in relevance; in focus (median vs tail risks; horizon); “rigor” of framework; access to data; etc.
    - Can say “GDP at risk” help to communicate with MoP?

- External: financial services industries, users, politicians, others
  - Financial stability hard to communicate and verify
    - Communication in general becomes harder for central banks
  - MaP more invasive than MoP
  - Political economy worse
    - Premium on governance, accountability, and communication
Who is responsible for macroprudential measures?

Percentage of 51 countries and territories

- 2008: Different agencies
- 2017: Central bank with regulation and supervision
- 2008: Central bank without regulation and supervision
- 2017: Integrated supervisor

- Without inter-agency committees
- With inter-agency committees
Question 8: How to interface on MaPs?

A case for autonomy, with transparency and accountability
A divine coincidence? Or another trilemma?

Autonomy

Transparency  Accountability
Issue 9: Design of the overall system

*Demand side + Supply side: Many linkages, no unified framework*

**Financial exposures (stocks and flows) between sectors**
Need to consider many policies

- Monetary policy
- Fiscal policy
- FX-related policy
- Microprudential policy
- Macroprudential policy

Macro stability
- Inflation
- Output

Financial stability
- Credit (including capital flows)
- Asset prices
- Fin system buffers
Question 9: How to make overall system (more) robust?

Ideally: Towards a more holistic macro-financial stability framework
Still... nine questions remaining

1. Why exactly are macroprudential policies (MaPs) needed?
2. What are outstanding empirical issues?
3. How to coordinate MaPs and MoP in practice?
4. How to balance, coordinate MaP and CFM tools?
5. What is the best MaP approach for risks within non-bank markets?
6. How can better data and market discipline complement MaPs?
7. Should MaPs aim for a “preferred” financial structure?
8. How to interface on MaPs?
9. How to make overall system (more) robust?