

Inflation targeting and financial stability

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Questions:

A. How to set up the macro prudential policy strategy?

- How to operationalize financial stability policy?
- Can we benefit from experience designing the monetary policy strategy?
- What is missing for the successful conduct of macro prudential policy?

Inflation targeting and financial stability

Questions:

B. How can MP under IT regime promote financial stability?

- What are potential adjustments of IT regime discussed?
- Should we amend policy rules for financial indicators?
- What is the appropriate degree of coordination of monetary, supervisory and regulatory policies in the decision making?

C. Are common central bank models capable to assess implications of macro prudential policy?

- Paper of Benes, Kumhof, and Vavra addresses some of the existing weaknesses.

Background: An unusual debate

Multiple instruments

- Re-emergence of FX interventions as a standard instrument
- Renewed appetite for administrative and prudential measures in both preserving financial stability as well as monetary policy instruments
- Various forms of quantitative easing and budget financing

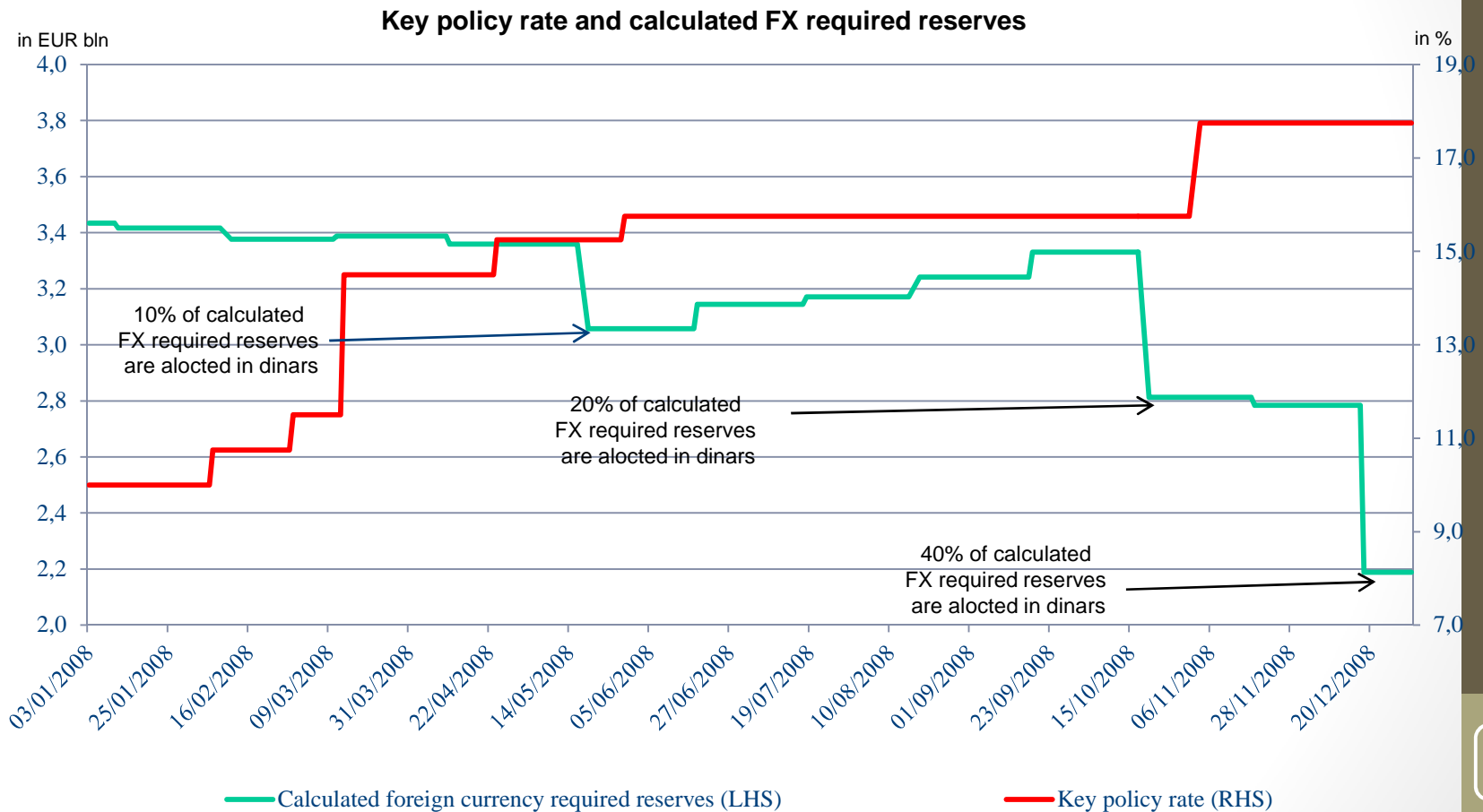
... and multiple objectives

- “leaning against the wind” policies
- Interest rates and quantitative easing to achieve financial stability objectives
- FX interventions as a tool supporting growth
- Money and FX market facilities to preserve market stability
- Administrative measures serving a macro-prudential role

Background: An unusual debate

- Problems with conflicting objectives during the crisis
 - Financial stability and macro-prudential warnings not feeding into policy stance assessment
 - Financial stability objectives interfered with monetary and fiscal ones, e.g. in floating but euroized economies
 - Growth in conflict with price stability objectives

Background: An unusual debate



A. Macro prudential policy

- Many countries have been experimenting with macro prudential measures, but a well defined framework (targets, measureable indicators, and instruments) is still missing.

Measure	Countries
Loan to Value	Singapore, China, South Korea, Hong-Kong
Loan to Income	Serbia
Debt to Income	South Korea
Credit restrictions	Serbia, Malaysia
Direct control of credit	Malaysia, Philippines, Singapore

Institutional arrangements:

EU—European Systemic Risk Board.

UK—Financial Policy Committee.

France—Financial Regulation and Systemic Risk Council.

A. Two Competing Concepts

- Price stability is sufficient, but needs to be refined
 - Challenge is to integrate financial stability with the traditional interest rate based monetary policy focused on price stability
 - Financial stability is a precondition for price stability - it makes achieving price stability easier
- Financial stability is a separate function
 - Challenge is to define the new function with its objectives, instruments and decision making processes
 - Financial and price stability may be in conflict

A. Two Competing Concepts

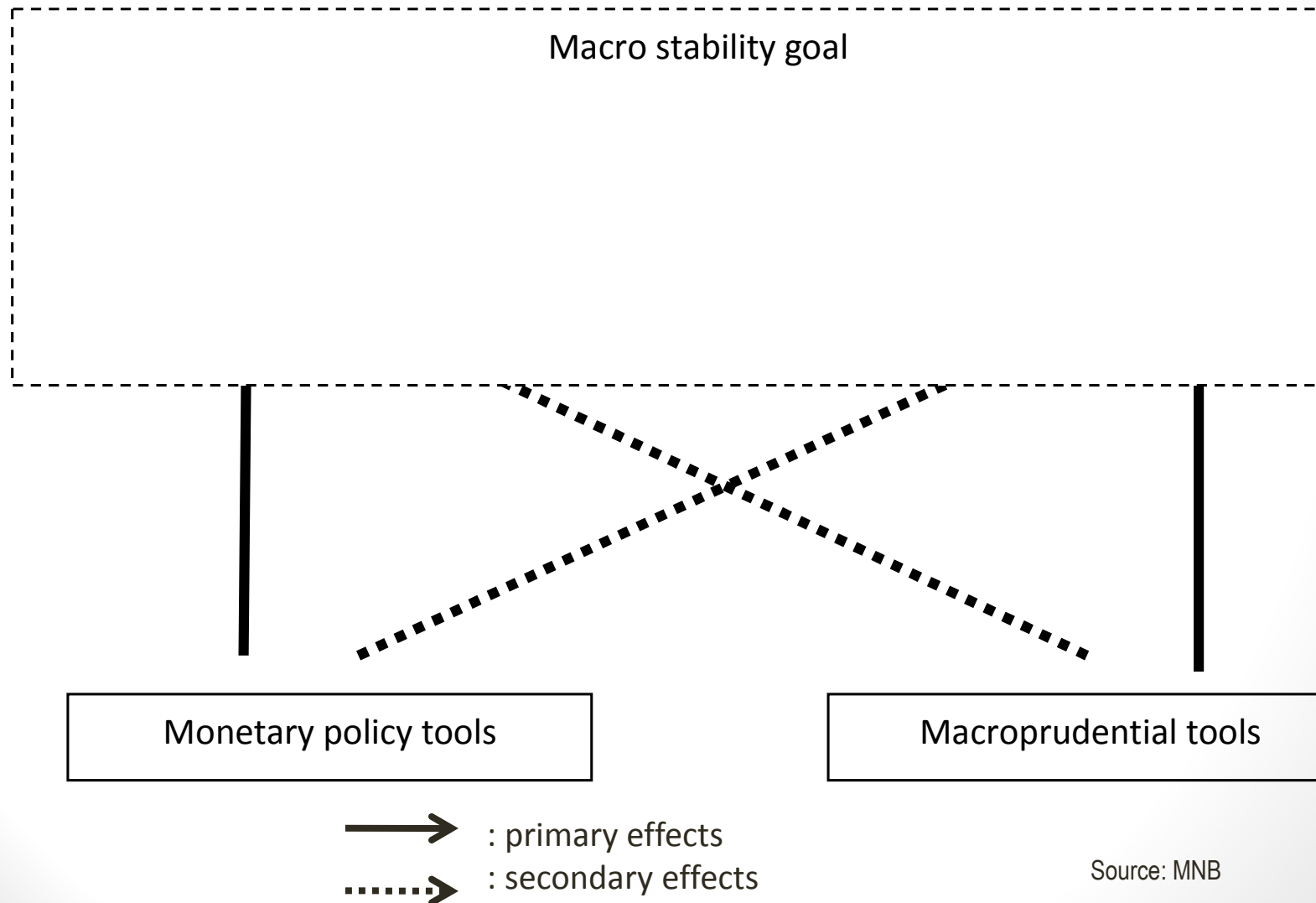
Price stability is sufficient, but needs to be refined

- Account for changing transmission channels
- Measures of leverage/fin stability risk as an additional intermediate objective
- Interest rates as the main instrument
- Other instruments/prudential measures as short-term fixes

Financial stability is a separate function

- Remove systematic risk across sectors and across time
- Potential conflict with price stability
- There are many feedback mechanisms between both functions that needs to be internalized
- Capital requirements as the main instrument (interest rates)

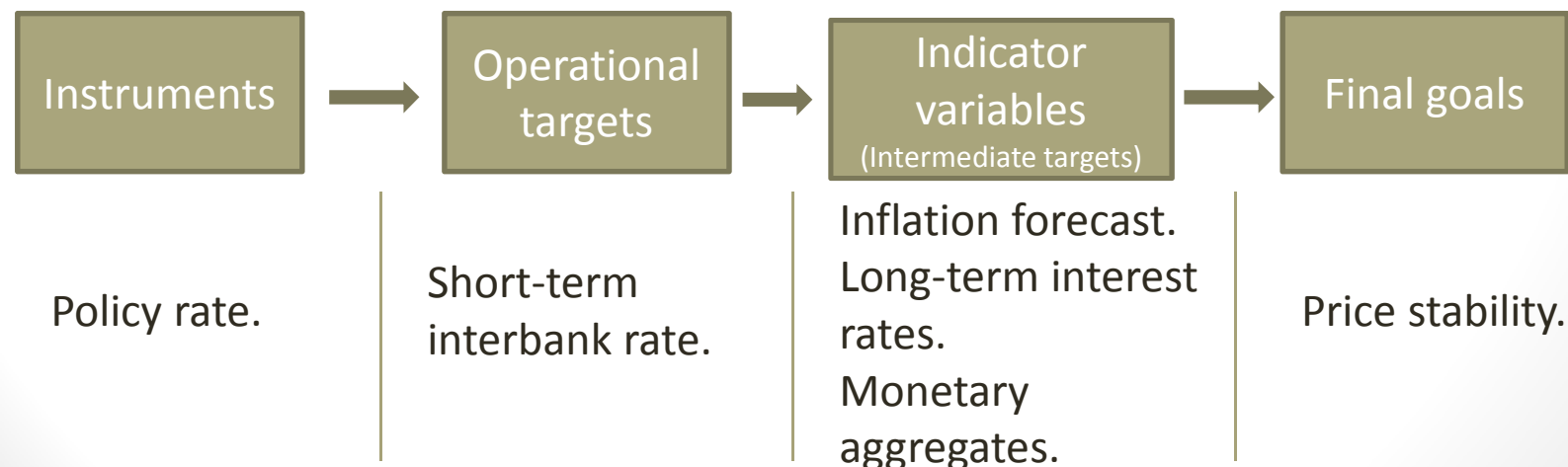
A. Price and Financial Stability: Integration or Coordination?



Source: MNB

A. Macro prudential policy

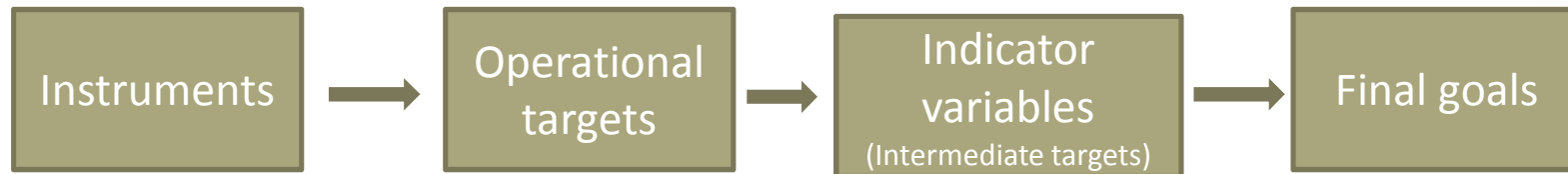
- To conduct macro prudential policy requires:
 - i. An operational framework with clearly defined goals, measurable indicators, and instruments.
 - ii. Knowledge of the transmission mechanism from instruments to targets and indicator variables.
 - iii. A rule for operational targets changes.
- Financial stability policy can be framed around a framework similar to monetary policy.



A. Macro prudential policy

- Potential benefits from such a framework for macro prudential policy:
 - i. Enhanced fulfillment of the financial stability goal— instruments affect financial stability indirectly with transmission lags.
 - ii. Regular assessment of policy stance via information variables is enabled.
 - iii. Improved communication of policy actions.
 - iv. Forward looking and rule based manner of policy is enabled.
- In contrast to the MP framework, there is:
 - i. More than one instrument but also many operational targets.
 - ii. Potential non-linearity—sudden stops, financial innovations, etc.

A. Macro prudential policy



1. Countercyclical capital buffers.
Dynamic provisioning.
Direct control of credit to specific sectors.

2. Loans to deposits limits. Liquidity requirements.

3. Loan-to-value ratios. Debt service to income ratios.

4. Currency mismatch limits. FX positions limits.

Capital adequacy ratio.
Provisions levels.

Liquidity measures (NSFR and LCR).

Loan-to-value ratios.

Currency mismatch.

Credit growth.

Liquidity indicators.

Mortgage lending.

Currency mismatch indicators.

Final goals

Macro financial stability

Micro financial stability

A. Macro prudential policy

Remaining agenda:

- Achieve a consensus on qualitative definition of financial stability (literature).
- Define measurable indicators of systemic risks or identification techniques.
- Macro prudential toolkit of instruments, including criteria for their choice and calibration.
- International co-ordination.

A. Macro prudential policy

Remaining agenda:

- Empirical evidence on the transmission from instruments to indicator variables.
- Decision making rules and communication of steps. Rule based or discretionary changes of instruments?
- An integration with micro prudential policy and supervision.
- Macro models exhibiting financial frictions and cycle.

B. Inflation targeting

- It is widely accepted that the primary objective of monetary policy is the price stability.

King (2009): *“Inflation targeting is a necessary but not sufficient condition for stability in the economy as a whole. When a policy is necessary but not sufficient, the answer is not to abandon, but to augment it.”*

Amendments of IT MP discussed in the literature:

1. Lengthening of policy horizons.
2. Price level targeting.
3. Changes of policy rules, including several instrument rules (e.g FX interventions or prudential measures with MP implications)

B.1. Lengthening of policy horizon

- Motivation:
 - i. Policy horizon of 2-3 years might be too short to take proper account of financial cycles;
 - ii. Or lengthening of the policy horizon will reduce inflation variability if financial frictions increase transmission lags.
- Two options: Forecasting (feedback) horizon or target horizon might be lengthened.
- However, from a practical perspective these strategies are not feasible:
 - i. Forecasts beyond the two years horizon are dominated by trends rather than business cycle movements.
 - ii. Adverse effects on credibility and accountability.

B.2. Price level targeting

- Could be considered as another means of lengthening policy horizon (Sims(2003) shows that optimal target horizon of PLT is longer than for IT).
- Might help to overcome credibility issues of lengthening of policy horizons.
- Also, suitable to deal with zero lower bound (ZLB).
 - With PLT misses of target on one side will need to be reversed, and this should feed into expectations in a stabilizing way.
- Only BoC is considering/debating the PLT option.
- Research suggests that more credibility/more forward-looking expectations bolster case for PLT.

B.3. Adjusting MP rules

- Considering price stability as the primary objective of monetary policy, most of studies conclude that standard Taylor type rules are close to optimal.
 - Models tend to suggest more aggressive inflation targeting rules or lengthening of the policy target horizon.
 - Policy rules adjusted for financial variables perform better than inflation based rules in responding to financial shocks.
 - However, following Curdia and Woodford (2009) optimal weights on financial variables vary with shocks.
 - MP can be a blunt tool to prick asset prices bubbles.
- Nevertheless, financial sector development and frictions have to be taken into account by central banks and incorporated into policy analysis and forecasting systems.

C. We need to understand more

- Policy measures sometimes taken under time pressure without analysis of effects
- Analytical and forecasting frameworks
 - Macro – usually no explicit treatment of the financial sector, leading to underestimation of the financial and real sector repercussions
 - Financial stability – tests are often static, and largely inconsistent with lacking a dynamic link to the macroeconomic framework

C. New Analytical Frameworks

- Need for a better understanding of the inter-linkages between the financial sector and the rest of the economy
 - Gain the capacity to conduct a forward looking analysis of financial and macroeconomic developments
 - Insufficient tools for macro-prudential analysis
- Many CBs and IFIs are intensively working in this area

C. Central banks models and financial frictions

- Prior to the crisis many central banks employed models assuming a perfect and complete financial market.
 - No transaction costs and information asymmetries—frictionless.
 - No uncertainty about financial contracts.
 - The financial structure of firms is considered as irrelevant—Modigliani-Miller theorems.
 - One risk free interest rate paid on bonds.
- Three approaches extensively used in the literature to introduce financial aspects into DSGE models:
 - 1) Financial accelerator framework.
 - 2) Collateral constraints framework.
 - 3) Strand exploiting explicit modeling of the banking sector.

C.1. The financial accelerator

- Introduced by BGG (1999).
- Endogenous development of credit markets amplifies and propagates shocks.
- Information asymmetries between borrowers and lenders.
 - Projects outcomes subject to idiosyncratic shocks.
 - Outcomes are observable ex-post by borrowers not by lenders—costly state verification.
- The costly state verification induces a positive external financing premium negatively correlated with borrower's net worth.
- Defaults occur in equilibrium and their frequency evolves over the business cycle.

Weaknesses (the original setup)

- State-contingent contracts—no aggregate risks bear by lenders.
- No financial intermediaries.

C.2. Collateral constraints

- Introduced by Iacoviello (2005).
- Asset price swings magnify imperfections in the credit market—very similar to the FA.
- The limited enforcement environment.
 - Lenders cannot force borrowers to pay unless the debt is fully insured by collateral.
 - Durable assets such as housing, capital, or land serve as collateral.
- Credit limits are determined by the market value of agent's assets.

Weaknesses (the original setup)

- No idiosyncratic project uncertainty and therefore endogenous default risks.
- No financial intermediaries assumed.

C.3. Banking sector modeling

- Modeling strategies range from relatively ad-hoc assumptions to rigorous micro-foundations.
- It is difficult to categorize these approaches. The modeling choice reflects objectives and obviously focuses on:
 - 1) Interest rate margins.
 - 2) Regulatory requirements.
 - 3) Banks risks taking, etc.

Ad 1.

- Banking as a costly activity.
 - Resources as capital, reserves, or labor are required to produce loans.
 - E.g. Benes, Otker-Robe, and Vavra (2009).
- Monopolistic competition and stickiness of interest rates.
 - E.g. Mandelman (2006) or Benes and Lee (2007).

C.3. Banking sector modeling

Ad 2.

- Banks experiencing regulatory requirements.
 - Banks face penalty costs if they deviate from the required level.
 - Incentive based regulation, e.g. Benes, Kumhof, and Vavra (2011).

Ad 3.

- Approaches motivate holding of capital/liquidity or seek to assess banks' risks taking.
 - Information asymmetries, risks of bank runs or idiosyncratic shocks and payout schemes are exploited.
 - See, e.g. Angeloni and Faia. (2009), Gertler and Karadi (2009).

Weaknesses

- Costly banking implies pro-cyclical interest rate spreads.
- A limited set of banking sector behavior is considered.

Remaining challenges

General

- Further empirical evidence on the importance of different transmission mechanisms.
- Asset prices behavior—bubbles, house prices, implications for the conduct of monetary policy.

Banks

- Debt contracts—non-state contingent with credit (default) risks; multi-period contracts (maturity mismatch).
- Balance sheets including interbank borrowing and liquidity risks.
- Contagion risks.
- Risk taking behavior—organizational structure, moral hazard, or time varying risk aversion?

Ex: Balance Sheet Effects

- Benes, Berg, Portillo and Vavra: “Sterilized Interventions and Balance Sheet Effects of Monetary Policy “
- Introducing balance sheet effects of monetary/exchange rate policy transmission through optimizing banking sector

Central Bank	Financial Sector	Households
<i>F</i>	<i>O</i>	<i>O</i>
	<i>L</i>	<i>B</i>
		<i>L</i>
		<i>NW</i>

- where *F* stock of FX reserves, *O* CB issued securities, *L* commercial banks loans to households, *B* banks refinancing from abroad, *NW* households net worth. Note that $NFL = L$, $F = O$
- Output-output model of banking sector

Ex Balance Sheet Effects

- Optimizing banking sector:

$$\max_{\{O,L\}} \Pi_{+1} = \exp(j)L + \exp(i)O - O + \exp(i^*)(O + L) \frac{S_{+1}}{S} - \Omega(O, L)$$

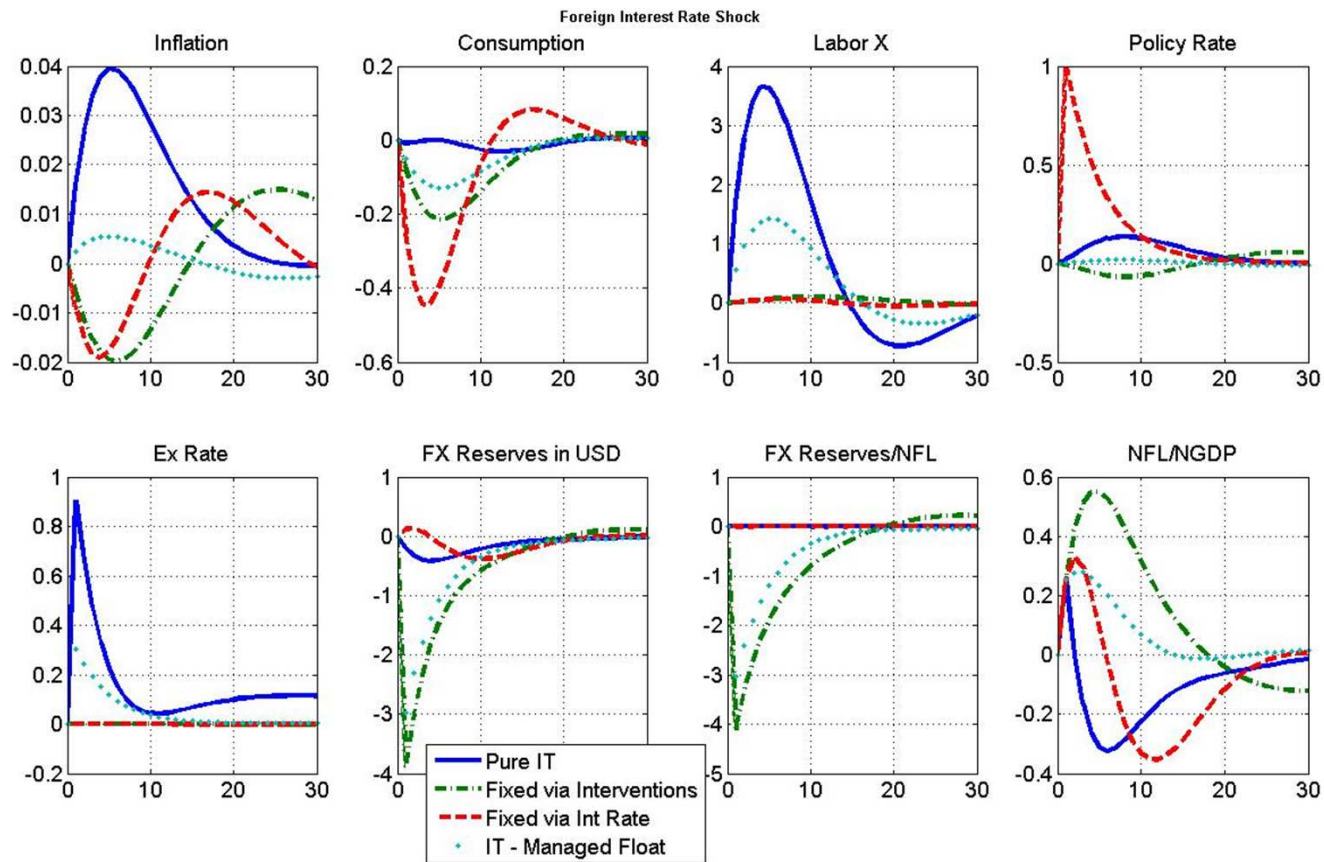
$$\begin{aligned} \Omega(O, L), \quad \Omega_i(\cdot) > 0 \quad \Omega_{ii}(\cdot) < 0 \\ \Omega_{ij}(\cdot) < 0, \quad i, j \in \{O, L\} \end{aligned}$$

- FOC:

$$\exp(i) = \exp(i^*) \frac{S_{+1}}{S} + \Omega_O\left(\frac{F}{P}\right), \quad \Omega'_O(\cdot) > 0$$

$$\begin{aligned} \exp(j) &= \exp(i^*) \frac{S_{+1}}{S} + \Omega_L \\ &= \exp(i) + \Omega_L - \Omega_O\left(\frac{F}{P}\right) \end{aligned}$$

Ex Balance Sheet Effects



Ex Bank Capital

Benes, Kumhof Vavra: **“Aggregate risk and bank capital: Incentive-based analysis of capital regulation in an open economy”** :

- Address at least some weaknesses exhibited by existing macro models.
- Capture interactions between real and financial cycles.
- Propose a framework suitable for macro-prudential policy analysis.
- Provide a special reference to emerging market economies (aspects as dollarization, characteristic shocks, etc.).
- Illustrate the use of the model developing a number of hypothetical scenarios as shocks to the country spread, terms of trade shocks, and asset price bubbles.

Ex Bank Capital (BKV model)

The model aspects crucial for an assessment of macro-prudential policy:

i. **Credit (default) and interest rate risks**

- Debt contracts exhibit endogenous defaults (idiosyncratic shocks to projects outcomes—the financial accelerator framework).
- Debt contracts are non-stage contingent contracts—there are subject to uncertainty on the aggregate (economy) level.
- As a result, lenders (banks) bear a part of aggregate risks.
- This type of contract is in contrast to a large amount of macroeconomic models with financial frictions and state-contingent debt contracts, originated by Carlstrom and Fuerst (1997) and Bernanke et al. (1999).

Ex Bank Capital (BKV model)

ii. Banks hold capital.

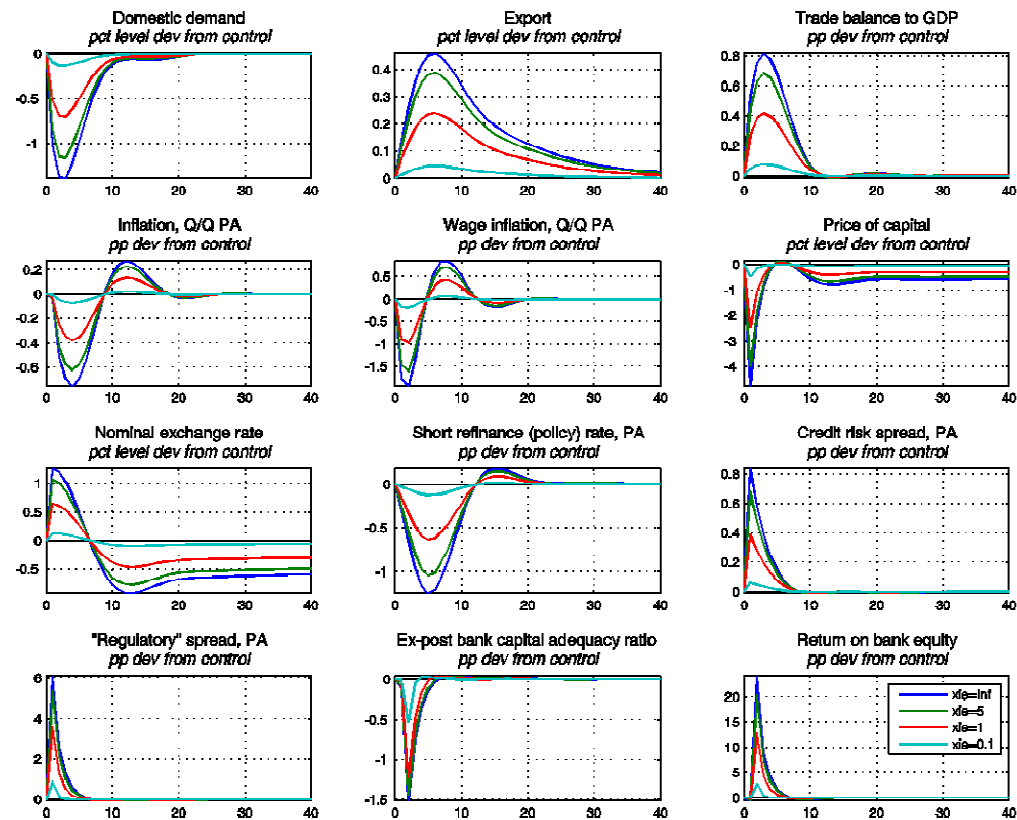
- Reflecting credit and aggregate (economy) risks, banks need hold their own net worth—bank equity, capital.
- Bank capital plays a non-trivial role in determining the banks' lending policy.

iii. Bank capital is subject to regulation

- Regulation is not a binding constraint in the bank optimization problem.
- Regulatory requirements are introduced as system of penalties that creates incentives for behavior of banks—**incentive based regulation** (Milne, 2002).
- Regulatory requirements and an assumption that acquiring new capital is costly give arise an endogenous capital buffer.
- Bank capital and balance sheet position of banks affect their lending—bank capital channel (Van den Heuvel, 2002).

Ex Reduction in the bank capital (BKV model)

Exogenous shock to bank capital

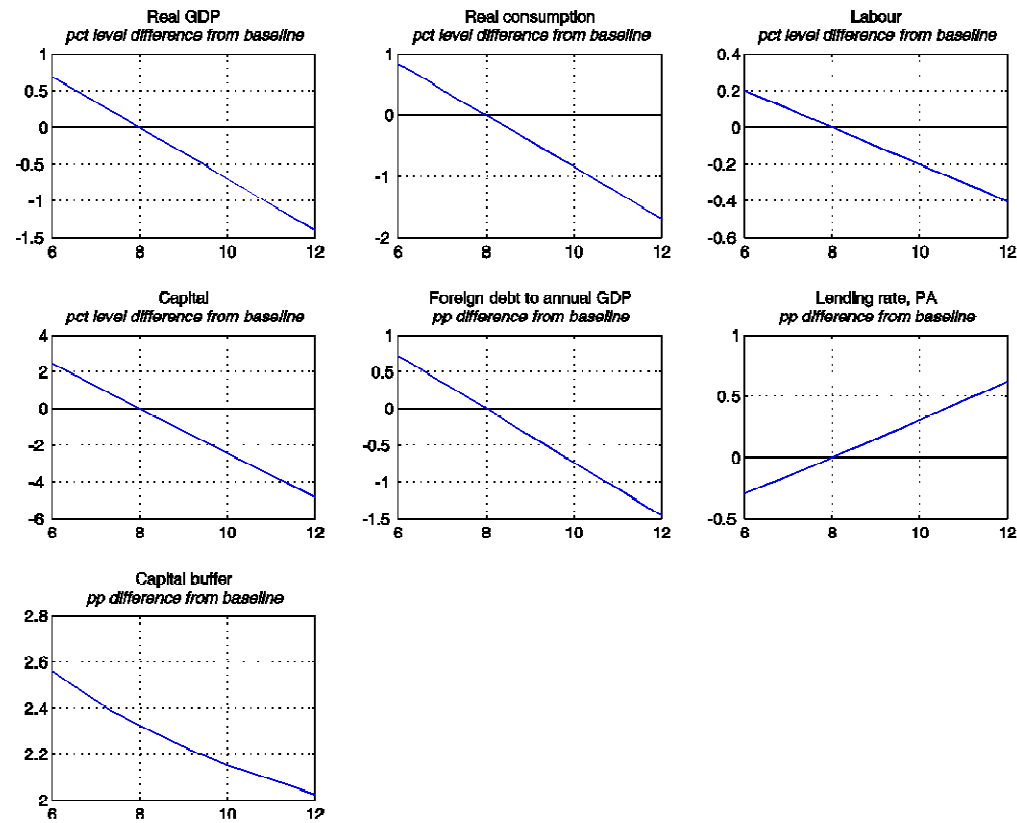


Ex Bank Capital (BKV model)

- Macro-prudential policy (in the form of capital requirements) has permanent effects on real equilibrium allocations
 - Unlike traditional MP tools
 - Similar to fiscal policy effects through taxation of HH borrowing (Bianchi and Mendoza, 2010)

Ex Changing Capital Requirements (BKV model)

Comparative static for regulatory minimum

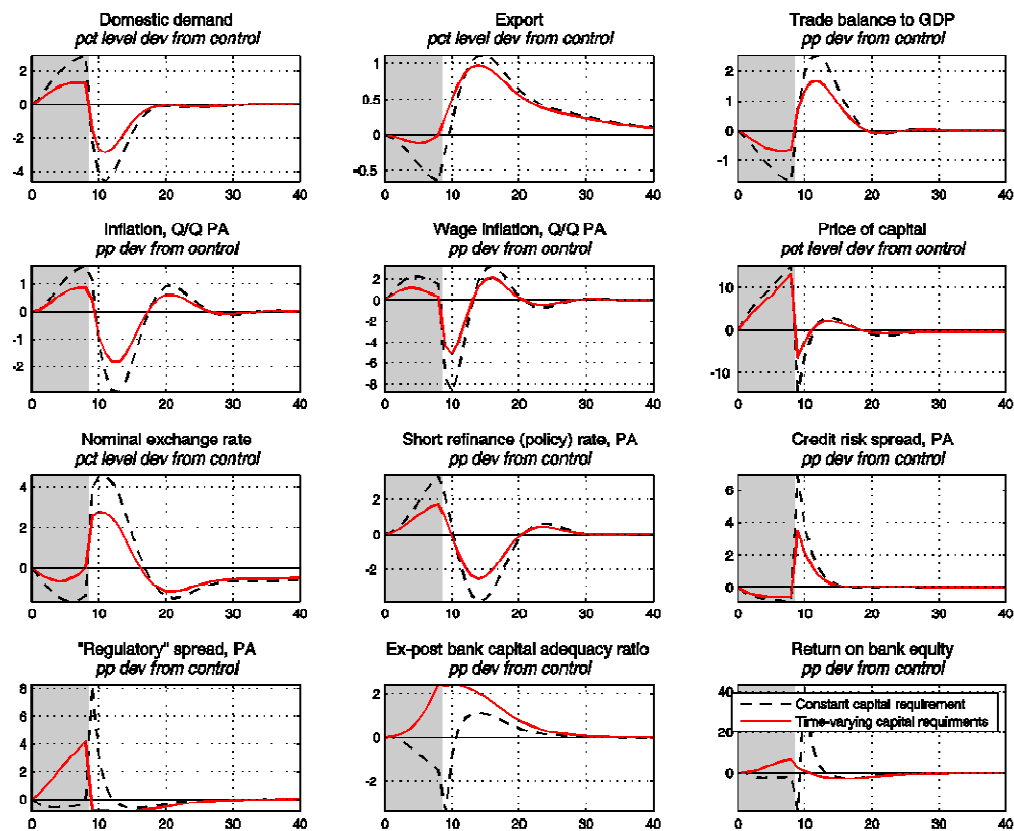


Ex Bank Capital (BKV model)

- Macroprudential regulation entails both costs and benefits
 - reduces output and consumption by increasing the wedge between refinance and lending rates (Estrella, 2004)
 - Creates more financially stable environment by reducing some externalities through limiting the leverages of banks and households

Ex Irrational asset price bubble with time varying capital requirements

Asset price bubble and burst



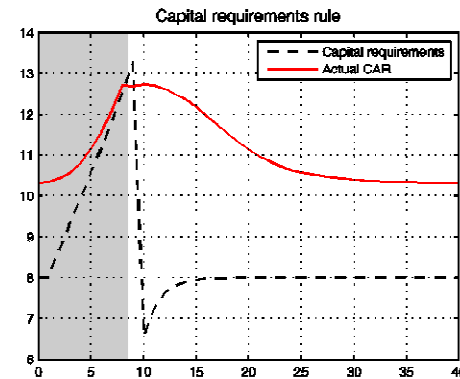
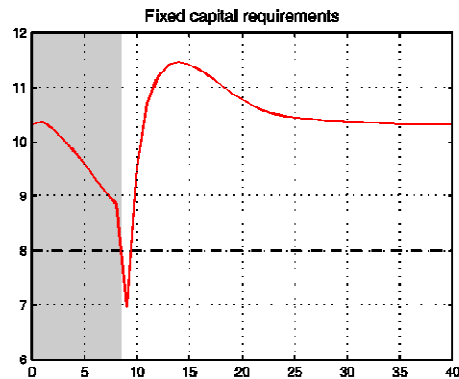
Ex Bank Capital (BKV model)

- Do not support the notion of pro-cyclical prudential policy
 - Linking capital requirements to real activity or targeting stable financial sector indicators (e.g. credits-to-GDP) is a reduced form thinking that links remedies to symptoms rather than the underlying cause of instability
 - Rather we need a measure of systemic (aggregate risk) across the financial sector
 - E.g. we use a lending spread as a measure of the aggregate credit spread and show that it can work more reasonably than a output (cyclical) related rule
 - $\gamma = \bar{\gamma} + \varphi(R_L - R_F - \bar{\Delta})$
 - However, in practice many measures as well as judgment and model based experiments needed – arguably many more than for robust monetary policy making

Ex Irrational asset price bubble with counter-cyclical requirements

Contrast the pro-cyclical requirements (hyphenated) with credit spread requirements

Asset price bubble and burst



Ex BKV Conclusions and Limitations

- Banks accumulate systemic risk during the bubble
 - Consumption, investment and lending increase
 - Borrowing from abroad increases
 - Capital adequacy falls
 - Credit risk spread declines
- Systematic macro-prudential policy can help reduce the build up of the imbalances
- No cross-sectional dimension , only time dimension (a representative bank)
- No liquidity risk
 - Early liquidation costs
- No deposits
 - Input-output, versus output-output story

Main Themes Again

- What is the appropriate degree of coordination of monetary, supervisory and regulatory policies in the decision making?
- The crisis is a bad reason for forgetting the hard won lessons of how to conduct policies enticing credibility
 - Simple targets, discipline in rules, independence in decisions, transparency in actions
- We need to understand more

Thank you

Backup slides

Regulatory measures implemented in emerging market economies

Objective	Tools	Examples
Manage aggregate risk over time (ie procyclicality)	<ul style="list-style-type: none"> • Countercyclical capital buffers linked to credit growth • Countercyclical provisioning • Loan-to-value (LTV) ratios • Direct controls on lending to specific sectors 	<ul style="list-style-type: none"> • China¹ • China, India • China, Hong Kong SAR, Korea, Singapore • Korea, Malaysia, Philippines, Singapore
Manage aggregate risk at every point in time (ie systemic oversight)	<ul style="list-style-type: none"> • Capital surcharges • Liquidity requirements / funding • Limits on currency mismatches • Loan-to-deposits requirements 	<ul style="list-style-type: none"> • China, India, Philippines, Singapore • India, Korea, Philippines, Singapore • India, Malaysia, Philippines • China, Korea

¹ Being considered.

Note that reserve requirements are not included as they are considered an instrument of monetary policy.

Source: ICFR web.