Flexible ITF in Indonesia: Framework, Modeling, and Policy Making

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International Conference on Economic Modeling
Bali, Indonesia, 16-18 July 2014
Agenda

- Why Flexible ITF?
- The New Framework: Monetary and Macroprudential Policy Mix
- Final Remarks
Why Flexible Inflation Targeting (ITF)?

Standard Inflation Targeting Framework (ITF) which solely rely on interest policy to achieve the inflation target is not always effective in many EMDCs. The trade-off to output is also large.

1. Non-monetary factors affecting inflation: volatile foods and administered prices.

2. Interest rate transmission mechanism is not always effective: banking industry microstructure and shallowness of financial market.

3. Financial sector imperfections: asymmetric information, risk taking and moral hazard, procyclical financial behavior, etc.

Standard ITF Model

\[ \pi_t^{CPI} = \lambda_1 \pi_{t-1}^{CPI} + (1 - \lambda_1)E_t \pi_{t+1}^{CPI} + \lambda_2 \hat{y}_t + \lambda_3 \hat{z}_t + e_t^{CPI} \]

Output gap

\[ \hat{y}_t = \beta_1 \hat{y}_{t-1} + \beta_2 \hat{y}_{t+1} - \beta_3 (\hat{r}_t + LCP_t) + \beta_4 \hat{y}^* + \beta_5 \hat{z}_t + e_t^Y \]

UIP

\[ i_t - i^* = E_t DS + prem_t + e_t^{si} \]

Taylor rule

\[ i_t = \gamma_1 i_{t-1} + (1 - \gamma_1)(\bar{r}_t + \pi_{t+1}^{tar} + \gamma_2 (E_t \pi_{t+3}^{CPI} - \pi_{t+3}^{tar})) + \gamma_3 \hat{y}_t + e_t^i \]
Significant impacts of volatile foods and administered prices to inflation require close coordination with the government.

Spillover impacts of global prices to imported inflation need appropriate exchange rate policy.

Importance of inflation expectation in anchoring inflation target necessitate monetary policy communication.

Inflation Expectation

CPI: Core, Foods, Energy

Core Traded and External Factors

*) Indeks komposit harga global dengan weighted average (berdasarkan prosentase impor dan bobot di IHK) dari komoditas pangan (CPO, gandum, gula, jagung dan kedelai), minyak dunia (WTI), emas, kapas, dan besi.
Financial imperfections (asymmetric information, risk taking & moral hazard, financial innovation, etc) cause overshooting financial asset prices, systemic risks, and procyclical financial activities that accentuate “boom” and “burst” in economic and financial cycles...

**Risk Taking Behaviour**

- **Interest Rate**
  - “Bad Creditor”
  - “Good Creditor”

- **Credit Rationing**
  - Loan Supply
  - Loan Demand

**Procyclicality**

- **Upswing ("boom")**
  - Procyclicality
  - Desired economic cycle

- **Downswing ("Burst")**

**Interconnectedness**

- Bank A
- Systemic Risk
- Bank B
- Bank C
- Bank D

**MACROPRUDENTIAL REGULATION AND SUPERVISION**

- Focus on mitigating systemic risk of SIFIs (systemically important financial institutions), not their individual financial soundness.
- And managing procyclicality (and sectoral and spatial distribution) of financial intermediations, not individual bank lending.
- Financial sector deepening in EMDCs plays key role in addressing imperfections.
**Financial Imperfections: Cases and Policy Implications**

*Monetary and macroprudential policy mix is needed to address a number of factors causing financial imperfections...*

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<tr>
<th>FACTORS</th>
<th>CASES</th>
<th>POLICY IMPLICATIONS</th>
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<tbody>
<tr>
<td><strong>1. Risk premia due to asymmetric information</strong> (Stiglitz)</td>
<td>• Credit rationing and interest rate rigidity</td>
<td>• Monetary policy through interest rate alone will not be effective. Direct measures to bank lending is needed.</td>
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<td>• Importance of credit risk in financial system stability</td>
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<td><strong>2. Net worth and external risk premium</strong> (Bernanke, Gertler, Gilchrist, 1999)</td>
<td>• Volume, interest rate, and credit risk premium are determined by the net worth of debtors.</td>
<td>• Financial accelerator phenomenon causes procyclicality and acceleration (boom, burst) of credit in the economy.</td>
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<td>• The need for counter-cyclical policy measures in maintaining monetary and financial stability</td>
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<td><strong>3. Moral hazard, bank capital, and agency cost</strong> (Holmstrom &amp; Tirole, 1997; Meh &amp; Moran, 2004)</td>
<td>• Financial acceleration due to moral hazard/agency problem in both bank lending and deposits.</td>
<td>• The need for own financing (down-payment or guarantee) in loan agreement → basis for LTV</td>
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<td>• The need for regulation on bank capital and → basis for regulation on capital buffer and liquidity requirement.</td>
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<td><strong>4. Exchange rate and balance sheet channel</strong> (Cespedes et al, 2004; Devereux et al, 2004)</td>
<td>• Procyclicality risk premium in offshore borrowing and portfolio investment causing exchange rate overshooting and corporate balance sheet</td>
<td>• Exchange rate policy for managing its flexibility (“fear of floating”)</td>
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<td>• The need for capital flow management and prudential measures on offshore borrowing.</td>
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<td><strong>5. Monopolistic competition in financial market</strong> (Gerali et al, 2008)</td>
<td>• Deviation of bank interest rate to market rate due to product differentiation. Deviation is increasing the stronger the market share of the bank.</td>
<td>• Financial acceleration happens because of bank enlarge its profit margin in time of financial distress by increasing the interest rate and loan collateral. Credit and investment decline much larger.</td>
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<td>• The need for transparency and fair competition in bank lending and other activities.</td>
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Financial Imperfections: Case in Indonesia

- Large spread of deposit and lending rate causing interest rigidity in monetary policy transmission.
- Large volatility of capital flows causing exchange rate overshooting which necessitate capital flows management (eg month holding on CB certificates) in addition to symmetric FX intervention.
- Procyclicality of bank lending requires macroprudential measures (eg LTV, capital buffers) to manage bank lending to support monetary and financial stability.

**Credit, Deposits, and BI Rate**

- Large spread of deposit and lending rate: Credit rate - Depo 1M rate spread: 449 bps

**Portfolio Flows & IDR Exchange Rate**

**Procyclicality of Bank Lending**

- Credit growth (% YoY)
- GDP growth (% YoY)
Agenda

- Why Flexible ITF?
- The New Framework: Monetary and Macroprudential Policy Mix
- Final Remarks
Flexible ITF: Monetary and Macroprudential Policy Mix

- The standard ITF still form the basis for the flexible ITF using monetary and macroprudential policy mix. Interest rate response complemented by exchange rate policy, capital flow management, macroprudential policy, and policy coordination and communication.
- Trying to make possible the impossible policy trilema: price stability for sustainable growth, exchange rate stability and capital flows, and financial system stability.

Strategy: Monetary and Macroprudential Policy Mix

1. Interest rate policy:
   - BI Rate
   - Corridor and term structure
2. Exchange rate policy
   - Consistent with “fundamental”
   - Smooth out short-term volatility
3. Capital flows management
   - Managing ST capital flow volatility to support exchange rate policy
4. Macroprudential policy
   - Managing procyclicality of bank lending to support interest rate policy
5. Policy coordination and communication
   - Communication to anchor inflation expectation
   - Coordination in addressing volatile foods and administered prices
Monetary and macroprudential policy mix reinforces the effectiveness of all channels of monetary policy transmission mechanism: interest rate, exchange rate, money, credit, and expectation.
Interest rate and Exchange rate policy

- **Interest rate policy:**
  - As in the standard ITF, the BI Rate is determined to anchor inflation forecast going forward to fall with the inflation target.
  - The interest rate corridor for deposit and lending facilities from the central bank is determined upon condition of the banking liquidity.

- **Exchange rate policy:**
  - Exchange rate policy is geared toward managing exchange rate stability along the path that is consistent with fundamental and macroeconomic forecasting and policy analysis.
  - Symmetric FX intervention to smooth out short-term exchange rate volatility and mitigate market disruption.
  - Adequate FX reserve is important to support the exchange rate policy and for self-insurance against disruptive capital flow volatility.
  - Capital flows management to short-term and volatile flows for supporting exchange rate policy and manage risks to monetary and financial stability.
Managing Capital Flows: Guiding Principles

- Macroprudential measures on capital flows as an integral part of overall policy mix. They are not stand alone policy.
- Operationally, the implementation of macroprudential measures on capital flows to be guided by the following principles:
  
  1. **Adherence to free foreign exchange system.** Prefer macroprudential measures as compared to capital control.
  2. **Welcome capital inflows.** Prefer capital inflows that are medium-longer term maturity and benefits for financing the real economic activities.
  3. **Limit the short-term and volatile capital inflows.** Macroprudential measures are well targeted to this type of inflows and enhance risk mitigation against their sudden reversals.
  4. **Effective implementation.** Prefer macroprudential measures that can be effectively monitored and supervised.
  5. **Clear communication.** Continuous communication, often in advance, to the market and public of the principles, objectives and modalities of the measures.

- Examples in Indonesia: (1) Months holding period for central bank bills (SBI), and (2) Short-term offshore borrowing of the banks to a maximum of 30% capital.
A number of macroprudential policy can be used to support monetary and financial system stability in accordance to the emerging risks and transmission channels ...

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<th>Envisaged macro-prudential tool</th>
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<td>• Capital ratio</td>
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<td>Lending contract</td>
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<td>• Debt service/income cap</td>
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<td>Liquidity or market risk</td>
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Sumber: Banque d France, 2011
Procyclicality of bank lending is measured through optimal lending model based on a concept of “Non-Accelerated Inflation Rate of Credit Growth”...

- Optimal lending: bank lending growth that is consistent with potential output so that it does not give rise to inflation pressures.
- Measured in total, loan types (consumption, working capital or investment), and economic sectors. As total, lending growth of 15-17% is consistent with 5.3% economic growth and inflation target of 4.5%±1% in 2014. As per economic sectors, they differs according to potential output.
**Macroprudential policy in Indonesia – Loan to Value Ratio**


- **Policy objective**: To manage (excessive) lending to property sector in accordance to sustainable long-term economic growth (including to address current account deficit), mitigate property price bubbles, and help in supporting monetary and financial system stability.

- **Key measures**: LTV progressive on mortgage lending to housing and apartment

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*Note:* for islamic financing, only for murabahah and istishna agreement

LP = Loan Facility; FP = Financing Facility

- **Policy impacts**
  - Mortgage lending decline substantially following the enforcement of progressive LTV
  - Number of debtors with mortgages for more than 1 housing/apartment decline
  - Loan quality can be maintained.
Why Flexible ITF?

The New Framework: Monetary and Macroprudential Policy Mix


Final Remarks
Forecasting and Policy Analysis System (FPAS) in Bank Indonesia involves a number of models: a DSGE type ARIMBI as the core model, complemented by a number of small-scale macroeconomic structural models (SOFIE and BoP) and medium-term MODBI large macroeconomic structural model.
Key Behavioural Equations in ARIMBI:

1. **IS – Output Gap:**
   \[
   \hat{y}_t = \beta_1 \hat{y}_{t-1} + \beta_2 \hat{y}_{t+1} - \beta_3 \hat{p}_t + \beta_4 \hat{y}_t^* + \beta_5 \hat{z}_t + \beta_6 d\text{cr}_t + e_t^y
   \]

2. **Phillips Curve (NKPC):**
   \[
   \pi_t^{\text{net}} = \lambda_1 \pi_{t-1}^{\text{net}} + (1 - \lambda_1)E_t \pi_{t+1}^{\text{net}} + \lambda_3 \hat{y}_t + \lambda_4 \hat{z}_t + e_t^{\pi^{\text{net}}}
   \]
   \[
   \pi_t^{\text{CPI}} = w^{\text{adm}} \pi_t^{\text{adm}} + (1 - w^{\text{adm}}) \pi_t^{\text{net}} + e_t^{\pi^{\text{CPI}}}
   \]

3. **Inflation CPI:**
   \[
   i_t - i_t^* = E_t DS_t + \text{prem}_t + e_t^s
   \]

4. **Uncovered Interest Parity:**
   \[
   \Delta \text{cr}_t = \delta_1 \Delta \text{cr}_{t-1} + (1 - \delta_1)(-\delta_2 \hat{p}_t - \delta_3 \text{spread}_t + \delta_4 \hat{y}_t + \delta_5 \text{ltv}_t - \delta_6 \text{gwm}_t) + e_t^{\Delta \text{cr}}
   \]

5. **Credit growth gap:**
   \[
   \text{def}_t = \theta_1 \text{def}_{t-1} + (1 - \theta_1)(\theta_2 \text{spread}_t + \theta_3 \text{cr}_t - \theta_4 \hat{y}_t) + e_t^{\text{def}}
   \]

6. **Default Risk gap:**
   \[
   \text{spread}_t = \nu_1 \text{spread}_{t-1} + (1 - \nu_1) \nu_2 \text{def}_t + e_t^{\text{spread}}
   \]

7. **Spread Gap:**
   \[
   i_t = \gamma_1 i_{t-1} + (1 - \gamma_1)(\overline{i}_t + \gamma_2 \hat{\pi}_t^{\text{CPI}} + \gamma_3 \hat{y}_t) + e_t^i
   \]

8. **Monetary Policy – Taylor Rule:**
   \[
   \text{ltv}_t = \mu_1 \text{ltv}_{t-1} + (1 - \mu_1)(-\mu_2 \text{cr}_t + \mu_3 \text{gwm}_t) + e_t^{\text{ltv}}
   \]

9. **LTV Rule:**
   \[
   \text{gwm}_t = \kappa_1 \text{gwm}_{t-1} + (1 - \kappa_1) \kappa_2 \text{cr}_t + e_t^{\text{gwm}}
   \]

10. **RR (GWM) Rule:**
FPAS in Bank Indonesia: Role of FPAS models

Model Structure of ARIMBI

[Diagram of ARIMBI model structure with various nodes and arrows indicating relationships between financial and economic indicators, including inflation gap, inflation target, expected inflation, credibility, interest rate (Taylor Rule), output gap, inflation (NKPC), lag interest rate, nominal exchange rate, real exchange rate, foreign interest rate, and financial block.]
FPAS in Bank Indonesia: Role of FPAS models

Financial Block in ARIMBI:

Note:
- variable relationship
- financial block equations
- implicit relationship (not modelled explicitly)
- implicitity variable
Financial Accelerator Mechanism in ARIMBI:
FPAS in Bank Indonesia: Business Process

A comprehensive FPAS and policy making is run every quarter for quarterly Board Meeting. Monthly board meeting is based on the core model of ARIMBI...

### FPAS and Policy Making Process

1. **Start**
2. **Data & Information Collection**
3. **Near Term Projection dan Analysis**
4. **State of The economy Meeting, Assumption, Initial Value**
5. **Running Core Model (1st Round)**
6. **Running Satellite Model (1st Round)**
7. **Projection & Policy Analysis Meeting**
8. **Running Core Model (2nd Round)**

### Pre-Board of Governors Meeting

- Board of Governors members, executive directors
The implementation of standard Inflation Targeting Framework (ITF) which rely only on interest rate response in Indonesia since 2001 has not always been effective. In addition to non-monetary factors affecting CPI inflation, financial imperfections make a number of limitations to smooth functioning of interest rate transmission.

Since 2010 Bank Indonesia implements Flexible ITF based on “A New Approach to Monetary and Macropreditential Policy Mix” to strike the optimality of five policy instruments: interest rate, exchange rate, capital flows management, macroprudential measures, and policy communication and coordination.

The new framework employs a Forecasting and Policy Analysis System (FPAS) based on the most modern and advanced modeling techniques, supported by comprehensive surveys, data, anecdotal information, discussions and judgment in a consistent business process of policy making.

Implementation of the new framework in Indonesia since 2010 has been successful in withstanding the spillover impacts of global crisis. Overall, the monetary and financial stability have been maintained in supporting the Indonesian economic resilience.
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