Raising the Inflation Target: How Much Extra Room Does It Really Give?

Jean-Paul L’Huillier
Raphael Schoenle

2022 ASSA Meeting
January 7-9, 2022
Motivation: Lack of room for monetary policy

Our question:

If raise the target to get extra room:
What are the constraints faced by the policy maker?

Not only theory: we quantify these constraints

How much more policy room does one really get?
- Some, but less than intended
- Reason: Private sector will react to policy
  Thus: target needs to be raised by more
Firms adjust prices more frequently

- Old idea: Ball, Mankiw & Romer (1988)
  higher trend inflation $\implies$ increased price flexibility
- We present new empirical evidence

Phillips Curve steepens + Potency of monetary policy ↓

Key implication:
Need to adjust nominal rate by more in recessions
1. Evidence on relation between target and frequency, U.S.

2. Because of potency loss:

\[ \text{effective extra room} < \text{intended extra room} \]

Raising from 2 to 4%: only 0.51 to 1.60 pp. eff. extra room
To effectively get more room, need to increase target by more

3. Higher optimal target
Effective extra room is substantially smaller than intended room
EMPIRICS
Positive relation between inflation and frequency:
High vs low-inflation-target period
Monthli Frequency and Inflation Target Measures, Over Time

Positive relation between target and frequency
Monthly Frequency and Inflation Target Measures, Scatter Plot

Slope approximately 1
Estimated equation: \( freq_t = \beta_0 + \beta_1 \pi_t + \epsilon_t \)

**Table: Frequency of Price Changes and Inflation Target**

<table>
<thead>
<tr>
<th></th>
<th>(I)</th>
<th>(II)</th>
<th>(III)</th>
<th>(IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target ( \pi_t )</td>
<td>1.61***</td>
<td>0.98***</td>
<td>1.04***</td>
<td>2.26***</td>
</tr>
<tr>
<td></td>
<td>(0.21)</td>
<td>(0.09)</td>
<td>(0.11)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>constant</td>
<td>4.61***</td>
<td>7.42***</td>
<td>7.26***</td>
<td>5.25***</td>
</tr>
<tr>
<td></td>
<td>(0.84)</td>
<td>(0.36)</td>
<td>(0.42)</td>
<td>(0.87)</td>
</tr>
<tr>
<td>( N )</td>
<td>28</td>
<td>27</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>68%</td>
<td>83%</td>
<td>78%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Data means:

<table>
<thead>
<tr>
<th></th>
<th>( \pi_t )</th>
<th>( freq_t )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.42</td>
<td>10.69</td>
</tr>
<tr>
<td></td>
<td>4.04</td>
<td>10.75</td>
</tr>
<tr>
<td></td>
<td>3.90</td>
<td>10.69</td>
</tr>
<tr>
<td></td>
<td>2.85</td>
<td>10.80</td>
</tr>
</tbody>
</table>

**Notes:** *** denotes significant at the 1% level.

(I) Fuhrer and Olivei, (II) Ireland, (III) Milani, (IV) Cogley and Sbordone.
Simple NK Model

- NK model with trend inflation
- Perfect indexation $\implies$ cancels effect of trend inflation
  Phillips curve (PC) is standard (Ascari 2004)
- Output gap shocks
Increased Price Flexibility: Calvo Parameter $\theta$

▶ **Assumption:** prices more flexible the higher the target:

$$\frac{\partial \theta}{\partial \pi} < 0$$

▶ Slope of PC: $\kappa(\theta) \in [0, \infty)$ (decreasing function)

▶ Thus: $\kappa$ increasing function of $\pi$

▶ Here: theoretical

   Later: empirical relationship

   (Also extension where disciplined by menu cost model)
Thought Experiment

- Consider 2 economies, economy 1 and economy 2, s.t.

\[ \bar{\pi}_2 > \bar{\pi}_1 \]

- Thus, \( \bar{i}_2 > \bar{i}_1 \) and \( \kappa_2 > \kappa_1 \)

- Consider shock that brings the rate to 0 in economy 1. Denote it \( \eta^0 \).

RESULT: \[ \eta^0 = -\frac{1+\phi\kappa_1}{\phi\kappa_1} \bar{i}_1 \]

- Now, suppose \( \eta^0 \) hits economy 2.

**Question:** By how much does \( i_2 \) move? And what is the remaining *effective* room away from 0?
Main Result: Formula for Effective Extra Room

Theorem
Consider the shock \( \eta^0 \). Then, the effective extra policy room is given by

\[
R^{\text{eff}}(\eta^0) = \Delta \pi + \Delta \mathcal{P} \cdot |\eta^0|
\]

where \( \Delta \mathcal{P} \) is the loss of potency of monetary policy, equal to

\[
\Delta \mathcal{P} = -\frac{\phi(\kappa_2 - \kappa_1)}{(1 + \phi \kappa_1)(1 + \phi \kappa_2)} < 0
\]

Proof proceeds by simple algebra

Notice: \( R^{\text{eff}}(\eta^0) < \Delta \pi \)
The Formula: Quantitative Insights

\[ R^{\text{eff}}(\eta^0) = \Delta \pi + \Delta \Psi \cdot |\eta^0| \]

- According to formula, difference \( R^{\text{eff}}(\eta^0) - \Delta \pi \) depends on
  
  \textit{change in potency} \times \textit{size of shock}

- The second term is large

- Thus: \( R^{\text{eff}}(\eta^0) - \Delta \pi \) relevant if \( \Delta \Psi < 0 \)
  
  (not relevant if \( \Delta \Psi \) is zero or negligible)
QUANTITATIVE MODELS

How much *effective* extra room?
Models

1. Simple NK (simple interest rate rule)

2. Standard NK (Taylor rule)


Effective and Intended Extra Room, NK Models

Effective extra room is substantially smaller than intended room
2. Using a Medium-Scale Menu Cost Model (Similar to Dotsey et al. 1999)

Quantitatively similar gain in effective extra room
Lower $r^*$ increases ZLB risk. Also, increased price flexibility increases the cost of ZLB.
Takeaways

1. Higher inflation target $\implies$ increased price flexibility

2. $\mathcal{R}^{\text{eff}} (\eta^0) < \Delta \pi$

3. Policy:
   
   “Do not raise it, or, if you raise it, make sure you raise it enough.”
EXTRA
Effective and Intended Room, Argentina Data from Alvarez, Beraja et al. (2018)