Has Monetary Policy Become More Efficient?
A Cross-Country Analysis

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Motivation

- Over the past two decades, macroeconomic performance has improved in both industrialized and developing countries.

- Inflation and output volatility have fallen
  - On average
  - For most countries
Figure 1: Change in inflation and output variability (83-90 vs. 91-98)

Inflation variability is measured as the squared deviation from a 2% target level (x 10,000)

Output variability is measured as the squared deviation from an H-P trend (x 10,000)
Central Question

- Which factors lie behind the changes in macroeconomic performance?
  - What has been the role of central banks in accounting for better performance?
  - Are the observed changes mostly the result of the world becoming a more stable place?

- We develop a method for measuring changes in performance and allocate their source to the two factors above.
Outline of the Presentation

1. Measuring the Sources of Macroeconomic Performance Changes.
2. Estimating the Efficiency Frontier.
3. Results and Updates.
Measuring the Sources of Performance Changes

- We use an *efficiency frontier* (Taylor, 1979) for monetary policy

  - Consider an economy that is affected by two general types of disturbances that require policy responses:
    - aggregate demand shocks
    - aggregate supply shocks

  - **Optimal policy**: Neutralizes demand shocks while faces a trade-off when confronted with supply shocks.

  - This trade-off traces a minimum variability locus between inflation and output.
Figure 2: Efficiency frontier and performance point
Measuring the Sources of Performance Changes

- We assume policymakers minimize:

\[
\text{Loss} = \lambda \text{var}(\pi) + (1 - \lambda) \text{var}(y), \quad 0 \leq \lambda \leq 1
\]

and define the following measures:

- Macro performance change ($\Delta P$):

\[
P_i = \lambda \text{var}(\pi_i) + (1 - \lambda) \text{var}(y_i), \quad \Delta P = P_1 - P_2,
\]

which can be decomposed into changes in the variability of supply shocks ($\Delta S$) and policy inefficiency ($\Delta E$):
Measuring the Sources of Performance Changes

\[ S_i = \lambda \var{\pi_i}^* + (1 - \lambda) \var{y_i}^*, \quad \Delta S = S_2 - S_1, \]

where \textquotedblleft*\textquotedblright\ stands for variances under optimal policy,

\[ E_i = \lambda [\var{\pi_i} - \var{\pi_i}^*] + (1 - \lambda) [\var{y_i} - \var{y_i}^*], \]

\[ \Delta E = E_1 - E_2. \]

- We can compute the proportion of the change in macro performance accounted by better policy:

\[ Q = \frac{\Delta E}{|\Delta P|} \]

\[ Q > 0 \implies \text{policy more efficient} \]

\[ Q < 0 \implies \text{policy less efficient} \]
Figure 3: Derivation of the Optimal Variances

Optimal Variances $[\text{Var}(\pi)^*, \text{Var}(y)^*]$
Estimating the Efficiency Frontier

- To estimate the efficiency frontier we solve a control problem in which a path for the interest rate is chosen to minimize the loss, subject to the dynamics of the economy.
- The frontier is traced out by solving the problem for different values of $\lambda$.
- The first step is to estimate the dynamic structure of the economies we consider.
Estimating the Efficiency Frontier

- The efficiency frontier is obtained using the estimated dynamic structure of the economy. We then compute estimates of the measures of interest.

- We consider plausible values of $\lambda$ (=0.3 for high-inflation countries; =0.8 all others).

- Robustness of results to this choice is shown.

- We use the bootstrap method to obtain an empirical distribution of the measures and:
  - Median bias-correct the estimates.
  - Assess the precision of our estimates.
Results

- 21 out of 24 countries experienced macro performance gains.

- More efficient policy or a calmer world?
  - Again, in 21 out of 24 countries policy efficiency improved.
  - In all countries with macro performance gain, better policy accounted for over 80% of such gain (except for Switzerland).
  - For 6 countries, better policy more than offset a higher variability of supply shocks.
Figure 4: Changes in Performance due to Policy

Performance Gain (in %)

Australia  Austria  Belgium  Canada  Chile  Denmark  Finland  France  Germany  Greece  Ireland  Israel  Italy  Japan  Korea  Mexico  Netherlands  New Zealand  Portugal  Spain  Sweden  Switzerland  UK  USA

Performance gain due to policy  Total performance gain
New Results

- Comparing macro performance for Denmark, Sweden and the U.K. between 91-98 and 99-06

- Further performance improvement for all three countries
  - ~25% performance improvement for Denmark (about 80% due to policy)
  - ~75% performance improvement for Sweden (almost 100% due to policy)
  - ~90% performance improvement for the U.K. (about 90% due to policy)
<table>
<thead>
<tr>
<th>Country</th>
<th>Measure</th>
<th>Preference for Inflation Stability (lambda)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>0.7</td>
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<tr>
<td>Denmark</td>
<td>Macroeconomic Performance Change</td>
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<td></td>
<td>[47.3%]</td>
<td>[27.1%]</td>
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<td>Monetary Policy contribution</td>
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<td>[92.3%]</td>
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<td>Sweden</td>
<td>Macroeconomic Performance Change</td>
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<td>[77.6%]</td>
<td>[76.3%]</td>
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<td>United Kingdom</td>
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<td>Monetary Policy contribution</td>
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<td>[91.6%]</td>
<td>[91.5%]</td>
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</tbody>
</table>
Accounting for the Changes

■ Some possible explanations.
  ➢ CB independence? Not clear.
  ➢ Shift towards inflation targeting regimes?
  ➢ Improvement in the transmission mechanisms?
Conclusions

- We propose a general methodology for analyzing changes in macroeconomic performance and its sources.

- In 21 of the 24 countries studied, macro performance increased in the 1990s relative to the 1980s. Monetary policy efficiency increased in the same number of countries.

- *Monetary policy efficiency* has been the driving force behind improved macroeconomic performance.