Operational Independence, Inflation Targeting and Bank of England’s Monetary Policy Stance

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Plan of talk

1. motivation

2. background
   - institutional framework
   - optimal monetary policy

3. approach and results
   - underlying theory
   - empirical findings

4. conclusions
Motivation

• UK as a particular country case
  – inflation targeting since 1992
  – operational independence since 1997
• what could be learnt from it about monetary policy?
  – does greater independence affect central bank behavior already in a regime of inflation targeting, and how?
  – or a researcher cannot disentangle the effects of operational independence from those of the business cycle?
• impartial approach
  – estimating forward-looking Taylor rules via GMM (Clarida-Galí-Gertler)
  – after modelling rational expectations by the errors-in-variables technique
UK institutional framework

• recent history: mostly *exogenous* ‘changes in regime’
  – Oct 1990: **ERM** membership
  – Sep-Oct 1992: ERM suspended - move to **inflation targeting**
  – Jun 1995: target inflation reformulated from *band* 1-4% p.a. to **point** 2.5%
  – May-Jun 1997: BoE granted **operational independence** from HMT - point target to become *symmetrical* = equal weight below and above target
  – Dec 2003: target inflation **lowered** from 2.5% to 2% p.a. and to be expressed in terms of HICP, renamed **CPI** (*RPIX*, since 1992; RPI before)

• current policy
  – **goal**: *price stability* = 2% p.a. inflation (on average) => sustainable growth of output and employment
  – **instrument**: BoE can choose the *interest rate* at which it supplies liquidity in the money market => financial sector and real economy (AD < > AS)
Optimal monetary policy

- **discretionary vs systematic** monetary policy: recent convergence to *rule-based* policy making
  - targeting rules – e.g., (flexible) inflation targeting – *optimal* (in NK-NNS models)
  - interest rate rules – e.g., Taylor(-type) rules – *suboptimal* (second-best) but less informationally demanding \(\Rightarrow\) useful as *approximation*
  - other rules – e.g., money supply rules (monetarism), exchange rate rules (gold standard) – too *rigid*

- origins and evolution of **Taylor(-type) rules**
  - Wicksell (1998, 1907), Goodhart (1992): able to stabilize the price index
  - Taylor (1993): *positive* description and *normative* prescription of policy
  - generalized Taylor(-type) rules: *backward-looking* (history-dependent), *forward-looking* (rational-expectations), interest rate smoothing, hybrid,…
Data and preliminary tests

- **raw data**
  - sources: ONS, BoE
  - frequency: quarterly
- **variable proxies**
  - SRNIR = 3mTBillR: proxy for repo rate (and 3 older operating instruments)
  - inflation = annual % change in RPI or RPIX
  - output gap = quadratic or Hodrick-Prescott detrending
- **preliminary tests**
  - seasonality: Census X12
  - stationarity: ADF, PP, KPPS, 4 alternative specifications each
- **data set types**
  - ‘final’ = RPI (sa) + 3mTBillR (sa) + final real GDP
  - ‘real-time’ = RPIX (nsa) + 3mTBillR (nsa) + real-time real GDP
- **2 subsamples**
Economics: NK (or NNS) theory

\[
\pi_t = \delta E[\pi_{t+1} | I_t] + \lambda (y_t - \xi_t)
\]

\[
y_t = E[y_{t+1} | I_t] - \frac{1}{\sigma} (i_t - E[\pi_{t+1} | I_t]) + \zeta_t
\]

\[
i_t^T = \beta_{\pi, +1} E[\pi_{t+1} | I_t] + \beta_{x, 0} x_t
\]

\[
i_t = \beta_{i, -1} i_{t-1} + (1 - \beta_{i, -1}) i_t^T
\]
Policy: central bank practice

\[ i_t^T = i^T + \beta_{\pi,+k} \left( E\left[ \pi_{t+k} \mid I_t \right] - \pi^T \right) + \beta_{x,+q} E\left[ x_{t+q} \mid I_t \right] \]

\[ i_t = \beta_i(L)i_{t-1} + \left( 1 - \beta_{i,-1} \right)i_t^T + \nu_t \]

\[ \beta_i(L) \equiv \beta_{i,-1}L^0 + \beta_{i,-2}L^1 + \ldots + \beta_{i,-n}L^{n-1} \quad \beta_{i,-1} \in [0,1) \]
Econometrics: GMM estimation

\[ i_t = \beta_i (L) i_{t-1} + (1 - \beta_{i,-1}) \left[ i^T + \beta_{\pi,+k} \left( E[\pi_{t+k} | I_t] - \pi^T \right) + \beta_{x,+q} E[x_{t+q} | I_t] \right] + \nu_t \]

\[ i_t = (1 - \beta_{i,-1}) \beta_{0,+k} + (1 - \beta_{i,-1}) \beta_{\pi,+k} \pi_{t+k} + (1 - \beta_{i,-1}) \beta_{x,+q} x_{t+q} + \beta_{i,-1} i_{t-1} + \varepsilon_t \]

\[ \varepsilon_t \equiv -(1 - \beta_{i,-1}) \left\{ \beta_{\pi,+k} \left( \pi_{t+k} - E[\pi_{t+k} | I_t] \right) + \beta_{x,+q} \left( x_{t+q} - E[x_{t+q} | I_t] \right) \right\} + \nu_t \]

\[ E \left[ \left\{ i_t - (1 - \beta_{i,-1}) \left( \beta_{0,+k} + \beta_{\pi,+k} \pi_{t+k} + \beta_{x,+k} x_{t+k} \right) - \beta_{i,-1} i_{t-1} \right\} z_t \right] = 0 \]
BoE monetary policy: preview of results

*analysis* in 2 *dimensions* and emphasis on ‘real-time’ data

1. *parameters* of BoE’s *reaction function* (stat, sign, magn)
   - *inflation*: perhaps *weaker* response *post*-independence
   - *interest rate smoothing*: *similar*, though *inconclusive*
   - *output gap*: *considerably stronger* response *post-*
     independence, robust across a number of alternative
     specifications and proxies

2. *stance* of BoE’s monetary *policy* (*<=>* business cycle)
   - rather *contractionary*, especially in 1993
### BoE pre-independence reaction function

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>GDP filter:</td>
<td>Quadratic</td>
<td>Hodrick-Prescott</td>
</tr>
<tr>
<td>( \beta_{0,+2} )</td>
<td>4.58*** (0.38)</td>
<td>3.49*** (0.47)</td>
</tr>
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<td>( \beta_{\pi,+2} )</td>
<td>0.67*** (0.19)</td>
<td>0.81*** (0.14)</td>
</tr>
<tr>
<td>( \beta_{x,0} )</td>
<td>0.63*** (0.05)</td>
<td>0.97*** (0.04)</td>
</tr>
<tr>
<td>( \beta_{r,-1} )</td>
<td>0.56*** (0.03)</td>
<td>0.60*** (0.02)</td>
</tr>
<tr>
<td>Adj R(^2)</td>
<td>0.66</td>
<td>0.68</td>
</tr>
<tr>
<td>OvId p-v</td>
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<td>$\beta_{0,+2}$</td>
<td>4.75*** (0.27)</td>
<td>4.52*** (0.26)</td>
</tr>
<tr>
<td>$\beta_{\pi,+2}$</td>
<td>0.50*** (0.16)</td>
<td>0.50 (0.29)</td>
</tr>
<tr>
<td>$\beta_{x,0}$</td>
<td>1.79*** (0.06)</td>
<td>2.50*** (0.10)</td>
</tr>
<tr>
<td>$\beta_{i,-1}$</td>
<td>0.37*** (0.02)</td>
<td>0.17*** (0.08)</td>
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<tr>
<td>Adj $R^2$</td>
<td>0.86</td>
<td>0.75</td>
</tr>
<tr>
<td>OvId p-v</td>
<td>0.79</td>
<td>0.74</td>
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## Pre-independence descriptive statistics

### 1992:4 – 1997:1

<table>
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<tr>
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<tr>
<td></td>
<td>RPI</td>
<td>RPIX</td>
<td>Fin</td>
<td>RT</td>
</tr>
<tr>
<td>Mean</td>
<td>2.48</td>
<td>2.80</td>
<td>2.92</td>
<td>2.98</td>
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<tr>
<td>Median</td>
<td>2.54</td>
<td>2.81</td>
<td>2.84</td>
<td>2.77</td>
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<tr>
<td>Max</td>
<td>3.60</td>
<td>3.62</td>
<td>4.68</td>
<td>4.97</td>
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<tr>
<td>SD</td>
<td>0.65</td>
<td>0.35</td>
<td>1.03</td>
<td>1.13</td>
</tr>
<tr>
<td>J-B p-v</td>
<td>0.79</td>
<td>0.81</td>
<td>0.94</td>
<td>0.82</td>
</tr>
<tr>
<td># obs</td>
<td>18</td>
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### Post-independence descriptive statistics


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<tr>
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<td>0.40</td>
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<td># obs</td>
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Actual 3-month TBill rate, % p.a.
Real-time vs final (H-P trend) data, %
Real-time vs final (Q-trend) data, %
Conclusions I

• *forward*-looking Taylor (*interest rate*) rules
  – characterize *reasonably well* monetary policy under a *targeting* rule
  – based on *real-time data* provide better description, relative to *final* data, of BoE’s reaction function under inflation targeting
• dominant *stance* of UK monetary policy has been *different*
  – 1 *contractionary* episode *before* operational independence
  – 3 *expansionary* episodes *after* operational independence
• *asymmetric* monetary policy *reaction function*
  – response to output gap *considerably stronger* in *post-*
  – relative to *pre*-independence period
Conclusions II

- overall, evidence
  - that helps *overcome prejudices* against inflation targeting
  - as a rigid ‘rule’ leaving *no room for ‘discretion’*
- *inflation targeting coupled with operational independence* does *not* necessarily generate
  - a *deflationary bias* in monetary policy
  - neither a ‘*benign neglect*’ to the evolution of the business cycle
- **BoE**
  - *a flexible inflation targeter*
  - in line with the *broader objectives* of UK monetary policy
Conclusions III

• **asymmetry** in the feedback function
  – appears *justified*
  – and deserves *credit*

• BoE has **optimally** been **balancing** between
  – the ‘rule’ (inflation targeting)
  – and ‘discretion’ (operational independence)
  – given the delegated institutional objective (the inflation target)
  – and the constraint of the evolving economic environment (the business cycle)

• **operational independence**
  – does *not* seem to matter (much)
  – on *top* of inflation targeting…