Monetary Policy after the Fall from Grace

PhD Conference in Monetary and Financial Economics at UWE

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Kent, Cambridge and Gresham

Kent

29th June 2015
Outline of Arguments

- Monetary policy turned out to be constrained at the zero lower bound leading to rediscovery of the importance of open market operations.
- Fiscal policy helped aggregate demand but also to recapitalise banks i.e. fiscal ‘backstop’ s.t. borrowing constraints.
- Banks are maturity transformers and have insufficient liquidity/capital in the event of risk aversion and may require control via macro-prudential instruments.
- Balance sheet operations expand the size and composition of the central bank balance sheet and reduce the duration of financial markets’ bond holdings and increase liquidity.
- Involve the issuance of short term debt-fiscal instruments (interest rate bearing reserves or T-Bills).
- Monetary-fiscal operations hedge liquidity risk but in the presence of significant sovereign risk - not clear whether operations involve some signalling about path of short rates -
- **Question**: what will the new policy nexus look like?
Policy Rate sufficient statistic to stabilise output and inflation

Asset prices, bank behaviour, debt, gearing all missing - see Chadha (2010)

Zero Lower bound expected 2% of the time, Bean (2003)
The transmission mechanism of monetary policy

- Market rates
- Asset prices
- Expectations/confidence
- Exchange rate
- Domestic demand
- Total demand
- Domestic inflationary pressure
- Inflation
- Import prices
- Net external demand

Note: For simplicity, this figure does not show all interactions between variables, but these can be important.

- Source: MPC 1999 report to the Treasury Committee
- Not a lot about banks, money or asset prices - key element of the MTM.
Are we in the worse state (B) or does the line (AA) continue South West without truncation because of balance sheet policies?
Case Study: The UK Recession

- Consumption and investment fall together - see Chadha and Warren (2012)
Using Wedges to Understand

It is all efficiency and if we simulate a BGG - financial accelerator model - and run a decomposition it is demand or supply?
Asset prices, money and demand can have a life of their own! See Chadha at al. (2010) and feedback to the economy.
Welfare losses are minimised when information from deposits are squeezed out. See Chadha et al. (2013). But more importantly feedback from market interest rates changes the path of Bank Rate.
Fund public expenditures with portfolio mixture of short-long-nominal-real debt.

- Too short - then debt st interest rate risk
- Too long - then debt pays term premium and faces lumpy rollover
- Too nominal - then face real payments uncertainty
- Too real - then face nominal payments uncertainty

⇒ Also offset bank liquidity risk by temporary swap of more illiquid govvies for reserves

Consider optimal allocation of debt. Now increase liquidity risk for private sector. Illiquid asset prices fall and liquid ones rise. Selling reserves and buying illiquid assets offsets the liquidity shock.
Coalition versus New Labour

Note the response to the ‘debt overhang’ after WWII.
### UK and United States: Debt Dynamics after World War II

(Percent of GDP)

<table>
<thead>
<tr>
<th>Period</th>
<th>USA</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interest</td>
<td>Inflation</td>
<td>GDP growth</td>
<td>Primary balance</td>
<td>Residual</td>
<td>Change in Debt</td>
</tr>
<tr>
<td>1946–51</td>
<td>2.02</td>
<td>-6.57</td>
<td>-3.61</td>
<td>-4.01</td>
<td>2.97</td>
<td>-9.2</td>
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<tr>
<td></td>
<td>5.32</td>
<td>-3.78</td>
<td>-1.60</td>
<td>-5.93</td>
<td>-0.73</td>
<td>-6.71</td>
</tr>
<tr>
<td>1951–56</td>
<td>1.67</td>
<td>-0.65</td>
<td>-2.44</td>
<td>-1.73</td>
<td>0.56</td>
<td>-2.58</td>
</tr>
<tr>
<td></td>
<td>4.49</td>
<td>-5.50</td>
<td>-2.61</td>
<td>-3.39</td>
<td>-4.76</td>
<td>-11.77</td>
</tr>
<tr>
<td>1956–61</td>
<td>1.83</td>
<td>-1.13</td>
<td>-1.52</td>
<td>-0.64</td>
<td>-0.4</td>
<td>-1.86</td>
</tr>
<tr>
<td></td>
<td>4.30</td>
<td>-2.80</td>
<td>-2.54</td>
<td>-3.98</td>
<td>-2.00</td>
<td>-7.01</td>
</tr>
<tr>
<td>1946–61</td>
<td>1.84</td>
<td>-2.78</td>
<td>-2.52</td>
<td>-2.13</td>
<td>1.04</td>
<td>-4.55</td>
</tr>
<tr>
<td></td>
<td>4.45</td>
<td>-3.41</td>
<td>-2.19</td>
<td>-4.21</td>
<td>-2.31</td>
<td>-7.67</td>
</tr>
</tbody>
</table>

- Even at low interest rates of 2% under financial repression, debt was halved in 15 years.
- Low interest rates of 2%, nominal GDP growth of 5% and 2% primary surplus will get debt to 60% of GDP in 10 years.
Nordaus (1994): suggests equilibria under co-ordination on the contract curve OR under Nash with higher rates (R) and lower fiscal surplus (S)

Monetary (MD) or Fiscal Dominance (FD) will determine where we lie on
Expansion of balance sheet - showed that it is possible to influence medium term bond rates - underprediction turned into overprediction of bond rates - impact of 20-100bp.
Shocks to net supply of debt may impact on prices (yields) if demand is inelastic, e.g. in bad times (Supply”) vs good times (Supply’)

Price of Long Term Debt may not only reflect risk in CAPM-world.
Stuck in the ZLB

- Bank Rate has got stuck and an important part of plotting a route of the doldrums is a compass.
- Low probability (long duration) of rate change implies different regime.
Moving from 5-year half life to 10-year half life: up to 250bp off 10-year bonds (using standard CIR model). Could reverse of its own accord - if signalling is not smoothed.
Table 4: Potential effects of central bank purchases of Treasuries since November 2008

<table>
<thead>
<tr>
<th>Change</th>
<th>5y forward 10y rate</th>
<th>10y term premium</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Marginal effect (range)</td>
<td>Total effect (range)</td>
</tr>
<tr>
<td>Privately-held debt (% of GDP)</td>
<td>7</td>
<td>1.7</td>
</tr>
<tr>
<td>Average maturity (months)</td>
<td>7</td>
<td>11.6</td>
</tr>
<tr>
<td>Total effect (bps)</td>
<td></td>
<td>93</td>
</tr>
</tbody>
</table>

Notes: Change in the first column refers to changes in privately-held debt which could be attributed to central bank interventions since November 2008. The range is selected by taking the min and max estimated coefficients in Table 1-2 (forward rate) and Table 3 (term premium).

- Quantity and maturity effects on long term rates.

Source: Chadha, Turner and Zampolli (2013)
Future Debt Sales

Source: Chadha, Turner and Zampolli (2013)
VI: DSGE Banking Model with Fiscal and Monetary Co-operation

**Households**
- Aggregate Demand
- Supply of Labour \( n \)
- Supply of Monitoring Work \( m \)

\[ U_t = \sum_{t=0}^{\infty} \beta_t^t \left[ \varphi \log c_t + (1-\varphi) \log (1-m_t - n_t) \right] \]

\( \lambda_t \): Budget Constraint

- Aggregate Demand
- Supply of Labour \( n \)
- Supply of Monitoring Work \( m \)

CIA: Demand Deposits
\[ D_t = c_t + p_t - V_t \]

Cash in Advance

**Production**
- Aggregate Demand
- Supply of Labour \( n \)
- Supply of Monitoring Work \( m \)

\[ y_t^p = K_t^\eta (a_1 n_t)^{1-\eta} \]

- Productivity Shock \( a1 \)
- Monopolistic Competition
- Calvo Pricing

**Banking Sector**
- Aggregate Supply
- Demand for Labour \( n \)

\[ L_t + R_t = D_t \]

- Aggregate Demand
- Supply of Labour \( n \)
- Supply of Monitoring Work \( m \)

**Monetary Policy**

\[ R_{ln}^m = \alpha \beta_1 + \beta_2 m_t + (1-\gamma) R_{l+1}^m \]

Fiscal Policy

\[ g_t = \frac{r^t_i}{p^t_i (1 + R^m_t)} + \frac{r^t_i + B^t_i}{p^t_i (1 + R^m_t)} \]

**Interest Rate**

<table>
<thead>
<tr>
<th>Interest Rate</th>
<th>Description</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R^T )</td>
<td>Benchmark rate</td>
<td>( \delta_t (\lambda_t - \lambda_{t+1}) + \delta_t (\Delta p_{t+1}) )</td>
</tr>
<tr>
<td>( R^B )</td>
<td>Yield on government bonds</td>
<td>( R^T - (\frac{\delta_t}{\sigma_t} \lambda_t - 1) \Omega_t )</td>
</tr>
<tr>
<td>( R^{IB} )</td>
<td>Interbank (and policy) rate</td>
<td>( R^{IB} - \frac{\sigma_t \gamma_t m_t}{(1 - \gamma_t) \lambda_t} )</td>
</tr>
<tr>
<td>( R^L )</td>
<td>Interest rates on loans</td>
<td>( R^{IB} )</td>
</tr>
<tr>
<td>( R^D )</td>
<td>Deposit rate</td>
<td>( R^{IB} (1 - \gamma_t) )</td>
</tr>
</tbody>
</table>
Providing reserves through monetary-fiscal instrument induces more reserves in an upswing and more loans in a downswing by increasing (reducing) rate of return on reserves relative to loans.
Model Results: Collateral Shock with Endogenous/Fractional Reserves

Impulse Responses to Negative Collateral Shock
Simulation of Consumption, Asset Prices, EFP and Reserve-Deposit Ratio

Endogenous Reserves: countercyclicality of reserve/deposit ratio so less gearing and EFP, inflation and asset prices less volatile
The Model

Chadha (Kent)

29th June 2015 25 / 40
Can start to think about the impact of changing e.g. LTVs on activity.

Chadha (Kent)
The Return of the Art of Central Banking.
29th June 2015 26 / 40
### Table 6. Welfare Losses

<table>
<thead>
<tr>
<th>Regime</th>
<th>Loss</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lax Regime</strong></td>
<td></td>
<td>( \lambda = 1, \delta = 0.9, \kappa = 0.9 )</td>
</tr>
<tr>
<td>Benchmark Policy</td>
<td>0.0628</td>
<td></td>
</tr>
<tr>
<td>Monetary Policy</td>
<td>0.0586</td>
<td></td>
</tr>
<tr>
<td>Fiscal Policy</td>
<td>0.0631</td>
<td></td>
</tr>
<tr>
<td><strong>Restrictive Regime</strong></td>
<td>( \lambda = 5, \delta = 0.2, \kappa = 0.4 )</td>
<td></td>
</tr>
<tr>
<td>Benchmark Policy</td>
<td>0.0531</td>
<td></td>
</tr>
<tr>
<td>Monetary Policy</td>
<td>0.0529</td>
<td></td>
</tr>
<tr>
<td>Fiscal Policy</td>
<td>0.0543</td>
<td></td>
</tr>
</tbody>
</table>

\( 1/\lambda \) (loan repayment prob), \( \delta \) (seizable capital), \( \kappa \) (ss LTV ratio)

- Optimising optimal policy in more restrictive regimes seems to lead to better outcomes.
VIII: The Lucas Costs of Business Cycles

\[ U(\bar{c}) = \frac{\bar{c}^{1-\rho}}{1 - \rho} \]

where \( \bar{c} = c + c^b \) and \( \rho \) is the CRRA parameter.

\[ E[U(\bar{c})] \approx \frac{\bar{c}^{1-\rho}}{1 - \rho} - \frac{\rho}{2} \bar{c}^{-\rho-1} \sigma_{\bar{c}}^2 \]

\[ \frac{\rho}{2} \left( \frac{\sigma_{\bar{c}}}{\bar{c}} \right)^2 = \frac{\rho}{2} \frac{\sigma_c^2 + \sigma_{c^b}^2 + 2\sigma_{c,c^b}}{\bar{c}^2} \]

- aggregate business cycle costs are small if covariances are negative
- financial frictions may involve a trade-off between levels and variance
<table>
<thead>
<tr>
<th>Parameters</th>
<th>Capital (%)</th>
<th>Funding Cost (%)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>alpha</td>
<td>sigma</td>
<td>elasticity</td>
<td>0.2</td>
<td>0.4</td>
<td>0.6</td>
<td>0.8</td>
<td>1</td>
</tr>
<tr>
<td>0.3</td>
<td>0.4</td>
<td>-0.171</td>
<td>-0.034</td>
<td>-0.069</td>
<td>-0.103</td>
<td>-0.137</td>
<td>-0.171</td>
</tr>
<tr>
<td>0.3</td>
<td>0.5</td>
<td>-0.214</td>
<td>-0.043</td>
<td>-0.086</td>
<td>-0.129</td>
<td>-0.171</td>
<td>-0.214</td>
</tr>
<tr>
<td>0.3</td>
<td>0.6</td>
<td>-0.257</td>
<td>-0.051</td>
<td>-0.103</td>
<td>-0.154</td>
<td>-0.206</td>
<td>-0.257</td>
</tr>
<tr>
<td>0.4</td>
<td>0.4</td>
<td>-0.267</td>
<td>-0.053</td>
<td>-0.107</td>
<td>-0.160</td>
<td>-0.213</td>
<td>-0.267</td>
</tr>
<tr>
<td>0.4</td>
<td>0.5</td>
<td>-0.333</td>
<td>-0.067</td>
<td>-0.133</td>
<td>-0.200</td>
<td>-0.267</td>
<td>-0.333</td>
</tr>
<tr>
<td>0.4</td>
<td>0.6</td>
<td>-0.400</td>
<td>-0.080</td>
<td>-0.160</td>
<td>-0.240</td>
<td>-0.320</td>
<td>-0.400</td>
</tr>
<tr>
<td>0.5</td>
<td>0.4</td>
<td>-0.400</td>
<td>-0.080</td>
<td>-0.160</td>
<td>-0.240</td>
<td>-0.320</td>
<td>-0.400</td>
</tr>
<tr>
<td>0.5</td>
<td>0.5</td>
<td>-0.500</td>
<td>-0.100</td>
<td>-0.200</td>
<td>-0.300</td>
<td>-0.400</td>
<td>-0.500</td>
</tr>
<tr>
<td>0.5</td>
<td>0.6</td>
<td>-0.600</td>
<td>-0.120</td>
<td>-0.240</td>
<td>-0.360</td>
<td>-0.480</td>
<td>-0.600</td>
</tr>
</tbody>
</table>

- Percentage increase in capital requirement (or funding costs) and impact on output as a function of the elasticity of output with respect to the costs of capital.
- Small permanent impact on GDP.
IX Macroprudential Instruments

- ‘One Club’ monetary policy has not only insufficient to prevent booms and busts but may have played a role in nurturing volatility.
- The newly formed FPC at the BoE has asked for extra instruments countercyclical capital, sectoral capital, leverage ratio and LTIs.
- No liquidity or LTVs, yet...

See Chadha and Corrado (JBus 2012) and Chadha, Corrado and Meaning (BIS WP 66) on welfare and output enhancing role of liquidity because it can reduce the volatility of the external finance premium.

- MPIs are ‘untested and with little evidence’ - no established models or data
- House of Commons Treasury Committee Evidence, see http://www.publications.parliament.uk/pa/cm201213/cmselect/cmtreasy/writev/macropru

- Does the financial sector stabilise or not?

Chadha (Kent)
once we start accounting for risk, we may want to miss inflation targets or find more efficient sets of instruments.
A financial sector with the same preferences may drive the economy to the social optimum.
A destabilising financial sector

But if asset prices, lending and market spreads act to amplify the cycle, we may be in trouble.
A financial sector with different preferences requires strong institutional co-ordination.
The pre-crisis problem

If unchecked may lead to excessive creation of inside money.
Debate in c2006-7 about publishing interest rate forecast

‘Conservative’ view: (i) do not tie future decision-makers hands, (ii) forecasts subject to news and ‘error’, (iii) may prevent private sector views being traded into market prices and (iv) practically difficult to agree on path

‘Transparency’ view: (i) level and path of interest rates matter, so provide more clarity; (ii) produce explicit projections conditional on expected state of economy; (iii) invites alternate views.

Forward Guidance on first change in rates only, although helpful, seems to be somewhere between the former and the latter
Consider complete ‘state contingent-time dependent’ guidance that respects uncertainty

Question whether this would lead to herding
ZLB represented about regime change and we need to avoid precipitous movements that may delay return to normal times.

Forward Guidance - helpful transparency about reaction function - but did it reveal (new) or confirm (explain)?

- we are far from the normal equilibrium and it is uncertain how we will return to neutral;
- the MTM via bond prices is highly sensitive; and
- we may wish to normalise at different speeds to trading partners.

But we do not know the plan for Bank Rate normalisation, what the plans are for the APF and have no quantified measure of the uncertainty in the ‘true’ state in terms of interest rate space.

Complete forward guidance by proving explicit probability density forecasts of Bank Rate.
Concluding Remarks

1. Inflation targeting cannot prevent "boom and bust"
2. Money supply and its counterparties matter and complicates the path and long run level of Bank Rate
3. Financial frictions act through traditional supply and demand side - making capacity judgements very hard
4. Fiscal policy underpins aggregate demand but also supports fragile financial institutions - further restrictions apply.
5. Debt will take 10-15 years to get back to ‘normal’ and demand is inelastic
6. Sensible application of liquidity and capital targets seem likely to reduce business cycle variance albeit at some cost of permanent output
7. Plotting the policy path is considerably more complicated and requires significantly more explanation than we had in the past.


Chadha, J., L. Corrado and S Holly, A Note on Money and the Conduct of Monetary Policy, Macroeconomic Dynamics, In Press. 2014.


Chadha J. and A. Waters, Applying a Macro-Finance Yield Curve to UK Quantitative Easing, Journal of Banking and Finance.