Non-standard monetary policy measures, monetary financing and the price level

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Disclaimer

The views expressed in this presentation are those of the authors and not necessarily those of the ECB or the Eurosystem.

Motivation #1

The financial crisis has led central banks to introduce a variety of non-standard measures:

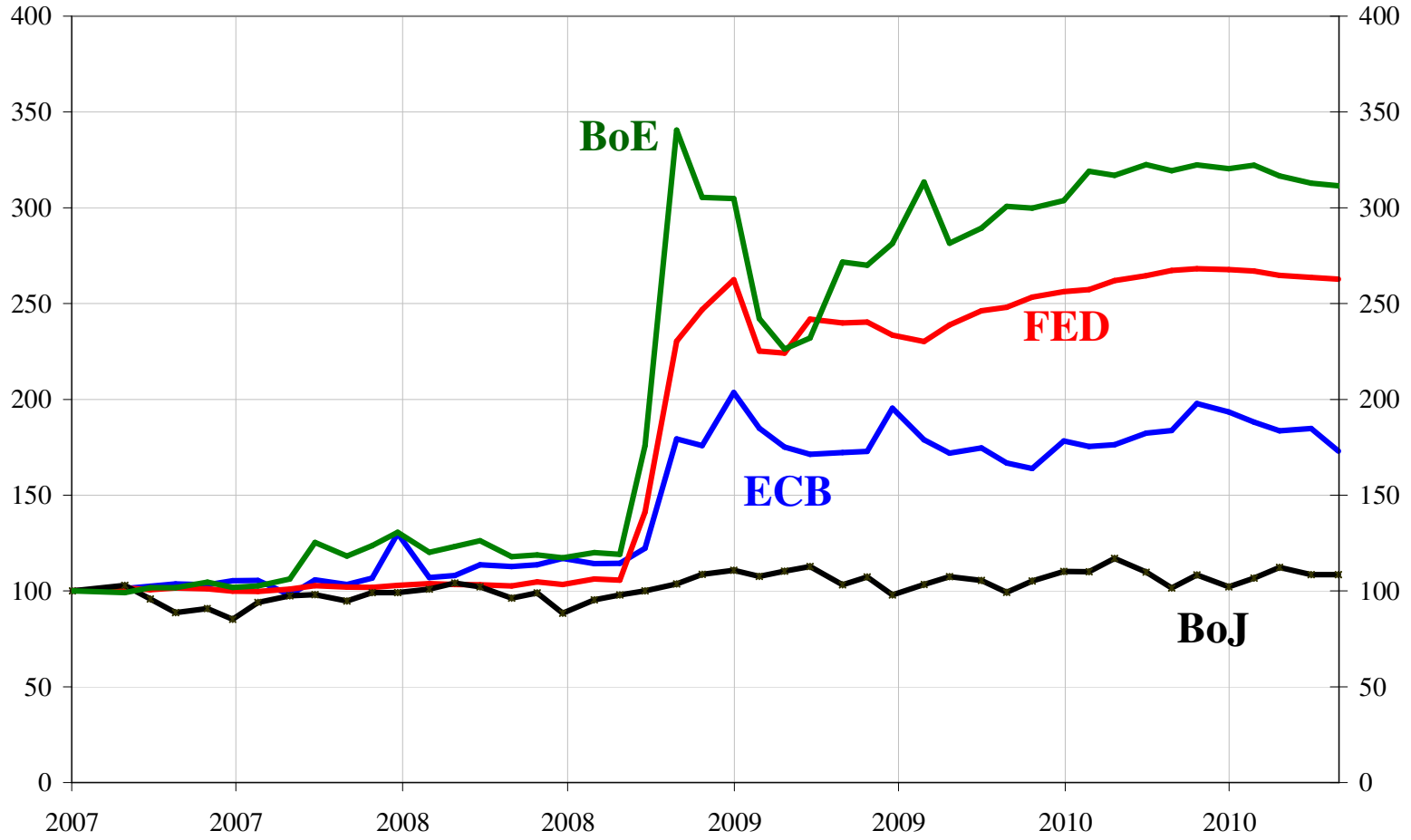
- ECB – 'enhanced credit support'
- FED – 'credit easing', QE2
- BoE – 'quantitative easing'

These appear to have 'worked' (at least in the sense of avoiding a financial cataclysm and providing some marginal stimulus to the economy) *(e.g. Gagnon et al; Joyce et al; Giannone et al)*

… but concerns have been expressed about their longer-term impact on central bank balance sheets and institutional independence *(e.g. Hamilton)*

Size of central bank balance sheets

index, January 2007 = 100



Source: ECB, Federal Reserve, Bank of England, Bank of Japan

Motivation #2

Two lines of research into the relationship between monetary and fiscal policies:

- Monetarist

  Money supply driven by fiscal factors

  Money created in excess of money demand

  Cagan model of hyperinflation

- Fiscal theory of the price level

  Government does not respect intertemporal budget constraint

  Government cannot default

  In general equilibrium, fiscal considerations can drive price developments

Motivation #3

- Central bank policy instruments

  Monetary policy (interest rate level, stock of 'reserves')

  Interest-on-reserves policy (liquidity management)

  Credit policy (composition of central bank asset holdings)

  $\Rightarrow$ (quasi-) fiscal activities of central banks …

  Goodfriend: *'credit policy is debt-financed fiscal policy'*

- Institutional considerations

  FED / Treasury Accord

  Prohibition of monetary financing *(Art. 123 of Lisbon Treaty)*

Anticipation of results

- Non-standard central bank measures take two forms / embody two elements:
  - 'pure' liquidity measures;
  - credit measures *(= (quasi) fiscal measures)*
- Viewed from the longer-term perspective in terms of implications for price stability:
  - liquidity measures are benign (but should be standard rather than non-standard);
  - credit measures:
    - can support (indeed, may be necessary to achieve) price stability;
    - but entail risks if not limited in scope and /or duration.

Simple model

- General equilibrium
- 3 actors in the economy
  - Private sector (households that own firms);
  - Central bank
  - Government
- In this exercise, we focus on the steady state

Households #1

- Maximise utility subject to intertemporal budget constraint

$$\max_{c,\ h,\ m,\ B^p,\ L^{cb}} E_0 \sum_{t=0}^{\infty} \beta^t\ U(c_t, h_t, m_t) \ = \sum_{t=0}^{\infty} \beta^t \ \left[u(c_t) - f(h_t) + \eta\ L\left(\frac{m_t}{\overline{m}}\right)\right]$$

$$\left(\frac{W_t}{p_t} - \tau_t\right) \ + \ R_{t-1}\ \frac{B^p_{t-1}}{p_t} \ + \ \frac{L^{cb}_t}{p_t} \ + \ i_{t-1}\ \frac{m_{t-1}\ p_{t-1}}{p_t} \ + \ \frac{D_t}{p_t} \ \geq \ (c_t + m_t) \ + \ \frac{B^p_t}{p_t} \ + \ R_{t-1}\ \frac{L^{cb}_{t-1}}{p_t}$$

Households #2

- Pins down real interest rate in steady state:

$$\beta = \frac{\widetilde{\pi}}{\widetilde{R}}$$

- Separability in period utility function yields recursive demand for reserves, with satiation:

$$m_t = m\left(c_t,\ \mu_t;\ \overline{m},\ \eta\right)$$

$$m_c > 0,\quad m_\mu \leq 0,\quad m_\eta > 0;$$

$$\overline{m} \leq m\left(c_t,\ 0;\ \overline{m},\ \eta\right)$$

$$\mu_t = \frac{(R_t - i_t)}{R_t} \geq 0$$

Firms

- Standard New Keynesian set-up
- Pins down output
- Negative relationship with steady state inflation rate

Central bank #1

- Assets: Government bonds, loans to private sector
- Liabilities: Reserves

$$m_t \; p_t \quad = \quad B_t^{cb} \quad + \quad L_t^{cb}$$

- Seigniorage function

$$\psi_t \quad = \quad \frac{R_{t-1} \; (B_{t-1}^{cb} - L_{t-1}^{cb})}{p_t} \quad - \quad (i_{t-1}) \; m_{t-1} \; \frac{p_{t-1}}{p_t}$$

Central bank #2

- Holdings of reserves are voluntary *(≠ Cagan / monetarist)*
- Seigniorage 'Laffer curve', with maximum revenue level

$$\psi_t \quad = \quad \frac{R_{t-1}\ (B^{cb}_{t-1} - L^{cb}_{t-1})}{p_t} \quad - \quad (i_{t-1})\ m_{t-1}\ \frac{p_{t-1}}{p_t}$$

$$\psi^*_t = \psi^*(c_{t-1};\ \overline{m},\ \eta)$$

Government #1

- Government expenditure is given exogenously, according to the mechanics …
  - In period *t-1*, the private sector "buries" g_{t-1} of available final consumption good
  - The government is presented with a 'bill' for these resources at the end of the period in nominal terms, $G_{t-1} = g_{t-1}\, p_{t-1}$
  - The government meets this bill during the next period, implying a real cost of $g_{t-1}\, p_{t-1}/p_t$
  - Crucially, there is scope to erode the real value of this payment via inflation

All that's missing is a pint of Guinness

Government #2

- So ‘government’ should be understood as encompassing the creators of (implicit) liabilities in the private sector …
- From an empirical point of view, this dramatically increases the potential costs …

Government #3

- Government balance sheet evolves according to …

$$\frac{B_t}{p_t} = \frac{(R_{t-1})\ B_{t-1}}{p_t} - \left(\tau_t - \frac{g_{t-1}\ p_{t-1}}{p_t}\right) - \psi_t$$

Government #4

- Where (real) 'conventional' lump-sum taxation is subject to an upper bound *('fiscal limit')* …

$$\tau_t \leq \overline{\tau} \qquad \forall t$$

owing to Laffer curve and / or political constraints …

"many countries in the industrial world have reached the limits of fiscal expansion. … governments cannot live beyond their means forever"

President J-C. Trichet, 9 July 2010

"Never again will the American taxpayer be held hostage by a bank that is too-big-to-fail"

President B. Obama, 21 January 2010

Consolidated public sector balance sheet

$$\frac{B_t}{p_t} = \frac{R_{t-1}\ B_{t-1}}{p_t} - \left(\tau_t - g_{t-1}\frac{p_{t-1}}{p_t}\right) - R_{t-1}\frac{p_{t-1}}{p_t} m_{t-1}\ \mu_{t-1}$$

- Because of the various technical and political constraints facing policy makers:
  - The government itself is not optimising;
  - The public sector may behave in a non-Ricardian way.

Key components of steady state

- Must meet the (real) interest burden of outstanding stock of government debt …

$$\frac{(1-\beta)}{\beta}\,\tilde{b}$$

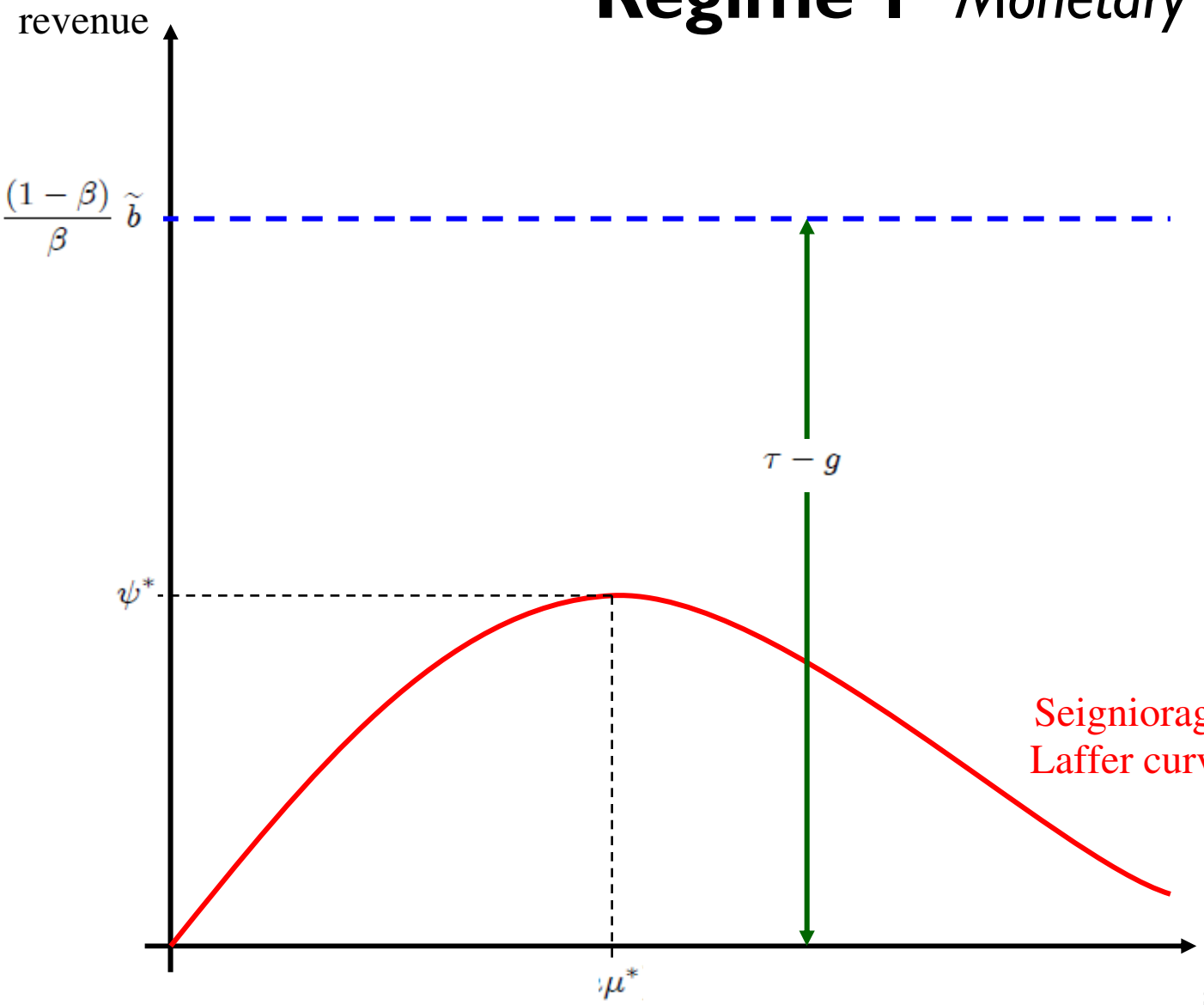
- out of primary balance …

$$\left(\tau_t - \frac{g_{t-1}\ p_{t-1}}{p_t}\right)$$

- plus seigniorage …

$$\psi_t$$

Regime I *Monetary dominance*



Regime I *Monetary dominance*

- Conventional taxation is able to meet all fiscal demands (and adjusts passively to do so) …

$$\overline{\tau} \geq \widetilde{g} + \frac{(1-\beta)}{\beta}\widetilde{b}$$

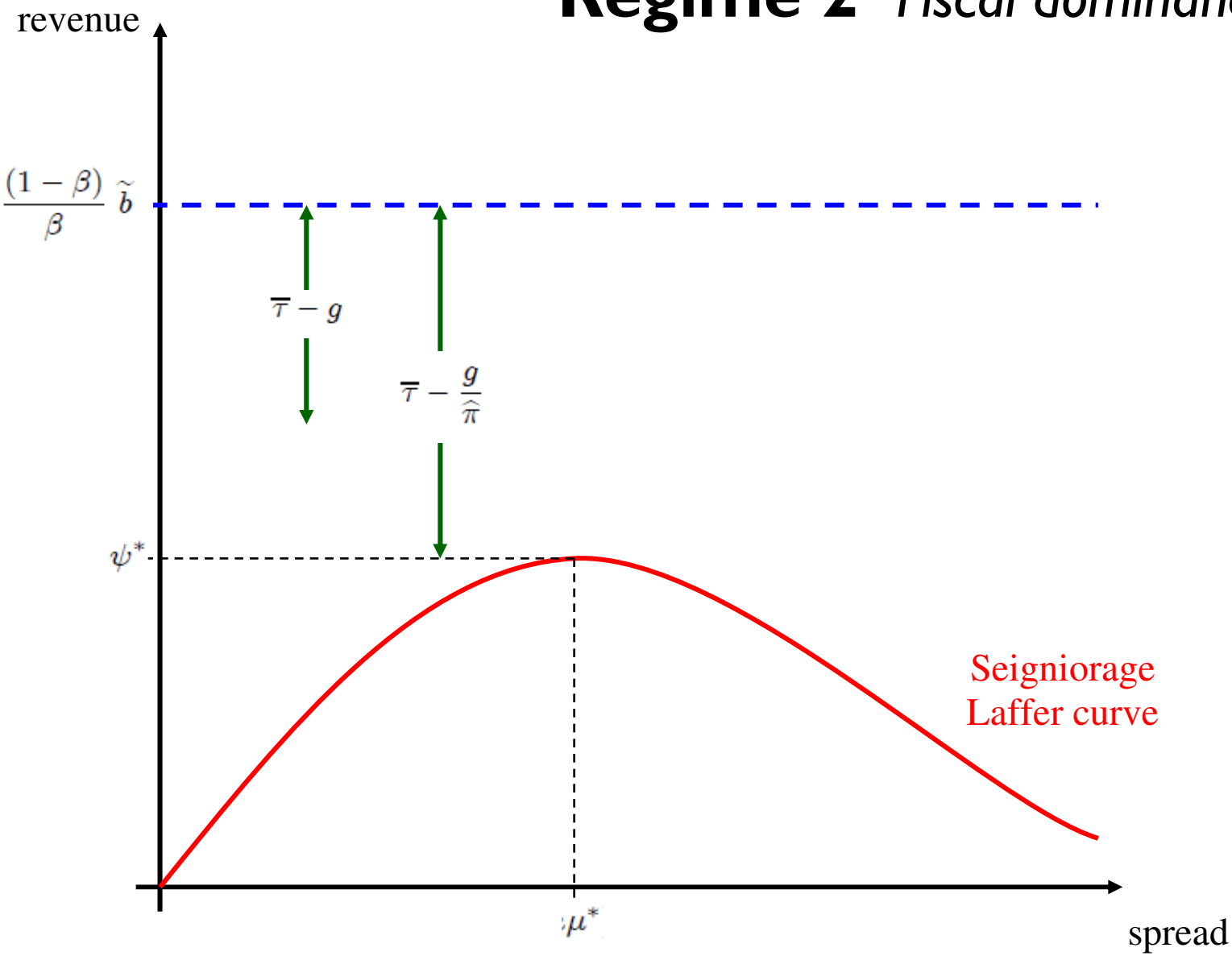
- Steady-state inflation rate is determined by the central bank

$$\pi^* = 1$$

- Central bank satiates demand for reserves

$$m_t \geq \overline{m} \qquad \mu_t = 0$$

Regime 2 *Fiscal dominance*



Regime 2 *Fiscal dominance*

- Fiscal capacity insufficient to meet needs …

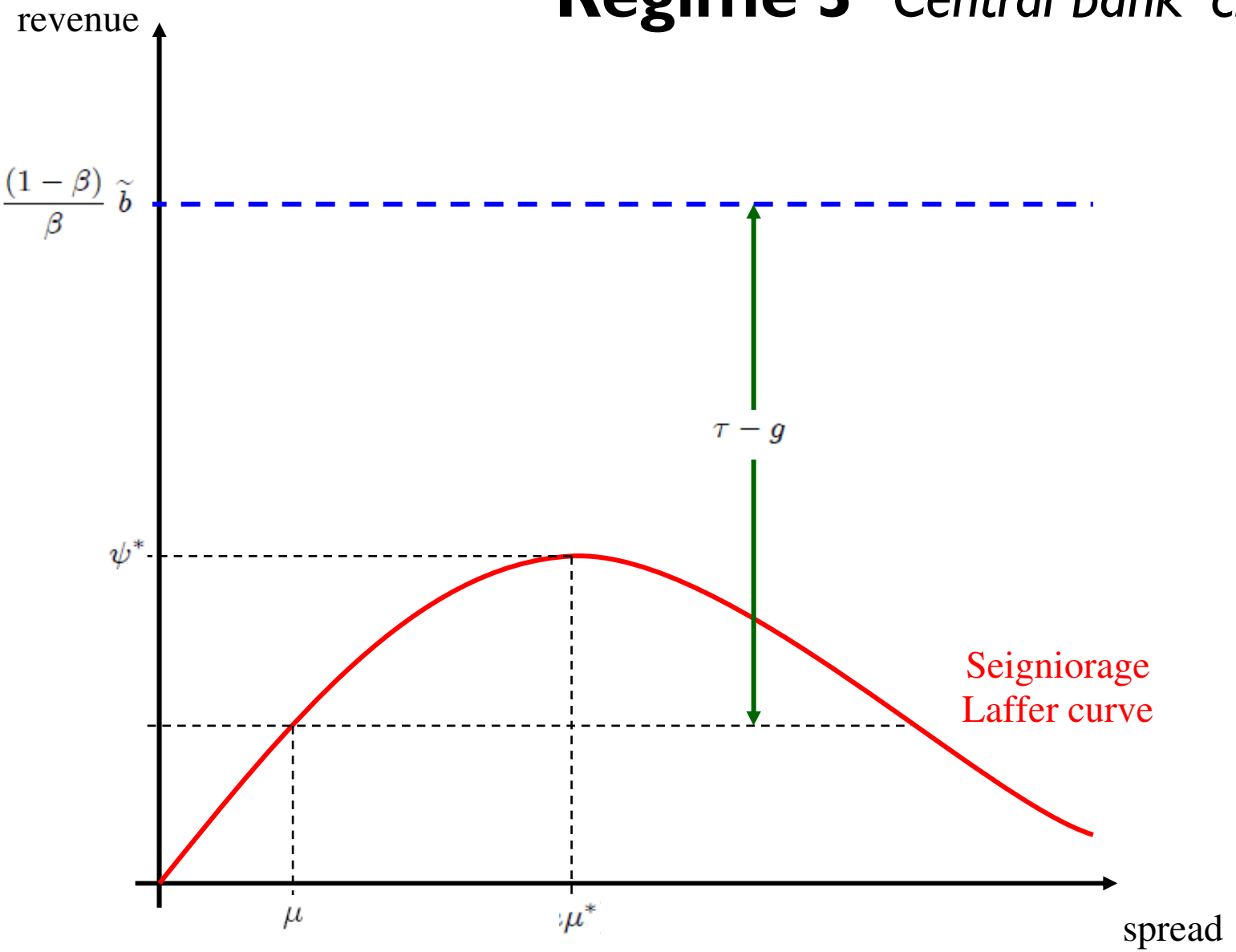
$$\widehat{g} \quad \geq \quad \overline{\tau} \quad + \quad \psi^*((\widehat{y} - \widehat{g}),\ \overline{m},\ \eta) \quad + \quad \frac{(\beta - 1)}{\beta}\ \widetilde{b}$$

- Steady-state inflation rate is determined by fiscal / general equilibrium considerations and is not consistent with price stability

$$\widehat{\pi} \quad = \quad \frac{\widehat{g}}{\left[\overline{\tau} \quad + \quad \psi^*((\widehat{y} - \widehat{g}),\ \overline{m},\ \eta) \quad + \quad \frac{(\beta-1)}{\beta}\ \widetilde{b}\right]} \quad \geq \quad 1$$

- Central bank 'trades off' higher inflation against liquidity provision

Regime 3 *Central bank 'choice'*



Regime 3

- To meet needs, reliant on seigniorage …

$$\overline{\tau} \leq \frac{\overline{g}}{\pi^*} - \frac{(\beta-1)}{\beta}\overline{b} \leq \overline{\tau} + \psi^*((\overline{y}-\overline{g}),\ \overline{m},\ \eta)$$

- Central bank can maintain price stability …

$$\pi^* = 1$$

- … but only by accommodating fiscal demands on its balance sheet

Efficacy of non-standard measures

- Liquidity measures are benign

Efficacy of non-standard measures

- 'Credit policy' measures are effective because of their (quasi) fiscal nature:
  - They can support (may even be necessary to maintain) price stability …
    - provide a 'buffer' when fiscal limits are reached;
    - can subsidise 'necessary activities' for monetary policy transmission when the scope for explicit / conventional fiscal support is limited by practical and / or political constraints
  - But there are limits: when these reached, there are consequences in terms of outlook for price stability

Further work

- Dynamics and expectational effects
  - Once g is stochastic, the support for g will influence price expectations and dynamics, potentially even well away from the bounds defined above …
- Endogenising fiscal demands
  - 'Ratcheting effect': creation of 'dependency' on non-standard measures on the part of financial system;

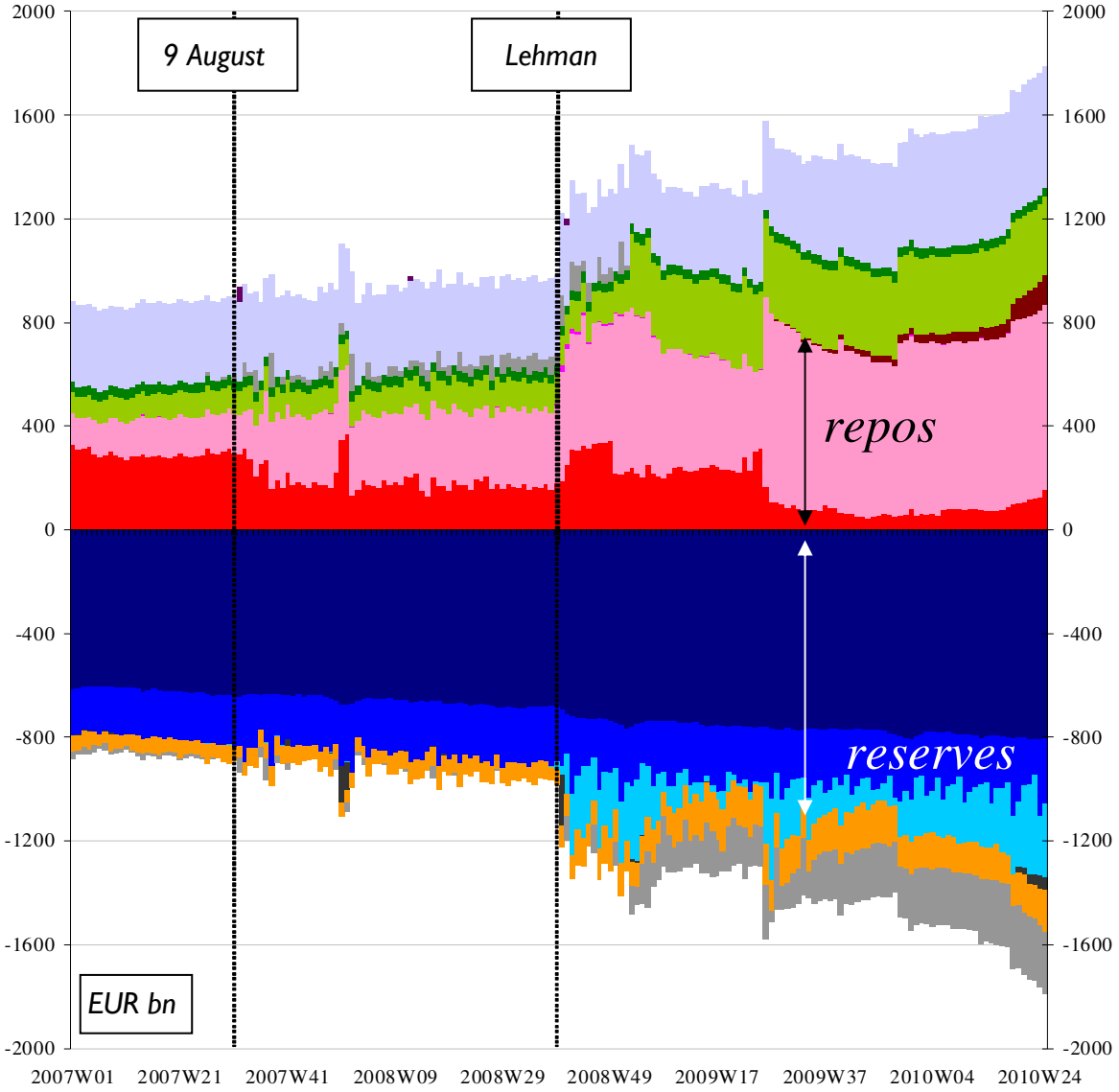
Further work

- Empirical issues
  - How large is the (quasi) fiscal capacity of the central bank?
  - How large are the (potential) costs of undertaking credit policy measures?
  - How close / binding are fiscal limits?
- Political economy
  - Institutional design of relationship between central bank, government and financial sector;
  - Risk-sharing mechanisms within a monetary union.

END

Background slides

Eurosystem balance sheet



Source: Lenza et al. (2010)