Optimal Policy and Simple Rules: A Unified Approach

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Motivation

- Two approaches:
  - Optimal policy (given a loss function)
  - Simple instrument rules

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  - Optimal policy (given a loss function)
  - Simple instrument rules
- Synthesis:
  - Realistic
  - Sensible
  - Flexible

- Model:

$$\begin{bmatrix} X_{t+1} \\ Hx_{t+1|t} \end{bmatrix} = A \begin{bmatrix} X_t \\ x_t \end{bmatrix} + Bi_t + \begin{bmatrix} C \\ 0 \end{bmatrix} \varepsilon_{t+1}, \tag{1}$$

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- Optimal policy (targeting rules):

$$L_t = E_t \sum_{h=0}^{\infty} \beta^h Y'_{t+h} \Lambda Y_{t+h}. \qquad (2)$$

where

$$Y_t = D \begin{bmatrix} X_t \\ x_t \\ i_t \end{bmatrix} \qquad (3)$$

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- Instrument rule:

$$i_t = f \begin{bmatrix} X_t \\ x_t \end{bmatrix} \tag{4}$$

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- Simple instrument rule:

$$i_t^s = f_s \begin{bmatrix} X_t \\ x_t \end{bmatrix} \tag{6}$$

$$i_t^s = a_i i_{t-1} + (1 - a_i) \left[a_\pi \pi_t + a_y y_t + a_{y-1} y_{t-1} \right]$$

- Optimal instrument rule:

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- Optimal simple rule:

$$i_t^{*,s} = f_s^* \begin{bmatrix} X_t \\ x_t \end{bmatrix} \quad (7)$$

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Simple vs optimal

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  - Minimizes loss (given a model)

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- Simple rules approach
  - Robustness (across models)

Taylor and Williams (2010):

"...Simple monetary policy rules are designed to take account of only the most basic principle of monetary policy of leaning against the wind of inflation and output movements. Because they are not fine tuned to specific assumptions, they are more robust to mistaken assumptions."

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Simple vs optimal

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  - Not realistic
  - Svensson (2003)

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- Optimal policy approach
  - No role for simple rules
  - Asso, Kahn and Leeson (2009)

FOMC meeting in 1995 (Asso, Kahn and Leeson, 2009)

- Janet Yellen:

"I do not disagree with the Greenbook strategy. But the Taylor rule and other rules. . . call for a rate in the 5 percent range, which is where we already are. Therefore, I am not imagining another 150 basis points".

- Extended loss function:

$$\hat{L}_t = (1-\theta)L_t + \theta(i_t - i_t^s)^2 \tag{8}$$

where

$$L_t = \pi_t^2 + \lambda y_t^2 + \delta\left(i_t - i_{t-1}\right)^2 \tag{9}$$

$$i_t^s = a_i i_{t-1} + (1-a_i)\left[a_\pi \pi_t + a_y y_t + a_{y-1} y_{t-1}\right] \tag{10}$$

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- Modified loss functions:
  - Orphanides and Williams (2008)

A Unified Approach

What do we do?

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  - Smets and Wouters (2007)
  - Rudebusch and Svensson (1999)
  - Taylor (1993)

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- Appropriate weight

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$$L_t = \pi_t^2 + 0.5 y_t^2 + 0.1 \left(i_t - i_{t-1} \right)^2$$

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- Optimal policy under commitment
    - Approximated by:

$$i_t = \sum_{j=1}^{4} b_{i,j} i_{t-j} + \sum_{j=0}^{4} b_{\pi,j} \pi_{t-j} + \sum_{j=0}^{4} b_{y,j} y_{t-j}$$

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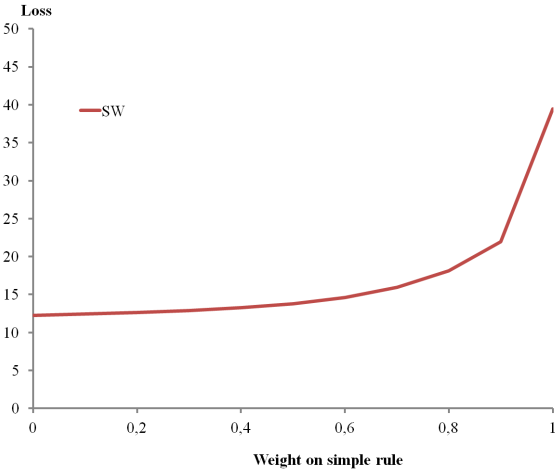
- Reference model: **Smets and Wouters (2007)**

A Unified Approach

Results – the classical Taylor rule

$i_t = 1.5\pi_t + 0.5y_t$



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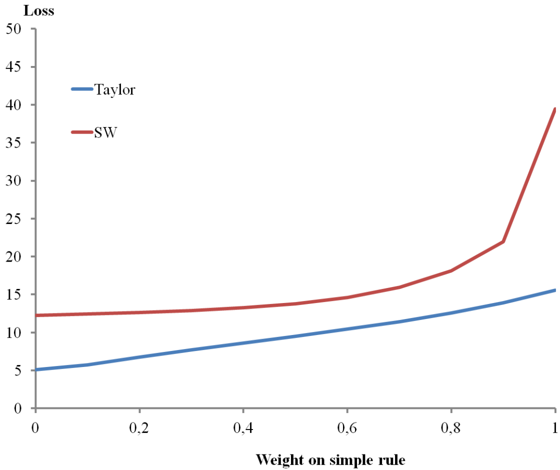

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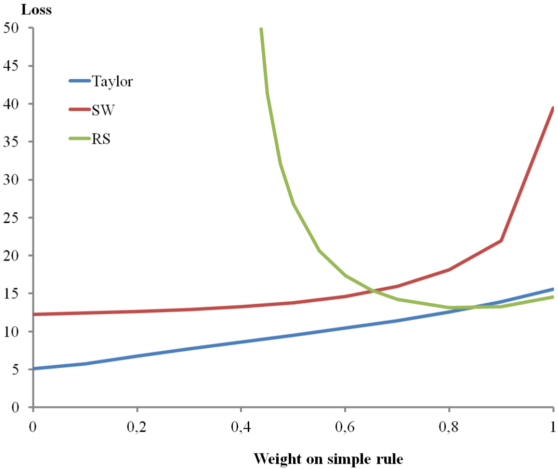

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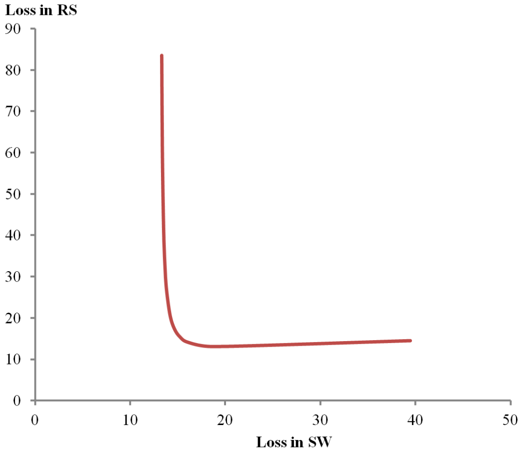

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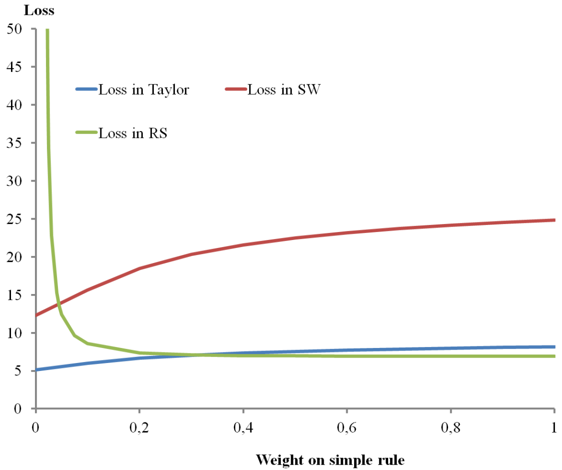
$$i_t = 3.84\pi_t + 2.345y_t - 0.008y_{t-1}$$



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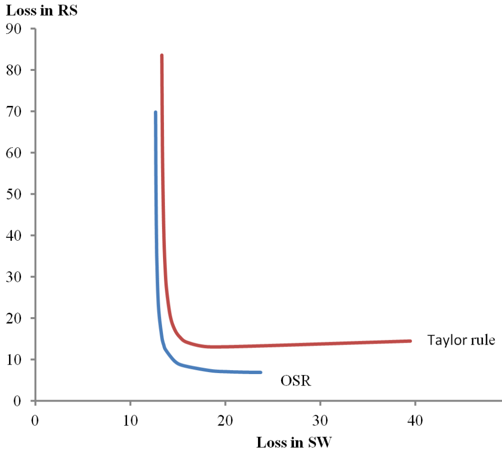

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"The proposal to use simple instrument rules as mere guidelines is incomplete and too vague to be operational" (Svensson, 2003)