Comments on:
"Labour Market Dynamics in the Euro Area: A Model-Based Sensitivity Analysis"

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This Paper

- A serious attempt at providing a coherent macroeconometric model of the Euro zone.
- Attempts to understand the sensitivity of estimated labor market dynamics to:
  - Model mis-specification
  - Structural change
- Contains, literally, hundreds of results
- My task
  - Strip the model back to its simplest components
  - Highlight the most interesting results (Narrow the focus)
  - Critique the analysis

Area-Wide Model

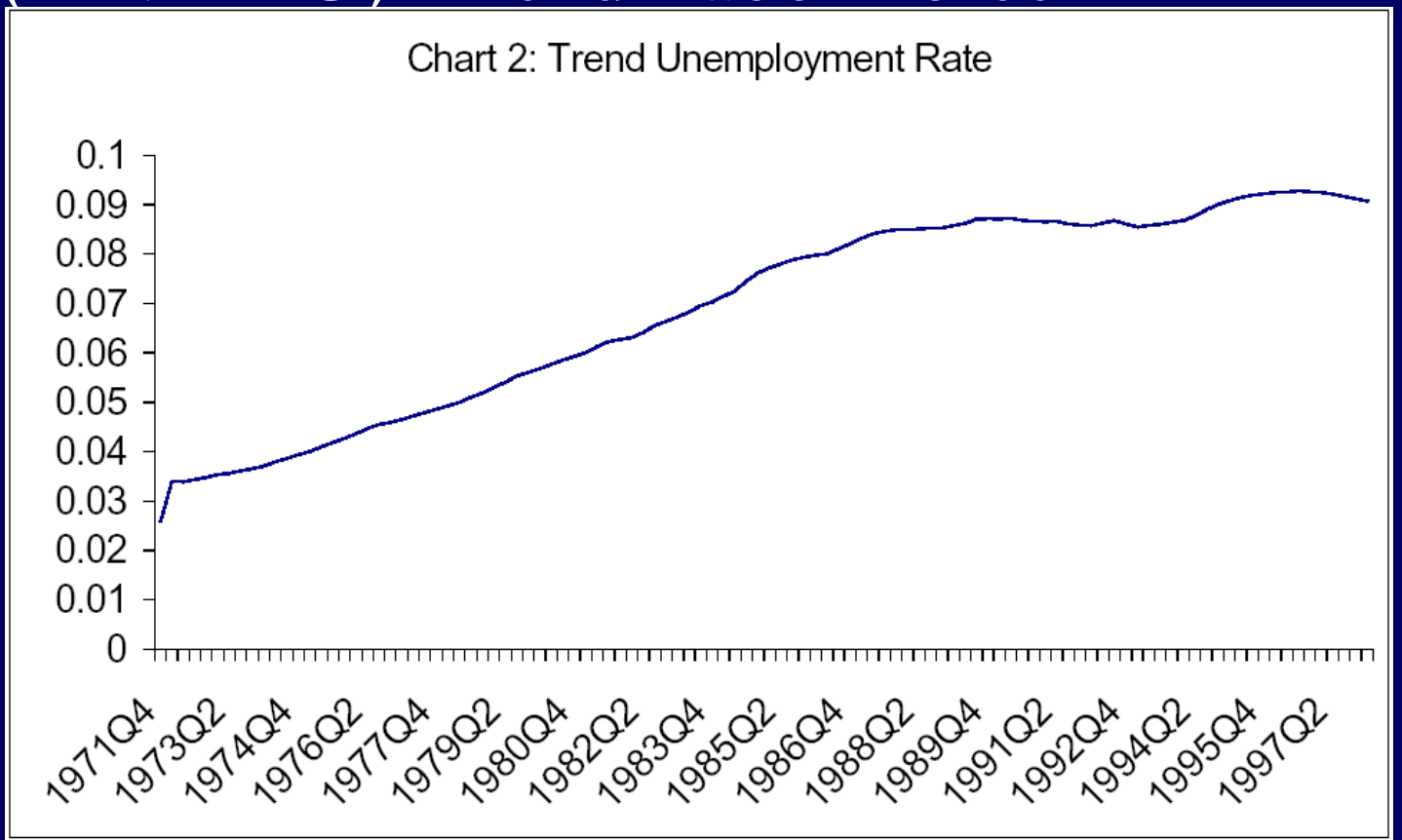
- Classical long-run: Nominal variables are independent of real
- "Keynesian" short-run: Nominal values do not immediately adjust
- Time-varying NAIRU is imposed & exogenous
- Policy rules:
  - Fiscal: Tax rates respond to deficit-to-GDP ratio
  - Monetary: Taylor rule: $i = \pi + \frac{1}{2}(\pi - \pi^*) + \frac{1}{2}(Y - Y^*) + r^*$
  - Necessary for convergence? (Yes)
- 89 equations
  - 15 behavioral equations
  - Accounting identities and stock-flow relationships
  - Policy reaction functions

Structure of the Labor Market

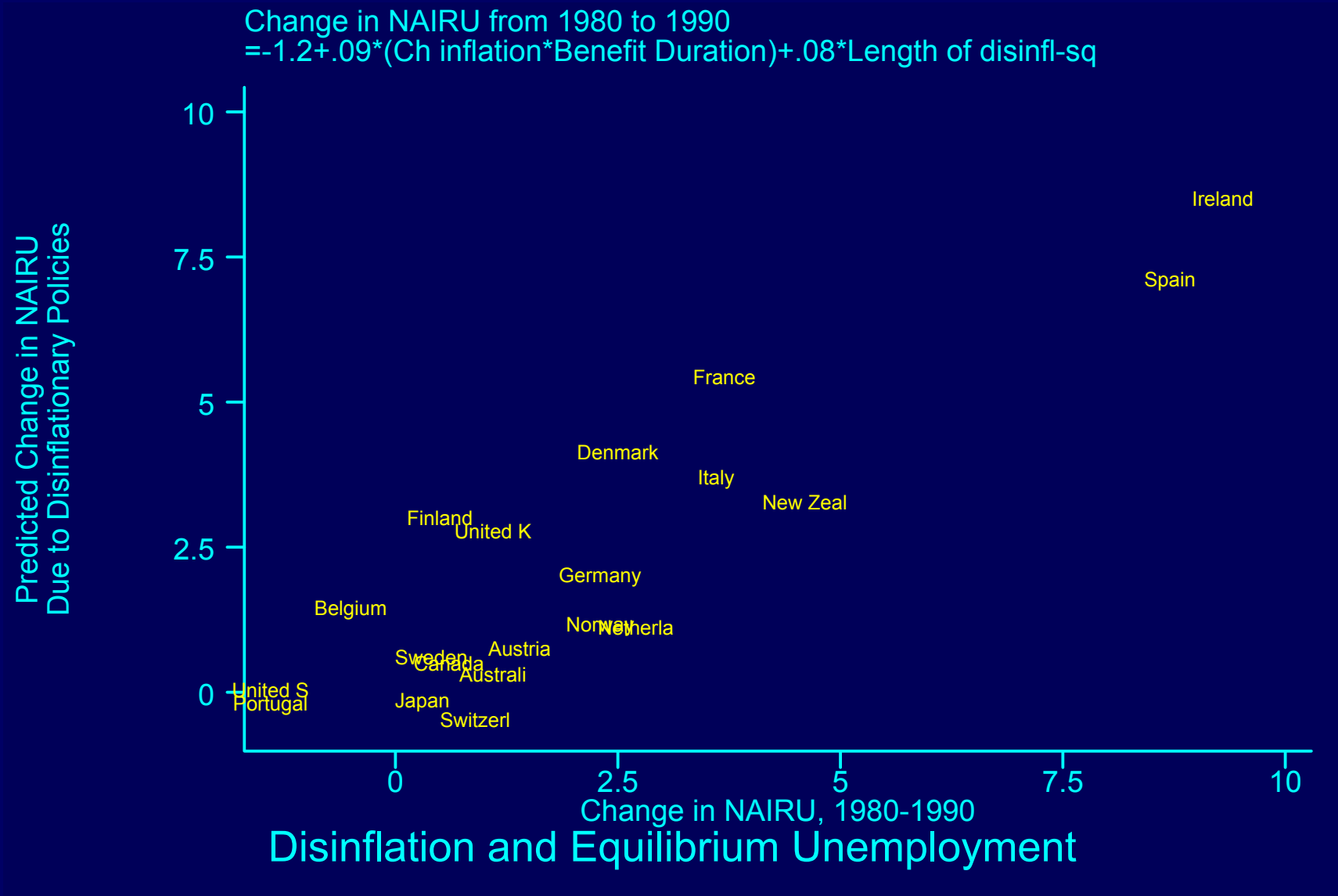
- Labor Supply
  - Exogenous
  - Fixed and exogenous NAIRU
- Labor Demand
  - Cobb-Douglas Production Function
- Disequilibrium Dynamics
  - Wage adjusts to unemployment

Labor Supply

- Equilibrium unemployment is exogenous
- Labor Supply is exogenous
- "Effective Labor Supply" =(1-NAIRU)*Trend Labor Force



Is the NAIRU Exogenous?

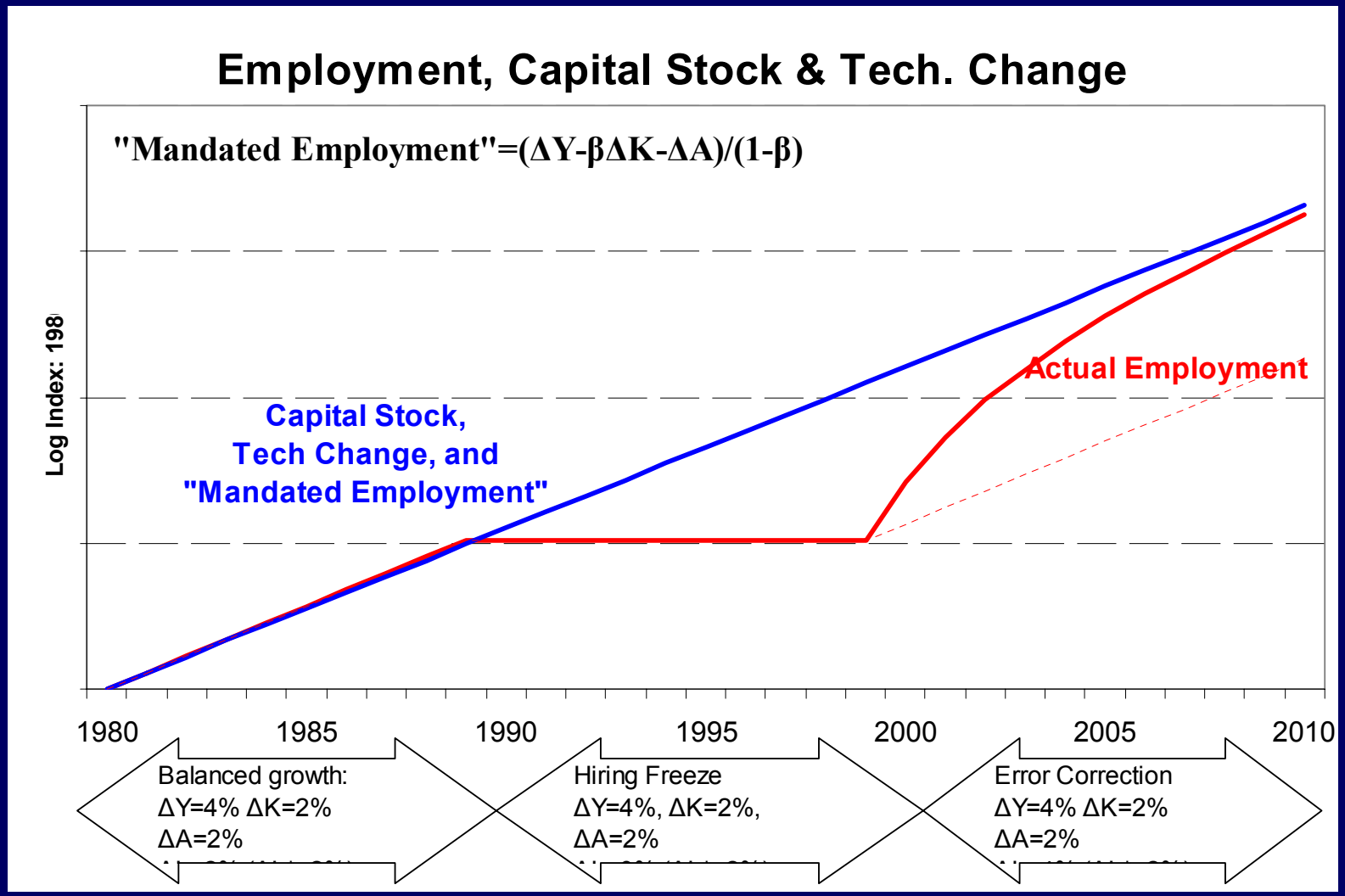


Source: Larry Ball (1996), "Disinflation and the NAIRU"

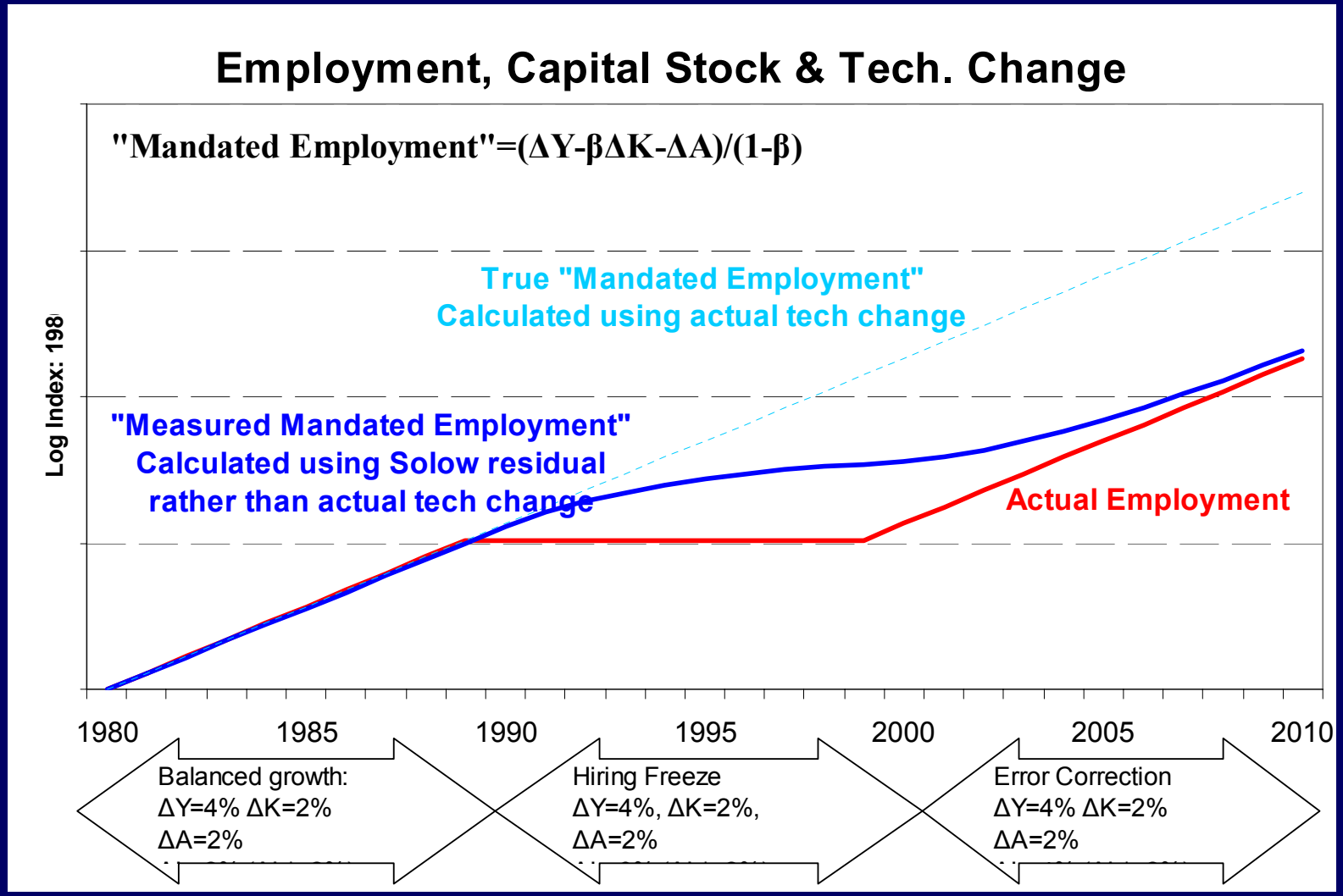
Labor Demand

- ΔEmployment =
  + 0.70 * ΔTrend Labor Force
  - 0.25 * ΔWage
  + 0.18 * ΔOutput
  - 0.18 * Error Correction Term
- What is the error correction term?
  - Cobb-Douglas Production Function ties down the long run
    - » $Y=A+\beta K+(1-\beta)L \quad \Rightarrow \quad L^{LR}=(Y-\beta K-A)/(1-\beta)$
  - The ECM describes an equilibrium force that pushes employment toward levels that make this equation hold.
  - But, *A* is the Solow ***residual*** (smoothed)
    - » An estimate that, by construction, makes this equation hold (on average in the medium-run)
    - » Thus, the model does not estimate convergence of employment to a long-run, but statistical properties of the Solow residual and HP-filter.

Authors' Interpretation: Re-equilibration



Alternative Interpretation: (Mis)measurement



Narrow the Focus

- Describe the various model specifications considered
- Describe the experiments performed upon these models
- Critique:
  - What would be interesting experiments to perform?
  - Which cases are most interesting?

Cases Considered

- Base case: Standard "Area Wide Model"
- Flexible: Real wage term in the employment equation and Phillips curve term in wages are multiplied by 2
- Hysteresis: Wage responsiveness varies with unemployment
- Sophisticated wage-setting: Wage growth reflects model-consistent inflation expectations (not just inflation target)
- Taylor rules:
  - Standard: $i = \pi + \frac{1}{2}(\pi-\pi^*) + \frac{1}{2}(Y-Y^*) + r^*$
  - Forecast-based: $i = E_t\pi_{t+4} + \frac{1}{2}(E_t\pi_{t+4} - \pi^*) + \frac{1}{2}(Y-Y^*) + r^*$
  - Big Dove: $i = \pi + 2(\pi - \pi^*) + 1/8\ (Y-Y^*) + r^*$
  - Dove: $i = \pi + 1(\pi - \pi^*) + 1/4\ (Y-Y^*) + r^*$
  - Hawk: $i = \pi + 1/4(\pi - \pi^*) + 1(Y-Y^*) + r^*$
  - Big Hawk: $i = \pi + 1/8(\pi - \pi^*) + 2(Y-Y^*) + r^*$
  - Interest rate smoothing:

    $i = 0.5\, i_{t-1} + 0.5(\pi + \frac{1}{2}(\pi-\pi^*) + \frac{1}{2}(Y-Y^*) + r^{*)}$

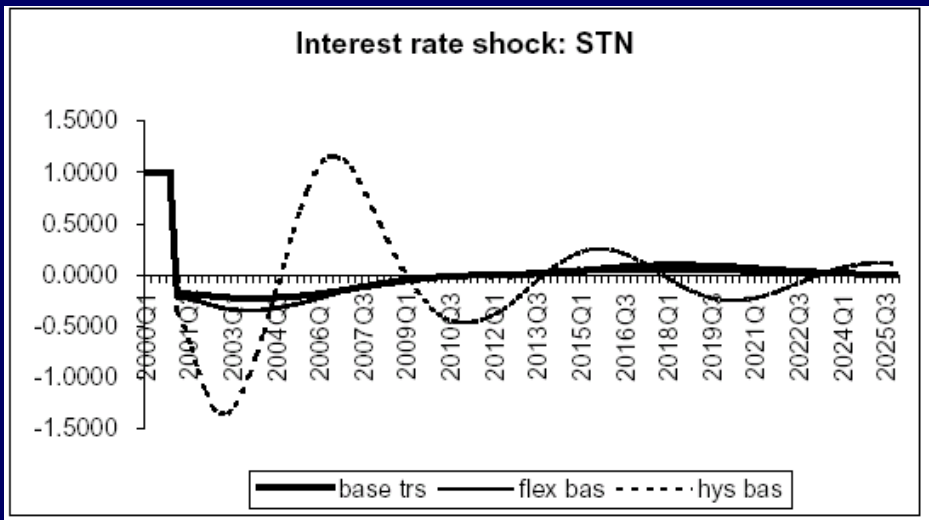
Why Consider Eight Cases?

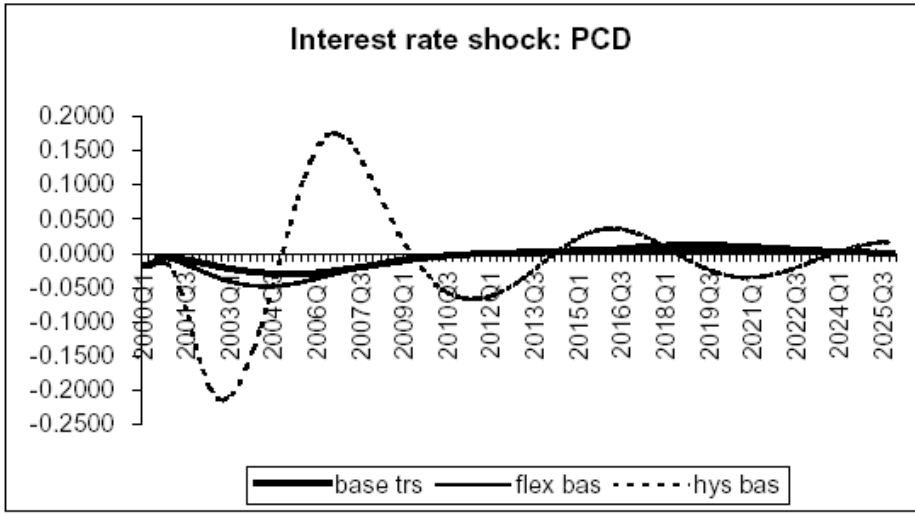
- Model sensitivity:
  What if we got the model wrong?
  - Base case
  - "Flexible" labour market
  - "Hysteresis" (slow-adjusting) labor market
  - Model-consistent inflation expectations underpin wage negotiations
- But why test 5 variants on the Taylor Rule?
  - Surely the ECB knows its own reaction function!
    - » Is this really part of the model the ECB should be uncertain about?
  - Alternative rationale: Search for optimal policy
    - » But this is explicitly rejected by the authors
    - » Need a welfare concept to analyze optimal policy
      - Currently missing

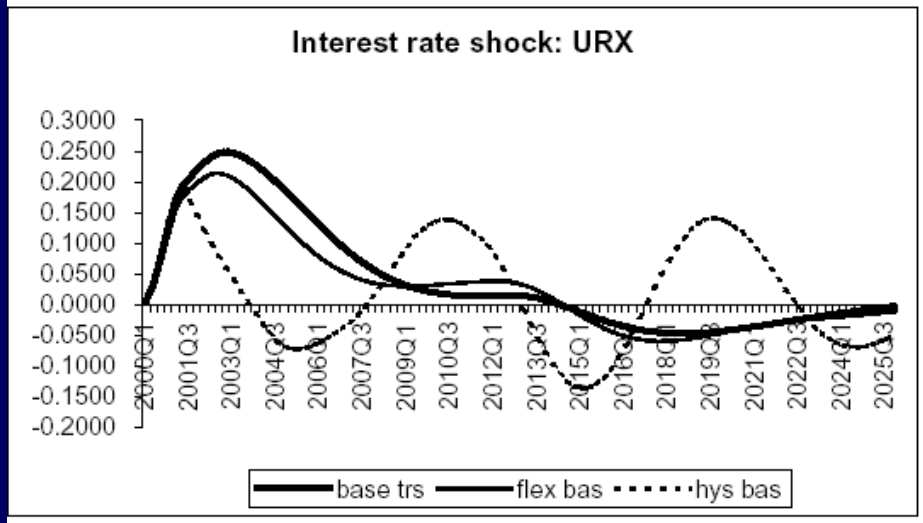
Deterministic Experiments

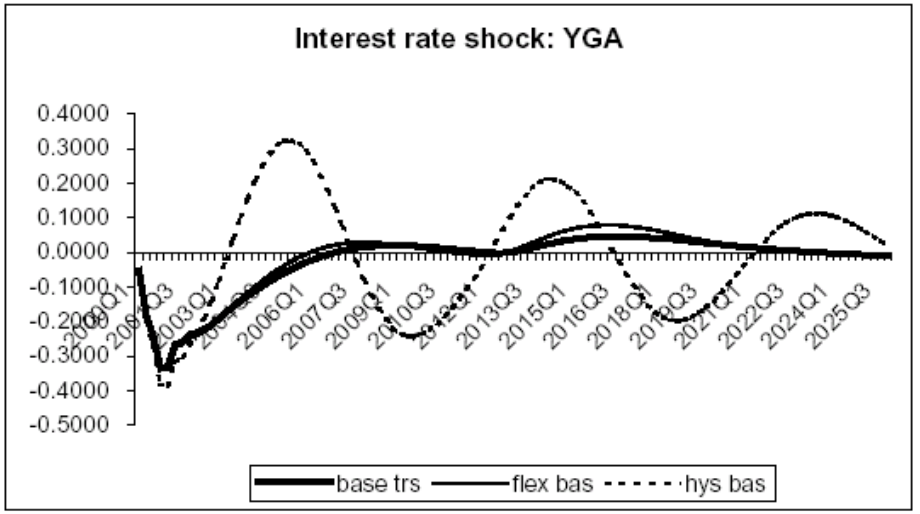
- Raise official interest rates 1% for 1 year
- Then revert to monetary policy rule
- Allow endogenous fiscal responses

Effects of raising interest rates 1% for a year







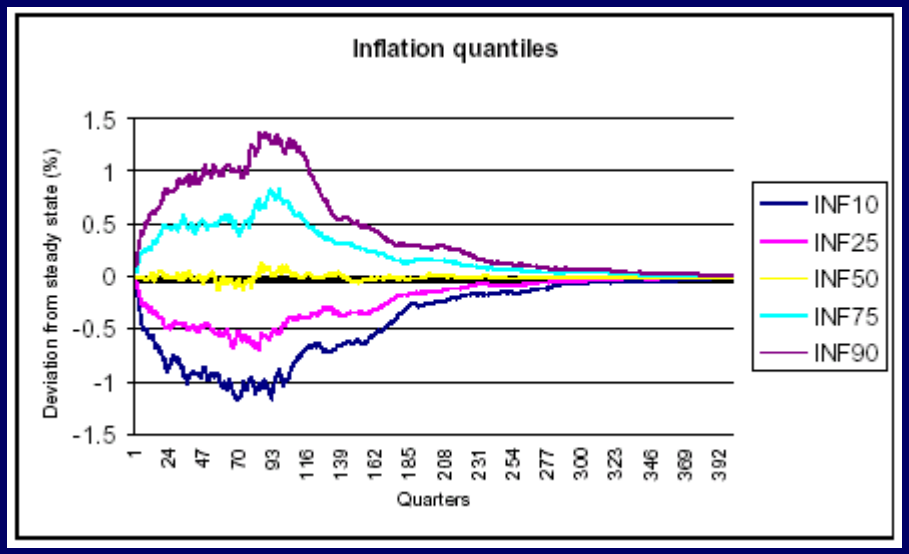


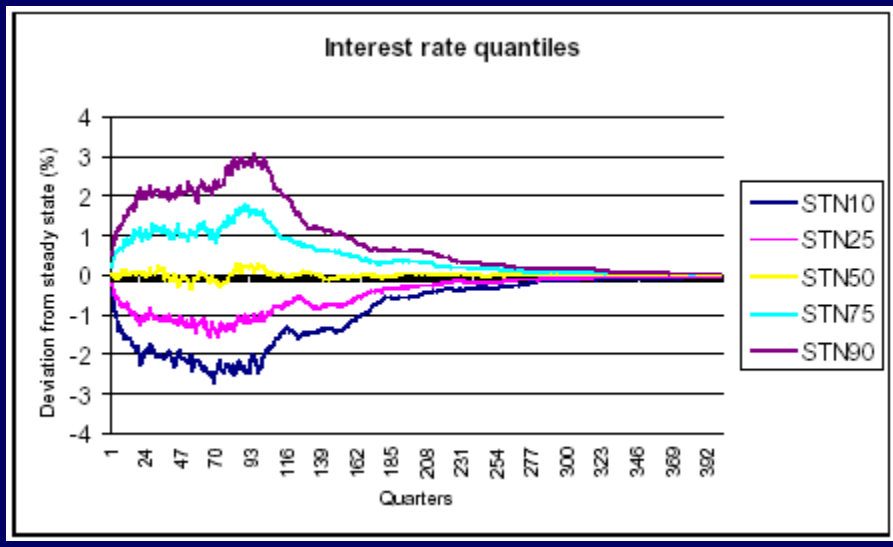
Charts 6: Temporary Shock to interest rates, different labour market configurations with the standard Taylor rule

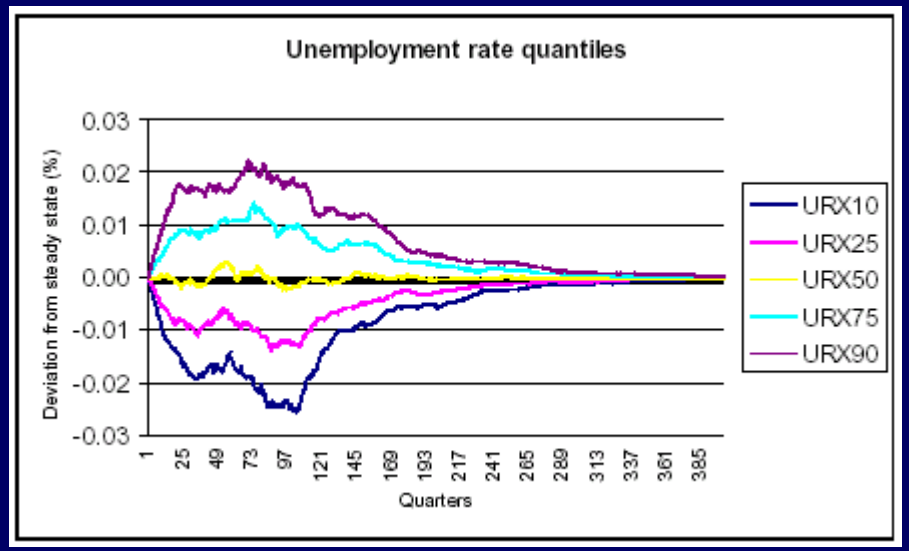
Stochastic Experiments

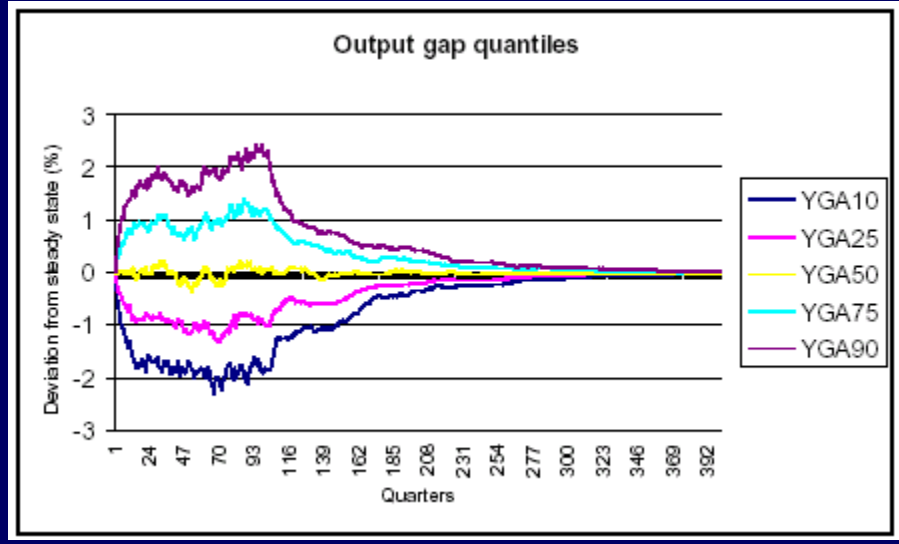
- Start from deterministic steady-state
- Run the economy for 100 quarters with random draws from the empirical shock distribution each quarter
  - Shocks occur in all 14 estimated equations
  - Rules out monetary and exchange rate shocks
  - Observe
- Stop. No shocks occur for the next 75 years.
  - Observe

Stochastic Experiments (Fig 8)



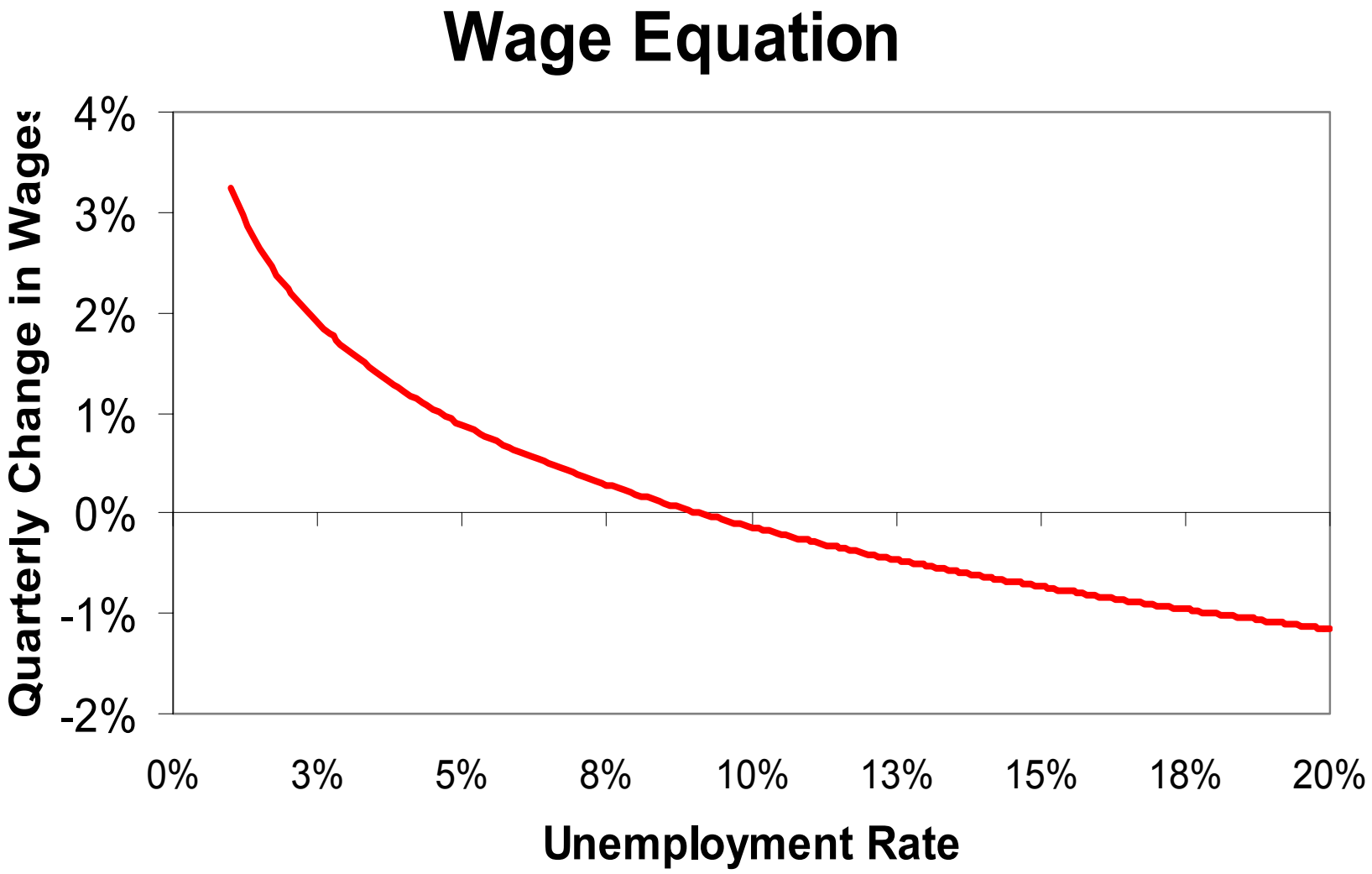






Base Case: Labor Market Adjustment

$$\Delta Wage_t = -0.0147 * \log\left(\frac{U_{t-1}}{U^*_{t-1}}\right) + \ldots stuff \ldots$$

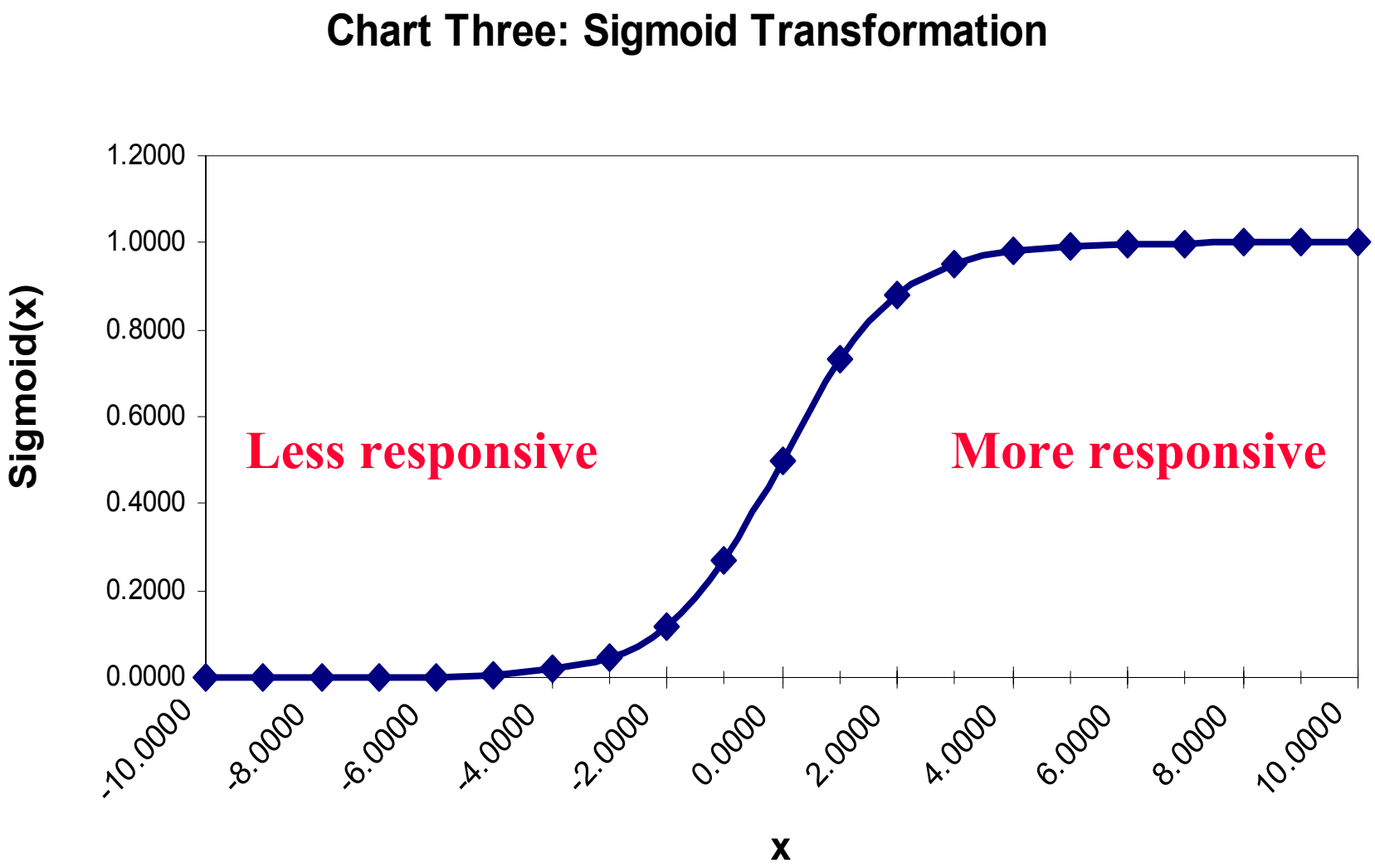


Hysteresis Model

- The idea:
  "*At extremes of unemployment, the labour-market adjustment process (the elasticity of wages wrt unemployment) might flatten considerably*" (p.3)
- Possibility of *unemployment traps*
- Consistent with the view that only large shocks are persistent
  - *Bianchi and Zoega*

Sigmoid Function

$$g(u) = \frac{1}{1 + e^{-ax}}$$



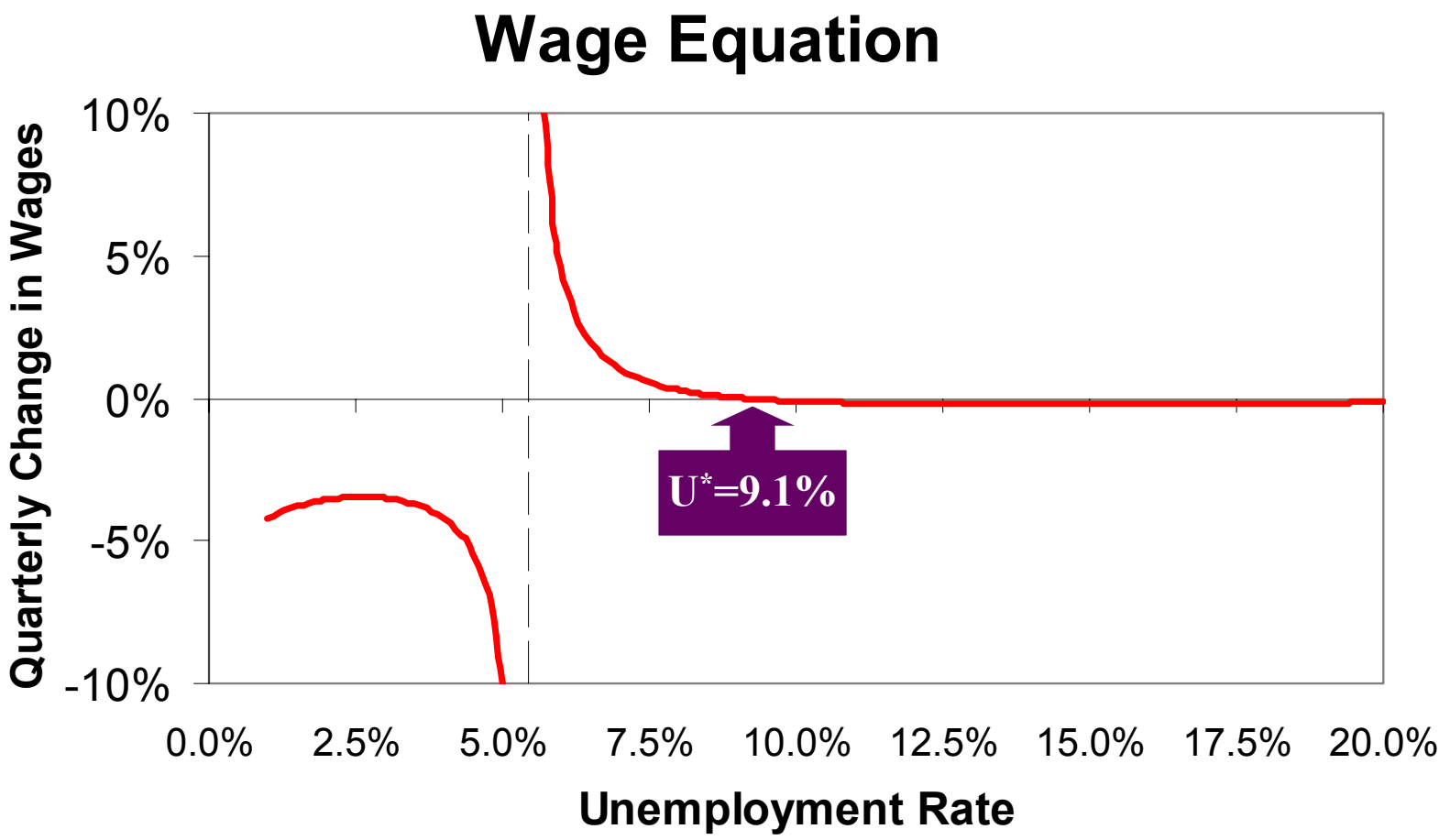
Actual Transformation: "Hysteresis Case"

$$\Delta Wage_t = -0.0147 * \log\left(\frac{U}{U^*}\right) * \left(\frac{-1/2 + 3/4}{-1/2 + 3/4\, e^{\frac{U-U^*}{U}}} \right)$$

- Useful properties:
  - Elasticity = estimated ε when $U=U^*$
    - » If unemployment = 9.1% ε = -0.0147
  - For equilibrium unemployment, $U^*=9.1\%$:
    - » If unemployment = 11%, ε = -0.0137
    - » If unemployment = 7%, ε = -0.0155

Actual Transformation: "Hysteresis Case"

$$\Delta Wage_t = -0.0147 * \log\left(\frac{U}{U^*}\right) * \left(\frac{-1/2 + 3/4}{-1/2 + 3/4\, e^{\frac{U-U^*}{U}}} \right)$$



Conclusions

- This large-scale macroeconometric model has great potential for policy analysis
  - Available online 
  - But what is gained in complexity is lost in transparency
  - The labor side of the model must incorporate interesting labor market phenomena
    - » Labor Supply
    - » Equilibrium unemployment
    - » Labor demand with a well-identified long run
- A useful sensitivity analysis for thinking about model mis-specification
  - But what are the most interesting experiments?
- Why not analyze optimal policy?
  - And the sensitivity of these conclusions to model mis-specification