

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 macroeconomic 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

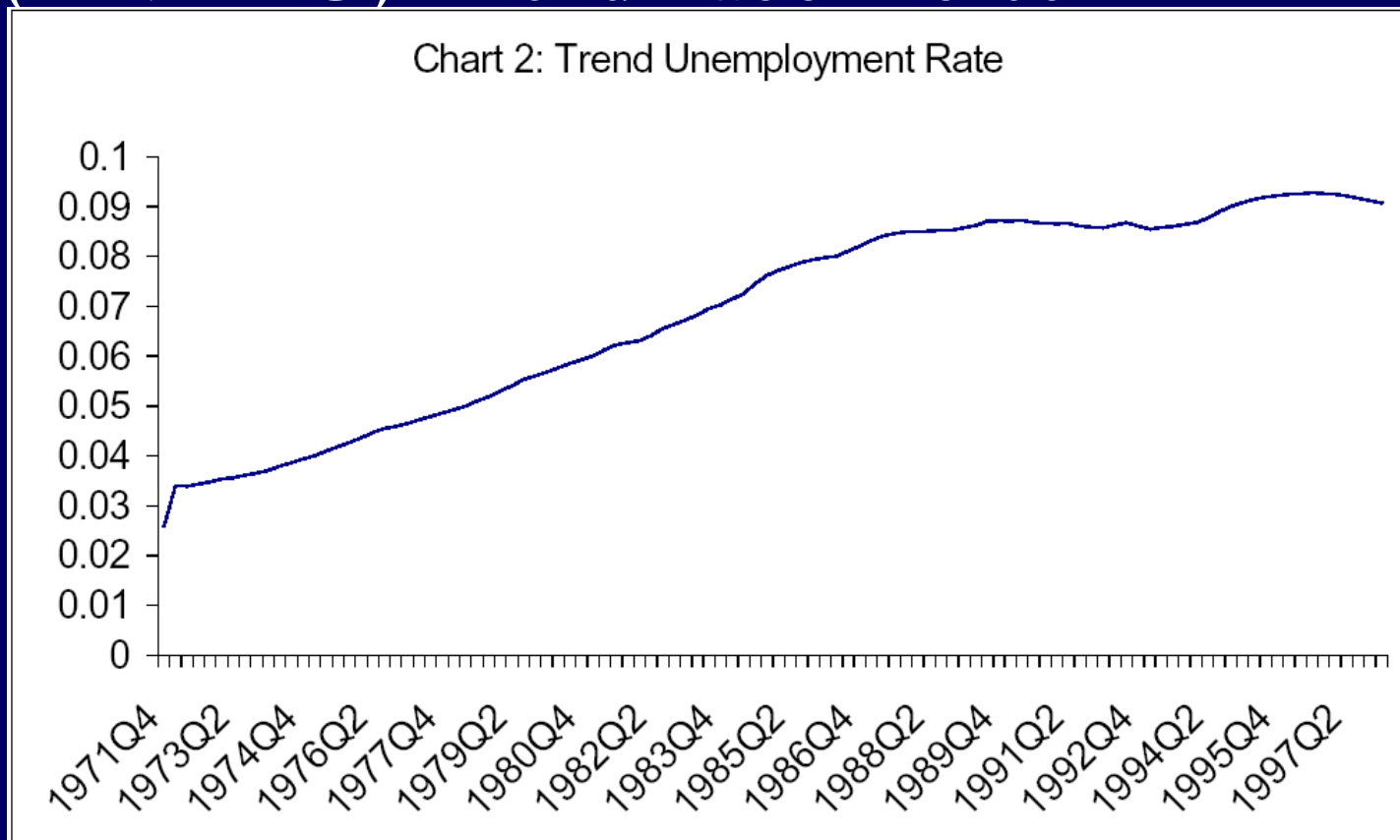
- ◆ Classical long-run: Nominal variables are independent of real
- ◆ “Keynesian” short-run: Nominal values do not immediately adjust
- ◆ Time-varying NAIRU is imposed & exogenous
- ◆ Policy rules:
 - Fiscal: Tax rates respond to deficit-to-GDP ratio
 - Monetary: Taylor rule: $i = \pi + \frac{1}{2} (\pi - \pi^*) + \frac{1}{2} (Y - Y^*) + r^*$
 - 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

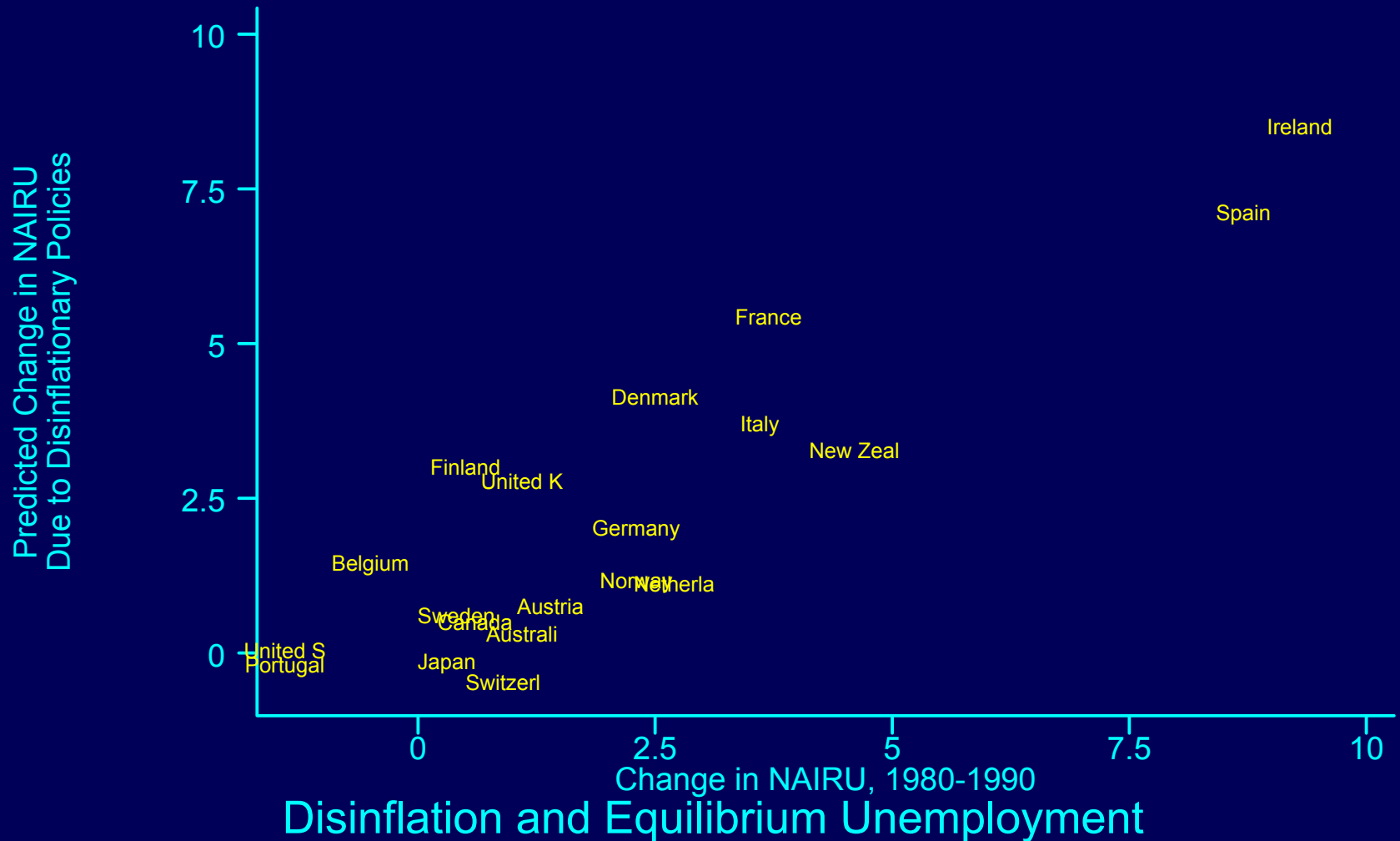
- ◆ Equilibrium unemployment is exogenous
- ◆ Labor Supply is exogenous
- ◆ “Effective Labor Supply”
= $(1 - \text{NAIRU}) * \text{Trend Labor Force}$



Is the NAIRU Exogenous?

Change in NAIRU from 1980 to 1990

$$=-1.2+.09*(\text{Ch inflation}*\text{Benefit Duration})+.08*\text{Length of disinfl-sq}$$

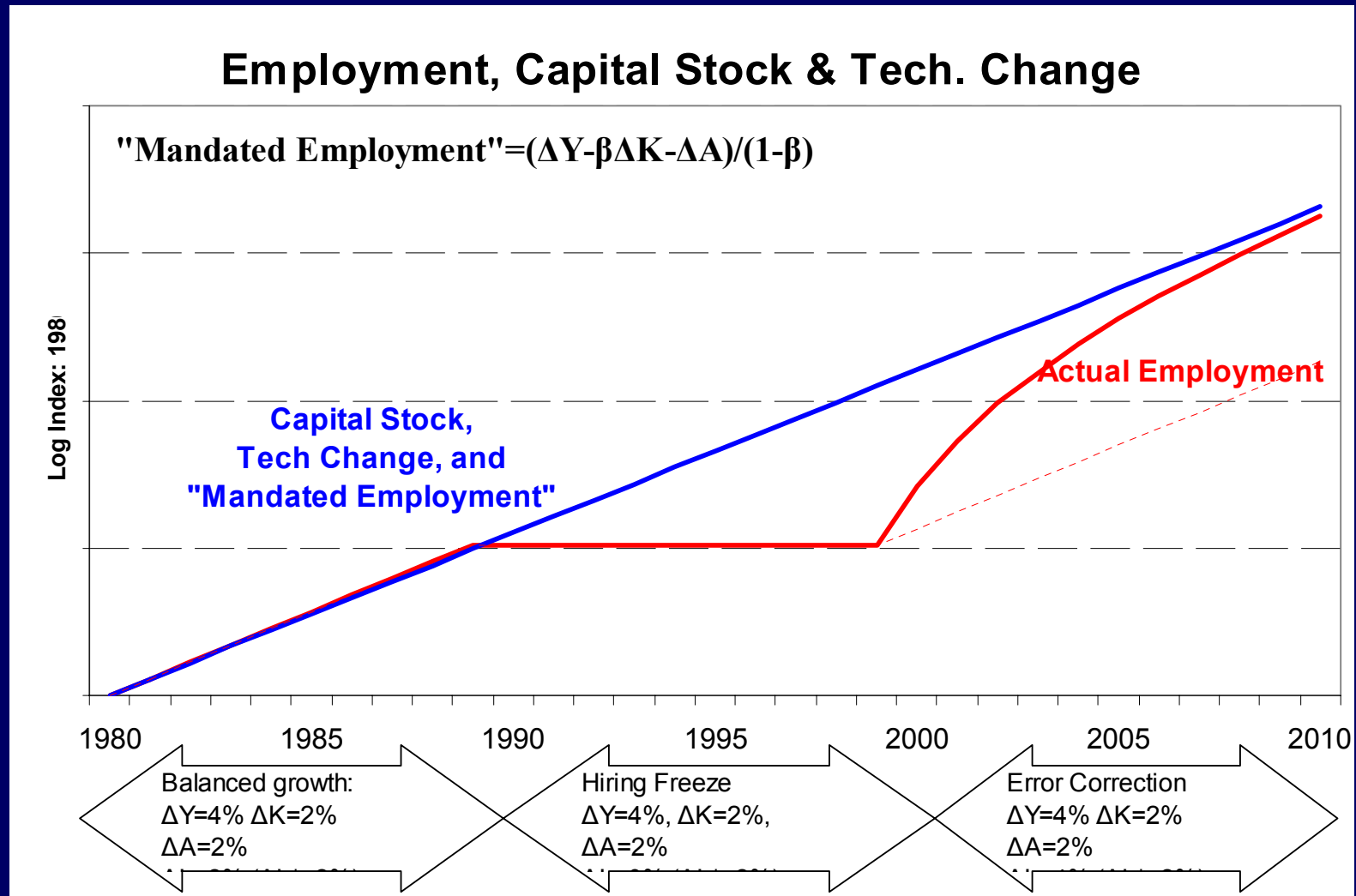


Source: Larry Ball (1996), "Disinflation and the NAIRU"

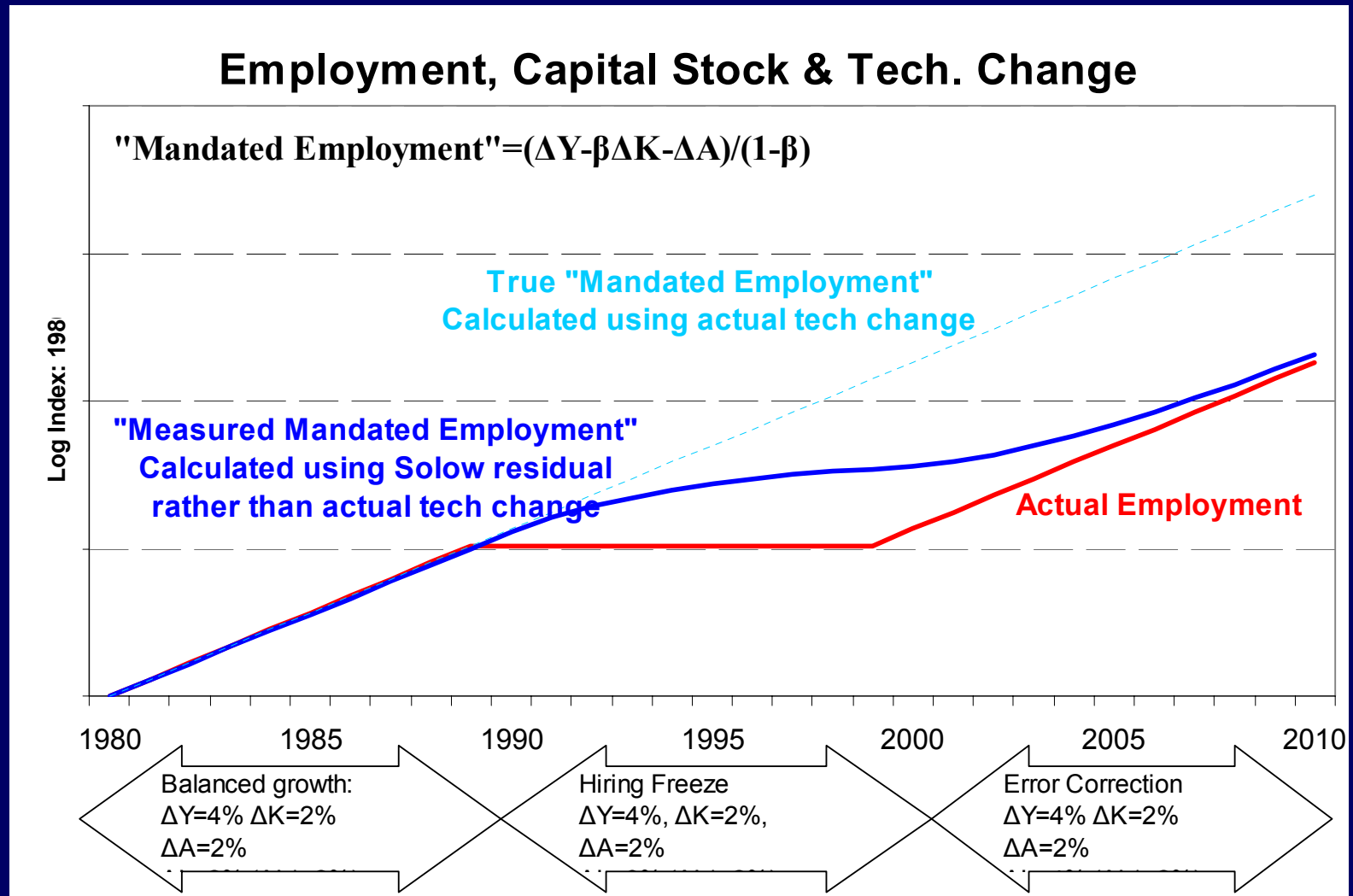
Labor Demand

- ◆ Δ Employment =
 - + 0.70 * Δ Trend Labor Force
 - 0.25 * Δ Wage
 - + 0.18 * Δ Output
 - 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: $i = \pi + 2 (\pi - \pi^*) + \frac{1}{8} (Y - Y^*) + r^*$
 - Dove: $i = \pi + 1 (\pi - \pi^*) + \frac{1}{4} (Y - Y^*) + r^*$
 - Hawk: $i = \pi + \frac{1}{4} (\pi - \pi^*) + 1 (Y - Y^*) + r^*$
 - Big Hawk: $i = \pi + \frac{1}{8} (\pi - \pi^*) + 2 (Y - Y^*) + r^*$
 - 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

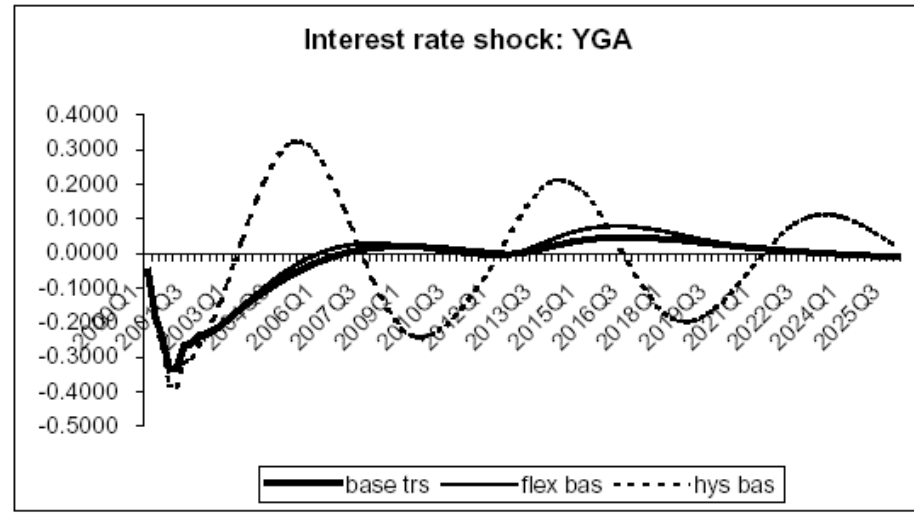
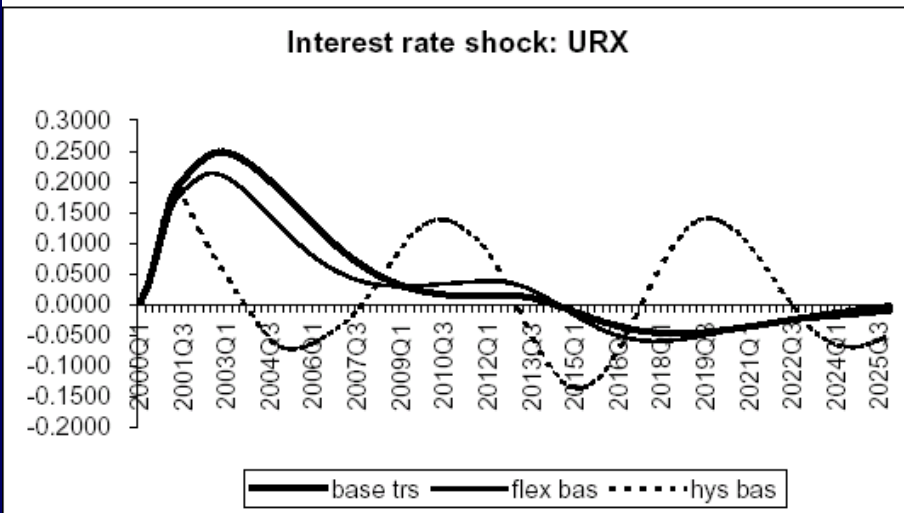
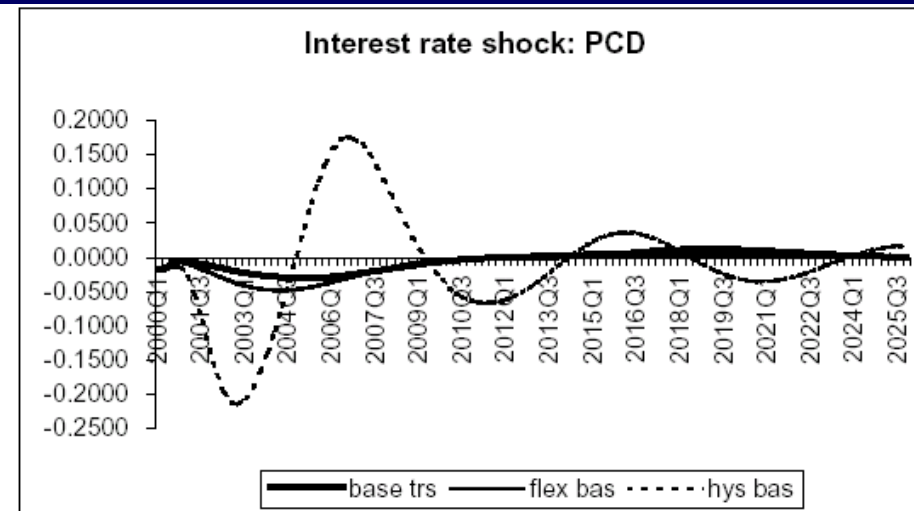
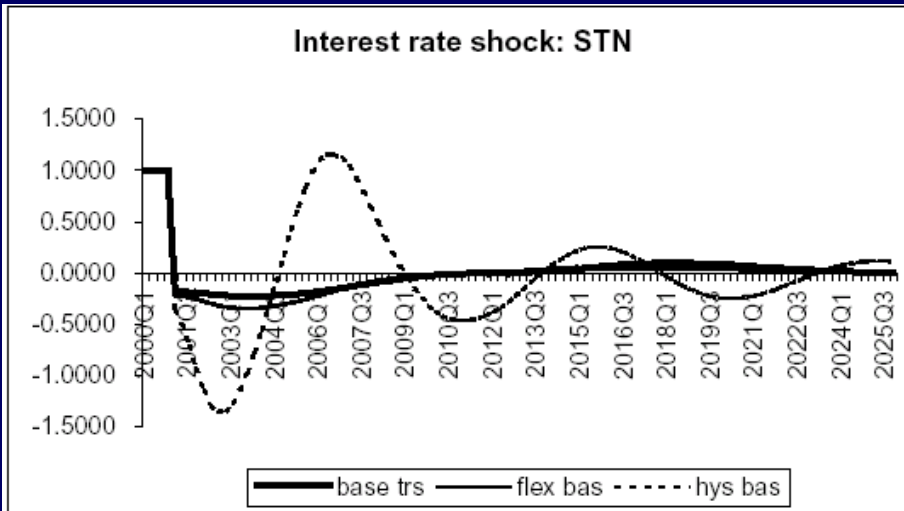
◆ But why test 5 variants on the Taylor Rule?

- 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

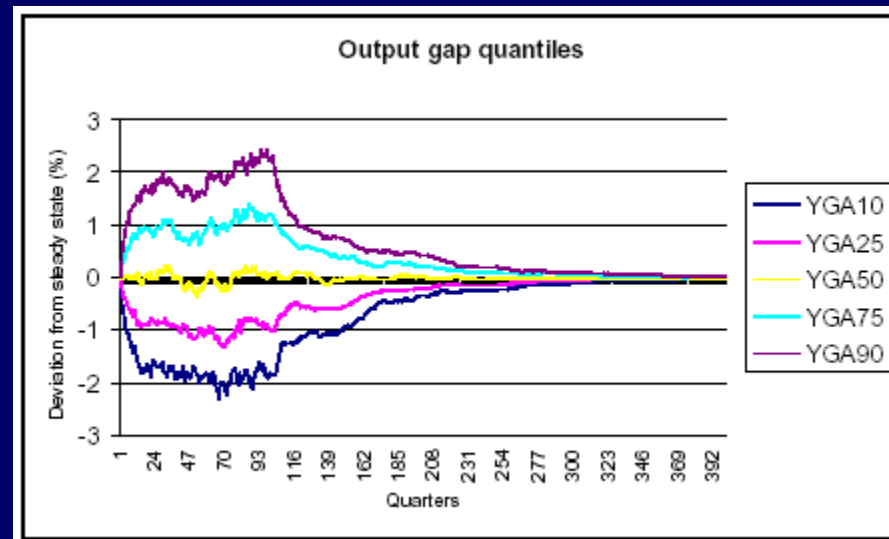
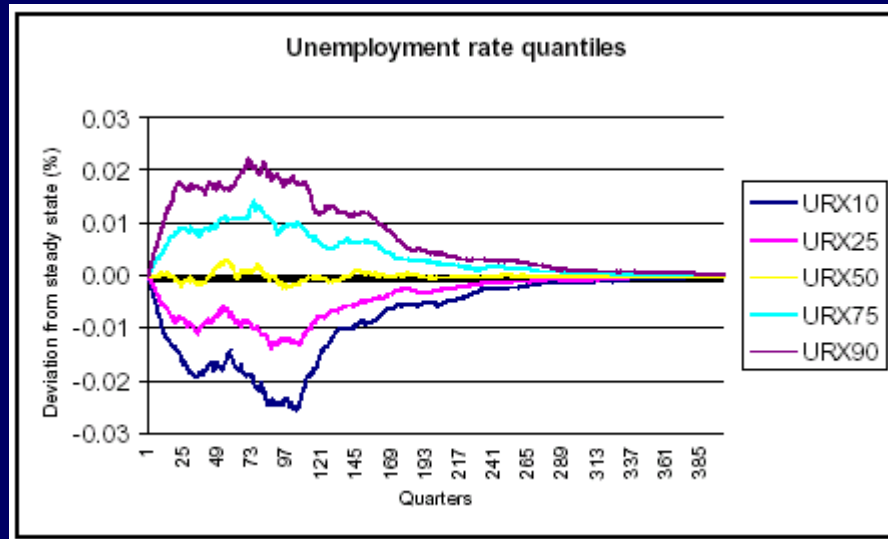
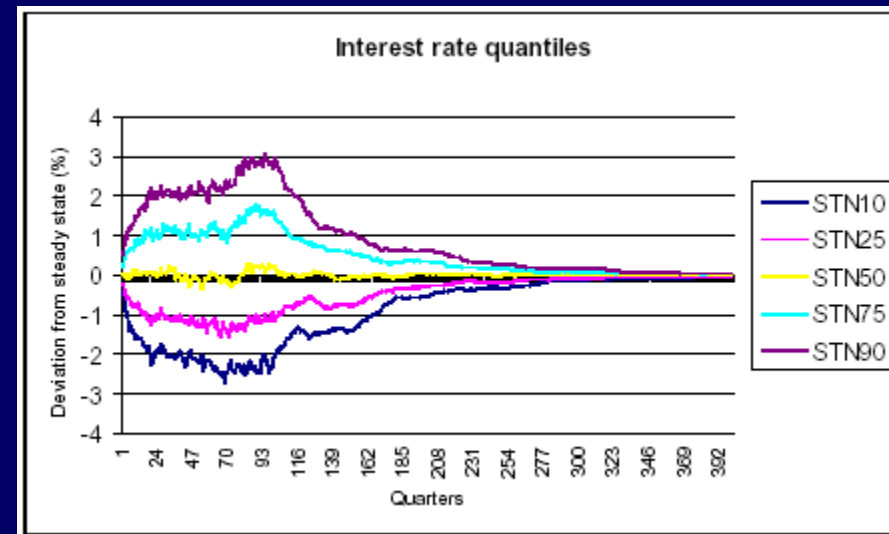
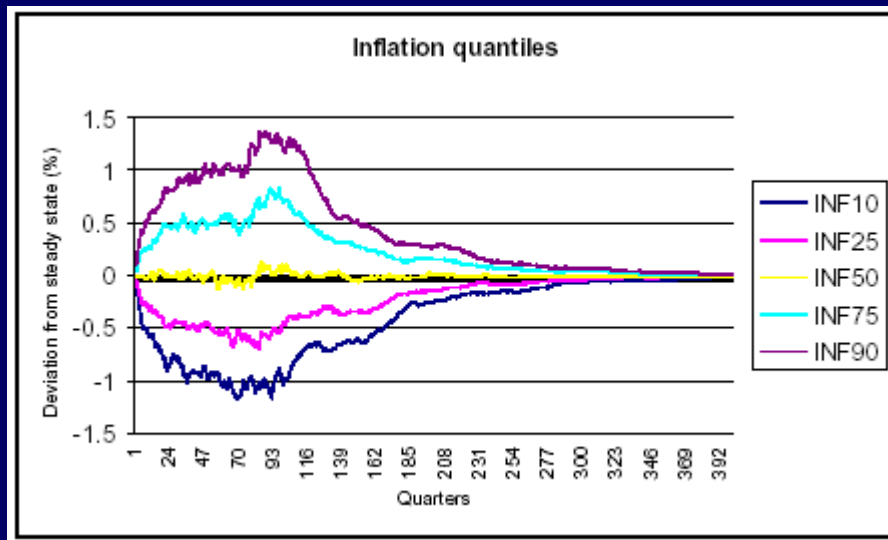


Charts 6: Temporary Shock to interest rates, different labour market configurations with the standard Taylor rule

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

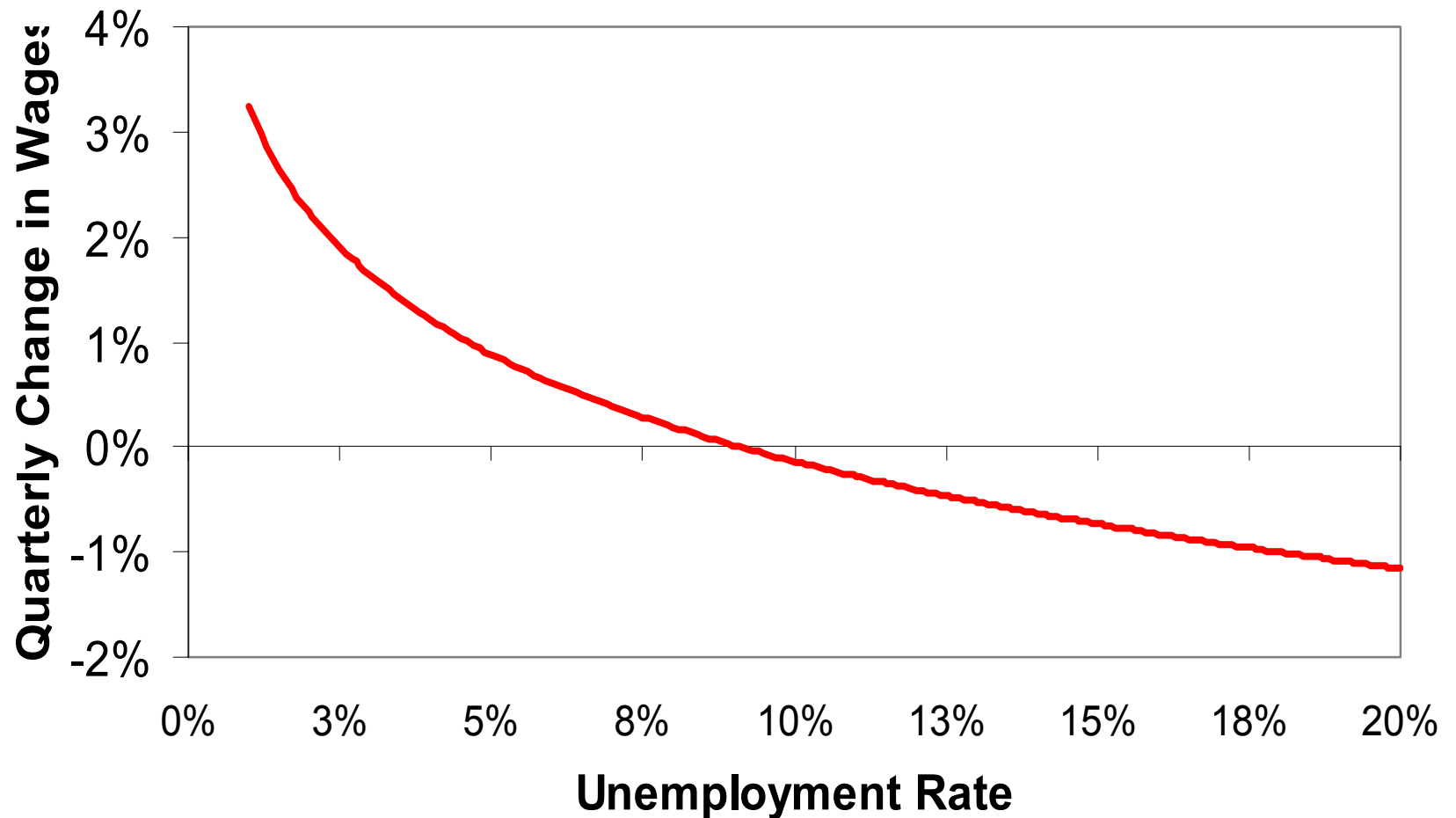
Stochastic Experiments (Fig 8)



Base Case: Labor Market Adjustment

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

Wage Equation



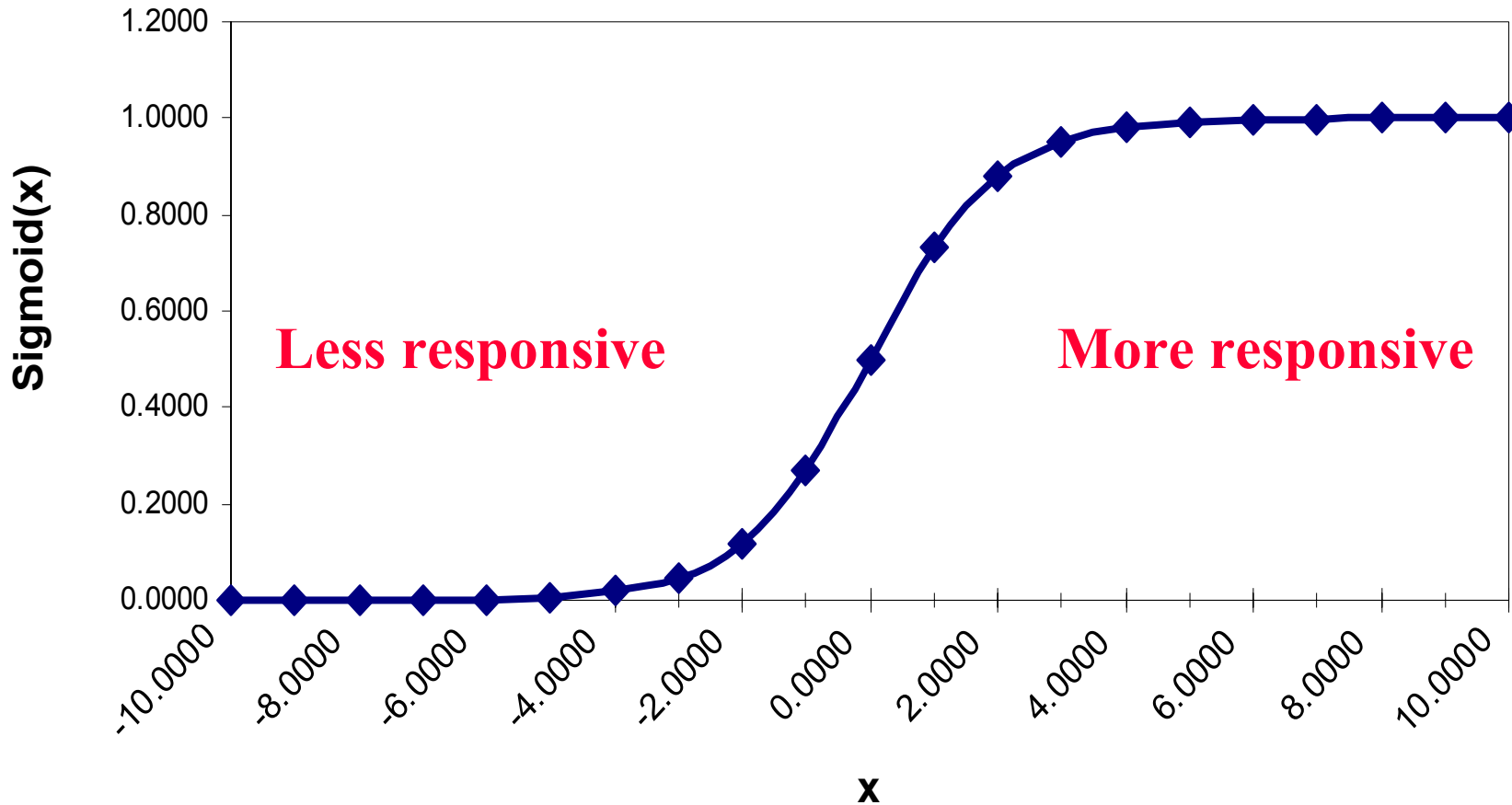
Hysteresis Model

- ◆ 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

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

Chart Three: Sigmoid Transformation



Actual Transformation: “Hysteresis Case”

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

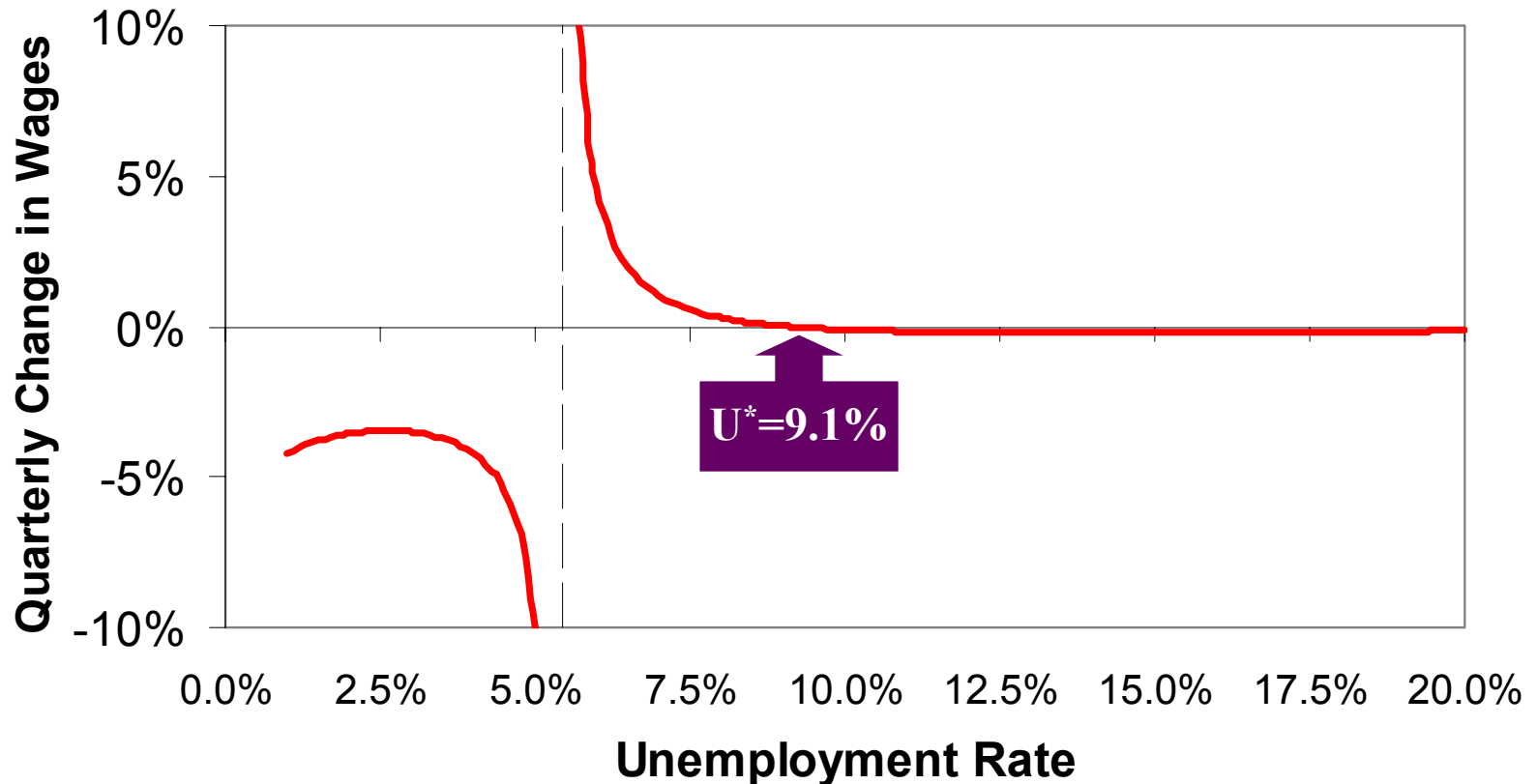
◆ Useful properties:

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


Actual Transformation: “Hysteresis Case”

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

Wage Equation



Conclusions

- ◆ This large-scale macroeconomic 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