

# Discussion of Irvine and Schuh

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# This Paper is Novel and Important

- The Great Moderation is not caused by
  - “Good Luck”
  - Better Monetary Policy
- Rather, 80% of reduced volatility is explained by changes in the structural relationships between industry-sector sales and inventory investment
- We only need to look at manufacturing and trade
  - Can neglect such previous “usual suspects” as military spending and residential construction

# This Discussion, like Gaul, is Divided into Three Parts

- The first part summarizes what I thought about the Great Moderation before reading this paper
- The second part summarizes the most important results of the authors
- The third part ponders the significance of the paper's results: by how much do I need to change my previous interpretation of the Great Moderation

# My Interpretation of the Great Moderation

- This is from NBER WP 11777 in November 2005
- Published in an obscure conference volume of the Reserve Bank of Australia, where the volume is devoted to exactly the same topic as the current SF conference.
- Some of the papers in that conference volume are worth looking up, not just mine

# Stabilization before and after 1984

## ■ Shocks

### ■ Demand shocks

- Federal government now the culprit not the salvation
- Inventory management
- Financial Market Deregulation stabilized residential housing

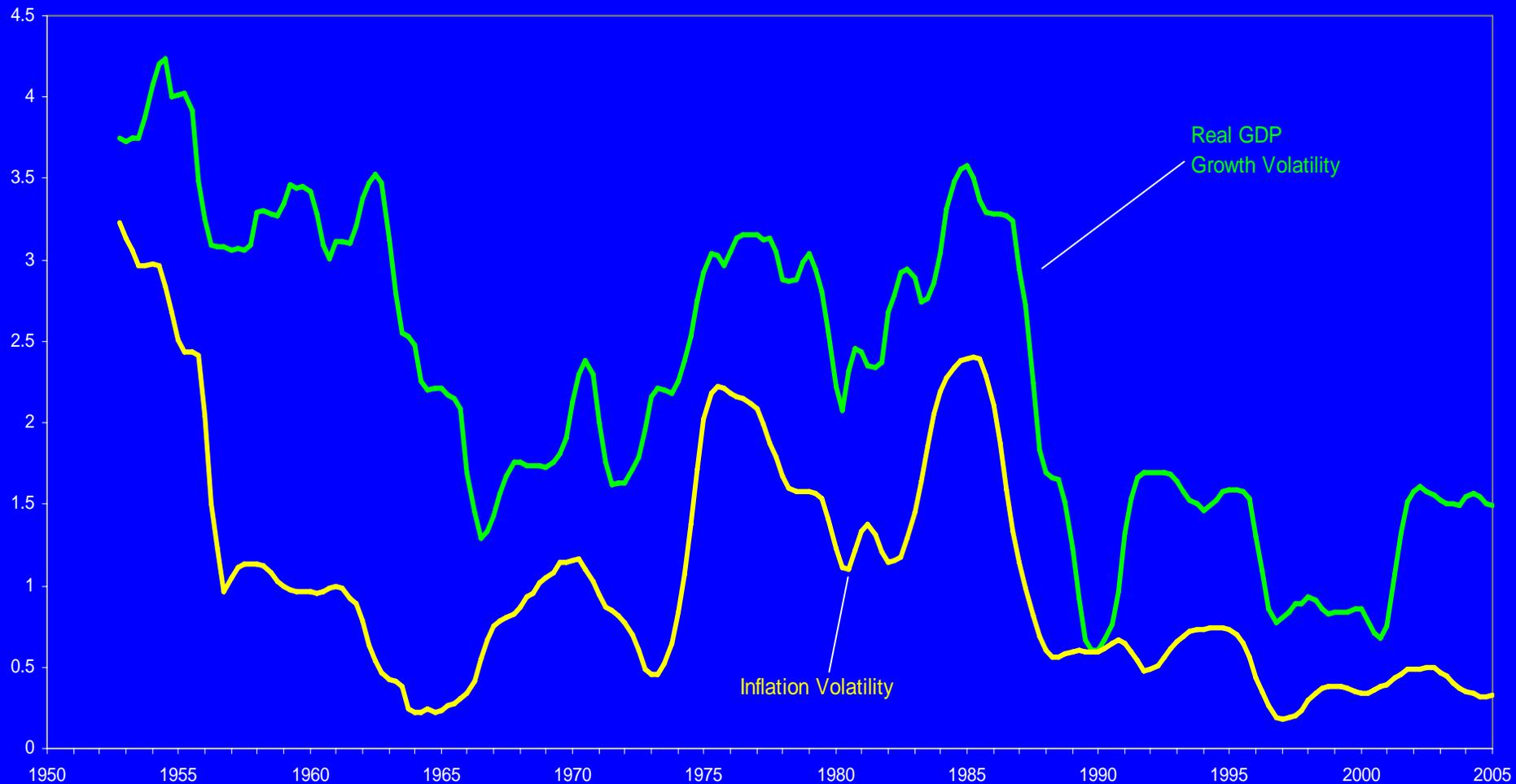
### ■ Supply shocks

## ■ Improved monetary policy

## ■ Of Lesser Importance

- Shifts in shares to services

# Inflation vs. Output Volatility: 20-quarter rolling standard deviation of 4-quarter growth rates



# Summary of inflation volatility vs. real GDP volatility (20 qtr st dev)

1952-72

1973-87

1988-2005

Real GDP	2.69	2.87	1.25
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GDP Deflator	1.11	1.67	0.48
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# Demand Side: Decomposition of GDP Contributions by 11 Sectors

Standard Deviations of 4-quarter Moving Averages of a Sector's Contribution to  $\Delta$  Real GDP

	1950-83	1984-2005	Diff	%
Real GDP	3.14	1.61	-1.53	100
Omit RS	2.78	1.44	-1.34	88
Omit II	2.44	1.33	-1.11	73
Omit Fed Govt	3.18	1.61	-1.57	103
Omit All 3	1.93	1.19	-0.74	48

# This Raises my First Question

- Inventory Change Accounts for 27%
- Inventory Changes, Residential Structures, and Federal Govt Account for 52%
- How Can a Paper That Covers only Manufacturing and Trade Account for most of the reduction in volatility?
- Consider the Possibility that the Shocks Feeding into their Structural Mechanism have Reduced Volatility

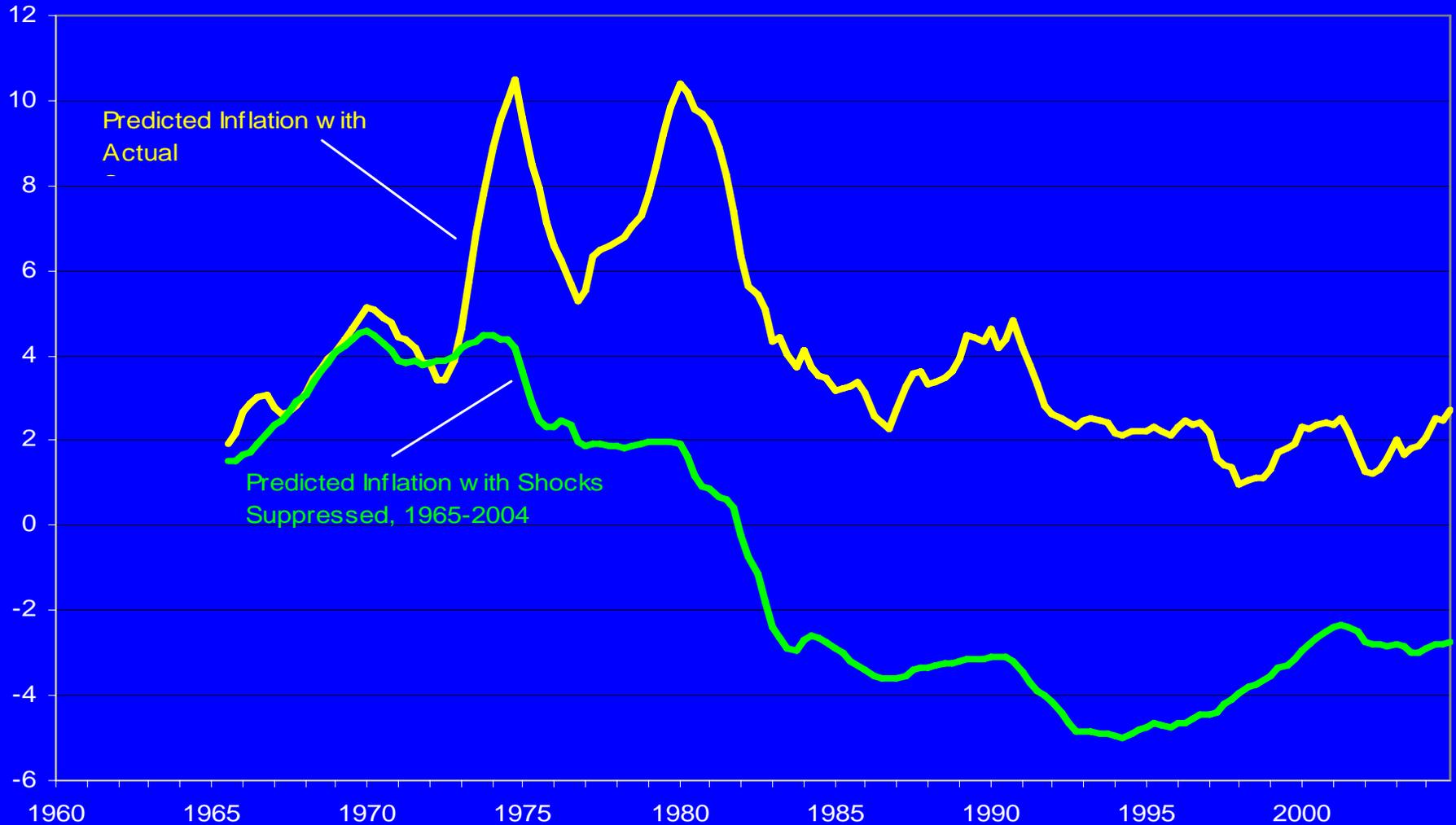
# Contrast their HAVAR with my Three Equation Model based on Stock-Watson

- Combines my “mainstream” or “triangle” approach to explaining inflation
  - Inertia
  - Demand through output or U gap
  - Specific supply shocks
- “Taylor Rule” equation for Fed Funds rate
  - Coefficients allowed to change, 1979 and 1990
- Output gap equation with feedback from interest rate changes
- Main difference from Stock-Watson (2002,2003) is the use of specific supply shock variables instead of stuffing them into the error term

# The Supply Shocks are Important and have been Neglected Here

- Everything is expressed as a relative rate of change. A zero value means no impact on aggregate inflation
- The list of four
  - Food-energy effect (difference headline vs. core inf)
  - Changes in relative price of imports
  - Changes in the productivity growth trend
  - Nixon-era price controls, “on-off” dummies adding to zero
- Next slide shows effect of suppressing all the supply shocks; all that’s left is effect of LDV and Ugap.

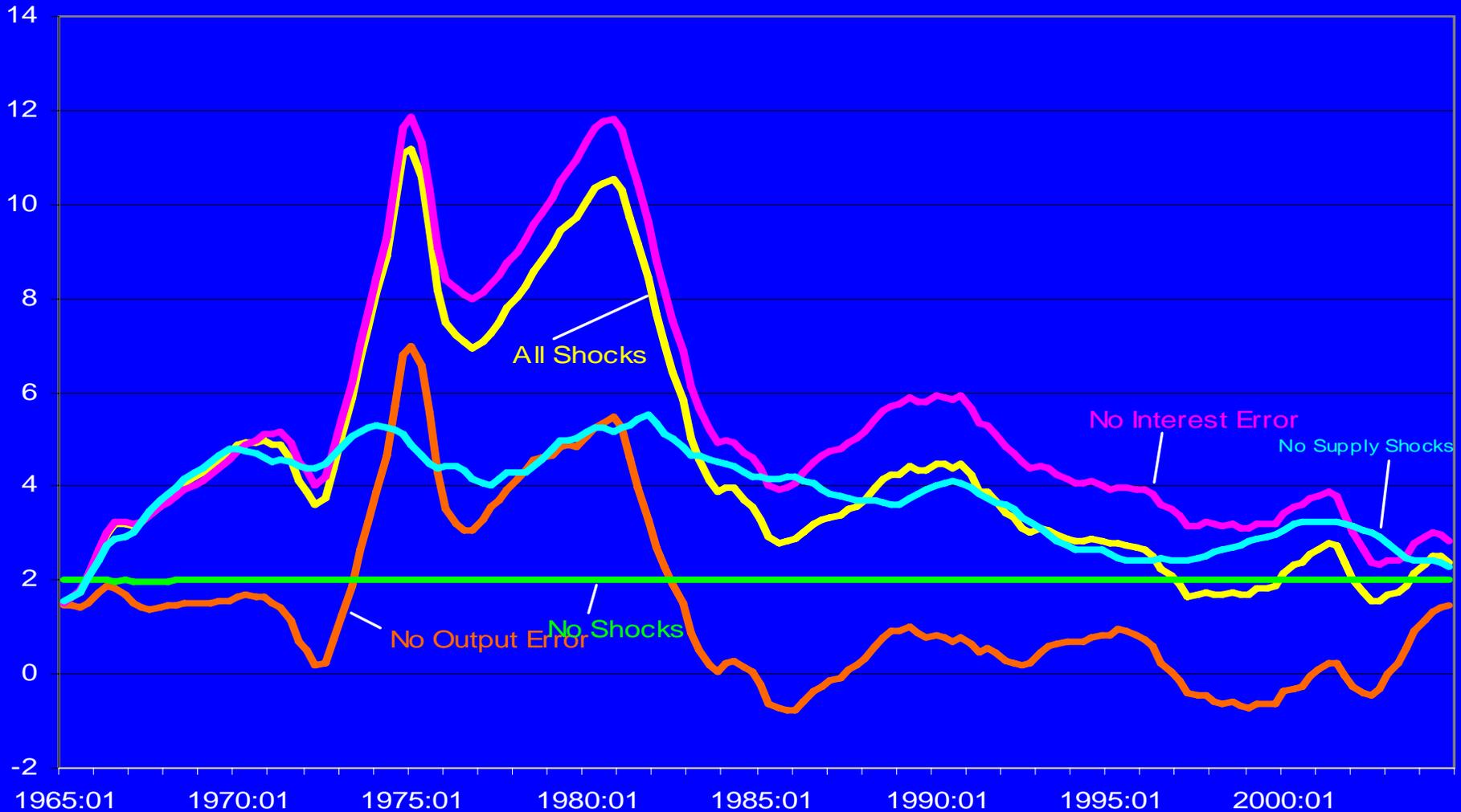
# The Dramatic Effect of Supply Shocks



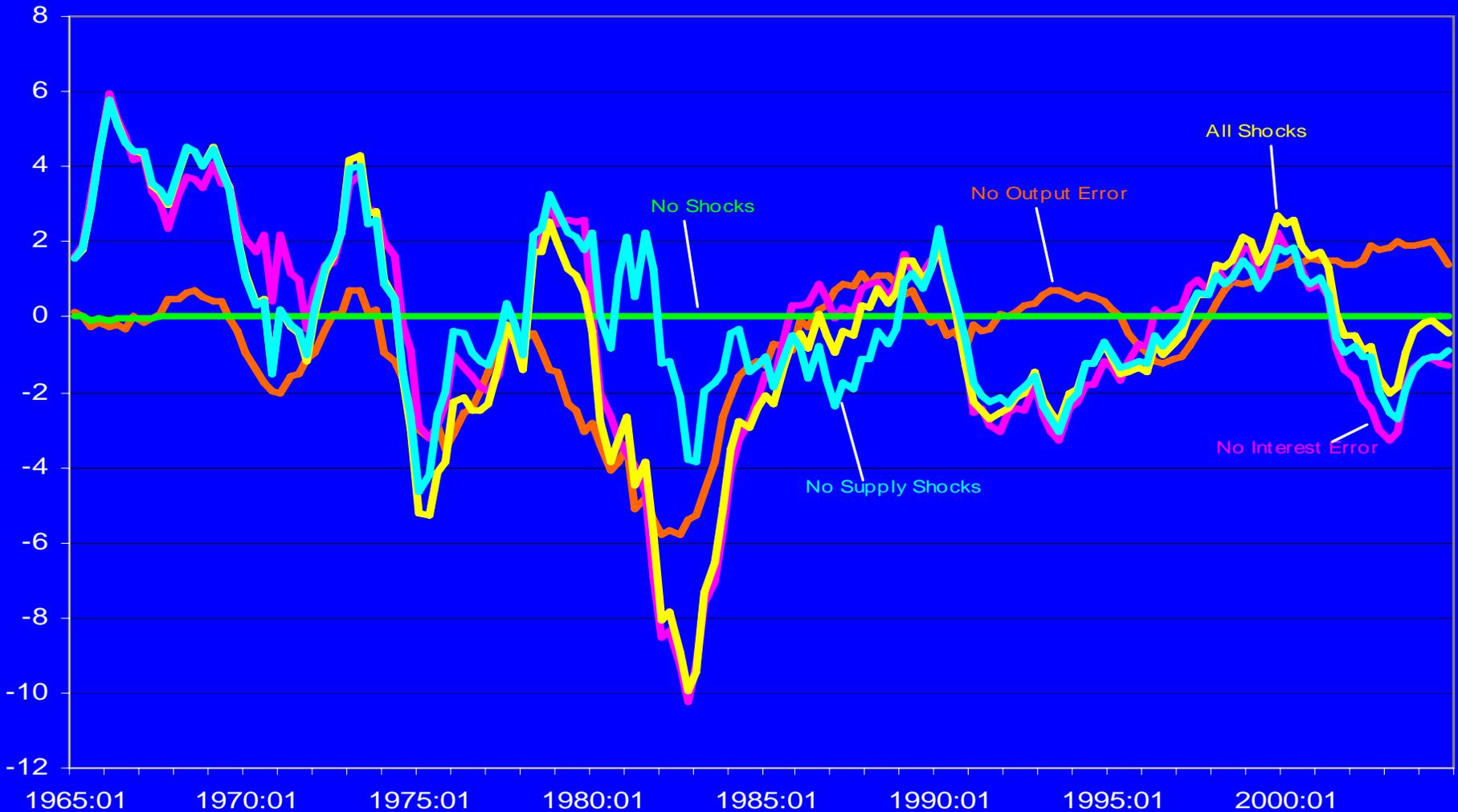
# Results from the No-SS Simulation

- The no-SS simulation is driven entirely by the LDV and the current and 4 lags on the unemployment gap
- No difference until 1973
- Without SS, inflation goes negative after 1982. But Volcker inflation-fighting would have been unnecessary without SS
- Difference narrows in late 1990s, why?

# Full Model Simulations: Here is Inflation



# The Basic Conclusion of the Paper: The Output Gap Simulations



# Conclusions

- Demand and Supply Shocks both Mattered
  - The Major Demand Shocks were Military Spending, Financial Institutions that Destabilized Residential Investment, and Primitive Inventory Management
  - The Major Supply Shocks were Import Prices (and Flexible Exchange Rates), Food-Oil Prices, Productivity Trend, and Nixon Controls

# Full-Model Simulations

- Comparing 1965-83 with 1984-2004
- Inflation Volatility
  - Reversal of SS Accounts for 80%, Output Error 20%
- Output Volatility
  - St Dev  $2/3$  explained by OE in both periods
  - SS contributed about  $1/3$  in first period

# Monetary Policy

- Big Surprise, Greenspan = Burns
- Narrow View: Many other changes
  - Credibility Because there was no inflation
  - Would have behaved differently if there had been more inflation
- Inflation-Output Gap Tradeoff Lives On
  - Greenspan policies throughout would have delivered 5 points higher inflation post-84
  - Output benefits only temporary

# Irvine-Schuh Conclude 80% Structural Change not “Good Luck”

- What does “Good Luck” Mean?
  - Switch of SS from bad to good is indeed “Good Luck”
  - But financial deregulation that reduced residential construction volatility is policy, not good luck
  - Reduced size and volatility of military spending is policy, not good luck
  - Improved inventory management results from technology, so “good luck” is a misnomer also

# Summary of Paper's Results

- Point of Departure, VAR
  - 21% of Great Moderation to Structural Change, 79% to “Good Luck”
- Their 3-sector HAVAR attributes 73% to Structural Change, only 27% left for Good Luck
- Since Improved Inventory Management is the top item on my list, I support the overall theme of their paper
- Qualification on p. 3: “A single, or even unified explanation, for the Great Moderation may be unlikely”
  - I agree, because I have already pointed to four explanations, not just one

# Consider the Auto Industry

- My Story, “changed structure” represents reduced macro volatility from other sources
- Faced with much reduced sales shocks, firms can and did manage inventories better
  - This can account for much of the reduced covariance between sales and inventories, between industry  $j$  and  $k$
- Don't forget 1970:Q4 GM strike, that huge spike in Figure 1. Yes, absence of auto strikes and labor strife is a structural change
- Good points in auto discussion: Dealers sell multiple brands, role of imports and exports
- Don't forget Toyota “pull vs. push” as foreign manufacturers invade US with a different system (Toyota operates with  $\frac{1}{2}$  the inventories per market share point, this week's WSJ)

# Interpreting this Paper: Impulse vs. Propagation Mechanisms

- By omitting any mention of military spending, residential construction, or inflation supply shocks, they “import unexplained” into their analytical structure at least half of the decline in output volatility
- All their metrics of reduced volatility are as a percentage of M&T variance, not total economy variance.
- By the way, why does data analysis extend only to 2001?

# Covariance between Sales and Inventory Investment (Table 3)

- What Table 3 shows is a radical decline in the late/early ratios in every row
- Variances and covariances declined in every row
- No evidence here for a change in structure, rather this seems compatible with some outside force reducing variance in sales which allowed reduction in variance of inventories and in covariance

# Advantages of HAVAR Model

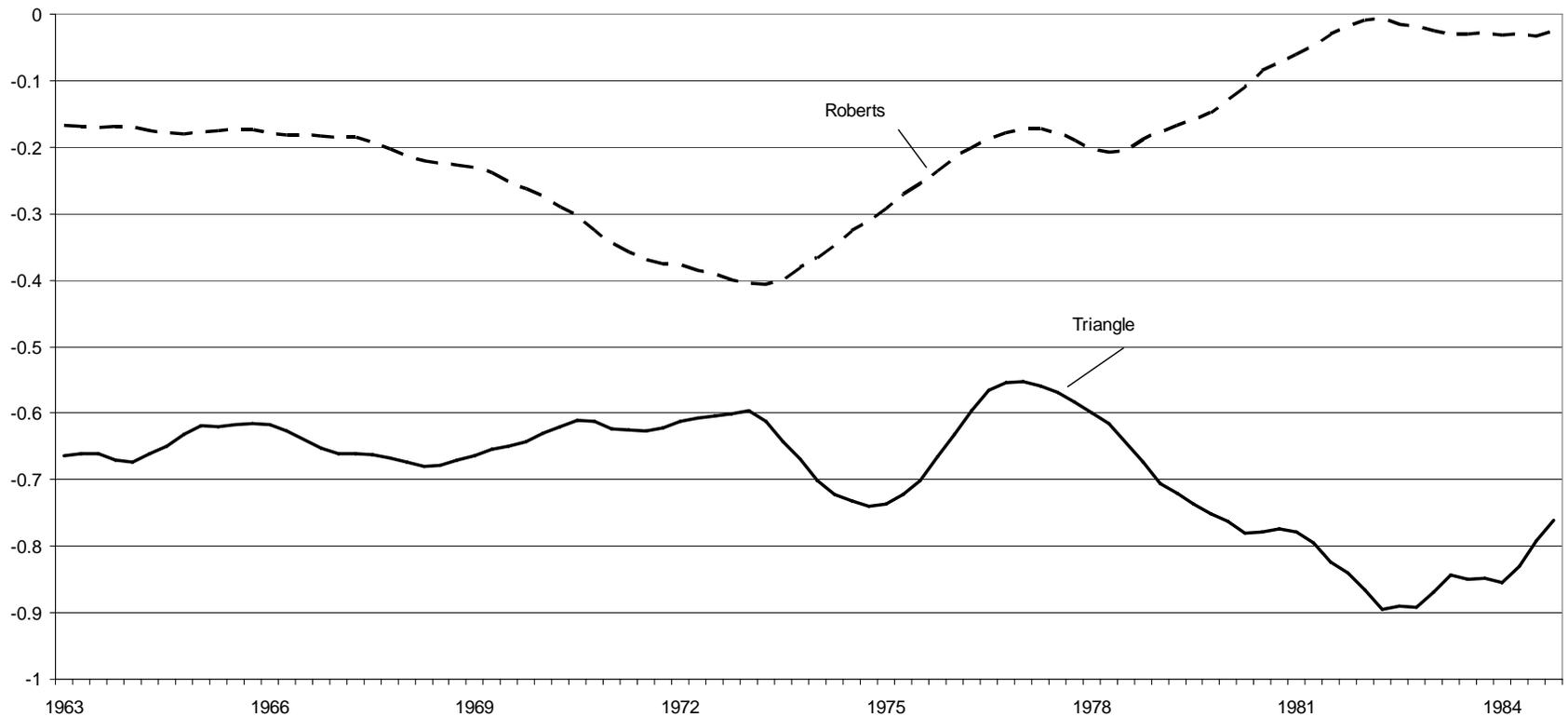
- Any Model that Nests other Models is Good
- Can Measure Significance of Implicit Restrictions
- However this works both ways
- My inflation model nests any simple VAR approach as in this paper

# The HAVAR inflation equation is nested in mine

- Like Stock-Watson, the inflation equation depends only on the output gap and Fed Funds rate
- All supply shocks are stuffed into the error term
- Short lags on lagged inflation
- Example of the flaws of this approach
  - Consider John Roberts of the Fed
  - Inflation depends on the unemployment gap and four lags of inflation

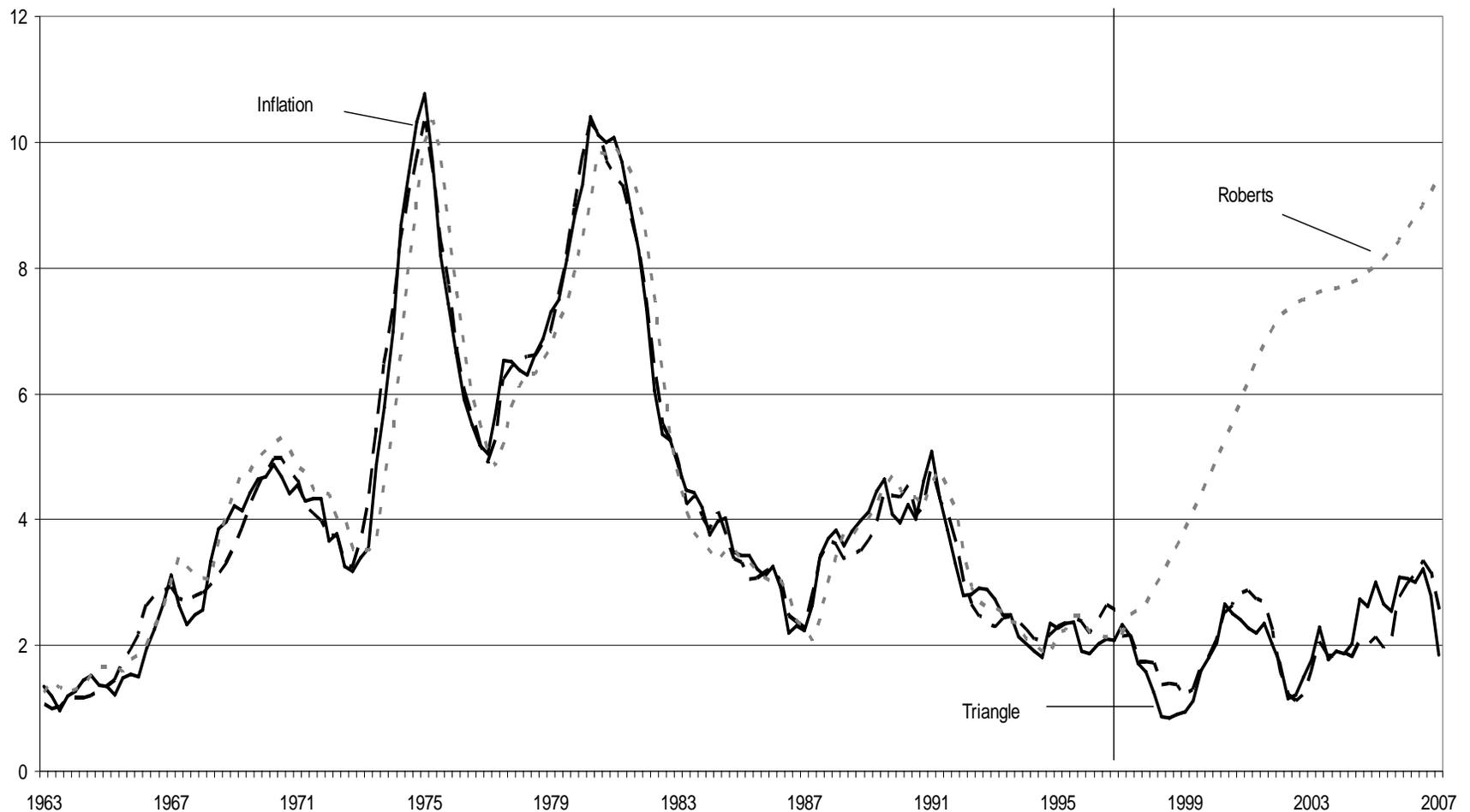
# Bias in Size and Drift of Phillips Curve Slope

Figure 9. Roberts Vs. Triangle Unemployment Coefficients on 90 Quarter Rolling Regressions from 1962:Q1 to 1984:Q3



# Post-Sample Dynamic Simulations

Figure 8. Predicted and Simulated Values of Inflation from Triangle and Roberts Equations 1962:Q1 to 2006:Q4



# Back to the HAVAR Structure

- Assumption (p. 17) that  $\Pi$  does not affect sales contemporaneously but sales do affect  $\Pi$
- This is violated by the everyday behavior of the auto industry
  - Overproduction leads to price incentives, interest rate incentives that directly increase sales
- Violated every day also in today's housing industry, where excess inventories lead to price reductions in order to stimulate sales
- Also conflicts with bottom p. 18 "inventories in one sector might plausibly affect sales in the other sector"

# Other Aspects of HAVAR

- Unlike Stock-Watson and others
  - No attempt to portray differences in monetary regimes
  - Other papers with this VAR structure allow for shifts of coefficients in the interest rate equation in 1979 and 1987 or 1990
- Discussion of sales persistence in autos
  - Not enough discussion of increased price flexibility
  - Price incentives and interest rate incentives

# General Conclusion

- Link with Gambetti-Gali paper
- My interpretation of hours-productivity correlation combines positive and negative correlation
- As overall volatility is reduced, the share of positive correlation is reduced that that of negative correlation increases
- Something like that may be happening in the structural dynamics of this paper