Quantifying the Forces Leading to the Collapse of GDP after the Financial Crisis

Robert E. Hall
Hoover Institution and Department of Economics
Stanford University

Structural and Cyclical Elements in Macroeconomics

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A key question today

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In this setting, the real interest rate is minus the rate of inflation.
RESPONSE TO SHOCK WITH STANDARD DMP LABOR MARKET
Extended DMP model

Unemployment depends negatively on the rate of inflation.
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The rest of the talk is about the mechanism underlying the negative dependence.
Equilibration with a Negative Dependence of DMP Unemployment on Inflation
Basic conclusion

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Thus, to explain the observation that inflation falls when unemployment rises by introducing a dependence of DMP unemployment on the inflation rate, the DMP labor-market curve must be flatter than the product-market curve.
Getting inflation into the wage-determination function

Walsh (2003): Sticky prices result in variations in market power, which enters the DMP model because higher market power lowers the revenue contribution of a worker.
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V. Ramey (2010) questions empirical evidence of
countercyclical variations in markups.

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No departure from strict rationality.
The U.S. economy in October 2008 and October 2009, while at the zero lower bound.

- **October 2008:**
  - Inflation: 1.9%
  - Unemployment: 6.6%

- **October 2009:**
  - Inflation: 1.5%
  - Unemployment: 10.1%

There is a 3.5 percentage point shift in the unemployment rate.
Inflation and Unemployment after the Crisis

Inflation rate, percent per year

Unemployment rate, percent

2008:4 through 2011:4

2007:1 through 2008:3

4.2 percentage point increase

0.63 percentage point decrease

0.0
0.5
1.0
1.5
2.0
2.5
3.0

0 2 4 6 8 10 12

Unemployment rate, percent

Inflation rate, percent per year
THE U.S. ECONOMY IN DECEMBER 2007 AND DECEMBER 2009

Inflation rate
Product market
October 2008: Inflation 1.9%, Unemployment 6.6%

Unemployment rate
Labor market
October 2009: Inflation 1.5%, Unemployment 10.1%
TWO TYPES OF HOUSEHOLDS

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\[ c_{I,t} = w_{t-1} n_{t-1} - (1 + r_{t-1}) v_{t-1} - \frac{\rho}{2} ([v_{t-1} - b_{t-1}]^+)^2 + v_t. \]
Financial friction

\[ f_t = \frac{1}{q_t} \left[ \alpha \frac{y_t}{k_t} + (1 - \delta)q_{t+1} \right] - 1 - r_t. \]
Borrowing by impatien
t household

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\[ b_t = v_t - x_t \]

.
Taylor rule

\[ r_{N,t} = [\tau_0 + \tau_\pi \pi_t - \tau_u u_t]^+ \]
Investment/GDP Ratio and Comprehensive Unemployment Rate, 2005 to 2022

Investment/GDP, left scale

Comprehensive unemployment rate, right scale
The Implied Values of the Financial Friction
Implied Values of the Tightening of the Borrowing Constraint as a Percent of Total Consumption
Model Solution with Financial Friction Only

Comprehensive unemployment rate

Actual and projected vs. Model solution with financial friction only
BURDEN OF DELEVERAGING AS A PERCENT OF CONSUMPTION