Beyond RBC models

- *From RBC to New Keynesian*

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Advanced Macro II

1. The Real Business Cycle paradigm:

- Fluctuations explained by technology shocks (Kydland-Prescott, 1982, Prescott 1986)

The revolutionary impact among academia:

Methodologically,

- DSGE models as a central tool
- FOCs replacing behavioral equations
- Rational expectation
- Quantitative aspects of modeling: calibration, simulation and evaluation.

Conceptually,

- The efficiency of business cycles.

  Equilibrium outcome – response to exogenous shocks.

  Efficient allocation.

  Implication – stabilization policies non-necessary.

- The importance of technology shocks as a source of economic fluctuations.

  TFP measured by Solow residual, the only driving force.

- The limited role of monetary factors.

Limited impact on central banks and policy institutions

Classical monetary model (RBC+monetary sector)

Neutrality of monetary policy->Friedman Rule (zero *i*)

Contradiction to:

- Common belief: influence to output and employment.
- Empirical challenges: non-neutrality

Irrelevancy to policy evaluation:

Normative implication vs. policy practice

2. The New Keynesian Models

- - *Go beyond RBC framework*

RBC	New Keynesian
Microfoundations(agents/firms)	√
DSGE	√
All market frictionless and perfect competition	Imperfections in goods market (monopolistic comp.)
Price adjust instantaneously	Nominal rigidities (p, w)
Technology shocks	√ + other shocks and transmission mechanisms

New ingredients:

- Monopolistic competition:

$$p^m > p^c,\ y^m < y^c$$

- Nominal rigidities:

Staggered p/w settings.

- Short run non-neutrality of monetary policy

New to RBC, but old to Keynesian (static, reduced form analysis)

Resulting differences w.r.t. RBC:

- Inefficient response to shocks

- Nominal rigidities(distortion)

  -> non-neutrality of monetary policy

  -> room for policy intervention

- Policy analysis and evaluation

Evidence of nominal rigidities

U.S. micro data

Taylor (1999): average frequency of price adjustment about 1 year.

Bils and Klenow (2004): 350 product categories, 4-6 months

Nakamura and Steinsson (2006): adjusting for sales, 8-11 months.

Heterogeneity of frequency across sectors/types of goods.

Unprocessed food, energy vs. services. Bils&Klenow(2004)

TABLE 2
MONTHLY FREQUENCY OF PRICE CHANGES FOR SELECTED CATEGORIES

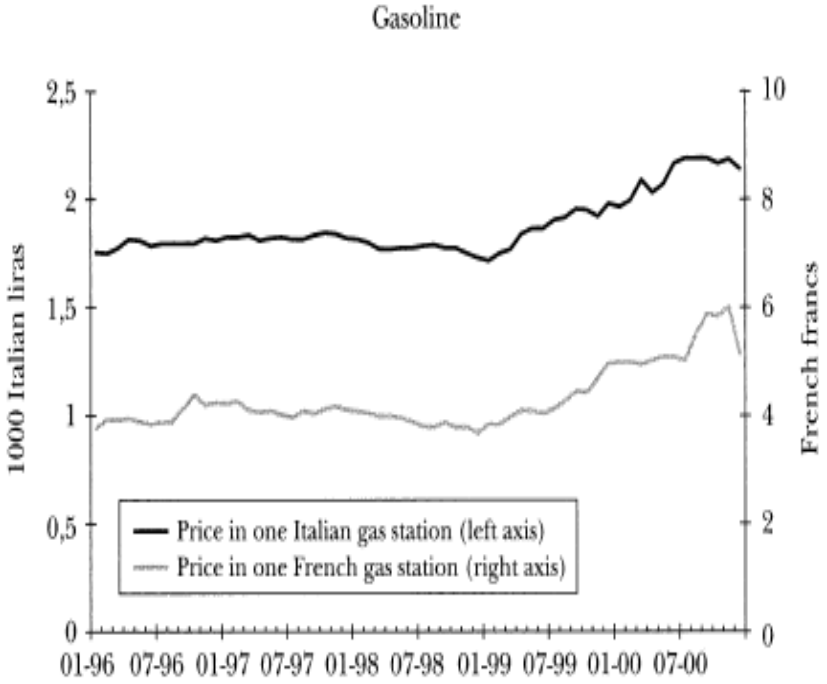
	Price Quotes with Price Changes (%) (1)	Price Quotes with Price Changes, Excluding Observations with Item Substitutions (%) (2)
All goods and services	26.1 (1.0)	23.6 (1.0)
Durable goods	29.8 (2.5)	23.6 (2.5)
Nondurable goods	29.9 (1.5)	27.5 (1.5)
Services	20.7 (1.5)	19.3 (1.6)
Food	25.3 (1.8)	24.1 (1.9)
Home furnishings	26.4 (1.8)	24.2 (1.8)
Apparel	29.2 (3.0)	22.7 (3.1)
Transportation	39.4 (1.8)	35.8 (1.9)
Medical care	9.4 (3.2)	8.3 (3.3)
Entertainment	11.3 (3.5)	8.5 (3.6)
Other	11.0 (3.3)	10.0 (3.3)
Raw goods	54.3 (1.9)	53.7 (1.7)
Processed goods	20.5 (.8)	17.6 (.7)

SOURCE.—U.S. Department of Labor (1997).

NOTE.—Frequencies are weighted means of category components. Standard errors are in parentheses. Durables, nondurables, and services coincide with U.S. NIPA classifications. Housing (reduced to home furnishings in our data), apparel, transportation, medical care, entertainment, and other are BLS major groups for the CPI.

Europe:

Dhyne et al.(2006): Frequency similar to NS2006.



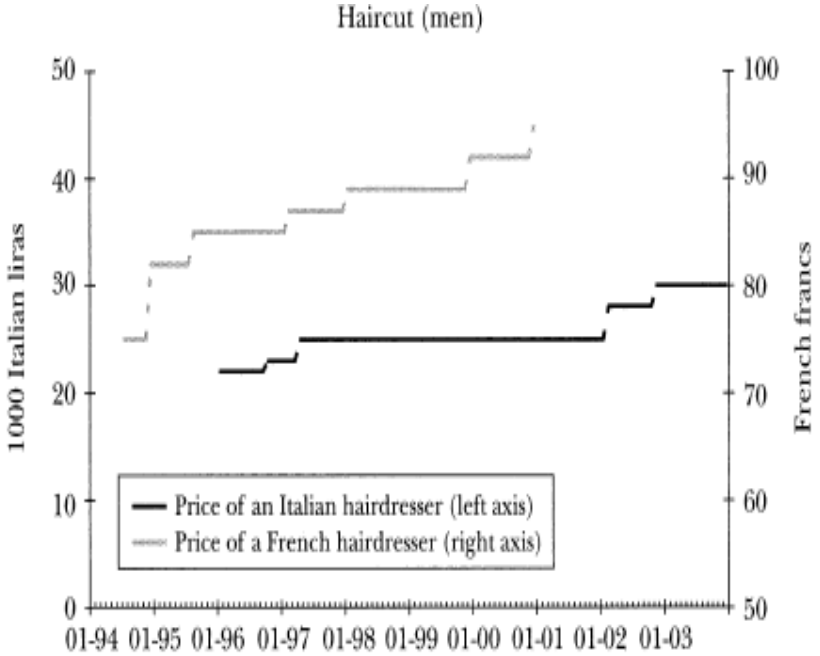


Table 3

Frequency of Price Changes by Product Types[a]

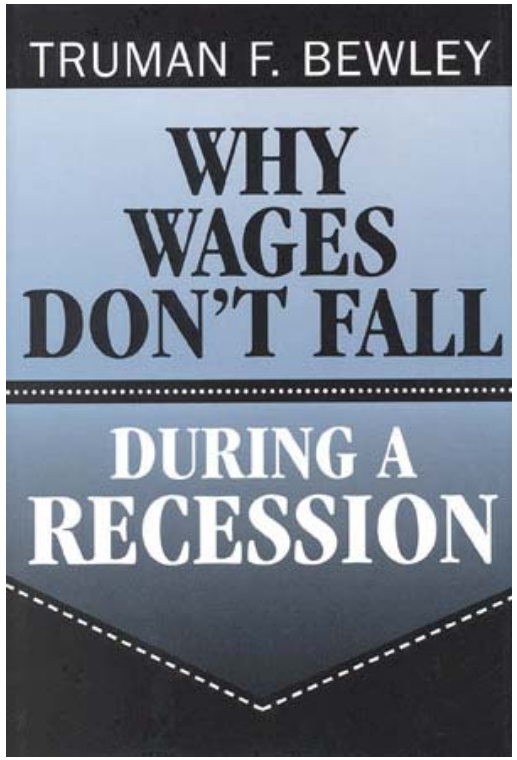
	Unprocessed food	*Processed food*	*Energy (oil products)*	*Non-energy industrial goods*	*Services*	*Total[b] country weights*	*Total[c] euro area weights*
Austria	37.5	15.5	72.3	8.4	7.1	15.4	17.1
Belgium	31.5	19.1	81.6	5.9	3.0	17.6	15.6
Germany	25.2	8.9	91.4	5.4	4.3	13.5	15.0
Spain[d]	50.9	17.7	n.a.	6.1	4.6	13.3	11.5
Finland	52.7	12.8	89.3	18.1	11.6	20.3	—
France	24.7	20.3	76.9	18.0	7.4	20.9	20.4
Italy	19.3	9.4	61.6	5.8	4.6	10.0	12.0
Luxembourg	54.6	10.5	73.9	14.5	4.8	23.0	19.2
Netherlands	30.8	17.3	72.6	14.2	7.9	16.2	19.0
Portugal	55.3	24.5	15.9	14.3	13.6	21.1	18.7
Euro area	28.3	13.7	78.0	9.2	5.6	15.1	15.8
United States	47.7	27.1	74.1	22.4	15.0	24.8	27.2

Sources: National central bank calculations on data from the national statistical institutes.

Similar for wages as prices.

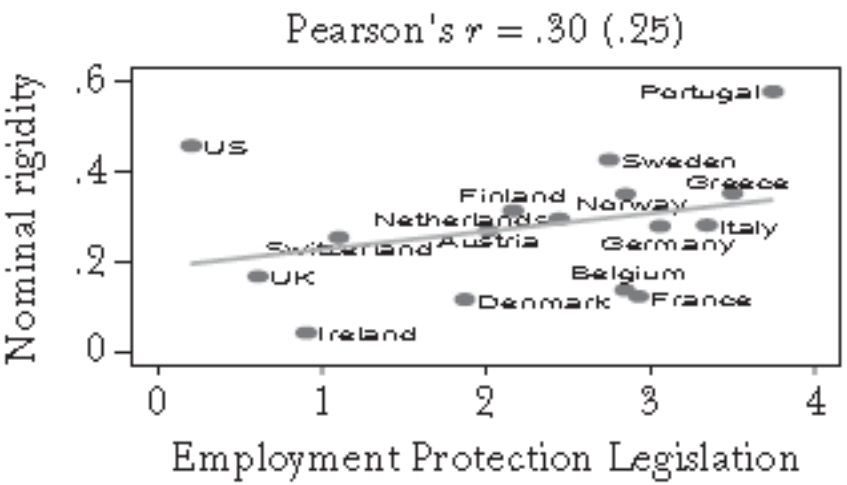
Taylor (1999): 1 year.

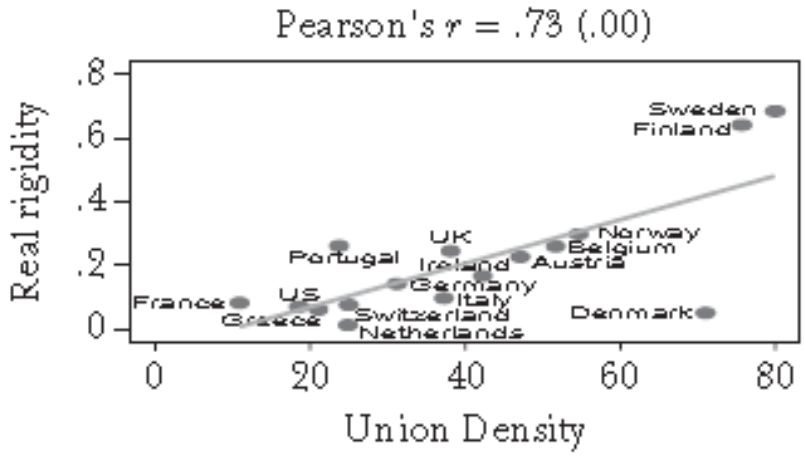
Bewley (1999): “Why wages don’t fall during a recession?”
Firms’ wage policy, downward nominal wage rigidities.



Dickens et al. (2007): multicountry study, downward nominal and real wage regidities.

28% (26%) workers covered by downward nominal (real) rigidities



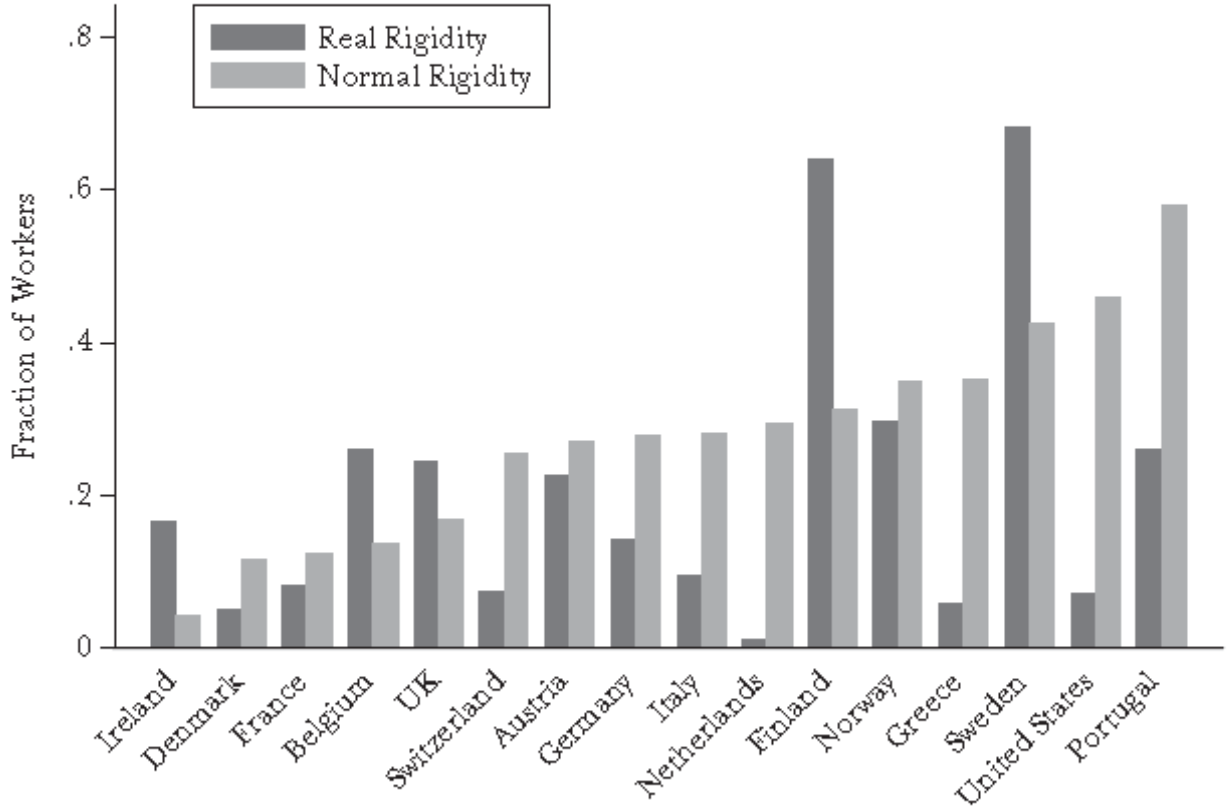


slation: OECD (2004), Corporatism and Union

Figure 3

Real and Nominal Rigidity by Country

(fraction of workers potentially affected)



Note: The table shows the fraction of worker in each country potentially affected by downward real and nominal wage rigidity.

Figure 2

Wage Change Distribution for All Countries and Years

Figure 2a: Nominal Wage Change

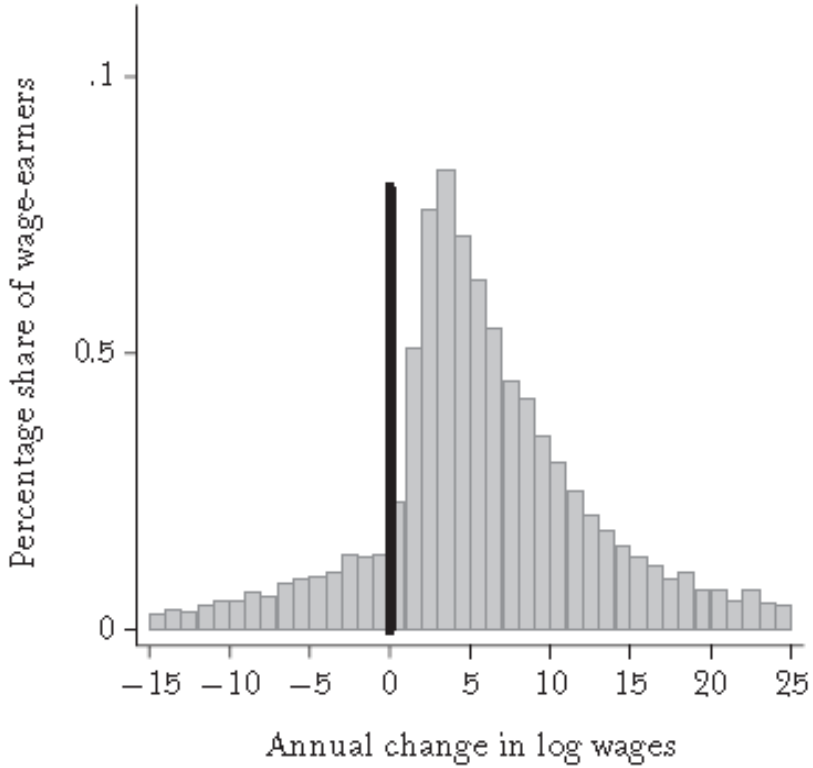


Figure 2b: Wage Change Centered on Median

Evidence of monetary policy non-neutrality

A natural consequence of nominal rigidities.

Change of real balance M/P

Change of real interest rate: r = i – dp

⇨ Change of aggregate demand => employment, output

Effects of monetary policy intervention:

Quantitative relevance

Identification of monetary policy shock

- Endogenous movement: deliberate response to developments in the economy -> comovement
- Exogenous: identification with structural VAR

e.g. residuals from a policy rule (assumption: GDP or price indices cannot respond contemporaneously to a monetary policy shock, OLS regression applies.)

TABLE 1

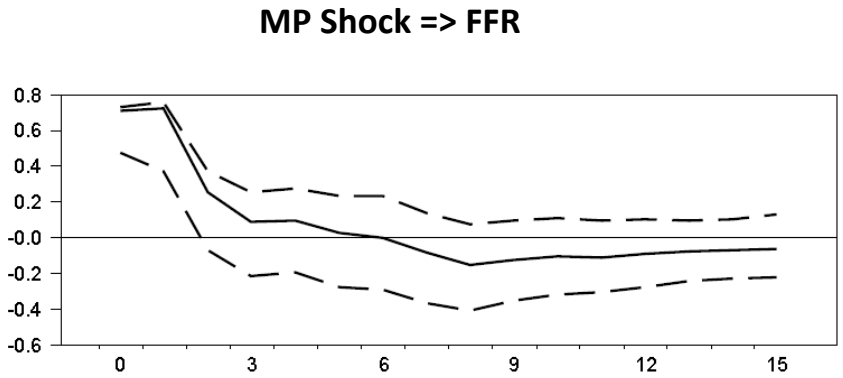
PERCENTAGE VARIANCE DUE TO MONETARY POLICY SHOCKS

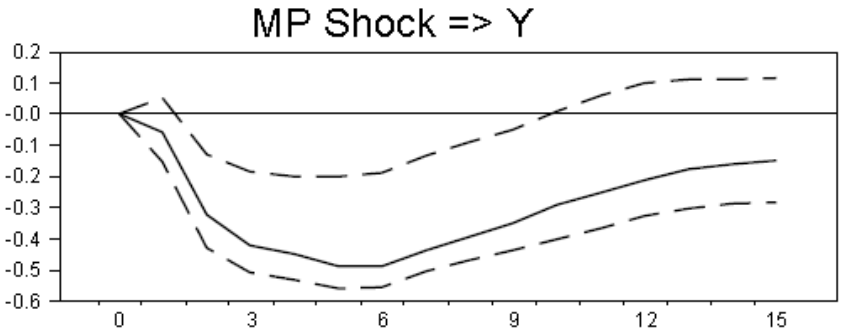
	4 Quarters Ahead	8 Quarters Ahead	20 Quarters Ahead
Output	15	38	27
	(4,26)	(15,48)	(9,35)
Inflation	1	4	7
	(0,8)	(1,11)	(3,18)
Consumption	14	21	14
	(4,26)	(5,37)	(4,26)
Investment	10	26	23
	(2,21)	(7,39)	(6,32)
Real wage	2	2	4
	(0,8)	(0,14)	(0,15)
Productivity	15	14	10
	(3,25)	(3,26)	(3,20)
Federal funds rate	32	19	18
	(18,44)	(8,27)	(5,27)
M2 growth	19	19	19
	(8,29)	(8,26)	(8,24)
Real profits	13	18	7
	(5,25)	(6,31)	(2,20)

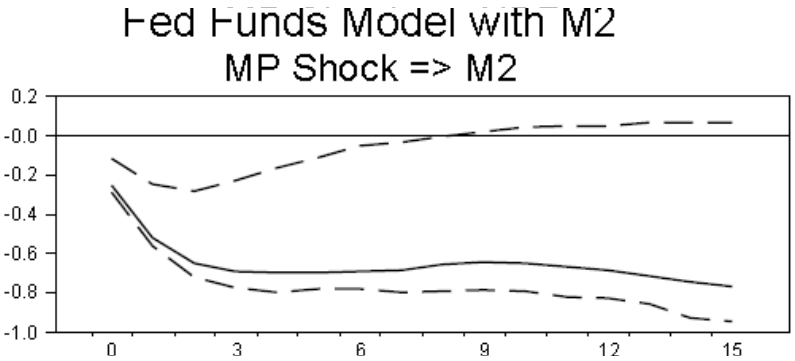
NOTE.—Numbers in parentheses are the boundaries of the associated 95 percent confidence interval.

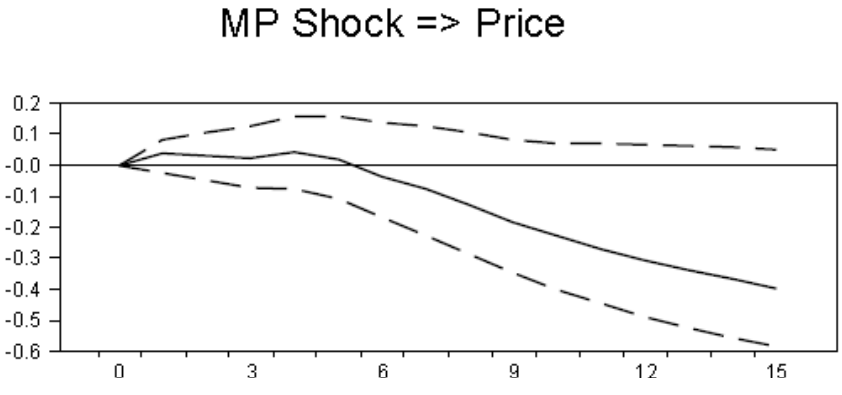
CEE(2005)

Estimated Dynamic Response to a Monetary Policy Shock (CEE 1999)









Quarterly data.

Tightening of MP, Real effect to Y, Sluggish response of price, liquidity effect of money supply to increase in FFR.