DISCUSSION OF:

LARGE AND STATE-DEPENDENT EFFECTS OF QUASI-RANDOM MONETARY EXPERIMENTS

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The Question

What is the causal effect of monetary policy?

- Empirical challenge:
  - Monetary policy is endogenous
  - Central banks employ legions of economists to pour over every little detail of the data
- Most common existing approaches to identification:
  - Controlling for things (VARs, Romer-Romer 04)
  - High frequency identification

An IV Approach

Trilemma instrument:

- Countries with fixed exchange rate and open capital accounts are forced to track base country interest rate movements
- Use base country interest rate movements as an instrument

Empirical Specification

$$y_{i,t+h} - y_{i,t-1} = \alpha_i^h + \Delta r_{i,t}\gamma_h + \boldsymbol{x}_{i,t}^*\boldsymbol{\beta}_{i,t}^* + \eta_{i,t+h}$$

- Instrument for $\Delta r_{i,t}$ with:

$$(\Delta r_{b(i),t}^* - \widehat{\Delta r^*}_{b(i),t}) \times PEG_{i,t} \times PEG_{i,t-1} \times KOPEN_{i,t}$$

- Controls: contemporaneous + 2 lags of change in:
  - GDP, C, I, CPI
  - short-rate, long-rate
  - house prices, stock prices
  - credit to GDP, world GDP

  (excluding dependent and independent variables, of course)
- Annual data on 17 countries from 1870 to 2013 (mostly post-WWII)

Main Result

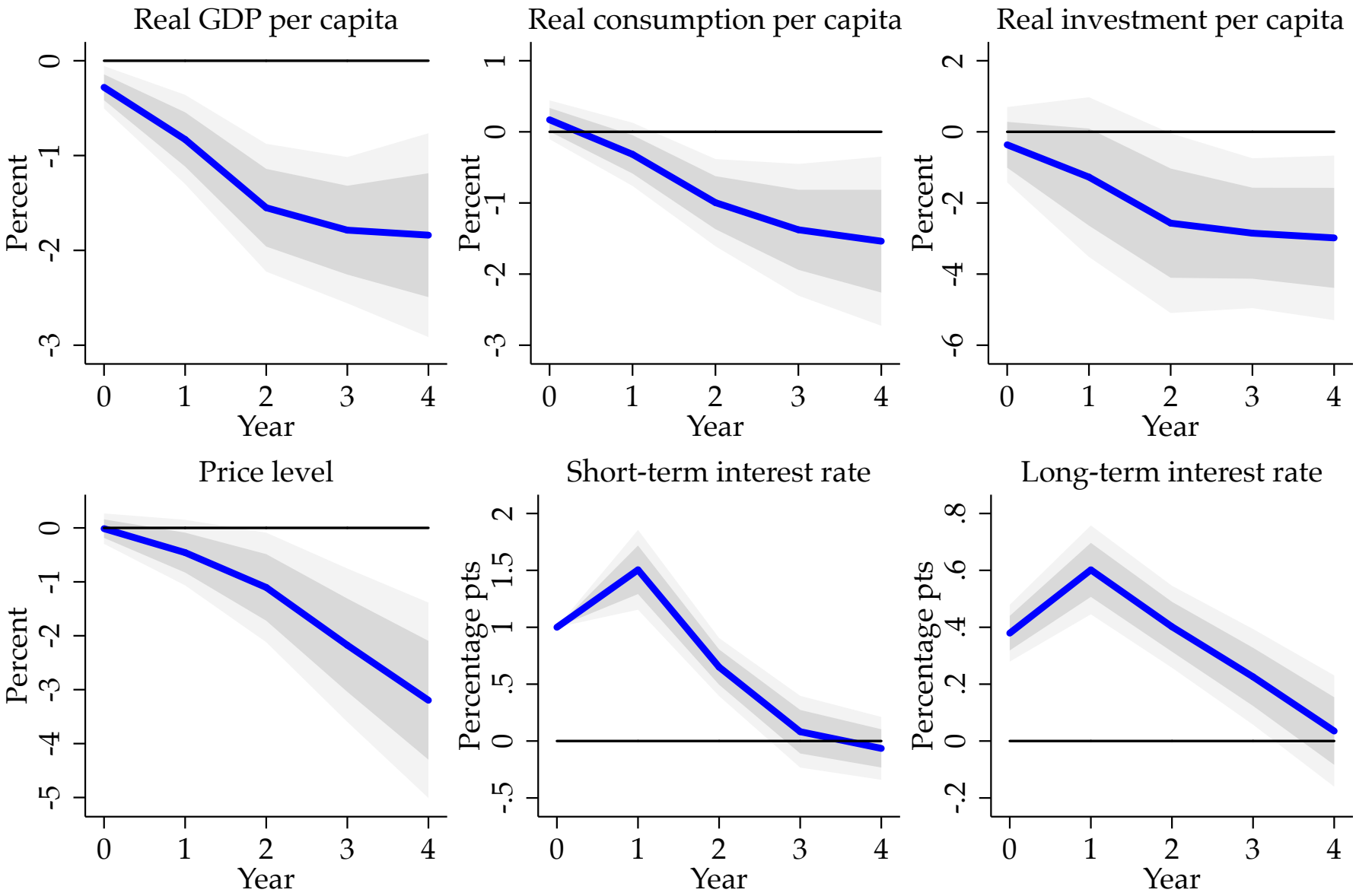
Table 4: *LP-OLS vs. LP-IV. Attenuation bias of real GDP per capita and CPI price responses to interest rates. Trilemma instrument. Matched samples*

Responses at years 0 to 4 (100× log change from year 0 baseline).

(a) Full sample	*Output response*		*OLS=IV*	*Price response*		*OLS=IV*
Year	LP-OLS	LP-IV	p-value	LP-OLS	LP-IV	p-value
	(1)	(2)	(3)	(4)	(5)	(6)
$h = 0$	0.10*	-0.22*	0.01	0.09	-0.22	0.11
	(0.04)	(0.13)		(0.05)	(0.20)	
$h = 1$	-0.16	-1.05***	0.00	0.22**	-0.70**	0.01
	(0.10)	(0.23)		(0.10)	(0.33)	
$h = 2$	-0.19	-2.00***	0.00	0.11	-1.61***	0.00
	(0.15)	(0.35)		(0.14)	(0.44)	
$h = 3$	-0.21	-2.31***	0.00	-0.08	-2.91***	0.00
	(0.19)	(0.44)		(0.22)	(0.70)	
$h = 4$	-0.06	-2.97***	0.00	-0.17	-3.88***	0.00
	(0.22)	(0.63)		(0.32)	(0.92)	
KP weak IV		48.14			42.76	
$H_0 : LATE = 0$		0.00			0.01	
Observations	667	667		667	667	

Main Result: post-WWII

(b) Post-WW2	(1)	(2)	(3)	(4)	(5)	(6)
$h = 0$	0.06*	-0.03	0.31	0.07	0.19	0.45
	(0.03)	(0.08)		(0.05)	(0.16)	
$h = 1$	-0.13	-0.90***	0.00	0.18**	0.10	0.78
	(0.10)	(0.24)		(0.08)	(0.29)	
$h = 2$	-0.20	-1.89***	0.00	0.09	-0.50	0.11
	(0.14)	(0.37)		(0.13)	(0.37)	
$h = 3$	-0.23	-2.03***	0.00	-0.13	-1.35***	0.01
	(0.17)	(0.42)		(0.22)	(0.45)	
$h = 4$	-0.15	-2.62***	0.00	-0.30	-1.96***	0.00
	(0.21)	(0.63)		(0.33)	(0.57)	
KP weak IV		37.03			33.86	
$H_0 : LATE = 0$		0.00			0.01	
Observations	522	522		522	522	


Real GDP per capita
Percent
0
-1
-2
-3
0
1
2
3
4
Year
Real consumption per capita
Percent
1
0
-1
-2
-3
0
1
2
3
4
Year
Real investment per capita
Percent
2
0
-2
-4
-6
0
1
2
3
4
Year
Price level
Percent
0
-1
-2
-3
-4
-5
0
1
2
3
4
Year
Short-term interest rate
Percentage pts
2
1.5
1
.5
0
-.5
0
1
2
3
4
Year
Long-term interest rate
Percentage pts
.8
.6
.4
.2
0
-.2
0
1
2
3
4
Year

Observations

- Relatively few pre-WWII observations
- Price response smaller in post-WWII sample
- Output response looks permanent?
- Important to look at path of short rate to be able to interpret response of output
- Large deviation from expectations hypothesis (long rate rises between year 0 and 1)

Correlated Shocks

Exclusion restriction:

- Base country interest rate shock **only** affects home country output through home country interest rates

Main threat to identification: **Correlated shocks**

- Base country raises rates because of good news in that country
- Good news may be correlated across countries
- Makes sense to fix exchange rate to country you share shocks with

CORRELATED SHOCKS: "UNANTICIPATED SHOCKS"

$$(\Delta r^*_{b(i),t} - \widehat{\Delta r^*}_{b(i),t}) \times PEG_{i,t} \times PEG_{i,t-1} \times KOPEN_{i,t}$$

- Instrument is "Taylor rule error"
  (i.e., change not explained by observables)
- Unconvincing for same reason as VAR is unconvincing
  (monetary policy responds to many things than are not controlled for)

Correlated Shocks: Aggregate Shocks

- Authors control for world GDP
- Why not include time fixed effects?
  (i.e., non-parametrically control for all aggregate variables)

- Would be better, but still not necessarily enough:
  - Countries may share **regional** and **sectoral** shocks
  - Not just world shocks

Correlated Shocks: Direction of Bias

- Most shocks should cause upward bias
  - Good news in base correlated with good news at home
  - Demand shocks, shocks to natural rate
- In this case, true effects even bigger than (already large) effects estimated by authors

- Exception: Cost push shocks

Source of Identification

- Author's sample: country-year observations categorized as pegs
- If all pegs were idealized open capital account pegs, first stage $R^2 = 1$
- Difference between OLS and IV come from deviation from this ideal

- Authors are not using floats as a control group

Alternative Specification

- Include floats in sample and include time fixed effects
- New instrument: base interest rate interacted with float/peg dummies
- Idea for identification:
  - Suppose float vs. peg status is randomly assigned
  - Base country does not $\uparrow \Delta r^*_{b(i),t}$ when pegs doing well relative to floats
  - $\uparrow \Delta r^*_{b(i),t}$ differentially increases rates for pegs versus floats
  - This is then exogenous variation in monetary policy
  - Look at how much more output falls for pegs versus floats
- Identification comes from comparing pegs to floats

Post-Treatment Controls

- Authors include contemporaneous controls
- But contemporaneous variables may be affected by shock
- Controlling for some of the effect!

  (e.g., effect on $y_{i,t}$ controlling for $c_{i,t}$ and $i_{i,t}$)

- Authors want to be close to VAR timing assumption
- Under this assumption $r_{i,t}$ affects $y_{i,t}$ but not vis-versa
  (strong assumption at annual frequency)
- Benefit: Can control for more stuff
- If not true, identification potentially messed up

LATE versus ATE

- Authors worry a lot about LATE versus ATE
  - LATE: Effect of interest rates for pegs
  - ATE: Average effect of interest rates for all countries
- But not obvious to me why LATE $\neq$ ATE
- Large effects presumably reflect some sort of price adjustment frictions
- Not obvious why pegs would be special in this regard
- Exchange rate channel may cause difference. But is this first order?

Comparison with Romer-Romer 04 Instrument

(a) RRCH IV	*Output response*	
Year	LP-OLS (1)	LP-IV (2)
$h = 0$	0.11	0.39***
	(0.03)	(0.16)
$h = 1$	-0.25	-0.23
	(0.20)	(0.23)
$h = 2$	-0.74	-0.57
	(0.14)	(0.53)
$h = 3$	-1.19*	-0.69
	(0.10)	(0.82)
$h = 4$	-0.97*	0.14
	(0.11)	(0.89)
KP weak IV		13.12
$H_0 : LATE = 0$	0.00	0.00
Observations	71	71

(b) Trilemma IV	(1)	(2)
$h = 0$	0.04	0.00
	(0.02)	(0.09)
$h = 1$	-0.12	-0.85***
	(0.13)	(0.22)
$h = 2$	-0.16	-1.61***
	(0.18)	(0.32)
$h = 3$	-0.15	-1.57***
	(0.21)	(0.37)
$h = 4$	-0.08	-1.49***
	(0.25)	(0.37)
KP weak IV		16.63
$H_0 : LATE = 0$	0.05	0.00
Observations	372	372

(RR instrument updated for US and UK by Cloyne-Hurtgen 14)

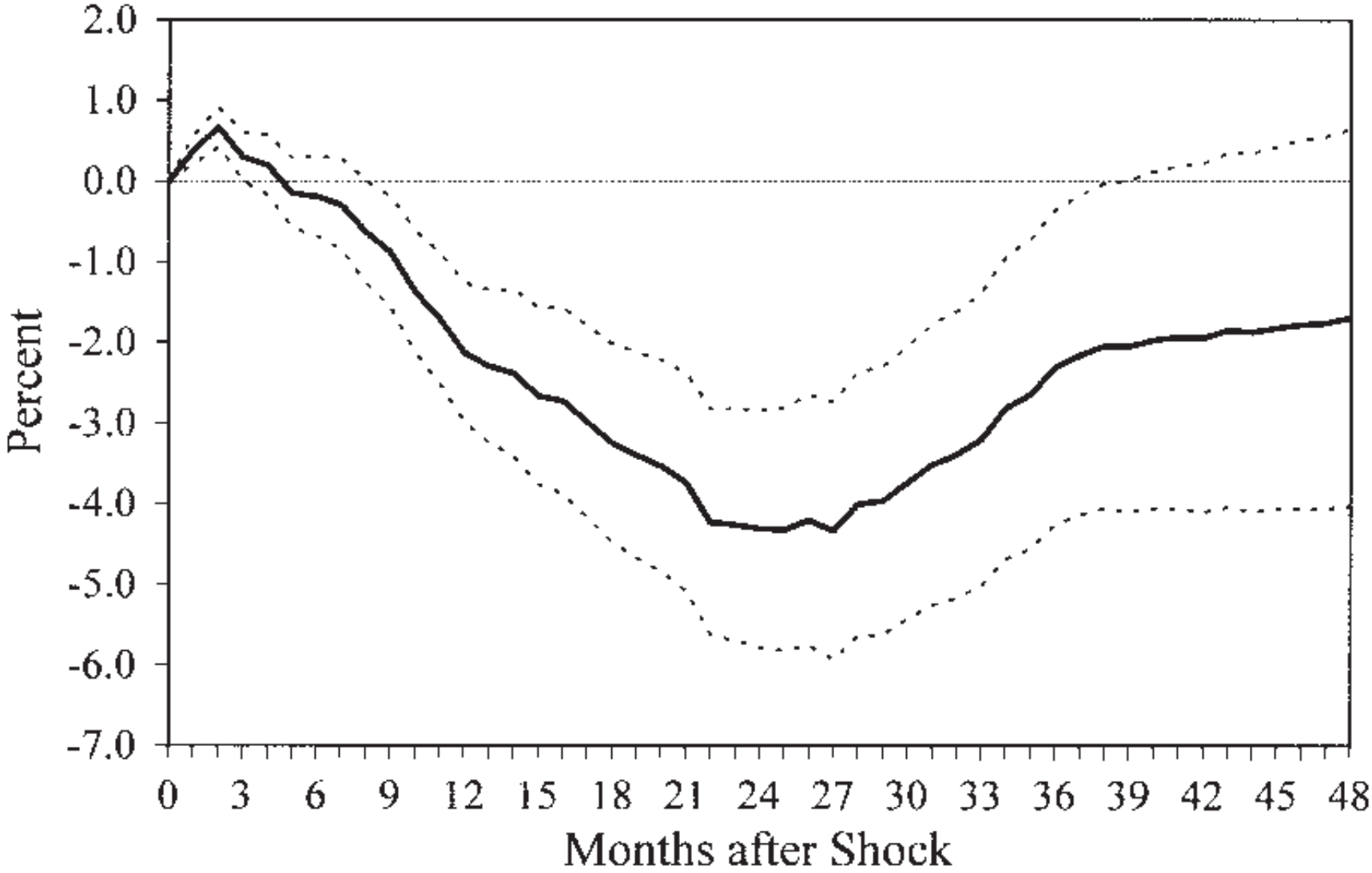


FIGURE 2. THE EFFECT OF MONETARY POLICY ON OUTPUT

Source: Romer-Romer 04

WHY SO DIFFERENT?

Results using RR instrument very different from RR results. Why?

- Different sample?
  - Includes UK
  - Updates sample period to the present
- Different data frequency (annual versus monthly)?
- Different specification?
  - Romer-Romer's specification is more like a VAR

$$\Delta y_t = a_0 + \sum_{k=1}^{11} a_k D_{kt} + \sum_{i=1}^{24} b_i \Delta y_{t-i} + \sum_{j=1}^{36} c_j S_{t-j} + e_t$$

  - Coibion 12 shows that RR output response is sensitive to number of lagged dependent variables included

▸ Prices

Conclusion

- Very nice contribution to empirical literature on monetary non-neutrality

- What would I do differently:
  1. Drop contemporaneous controls
  2. Add floats to sample and include time fixed effects
  3. Instrument based on differential sensitivity of peg vs. float interest rates to base interest rates

Appendix

Comparison with Romer-Romer 04 Instrument

(a) RRCH IV

Year	*Price response* LP-OLS (4)	LP-IV (5)
$h = 0$	0.12	0.43*
	(0.13)	(0.23)
$h = 1$	0.47	0.83**
	(0.13)	(0.33)
$h = 2$	0.65**	0.79
	(0.02)	(0.62)
$h = 3$	0.08	-0.59
	(0.39)	(1.04)
$h = 4$	-0.51	-2.52*
	(0.69)	(1.42)
KP weak IV		12.85
$H_0 : LATE = 0$	0.00	0.00
Observations	71	71

(b) Trilemma IV

	(4)	(5)
$h = 0$	0.07	0.16
	(0.05)	(0.13)
$h = 1$	0.18	0.04
	(0.10)	(0.26)
$h = 2$	0.10	-0.69*
	(0.14)	(0.41)
$h = 3$	-0.08	-2.17***
	(0.21)	(0.60)
$h = 4$	-0.17	-3.49***
	(0.34)	(0.81)
KP weak IV		15.35
$H_0 : LATE = 0$	0.01	0.00
Observations	372	372

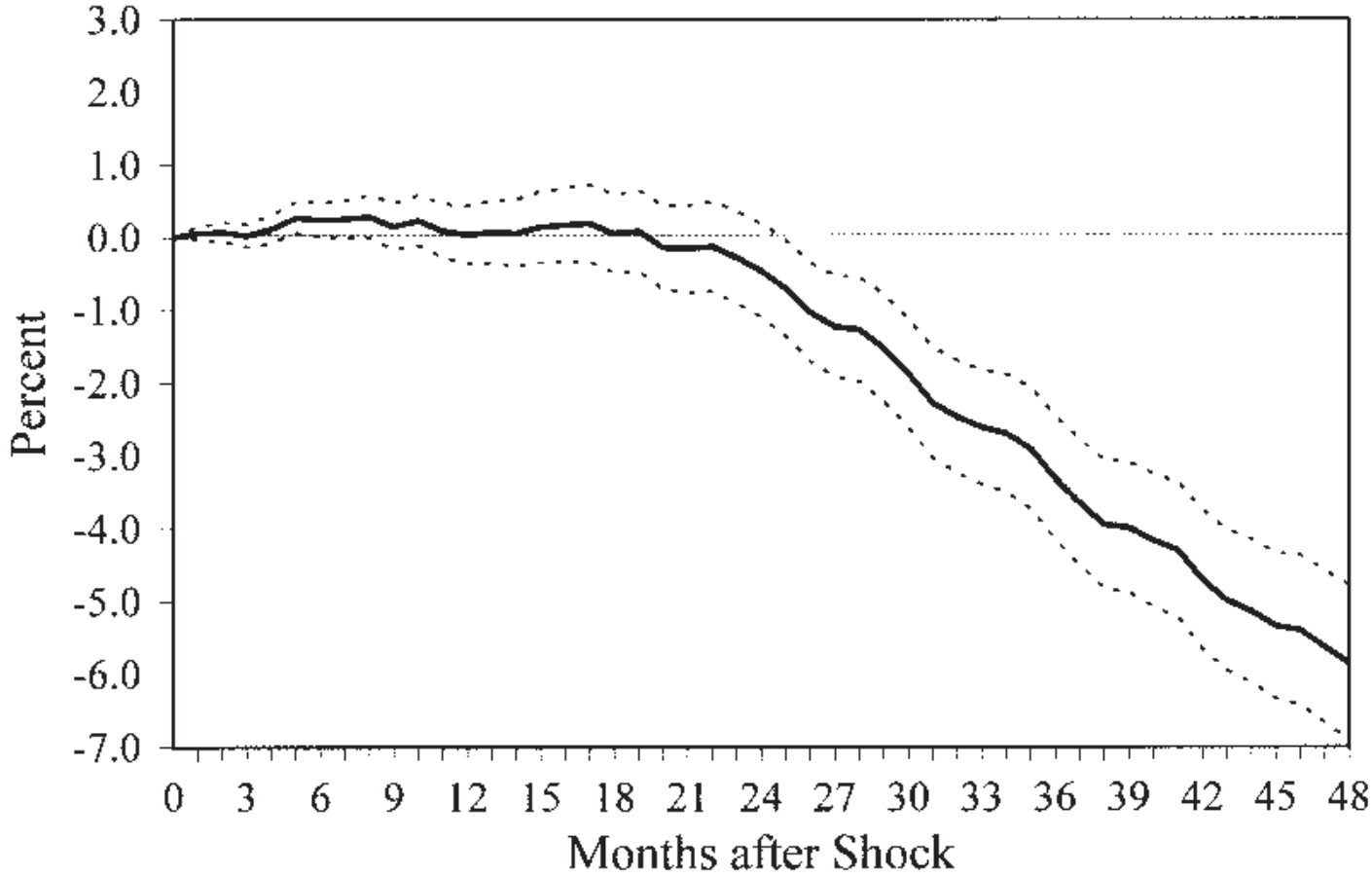


FIGURE 4. THE EFFECT OF MONETARY POLICY ON THE PRICE LEVEL

Source: Romer-Romer 04 ▸ Back