

Effects of Fiscal Stimulus in Structural Models

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June 2nd, 2009

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Outline of the Presentation

1. Basic objectives and conclusions
2. Summary of the methodology and the models
3. What did we learn?

Basic Objectives

1. Compare fiscal multipliers from structural models developed in policymaking institutions.
2. Examine what assumptions give rise to large and small multipliers.
3. Use the models to quantify the effects of the G20 stimulus.

Basic Conclusions

1. No such thing as a simple fiscal multiplier! The response of the economy to discretionary fiscal stimulus depends on a number of factors.
2. The 4 global models suggest that the G20 stimulus will have important effects on global GDP. Without this stimulus, the models suggest that global GDP would be substantially weaker in 2009 and 2010.

Multipliers from Temporary Changes in Fiscal Instruments

- The change in the fiscal instrument is calibrated to generate a change in expenditures or revenues equal to 1% of baseline GDP, for either one year or two years.
- The government deficit and debt respond endogenously because of automatic stabilizers.
- The multiplier is measured simply in terms of real GDP as a percent deviation from the baseline.
- It is assumed there is a coordinated global monetary policy response. Monetary policy is determined by an interest rate reaction function, where interest rates are allowed to either adjust freely, or are held fixed for one or two years.

Why is it Critical to Examine the Multipliers under Monetary Accommodation?

- Timely fiscal expansions are critical when there are risks of deflation and the policy rate is at the zero interest rate floor.
- In a situation where fiscal stimulus is designed to help exit from a recession, fiscal multipliers should be expected to be larger than during periods when monetary and fiscal policies are working at cross purposes and central banks are raising interest rates to offset the expansionary and inflationary implications of a fiscal expansion.
- Considered 3 cases. No monetary accommodation, where central banks raise interest rates, and 2 alternatives, where there are 1 and 2 year delays in raising rates.

The Seven Fiscal Instruments

1. increase in government consumption.
2. increase in government investment.
3. increase in general lumpsum transfers.
4. increase in lumpsum transfers targeted to hand-to-mouth consumers.
5. decrease in labour tax revenue collection.
6. decrease in consumption tax revenue collection.
7. decrease in corporate income tax revenue collection.

Summarizing the Models

- Six institutions participated – European Commission, International Monetary Fund, European Central Bank, Board of Governors of the Federal Reserve System (with two models), OECD, and the Bank of Canada.
- 6 DSGE models; all models are structural.
 - The 4 global models are BoC-GEM, GIMF, QUEST and SIGMA.
 - NAWM is a 2 region model (United States and the euro area).
 - FRB-US is the United States only.
 - OECD Fiscal is the euro area only.

KEY MODEL FEATURES

	# of regions	Hand-to-Mouth	Monetary Policy	Special Features
QUEST	3	20%, 20%*	Taylor Rule	Credit Constrained Consumers; Housing Sector
GIMF	5	25%	IFB (+ Y growth in US)	OLG, Life-cycle income profiles for consumption
FRB-US	1	40%	Taylor Rule	Very detailed breakdown; a lot of work on empirics
SIGMA	2	50%	Taylor Rule	
BoC-GEM	6	15%	IFB	Sectors for oil, commodities and food
NAWM	2	25%	Taylor Rule	
OECD Fiscal	1	25%	Taylor Rule	Endogenous government debt risk premium

* QUEST has both credit-constrained consumers and hand-to-mouth consumers.

A. The Magnitude of the Fiscal Multiplier Depends on Many Factors

The magnitude of the fiscal multiplier is highly dependent on a number of factors, which may be another important reason why reduced-form empirical estimates are all over the map.

A.1 The Role of Monetary Accommodation

- The multiplier should be expected to be larger when a fiscal expansion is needed because it is more likely that it will be accommodated by monetary policy. This point came through in all the model simulations.

No monetary accommodation:

aggregate demand $\uparrow \implies$ real interest rate \uparrow

offsets the fiscal stimulus

Monetary accommodation:

aggregate demand $\uparrow \implies$ inflation \uparrow

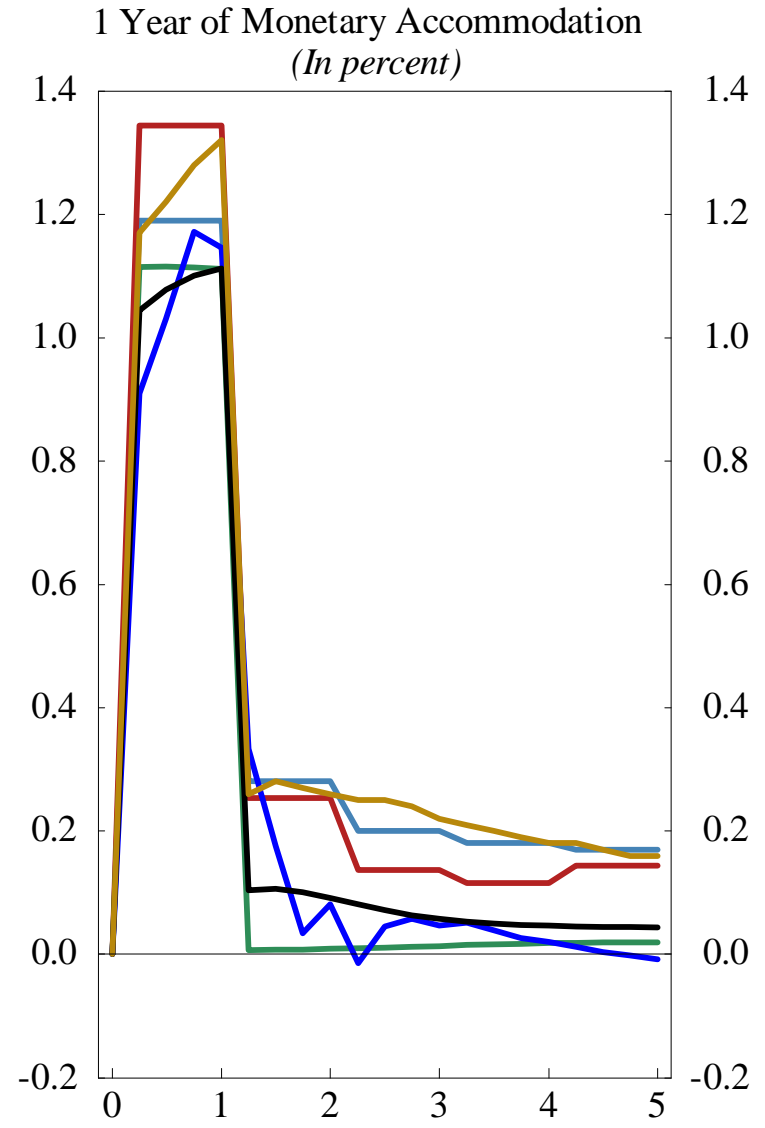
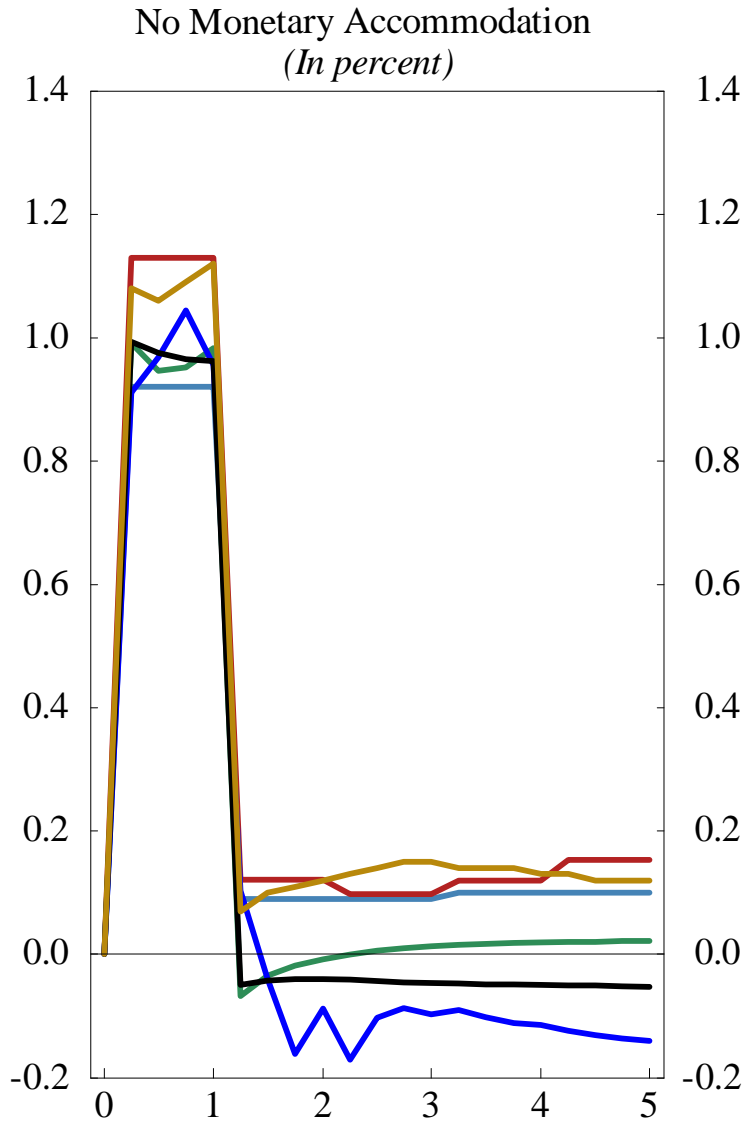
\implies real interest rate \downarrow

complements and exacerbates the fiscal stimulus

Instrument: Government Investment Real GDP

1 Year of Fiscal Stimulus

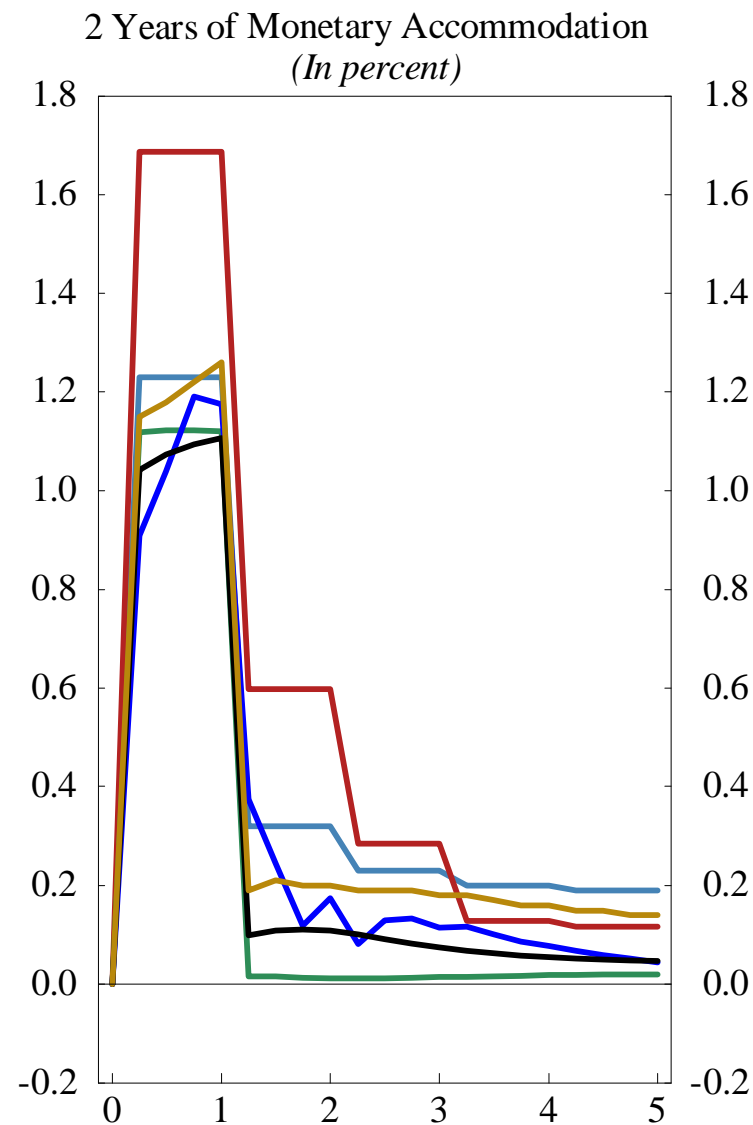
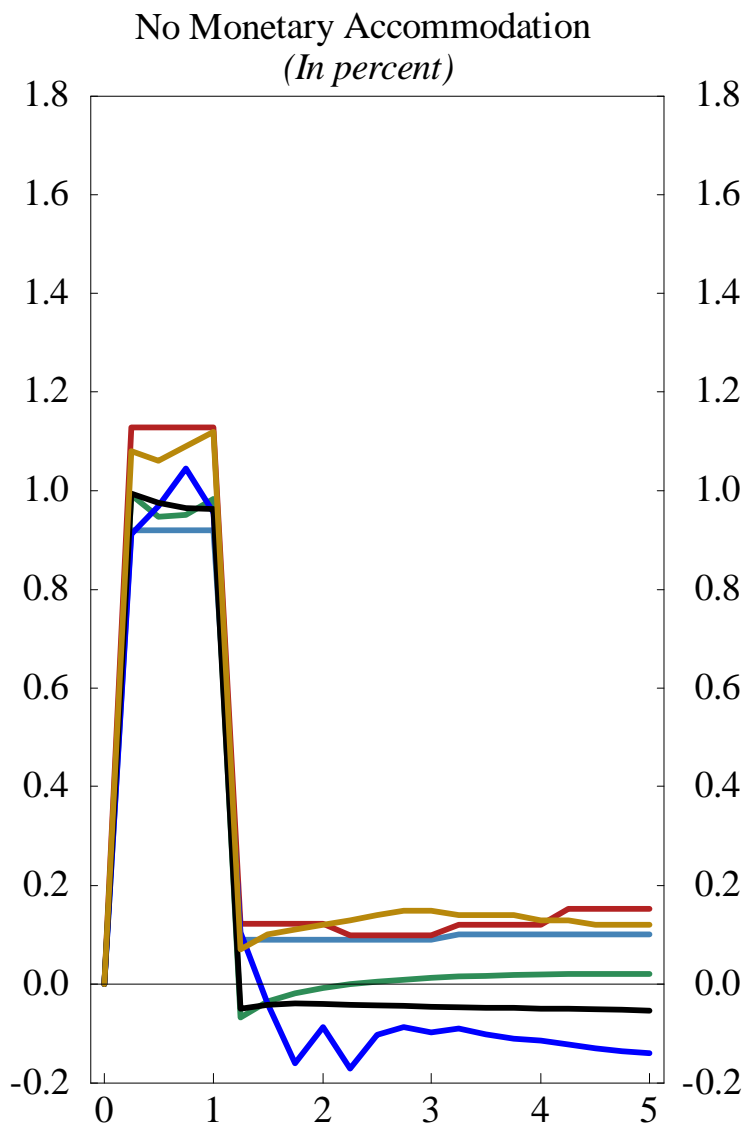
— EC's QUEST;
 — IMF's GIMF;
 — ECB's NAWM;
 — Fed's FRB-US;
 — Fed's SIGMA;
 — BoC's GEM



Instrument: Government Investment Real GDP

1 Year of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
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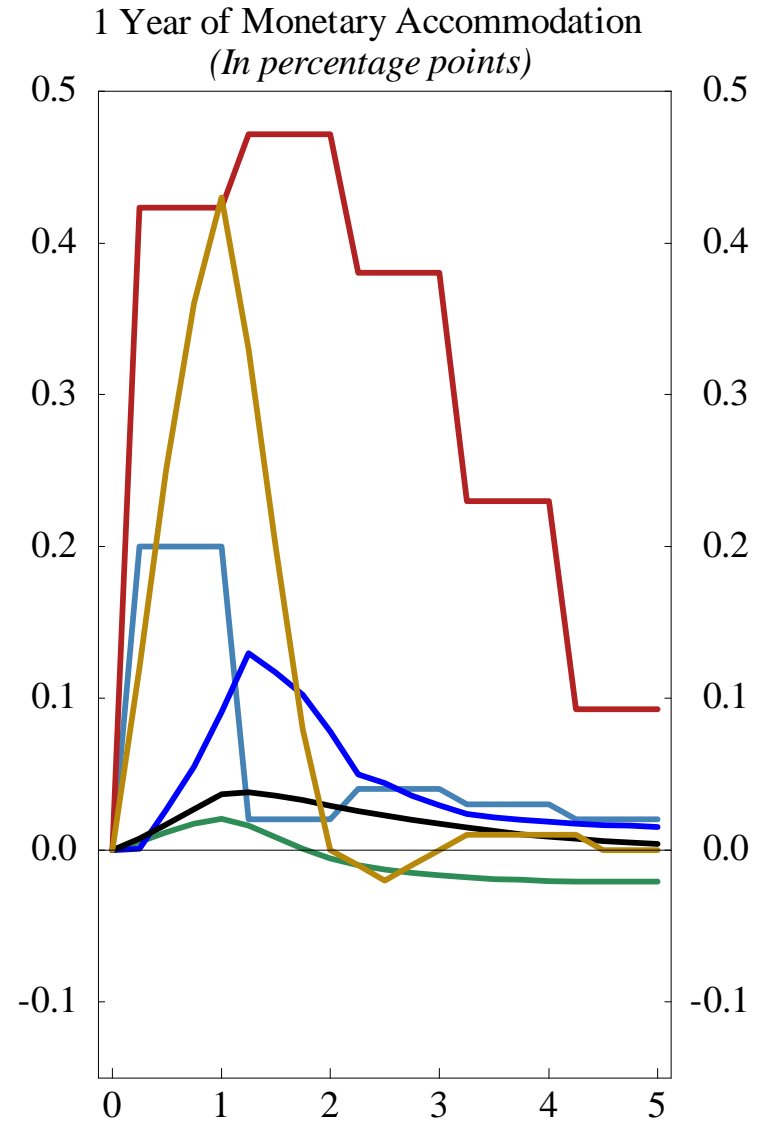
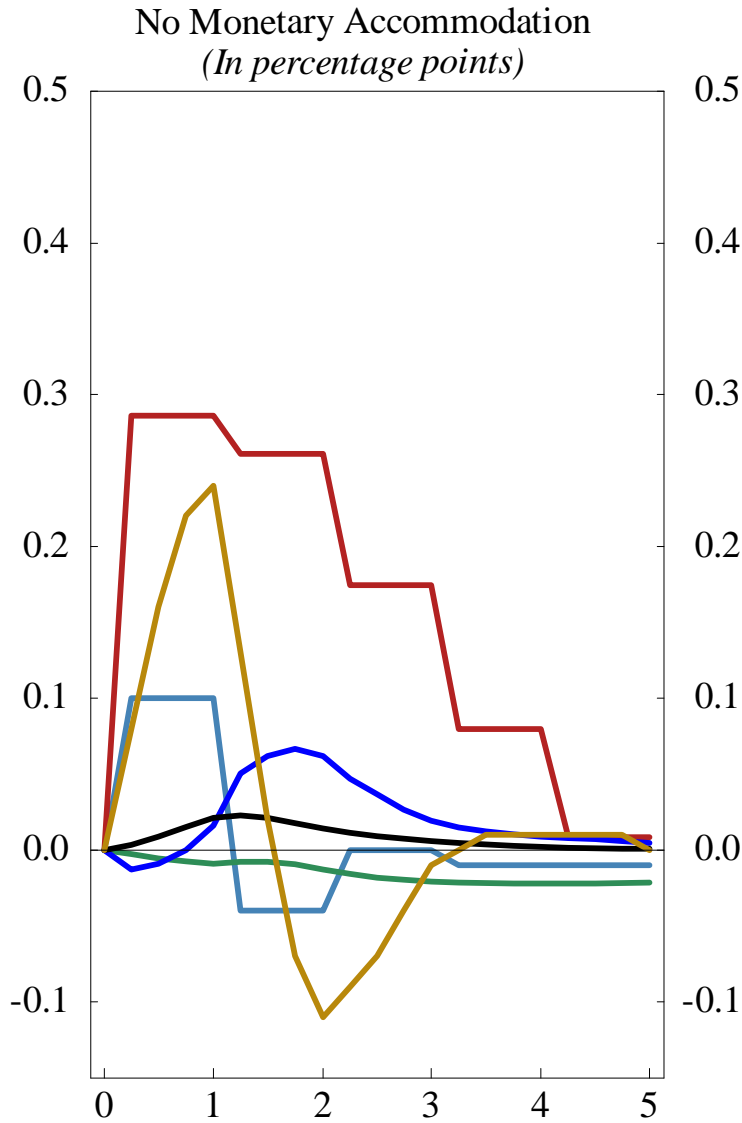


Instrument: Government Investment

Inflation

1 Year of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
 — ECB's NAWM;
 — Fed's FRB-US;
 — Fed's SIGMA;
 — BoC's GEM

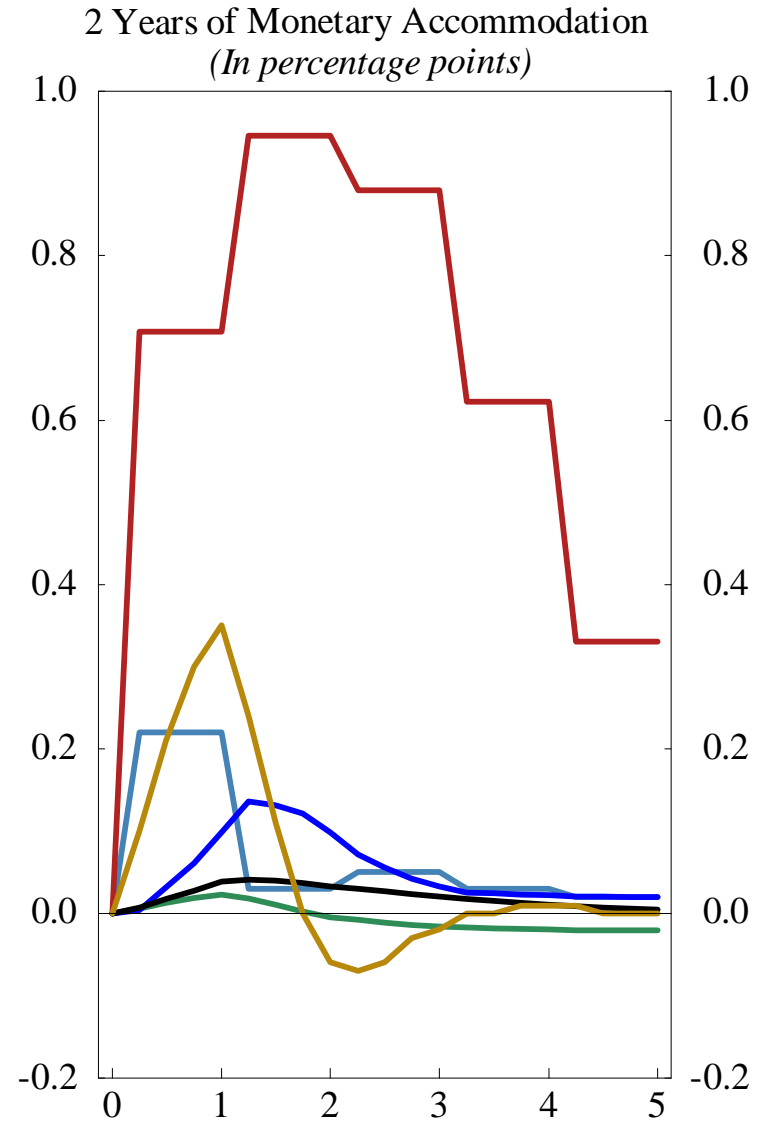
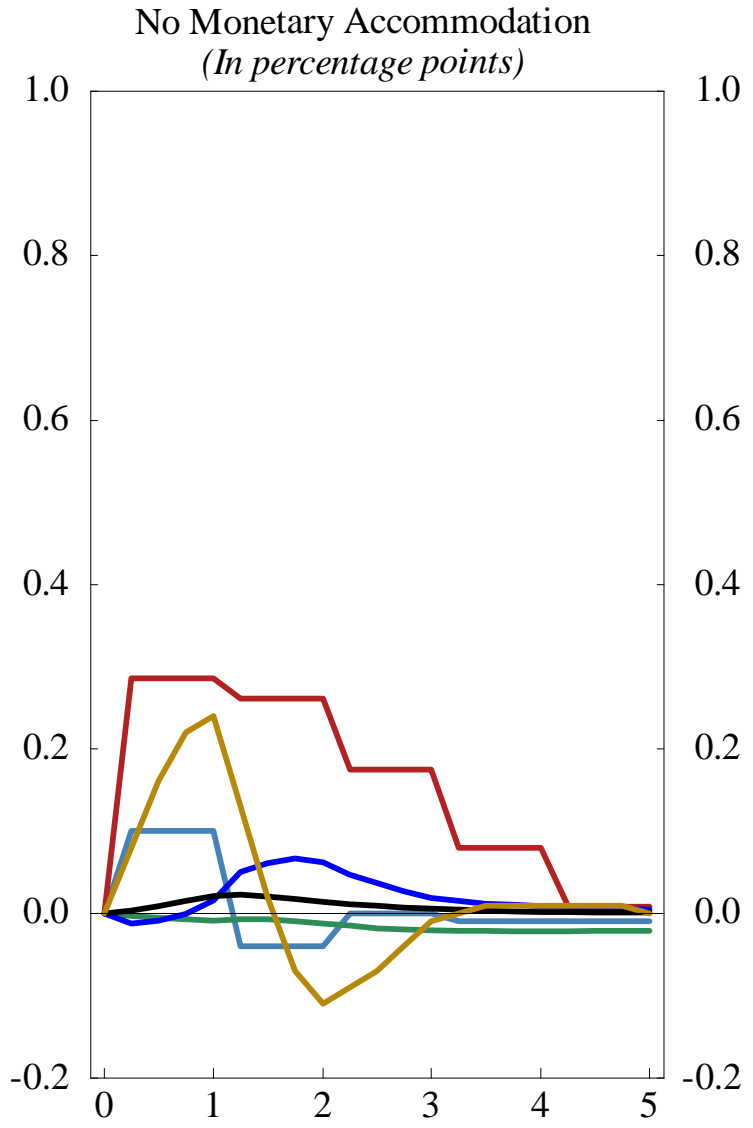


Instrument: Government Investment

Inflation

1 Year of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
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 — BoC's GEM

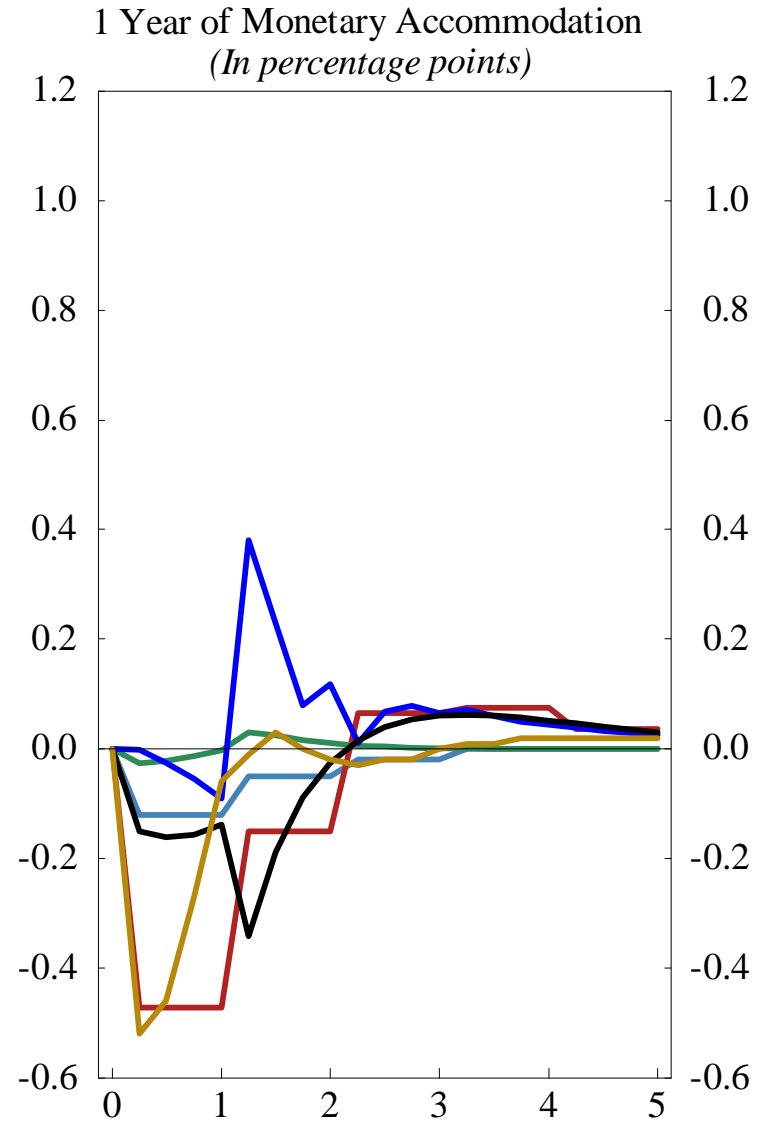
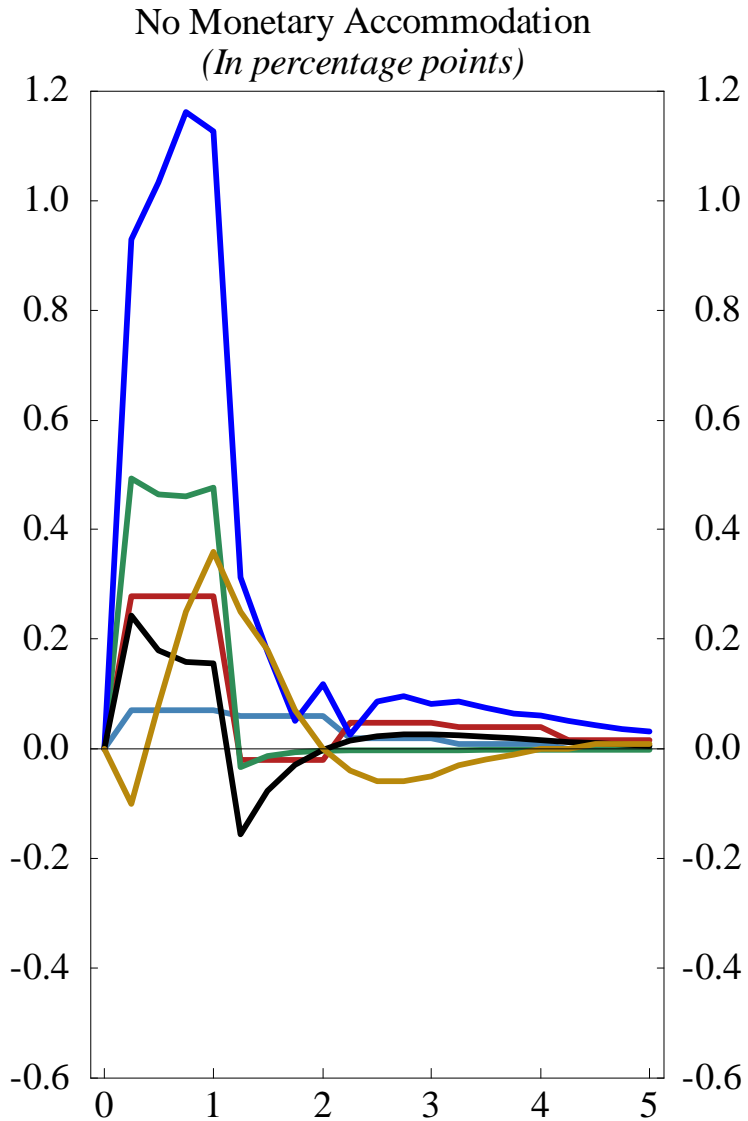


Instrument: Government Investment

Real Interest Rate

1 Year of Fiscal Stimulus

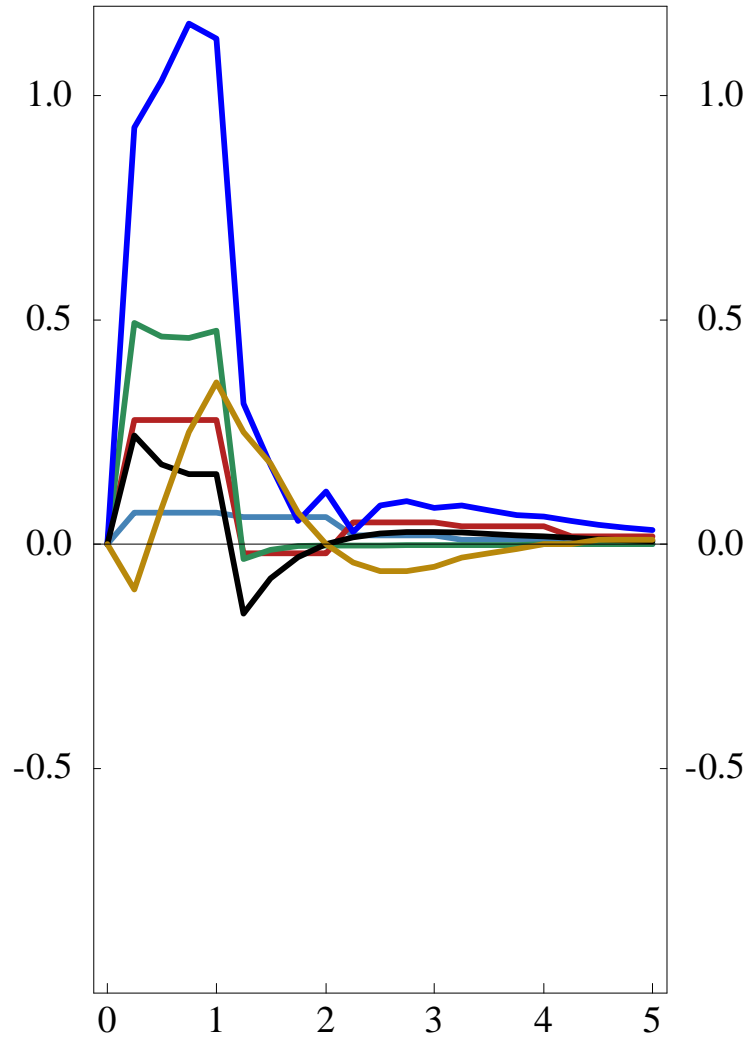
— EC's QUEST;
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 — Fed's SIGMA;
 — BoC's GEM



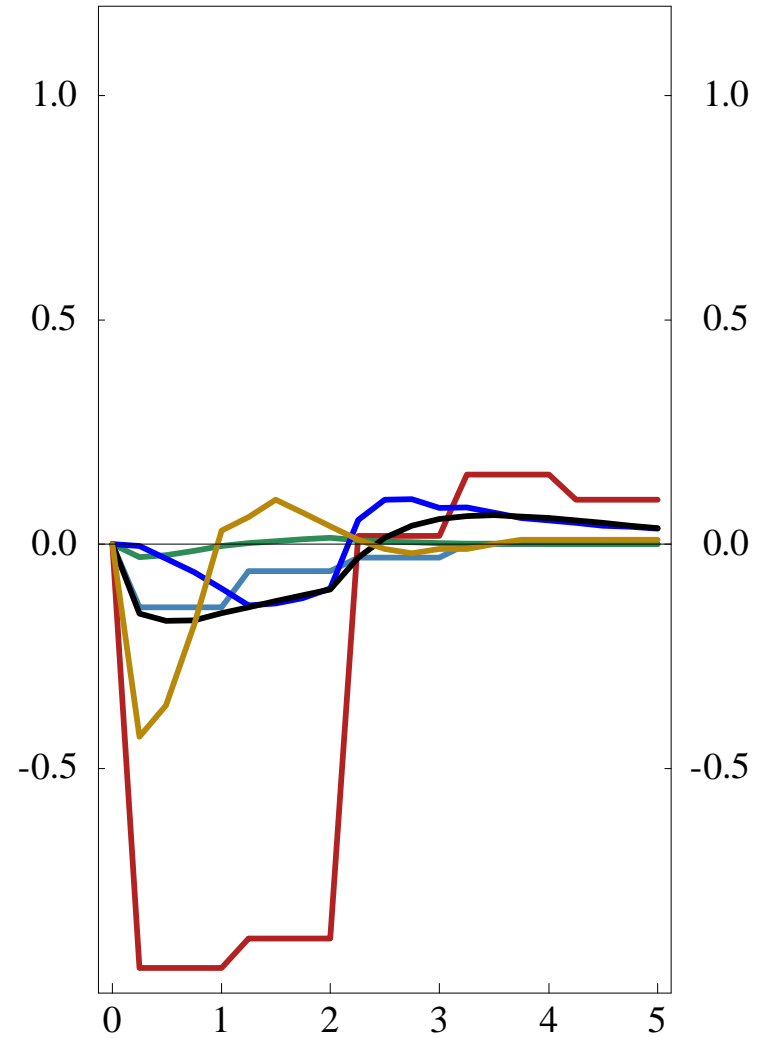
Instrument: Government Investment Real Interest Rate 1 Year of Fiscal Stimulus

— EC's QUEST; — IMF's GIMF; — ECB's NAWM; — Fed's FRB-US; — Fed's SIGMA; — BoC's GEM

No Monetary Accommodation
(In percentage points)



2 Years of Monetary Accommodation
(In percentage points)



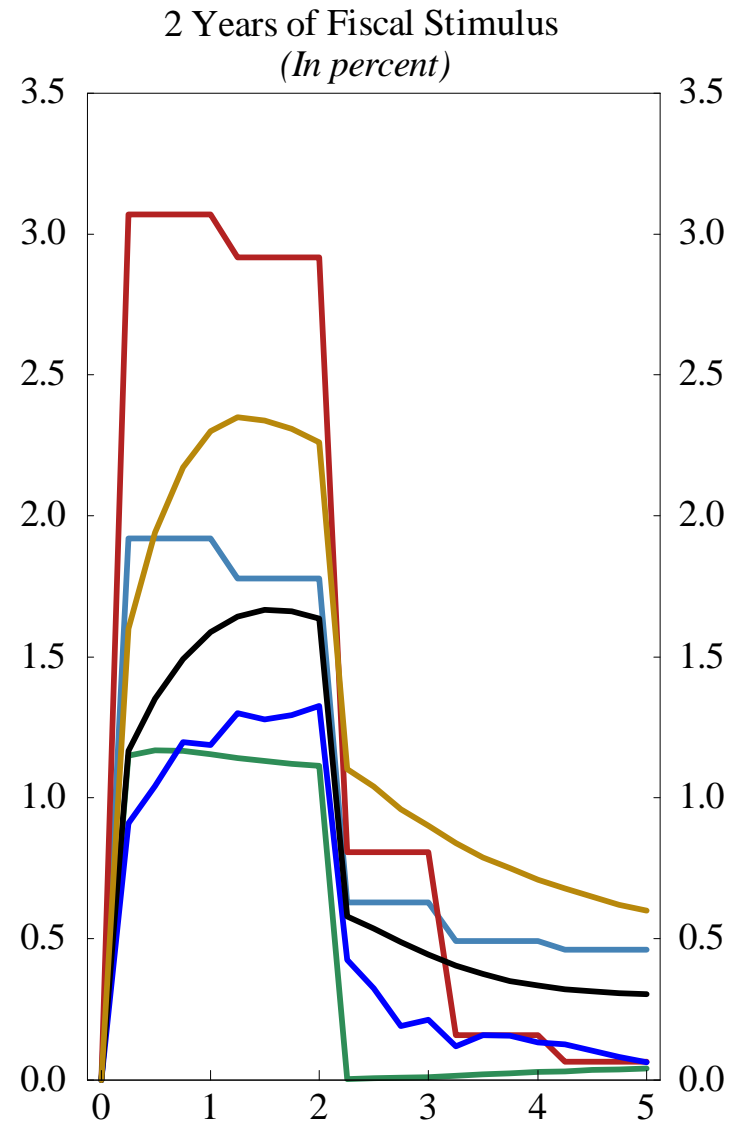
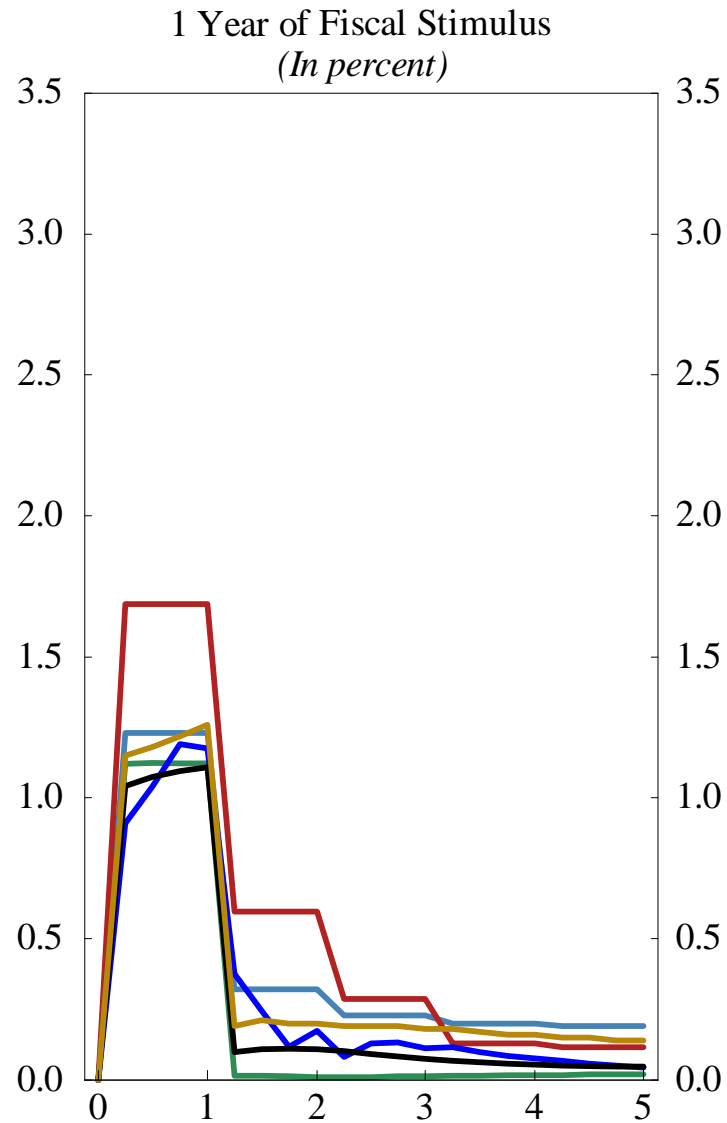
A.2 Persistence of the Fiscal Stimulus

- The multiplier will depend on the persistence of the fiscal stimulus measure.
- Fiscal expansions that are expected to persist indefinitely will have smaller multipliers because they will generate stronger private-sector offsets.
- However, when fiscal expansions are necessary to help fight a deflationary threat, a 2-year expansion can have larger multiplier effects than a 1-year expansion, if it is successful in raising inflation and reducing real interest rates.

Instrument: Government Investment Real GDP

2 Years of Monetary Accommodation

— EC's QUEST; — IMF's GIMF; — ECB's NAWM; — Fed's FRB-US; — Fed's SIGMA; — BoC's GEM



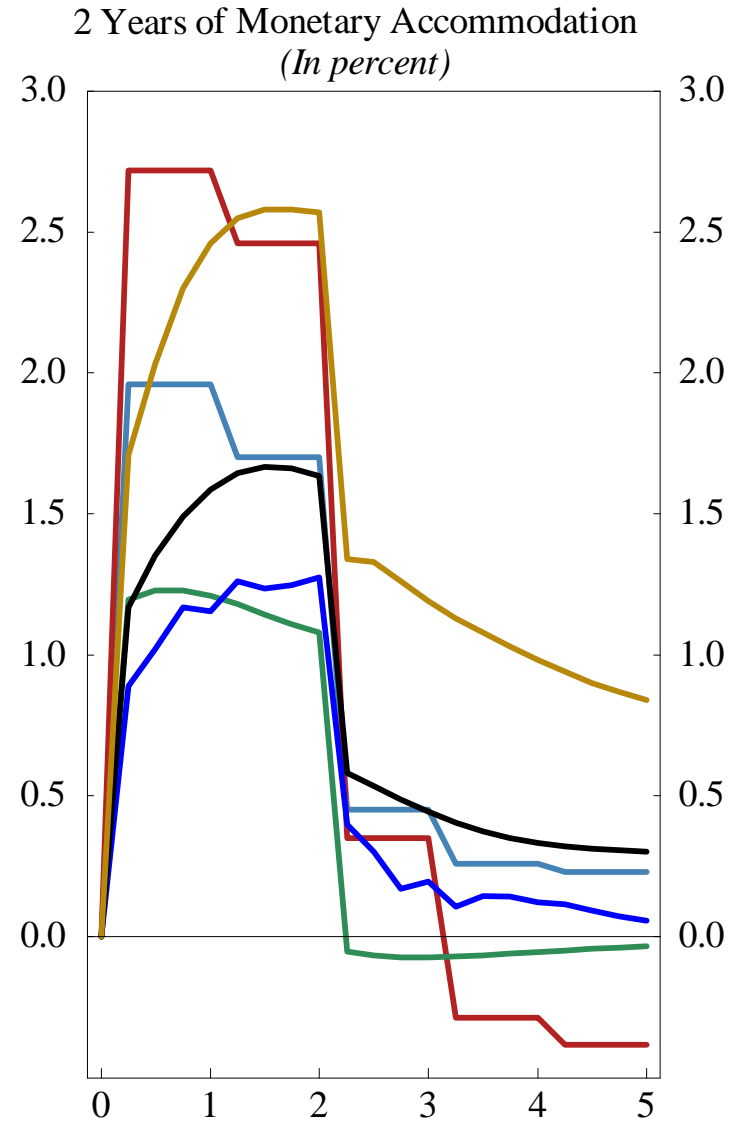
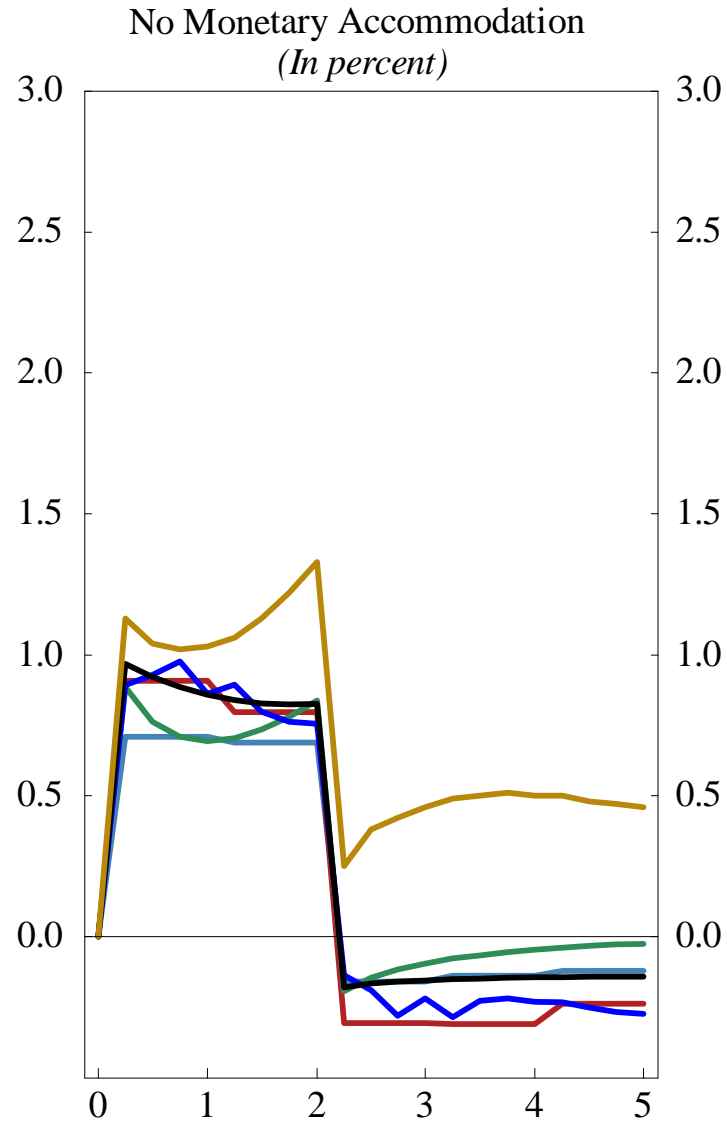
A.3 Some Multipliers Enter Aggregate Demand Directly

- The multipliers are larger for government absorption (investment and consumption) than for other instruments.
- This point comes through in all the model simulations.
- This result is uncontroversial, because these shocks have direct effects on aggregate demand, and do not have to work by affecting private sector spending behavior.

Instrument: Government Consumption Real GDP

2 Years of Fiscal Stimulus

— EC's QUEST; — IMF's GIMF; — ECB's NAWM; — Fed's FRB-US; — Fed's SIGMA; — BoC's GEM



A.4 Some Multipliers Act Through Indirect Channels

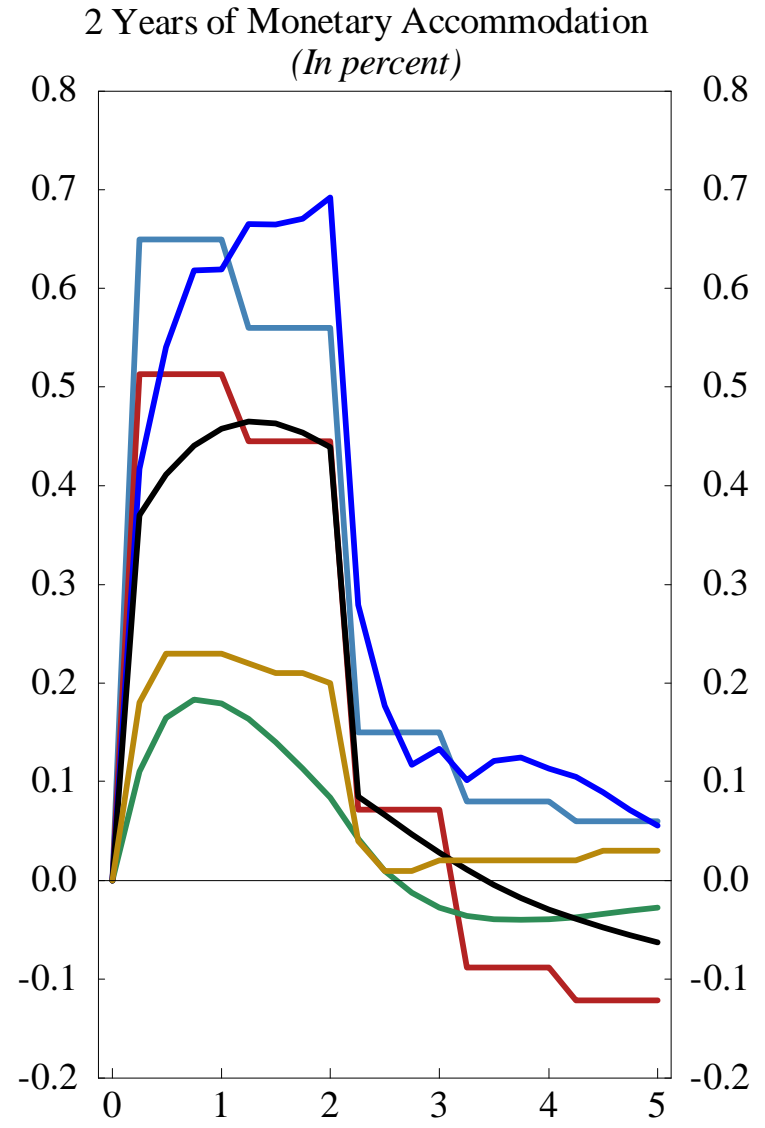
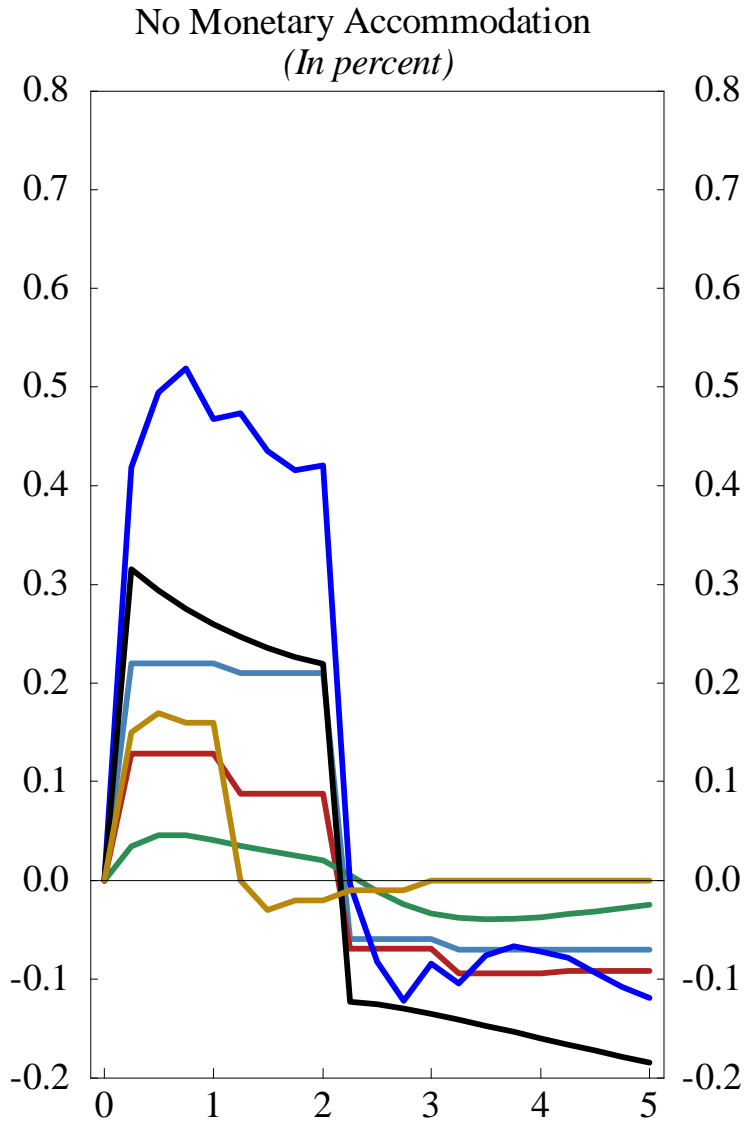
- The multipliers are smallest for general transfers and corporate taxes, as consumers and firms see through the temporary nature of the shocks.
- Somewhat larger for labor tax movements, but still much smaller than direct purchases (government absorption).

Instrument: General Transfers

Real GDP

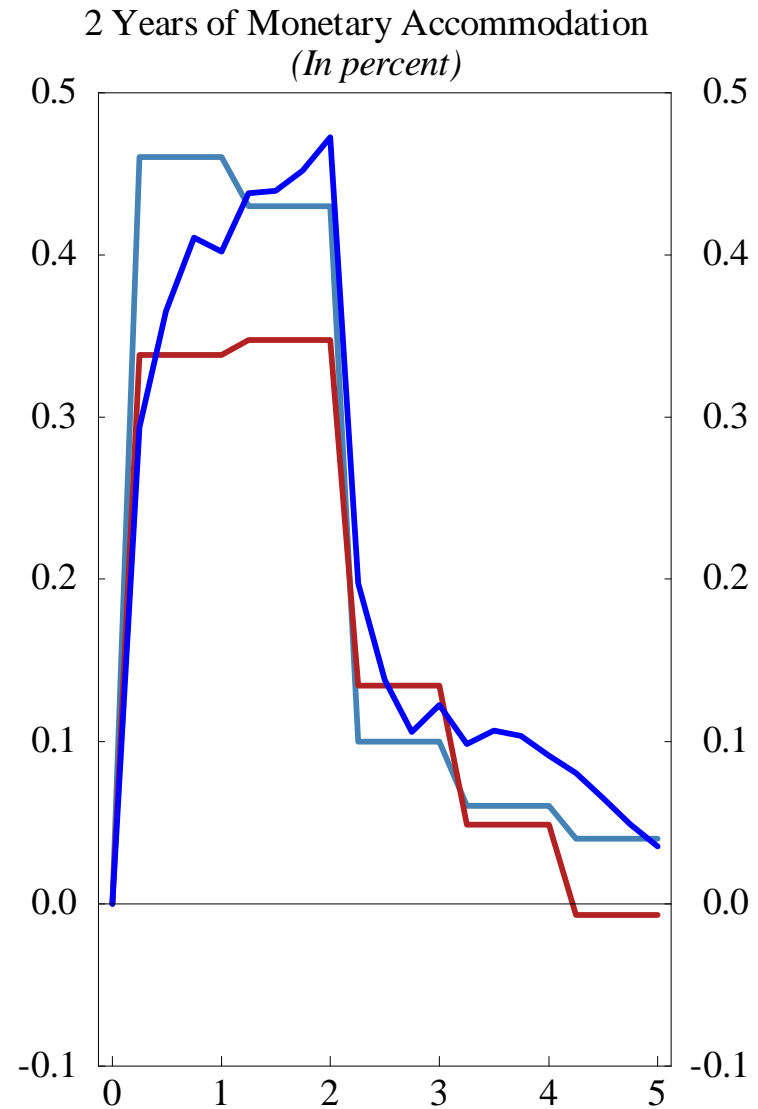
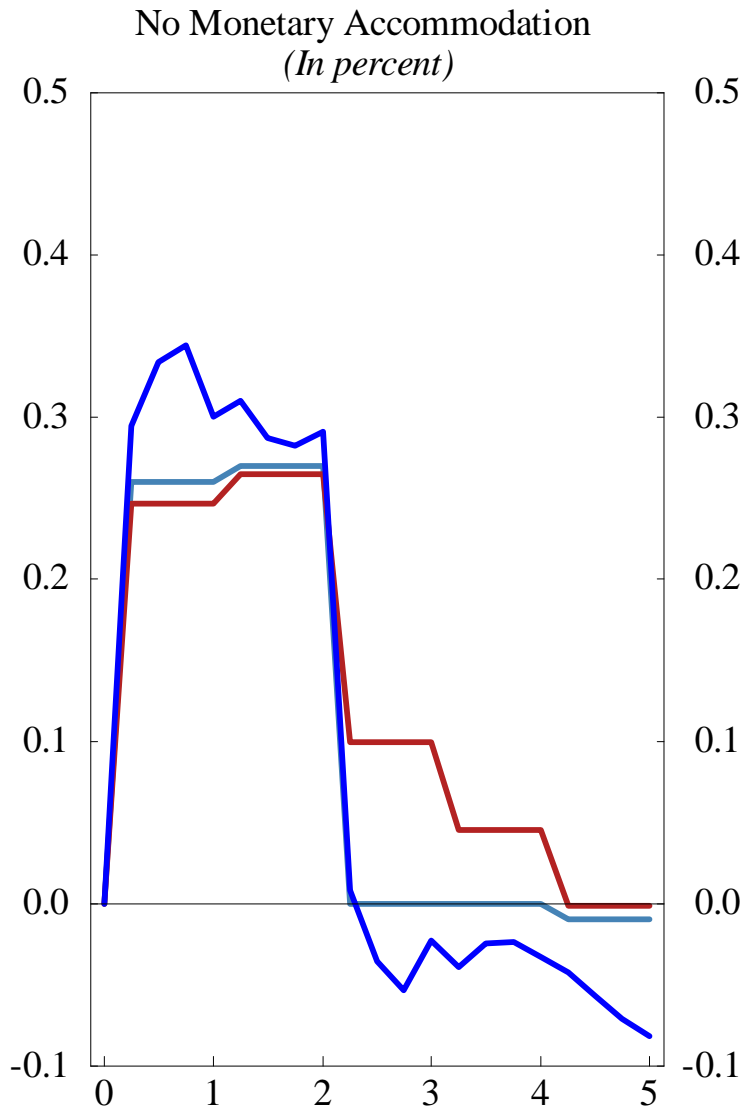
2 Years of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
 — ECB's NAWM;
 — Fed's FRB-US;
 — Fed's SIGMA;
 — BoC's GEM



Instrument: Labor Income Tax United States: Real GDP 2 Years of Fiscal Stimulus

— EC's QUEST; — IMF's GIMF; — Fed's FRB-US

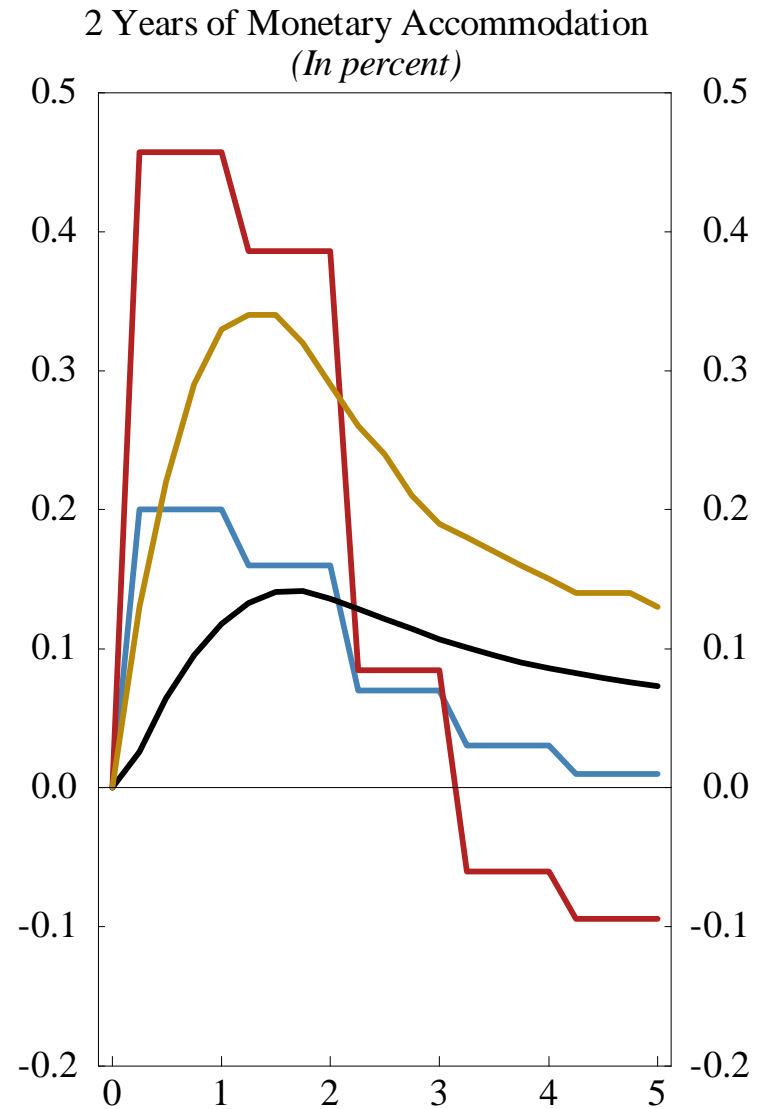
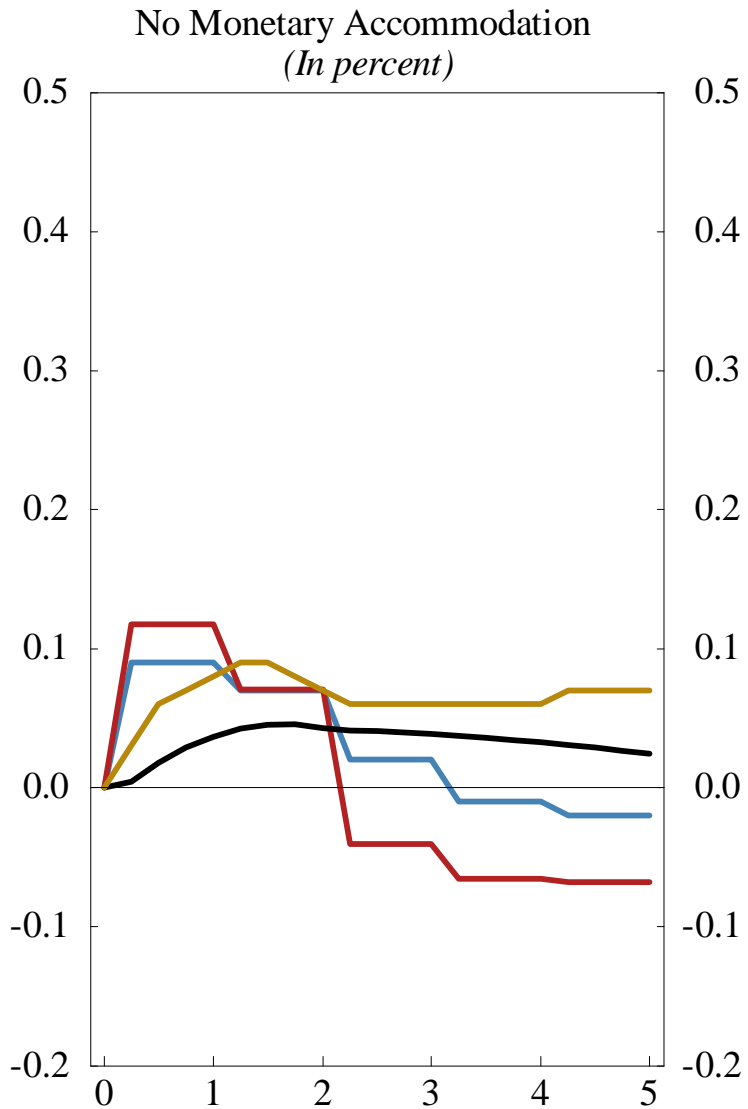


Instrument: Corporate Income Tax

United States: Real GDP

2 Years of Fiscal Stimulus

— EC's QUEST; — IMF's GIMF; — Fed's SIGMA; — BoC's GEM



A.5 The Role of Hand-to-Mouth or Liquidity-Constrained Consumers

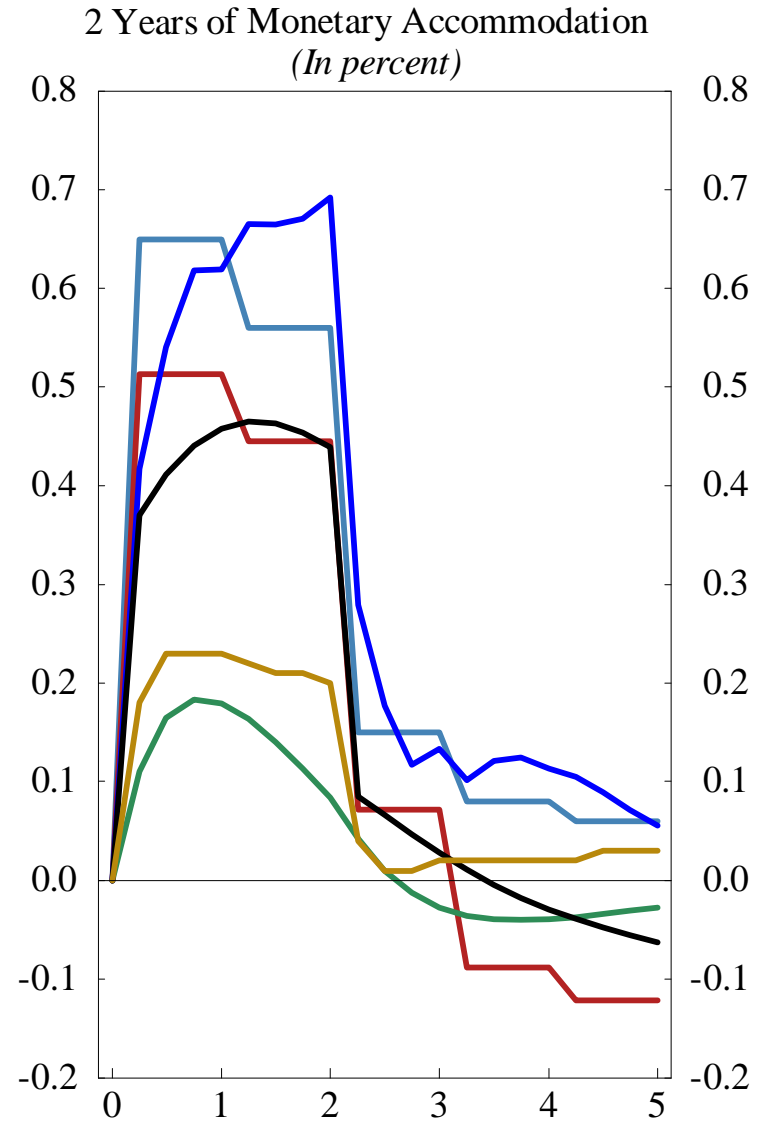
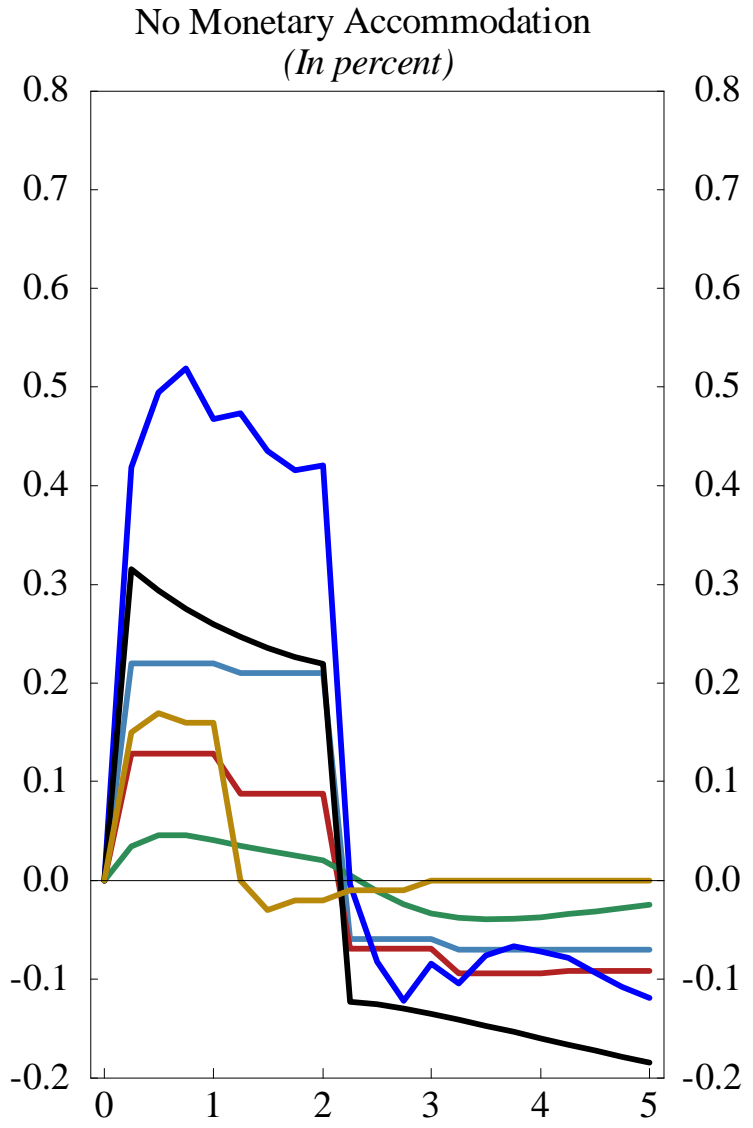
- The multiplier depends on the share of hand-to-mouth or credit-constrained consumers.
- A good example are temporary cuts in general transfers.
 - General transfers do not affect the behavior of forward-looking consumers, because they adjust their savings behavior to partially offset future tax liabilities.
 - Hand-to-mouth (HM) and credit-constrained (CC) consumers spend in response to higher general transfers.
- The multipliers are small across all models, but will be somewhat larger in those models that have a higher share of hand-to-mouth or credit-constrained consumers.
 - namely, FRB-US (40% HM), SIGMA (50% HM) and QUEST (20% HM and 20% CC).

Instrument: General Transfers

Real GDP

2 Years of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
 — ECB's NAWM;
 — Fed's FRB-US;
 — Fed's SIGMA;
 — BoC's GEM



A.6 The Effects of Targeting Transfers

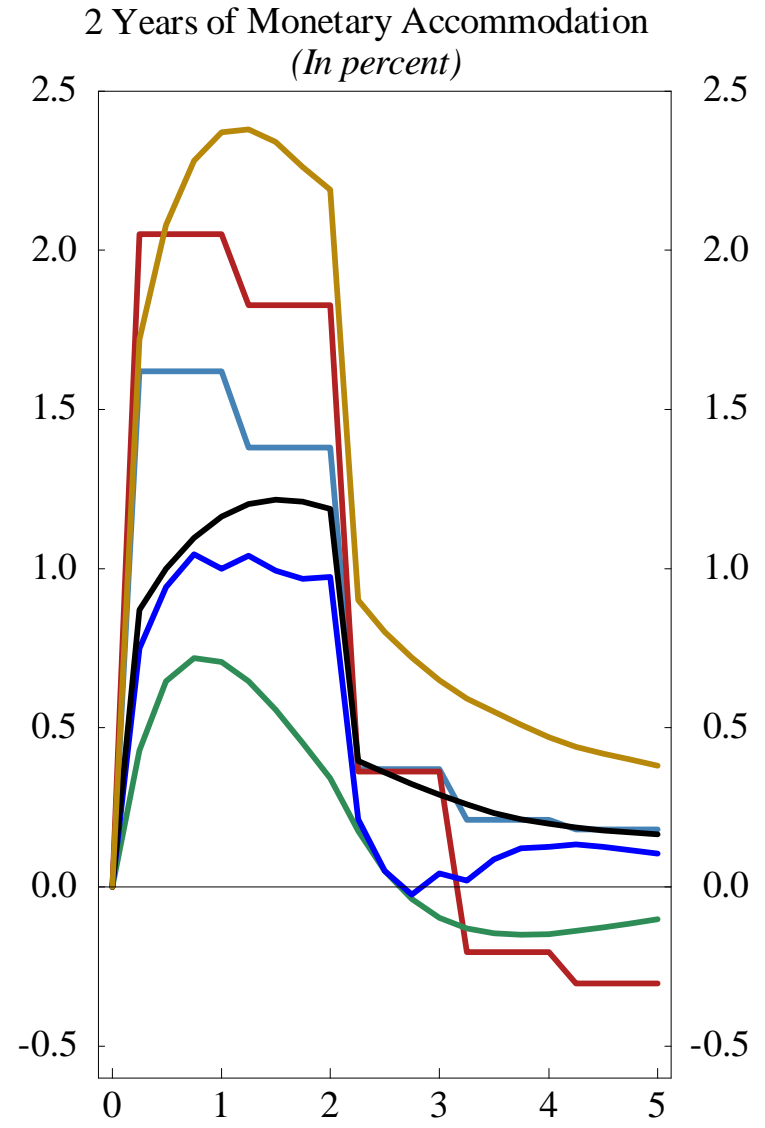
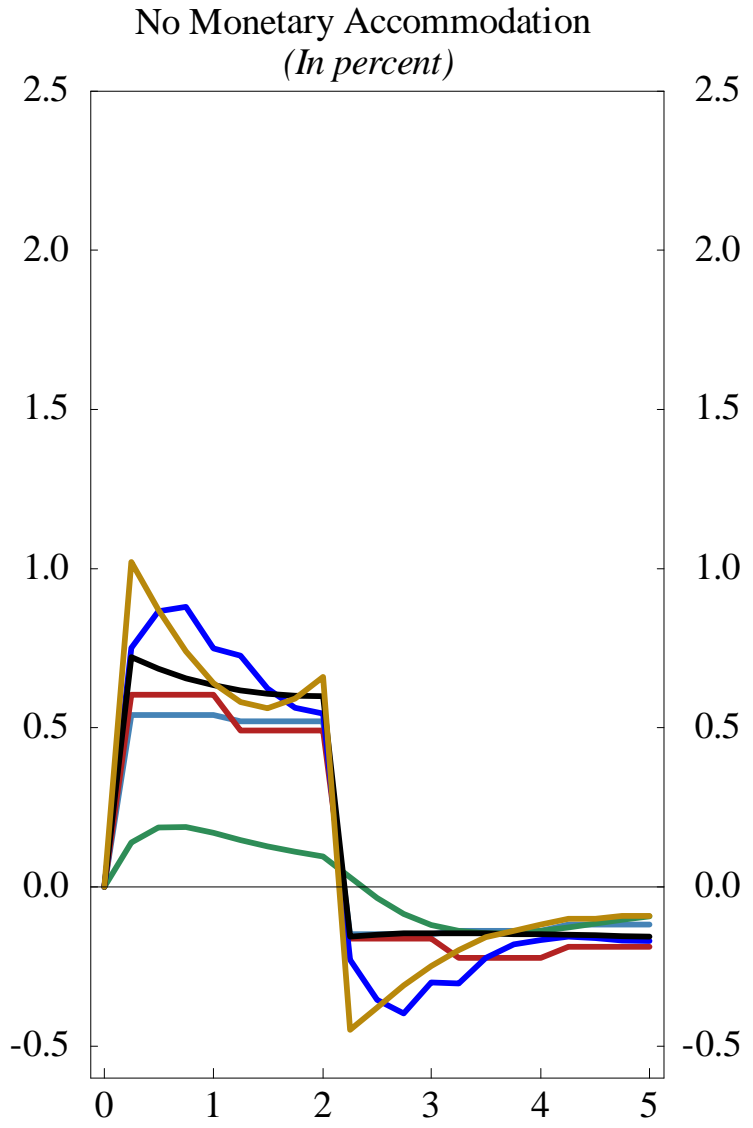
- Targeting lump-sum transfers to people who will spend them in full, immediately, has similar effects to an increase in direct government purchases.

Instrument: Targeted Transfers

Real GDP

2 Years of Fiscal Stimulus

— EC's QUEST;
 — IMF's GIMF;
 — ECB's NAWM;
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 — Fed's SIGMA;
 — BoC's GEM



A.7 The Role of Economic Openness

- The multiplier depends on openness. It is smaller for Europe than the United States, because Europe is more open.

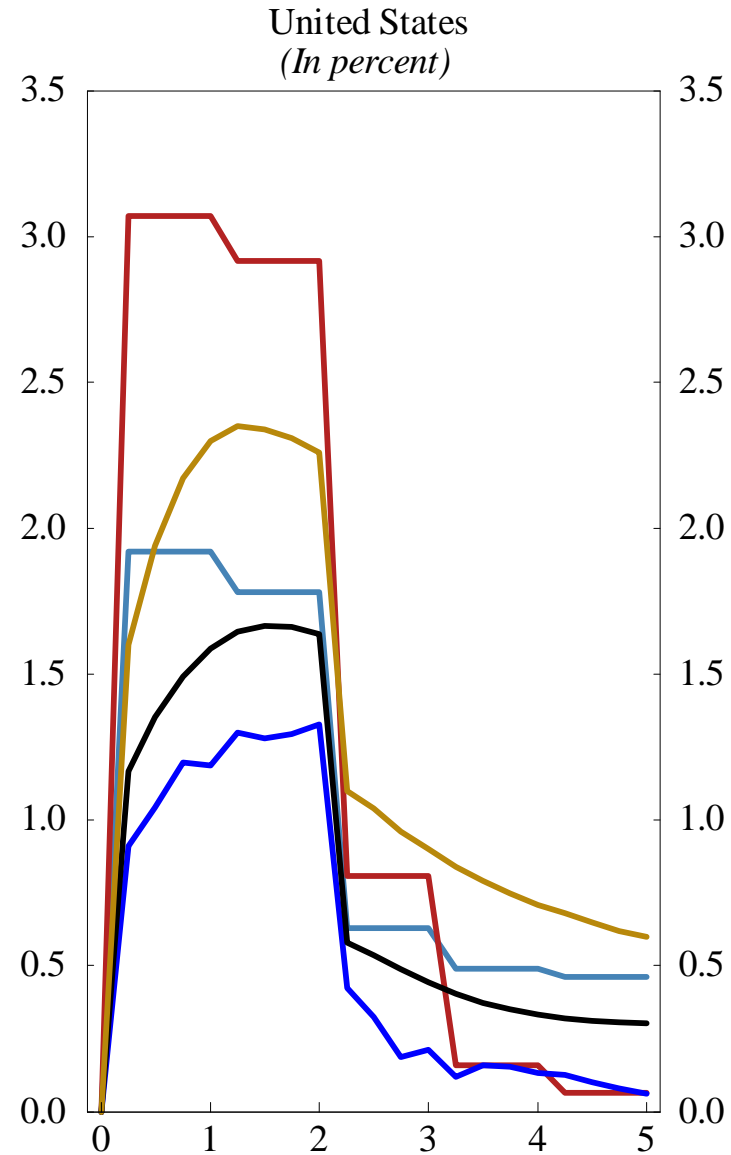
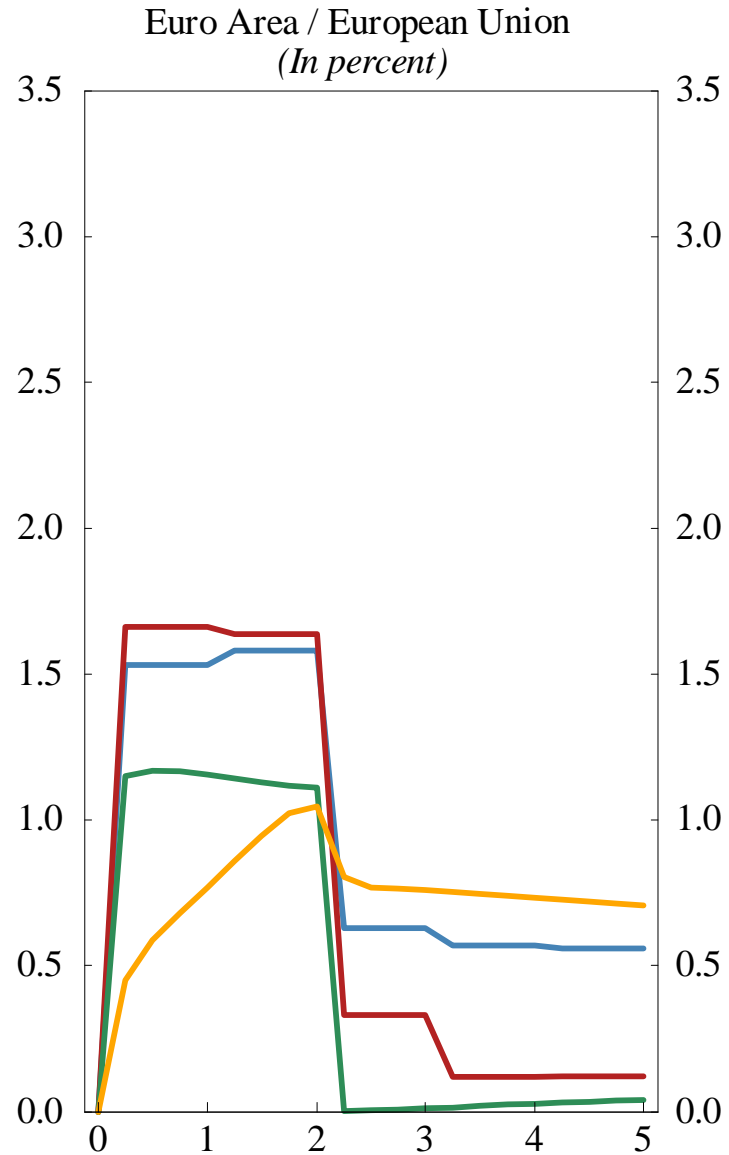
A.8 The Degree of Nominal Rigidities in Prices and Wages

- The multiplier depends on the degree of nominal rigidities when there is monetary accommodation with the objective of raising inflation and reducing the real interest rate.
= another reason why the multiplier is smaller in Europe.

Instrument: Government Investment Real GDP

2 Years of Monetary Accommodation

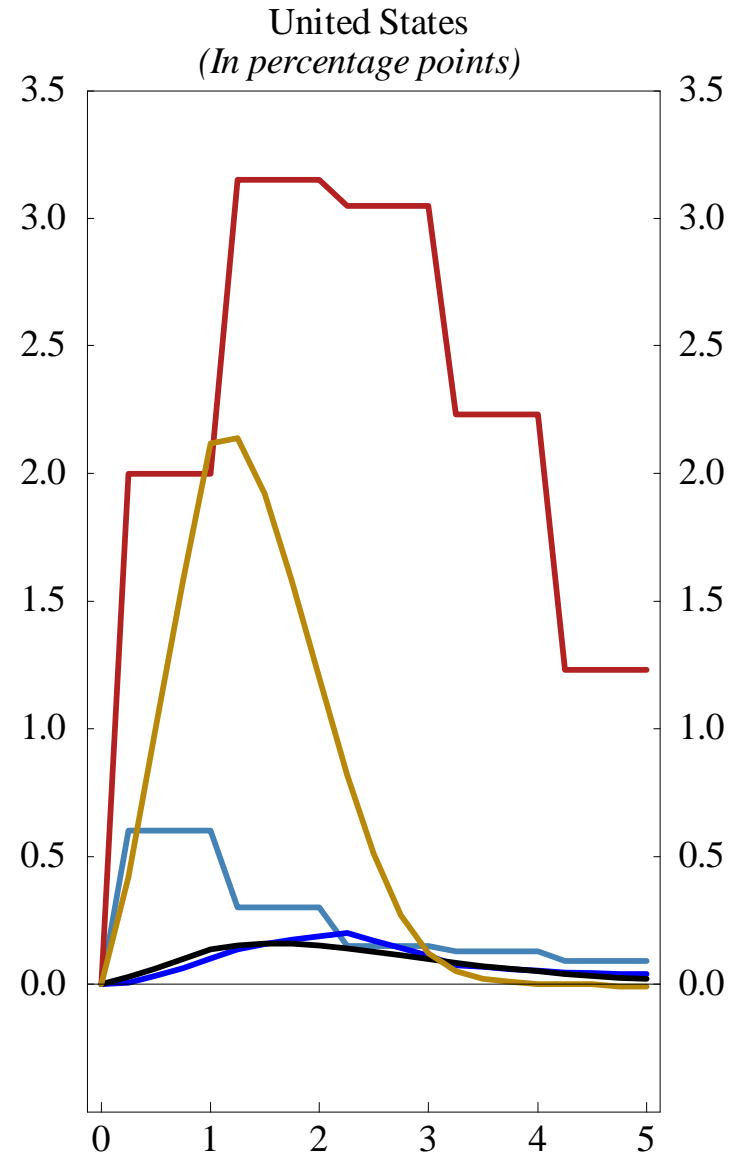
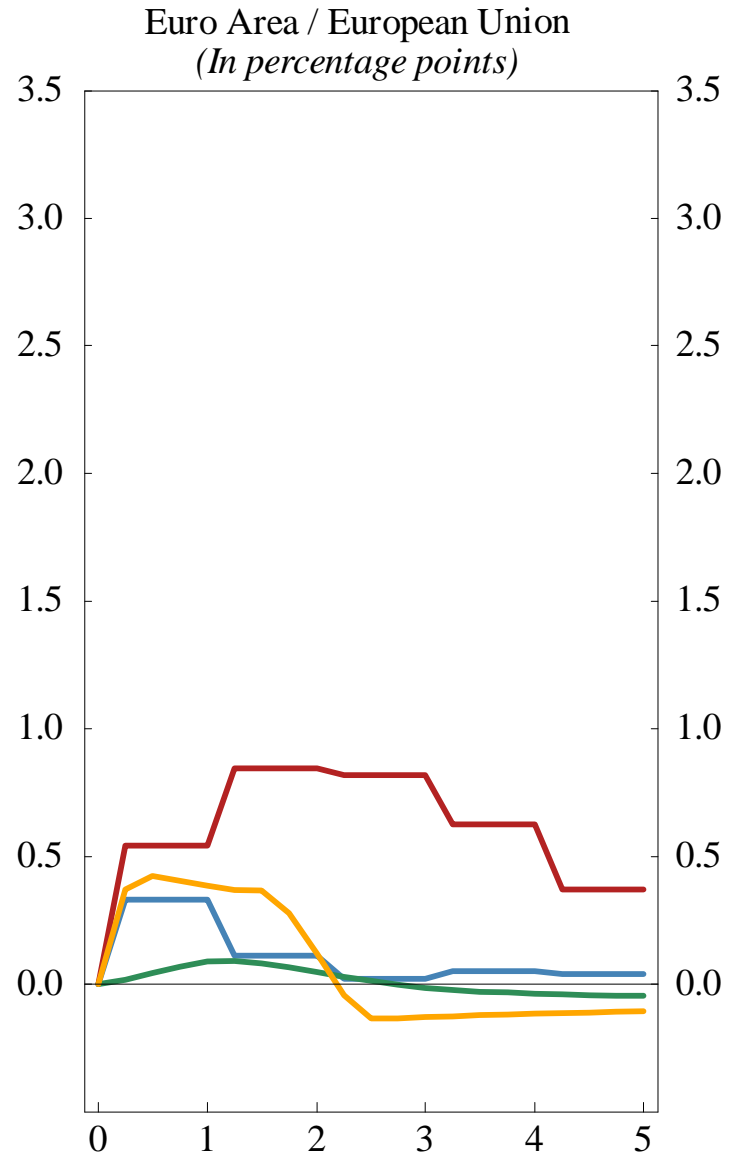
EC's QUEST; IMF's GIMF; ECB's NAWM; OECD's Fiscal; Fed's FRB-US; Fed's SIGMA; BoC's GEM



Instrument: Government Investment Inflation

2 Years of Monetary Accommodation

EC's QUEST; IMF's GIMF; ECB's NAWM; OECD's Fiscal; Fed's FRB-US; Fed's SIGMA; BoC's GEM



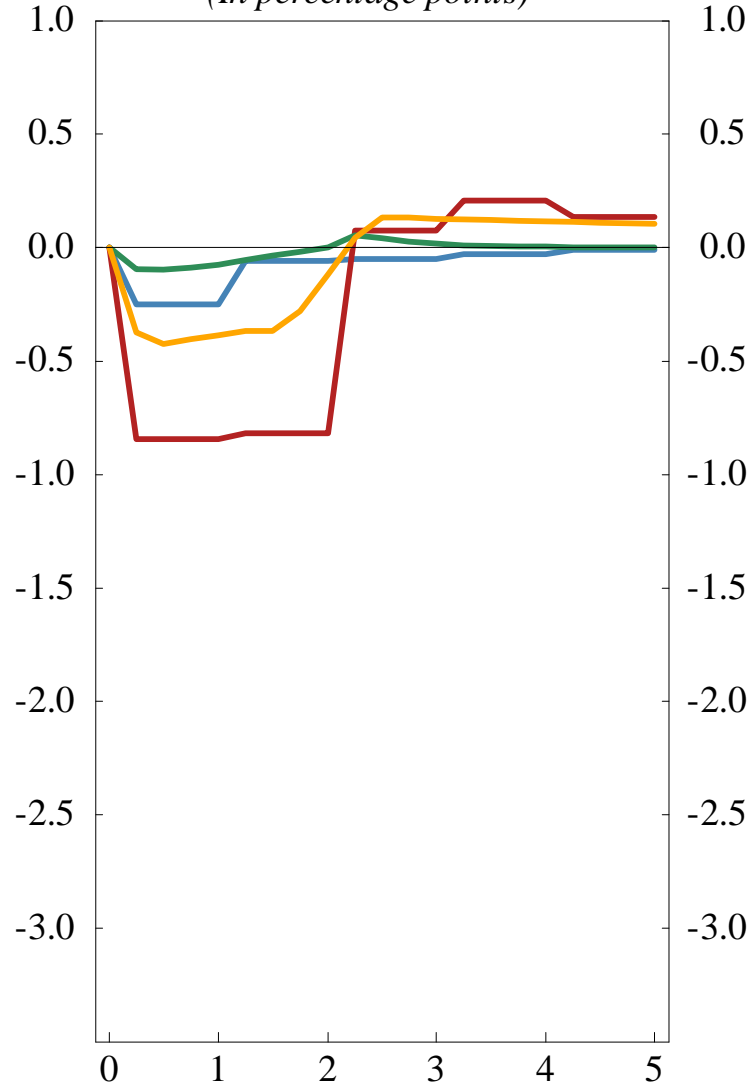
Instrument: Government Investment

Real Interest Rate

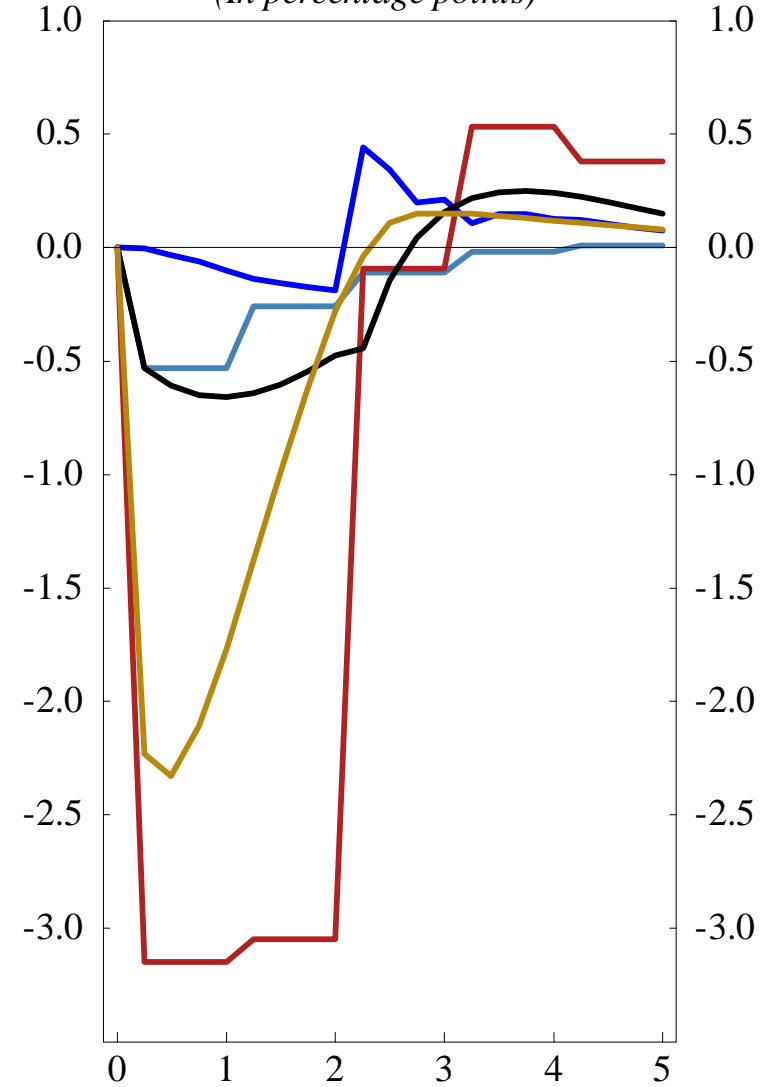
2 Years of Monetary Accommodation

EC's QUEST; IMF's GIMF; ECB's NAWM; OECD's Fiscal; Fed's FRB-US; Fed's SIGMA; BoC's GEM

Euro Area / European Union
(In percentage points)



United States
(In percentage points)



B. Permanent Changes in the Fiscal Instruments

There could be large long-term crowding-out effects from a buildup in government debt.

B.1 More Negative Effects if the World is Non-Ricardian

- In the non-Ricardian models (such as GIMF) government debt is treated as wealth by consumers.
⇒ higher debt requires a permanent increase in real interest rates to contain expansionary effects, reducing investment and the long-term level of potential output and real income.

B.2 More Negative Effects from the Composition of Taxes

- If this results in using larger distortionary taxes (capital versus labor because supply of the former is more elastic), this would exacerbate the crowding-out effects of higher levels of government debt.

B.3 Negative Effects on Potential Output

- If this results in large cuts to government investment to finance the interest burden, it could have large negative consequences, as the long-term level of potential output is reduced.

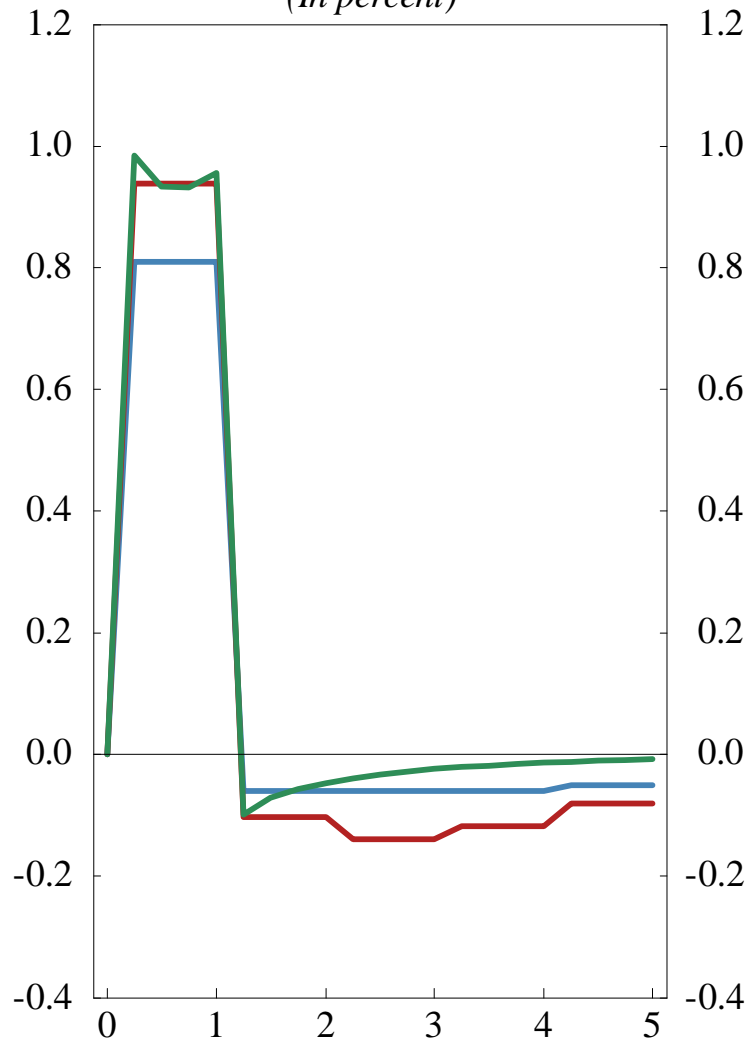
B.4 Long-Run Crowding Out Effects the Short Run

- If agents perceive that a temporary fiscal stimulus measure will be, instead, a permanent change in a fiscal instrument, the short-run multiplier will be lower, in anticipation of the long-run crowding out effects.

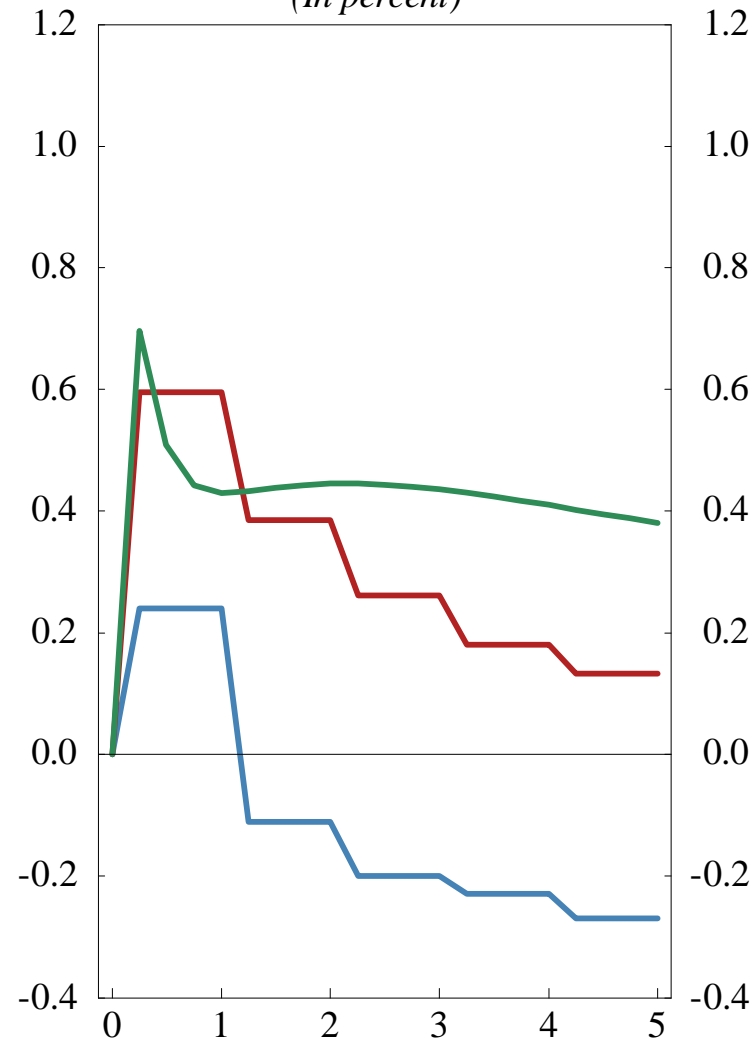
Instrument: Government Consumption European Union / Euro Area: Real GDP No Monetary Accommodation

— EC's QUEST; — IMF's GIMF; — ECB's NAWM

1 Year of Fiscal Stimulus
(In percent)



Permanent Change in the Fiscal Instrument
(In percent)



C. A Real World Example – The G20's Announced Fiscal Stimulus Packages

Consider the fiscal stimulus packages that are going to be implemented over 2009 and 2010 by the G20 countries.

- Japan and Emerging Asia spend more in 2009; other regions are roughly equal 2009 and 2010.
- Europe has the smallest packages; very little is spent in Africa or Latin America.
- Composition:
 1. Emerging Asia: Spending dominates.
 2. Japan: Transfers dominate.
 3. U.S.: Transfers and labor taxes dominate.
 4. Euro Area and Other Countries: Big role for capital income taxes in 2010.

G20 Fiscal Stimulus Packages

2009

% of domestic GDP	Government Consumption	Government Investment	Social Safety Net	General Transfers	Labor Income Tax Cut	Consumption Tax Cut	Corporate Income Tax Cut	<i>TOTAL</i>
<i>United States</i>	0.00	0.23	0.55	0.54	0.27	0.00	0.41	1.99
<i>Euro Area</i>	0.03	0.26	0.15	0.10	0.19	0.08	0.04	0.85
<i>Japan</i>	0.33	0.32	0.95	0.66	0.05	0.00	0.05	2.36
<i>Emerging Asia</i>	0.28	1.37	0.23	0.10	0.06	0.05	0.08	2.17
<i>Other Countries</i>	0.14	0.14	0.26	0.12	0.04	0.02	0.13	0.86

G20 Fiscal Stimulus Packages

2010

% of domestic GDP	Government Consumption	Government Investment	Social Safety Net	General Transfers	Labor Income Tax Cut	Consumption Tax Cut	Corporate Income Tax Cut	<i>TOTAL</i>
<i>United States</i>	0.00	0.33	0.10	0.58	0.57	0.00	0.23	1.80
<i>Euro Area</i>	0.02	0.13	0.07	0.02	0.34	-0.04	0.19	0.72
<i>Japan</i>	0.00	0.58	0.21	0.89	0.04	0.00	0.04	1.76
<i>Emerging Asia</i>	0.17	1.34	0.00	0.04	0.03	0.04	0.09	1.72
<i>Other Countries</i>	0.09	0.04	0.08	0.02	0.07	0.00	0.13	0.43

Model Comparison

Compare the results from the G20 fiscal stimulus packages for the United States and the rest of the world, from BoC-GEM, GIMF, QUEST, and SIGMA.

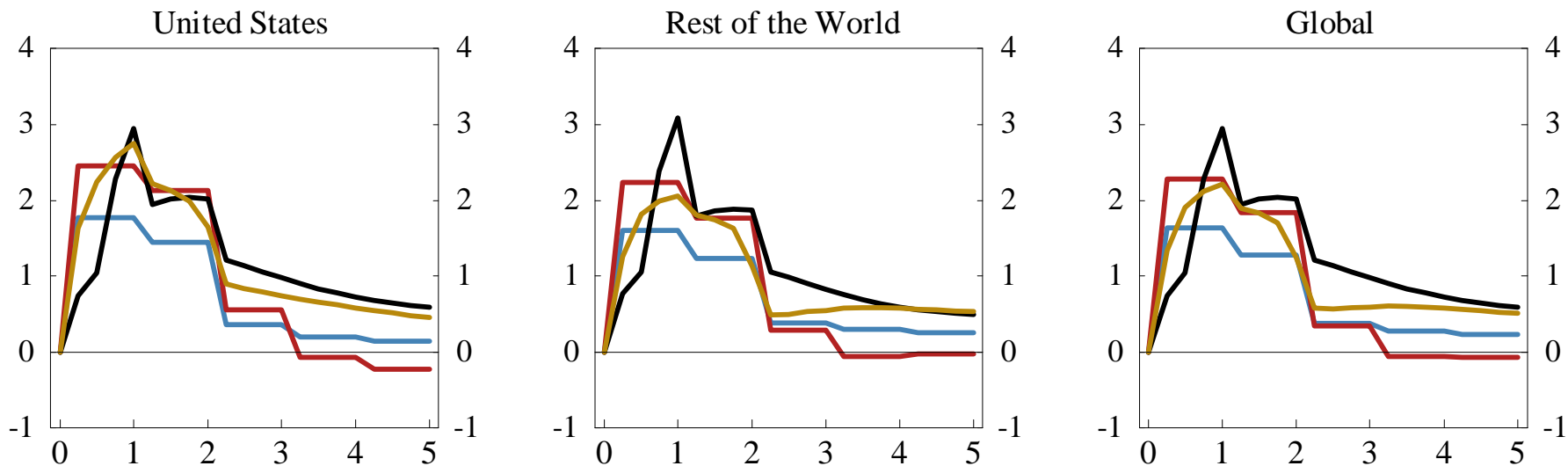
- SIGMA is largest, while QUEST is smallest, but the results are all very similar.
- a key driver = inflation persistence and effectiveness of monetary policy.
 - for example, there is little inflation movement in QUEST; high inflation movement in GIMF, so monetary accommodation has a much larger effect in GIMF.

G20 Fiscal Stimulus Packages

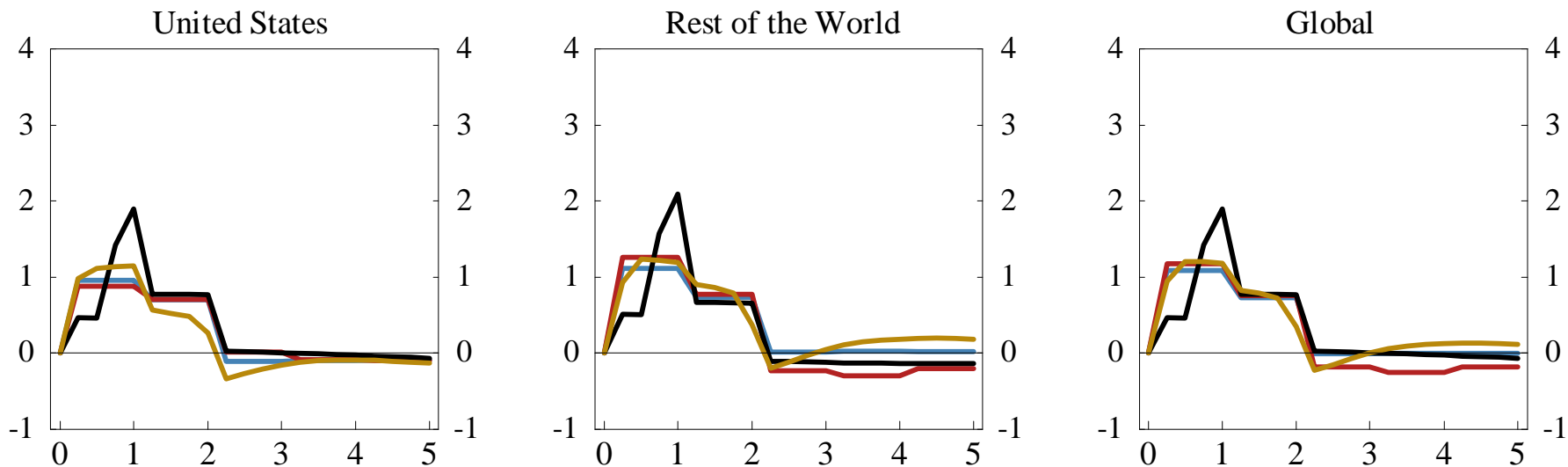
Real GDP (Percent Deviation from Baseline)

— EC's QUEST; — IMF's GIMF; — Fed's SIGMA; — BoC's GEM

2 Years of Monetary Accommodation



No Monetary Accommodation



What Did We Learn?

- Fiscal stimulus has a role to play.
 - Particularly in a low inflation environment, where output is below potential, and monetary policy is accommodative.
- It is key that fiscal policy is conducted to maintain fiscal responsibility in the medium and long term.