

# Did Easy Money in the Dollar Bloc Fuel the Global Commodity Boom?

by Christopher Erceg, Luca Guerrieri and  
Steven Kamin

Federal Reserve Board

September 2010

The views expressed in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.

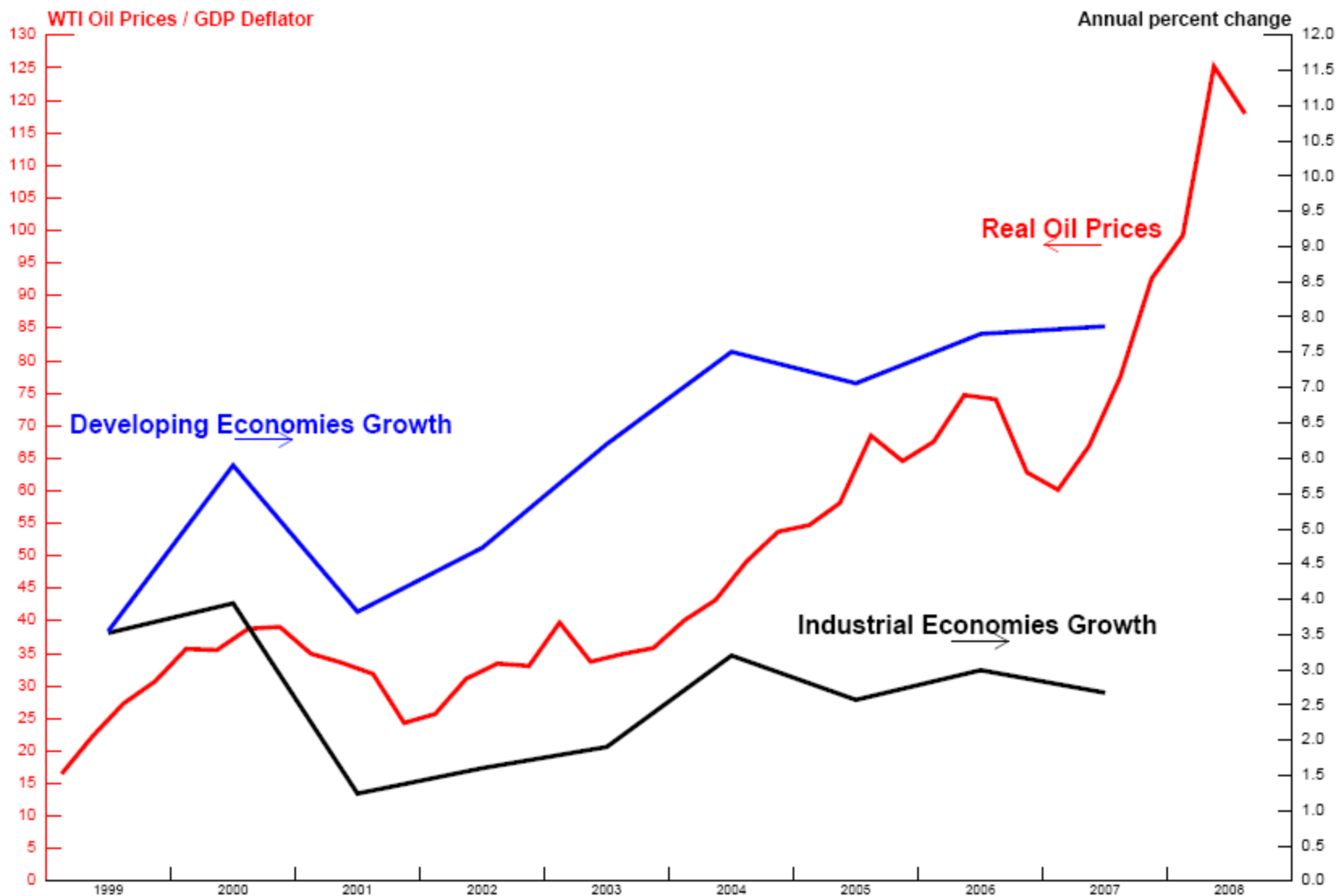
## The Global Runup in Commodity Prices

- Understanding the sources of commodity price fluctuations remains an important issue for policymakers:
  - commodity price surge in 2007-2008 exacerbated financial crisis, in part by constraining monetary policy.
  - renewed runup in prices could weaken recoveries in oil-importing countries, and widen current account deficits.
  - volatility in oil and commodity prices poses a challenge for monetary policy, especially for inflation-targeters.

## Explanations for (pre-crisis) Commodity Price Boom

- Real Shocks to Demand/Supply ( “Fundamentals Based” )
  - demand for commodities boosted by rapid industrialization in emerging markets
  - 80 percent of rise in world oil consumption over 2000-2006 attributable to faster growth in emerging markets
  - supply of commodities grew (unexpectedly) slowly, especially over 2004-2007 when demand was growing rapidly.

Figure 2: Recent Global Real GDP Growth and Real Oil Prices



Source: Wall Street Journal; Bureau of Economic Analysis; IMF WEO Database, October 2007.

**Table 1: Sources of Growth of Oil Consumption**

	<b><u>Oil Consumption</u></b> <b><u>Growth Rate</u></b> <b>(2000-2006)</b> <b>(percent change)</b>	<b><u>Contribution to World</u></b> <b><u>of Oil Consumption</u></b> <b>(2000-2006)</b> <b>(percentage points)</b>
<b>1. World</b>	1.7	1.7
<b>2. Developing</b>	3.7	1.4
<b>3. Asia</b>	4.8	0.8
<b>4. China</b>	7.8	0.6
<b>5. India</b>	2.1	0.1
<b>6. Latin America</b>	1.6	0.1
<b>7. Brazil</b>	0.4	0.0
<b>8. Industrial</b>	0.5	0.3
<b>9. United States</b>	0.8	0.2

Source: International Energy Agency

## Explanations for (pre-crisis) Commodity Price Boom

- Accommodative Monetary Policy in United States and other industrial countries.

- to extent that accommodative policy reflected “policy innovations” (i.e., departures from a Taylor rule), lower policy rates boosted aggregate demand and stimulate demand for commodities.

- reduced cost of holding inventories also increased demand and contributed to higher prices.

- but accommodative policy not likely of itself to explain boom in 2007-2008 when the U.S. was cutting rates in response to adverse shocks.

## Explanations for (pre-crisis) Commodity Price Boom

- Dollar Bloc Story

- Many emerging market economies, especially in Asia, pegged to the dollar – “the dollar bloc”

- Loosening of U.S. monetary policy meant that dollar bloc countries had to loosen also.

- Looser U.S. policy fueled an excessive rise in demand in emerging markets, since low interest rates were inappropriate for these fast-growing commodities; and higher overall demand caused commodity prices to surge.

## Martin Wolf Quote (Financial Times, 2008)

- "Today the hapless Federal Reserve is trying to re-expand demand in a post-bubble U.S. economy. The principal impact of its monetary policy comes, however, via a weakening of the U.S. dollar and an expansion of the emerging economies linked to it."



## SIGMA: Three Country DSGE Model

- **Closed economy** features similar to models of Christiano, Eichenbaum, and Evans (2005) and Smets and Wouters (2003).
- Specification includes **external habit persistence in consumption**, and **investment adjustment costs** that depend on change in investment.
- **Calvo-style nominal wage and price rigidities**, with full dynamic indexation in wage and price-setting.

## SIGMA: Three Country DSGE Model

- **Government spending** is exogenous, with lump-sum taxes adjusted to satisfy the government's intertemporal budget constraint.
- Each country produces a distinct basket of **non-oil goods** that it trades with other countries.
- Prices of traded goods are set in currency of buyer (i.e., **local currency pricing** as in Devereux and Engel), and adjustment costs make it costly to adjust trade shares.
- Some simplifications relative to some variants of SIGMA: desired markups are fixed, all households are Ricardian, and no financial frictions.

## Three Country Blocks

- U.S. Block:
  - 25 percent of world GDP
  - policy interest rates set by modified Taylor rule with interest rates smoothing, and where activity measure is four quarter GDP growth.
- Developing Asia/Latin America Block (DA-LA):
  - 20 percent of world GDP
  - in benchmark, currencies pegged to U.S. dollar (but also consider Taylor rule).
- Rest of World Block (ROW):
  - 55 percent of world GDP
  - follow Taylor rule, currencies float.

## Oil Sector

- World Oil Supply

- each country block has fixed endowment; U.S. endowment is 33 of its steady state consumption, and DA-LA block 60 per-cent.

- Global Oil Demand

- oil is both an input into production, and into the household consumption bundle. – costly to adjust oil share for both firms/households in response to relative price changes.

- oil demand responds immediately to changes in gross output or aggregate consumption.

- very slow response of oil share to relative price changes (half-life 10 years); elasticity .05 after 4 quarters, 0.5 in long-run.

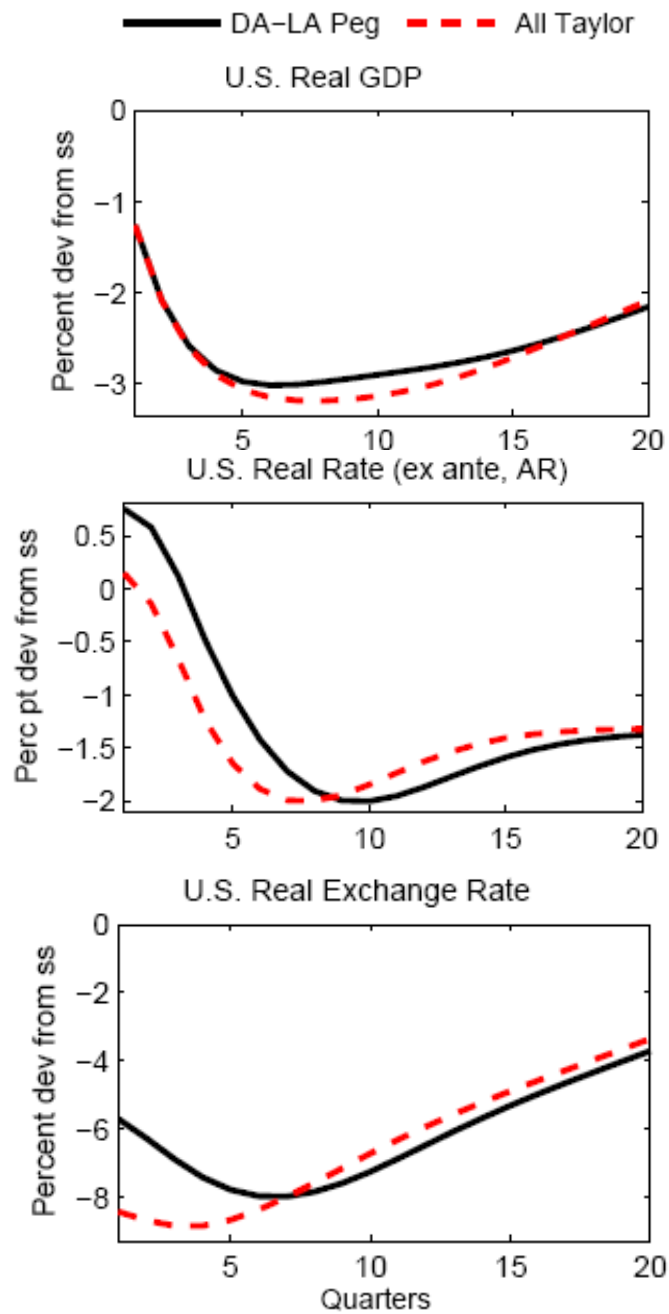
## Monetary Policy Loosening following Adverse Shock

- SIGMA simulation in which an adverse U.S. aggregate demand shock causes U.S. policy rates to fall by 200 basis points relative to baseline.
  - similar to actual decline in funds rate relative to baseline in 2001-2003 period following tech recession, and in first three quarters of 2008.
- Consider two different assumptions about monetary response in DA/LA (peg in benchmark, Taylor-rule in alternative).

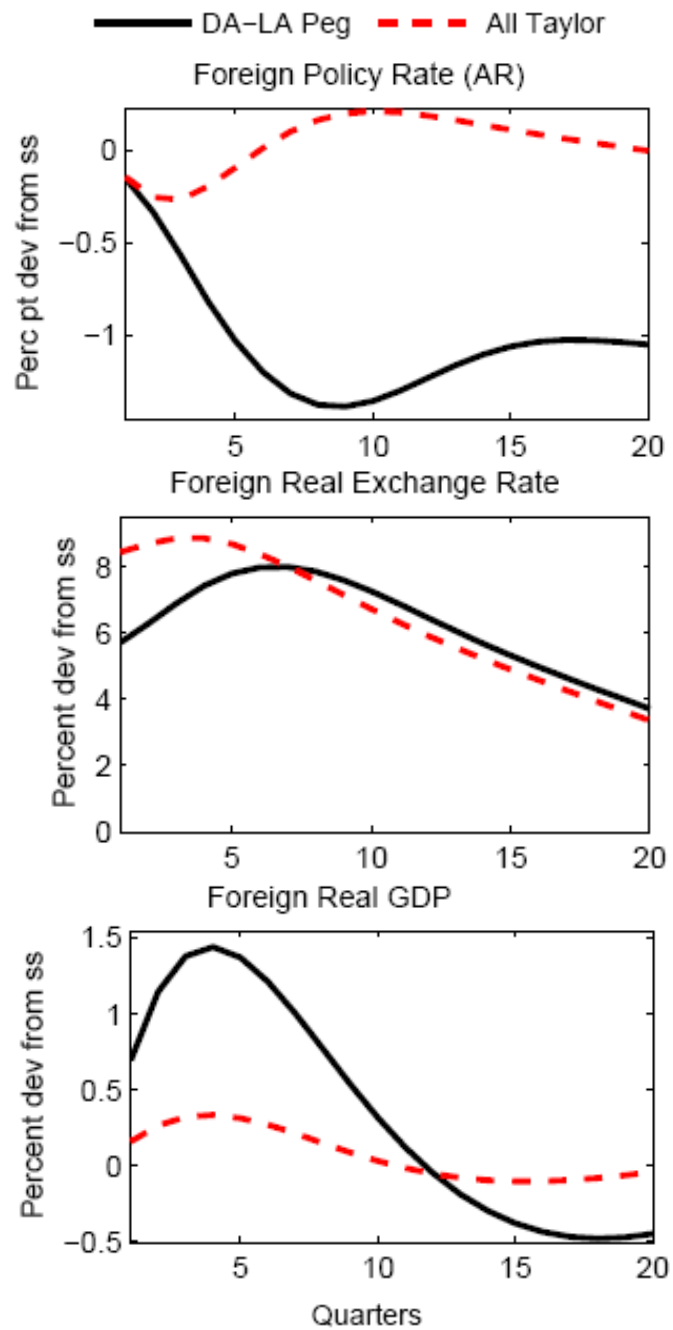
## Monetary Policy Loosening following Adverse Shock (con't)

- Under DA-LA peg, persistently low U.S. nominal interest rates cause DA/LA rates to fall, which boosts output and inflation.
  - the GDP boom in DA/LA is transient, as their exports become less competitive, and because inflation turns negative (the real exchange rate overshoots, and must depreciate).
- The simulation can account for a transient rise in world oil prices, but it dies away quickly.
- Key feature of actual runup in oil prices was that price increases were expected to persist (as inferred from futures market observations).

**Figure 6: U.S. Aggregate Demand Shock**



**Figure 7: U.S. Aggregate Demand Shock (Foreign Responses)**





**Figure 8: U.S. Aggregate Demand Shock**

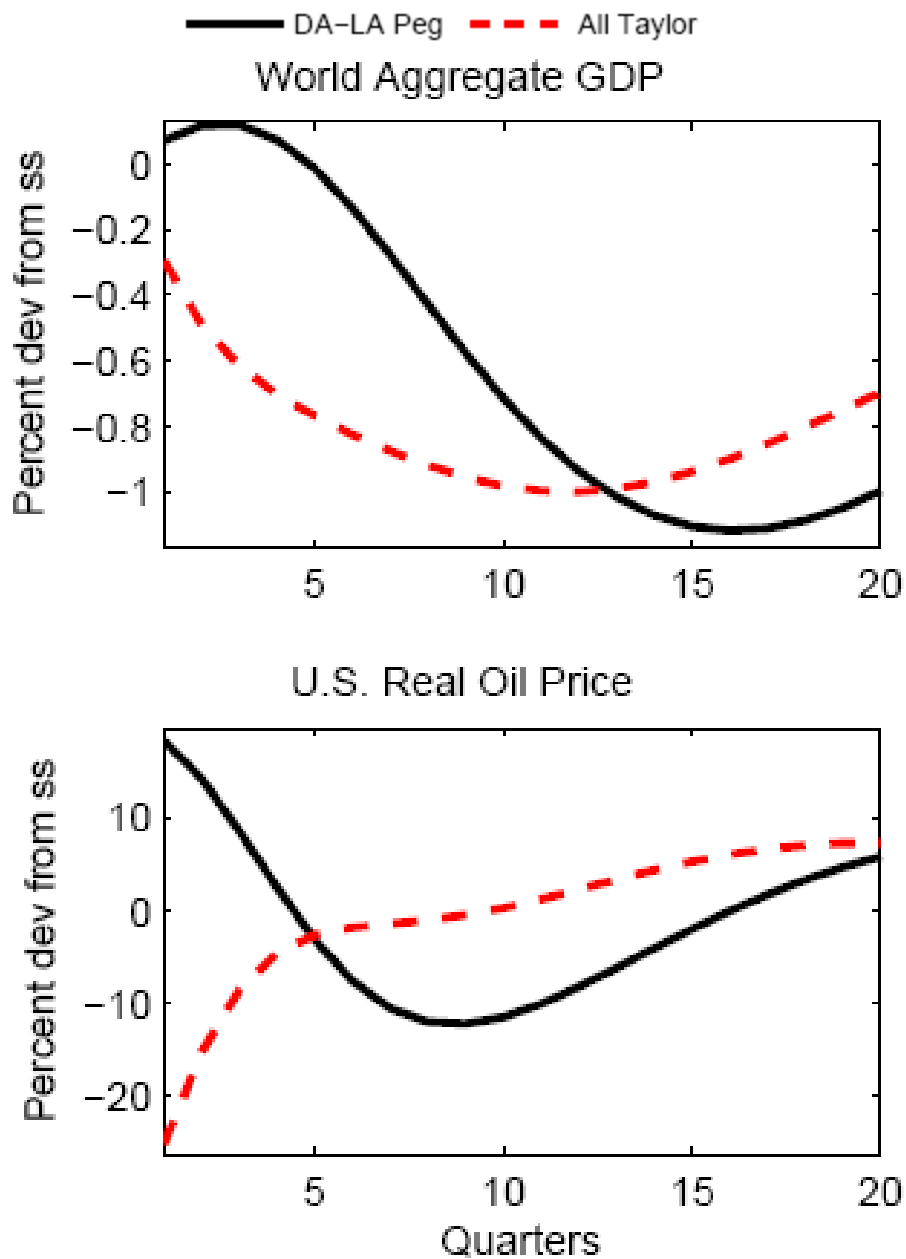


Figure 5a: U.S. Aggregate Demand Shock

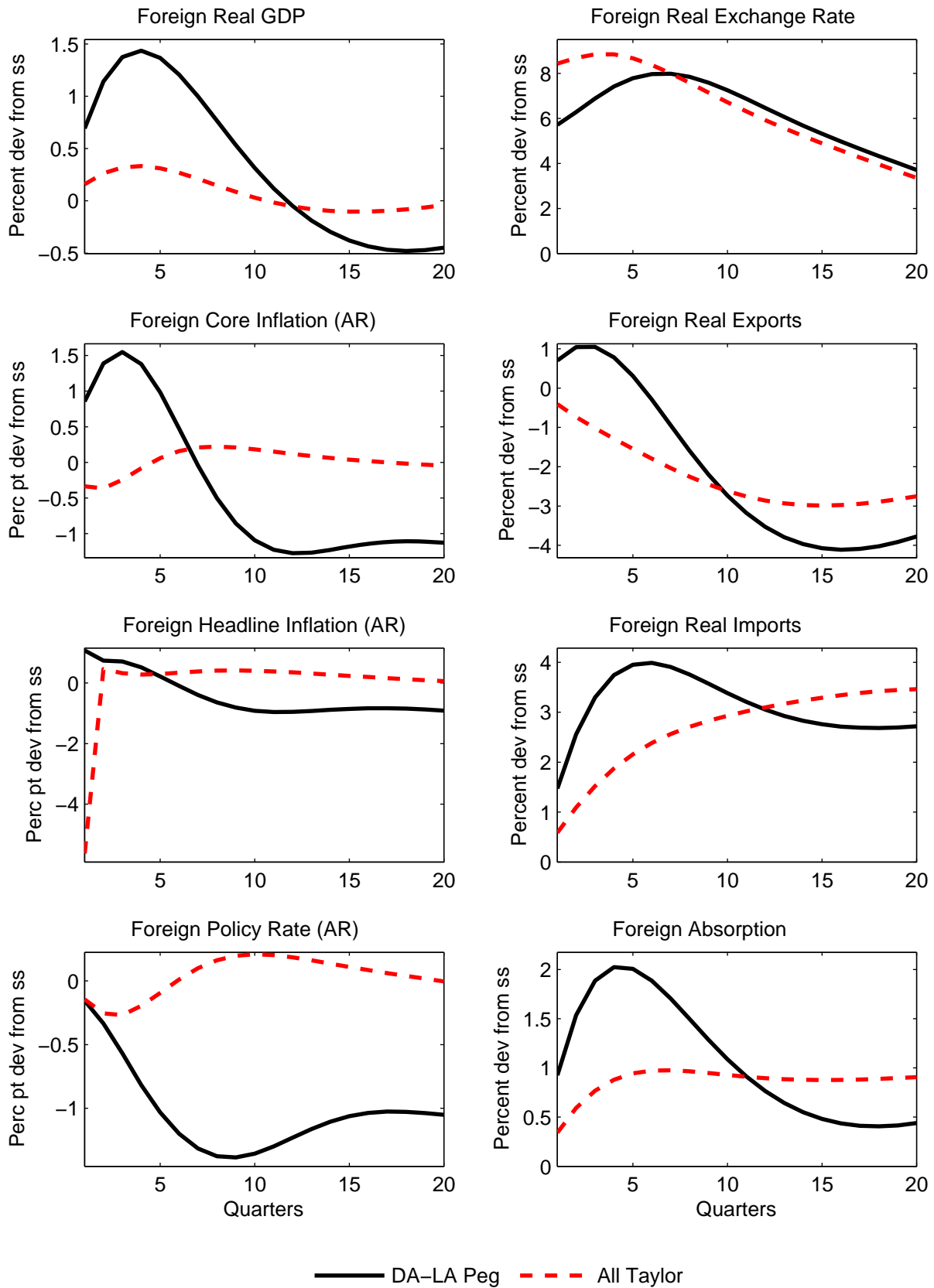


Figure 5b: U.S. Aggregate Demand Shock (DA Responses)

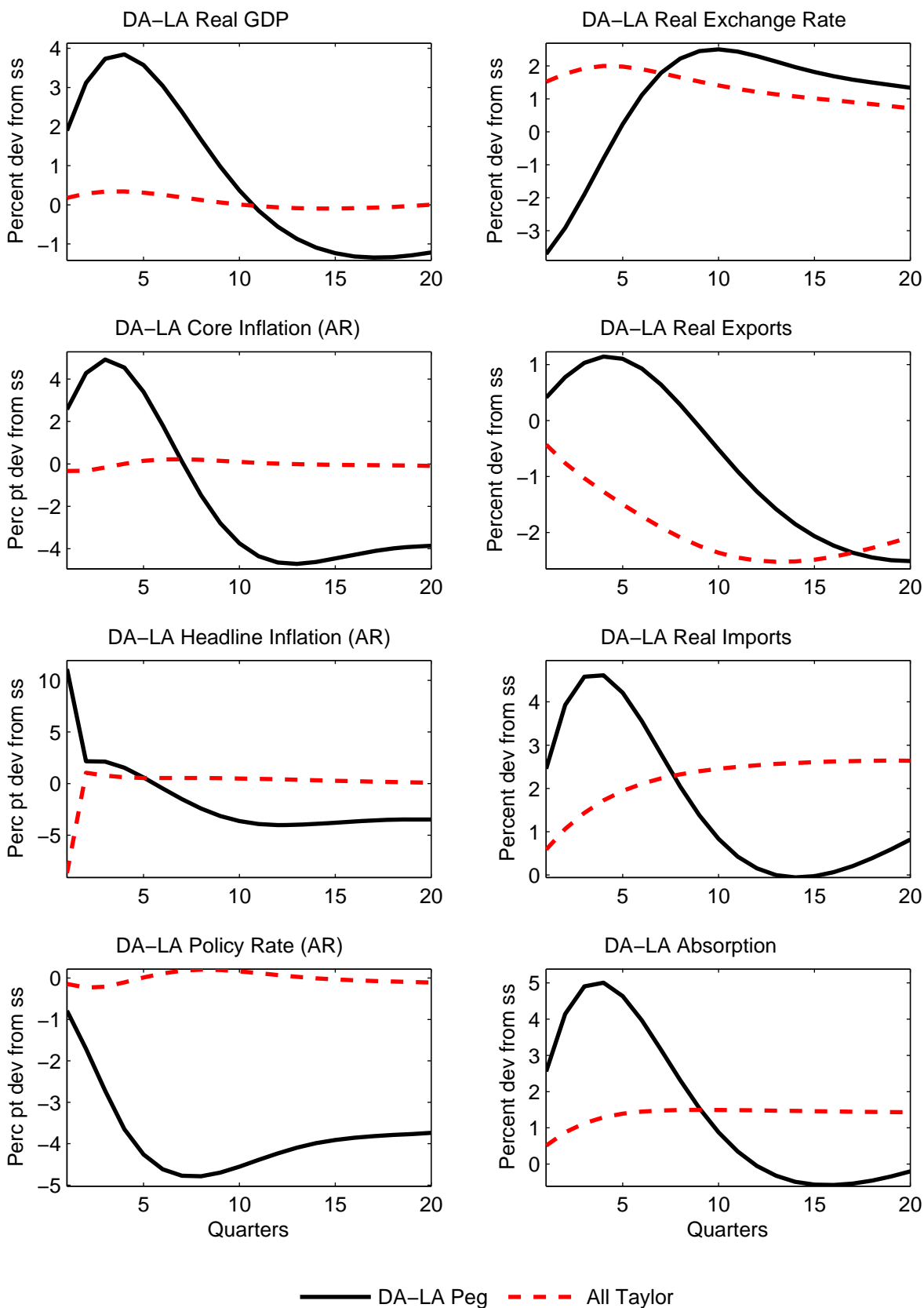
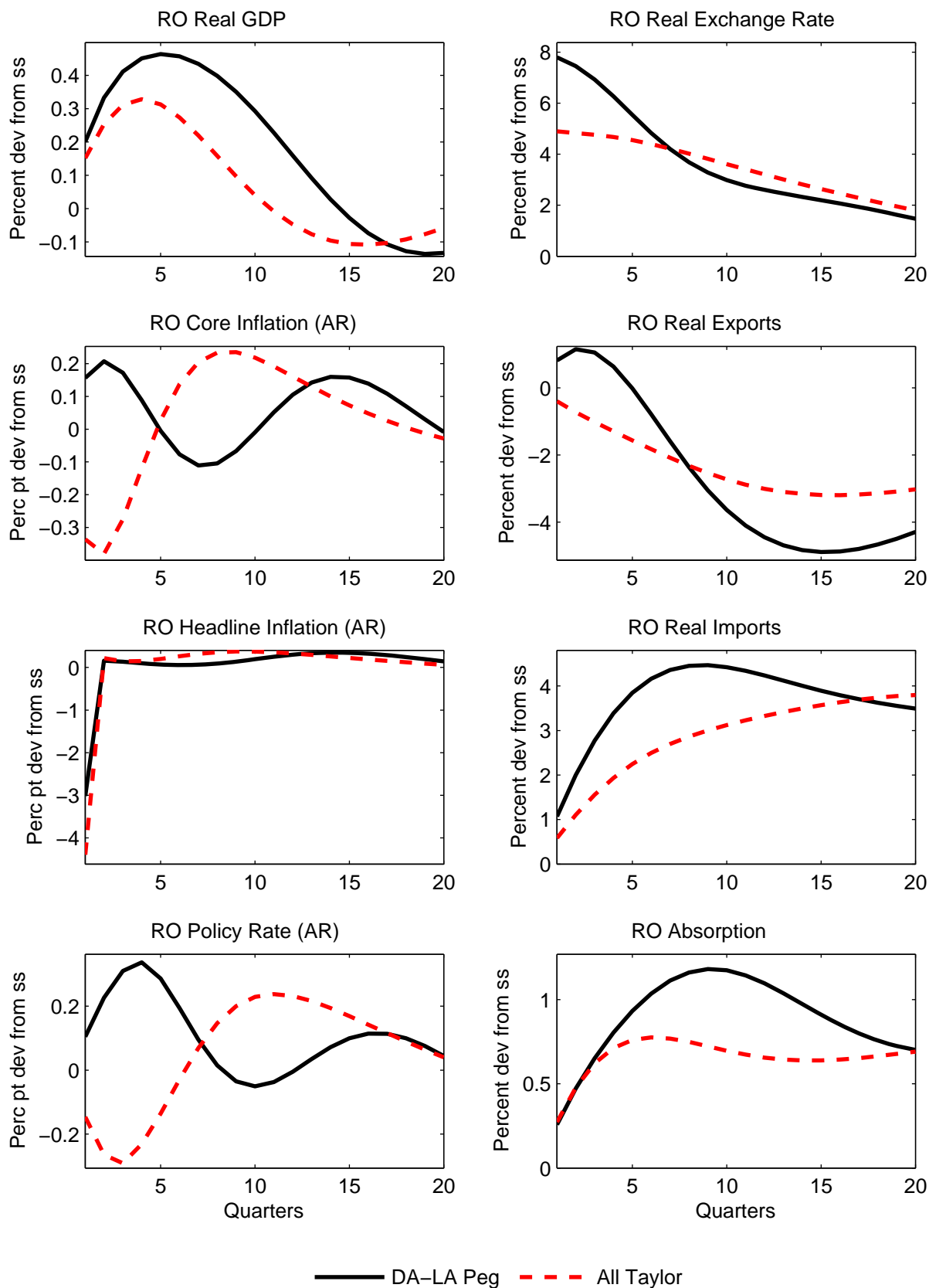


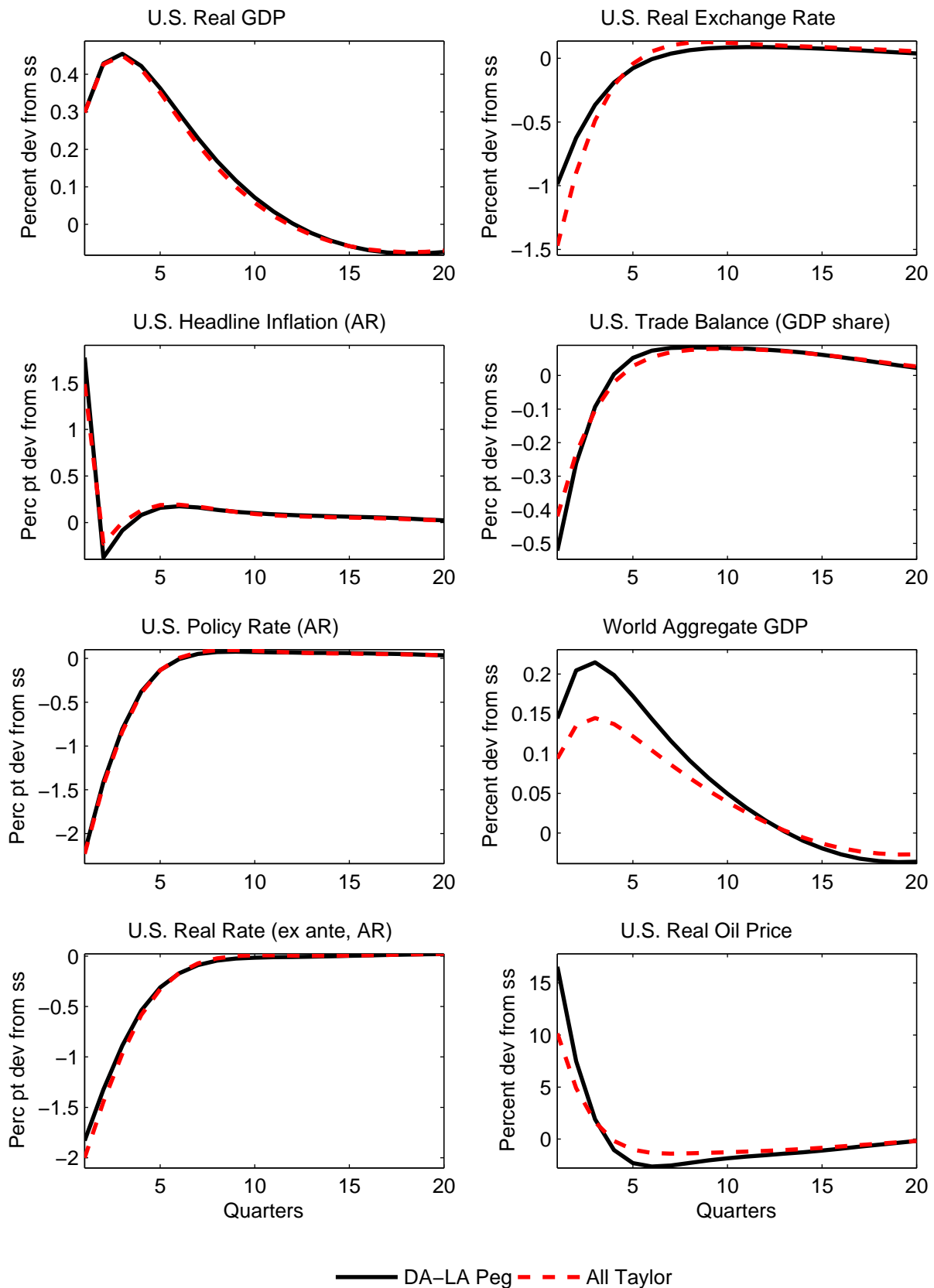
Figure 5c: U.S. Aggregate Demand Shock (ROW Responses)



## Monetary Policy Innovations

- Monetary policy innovations – departures from a Taylor rule – may have played a substantial role in fueling excessive growth in domestic demand over the 2004-2006 period (Taylor).
- Second simulation investigates the effects of a 200 basis point innovation to the U.S. monetary policy rule (in line with estimates of the deviation of actual policy from a Taylor rule in early 2004).
- U.S. and foreign output rise in response to this shock, but effects on world GDP are transient. Again, the model can explain some increase in oil prices, but not the persistence.

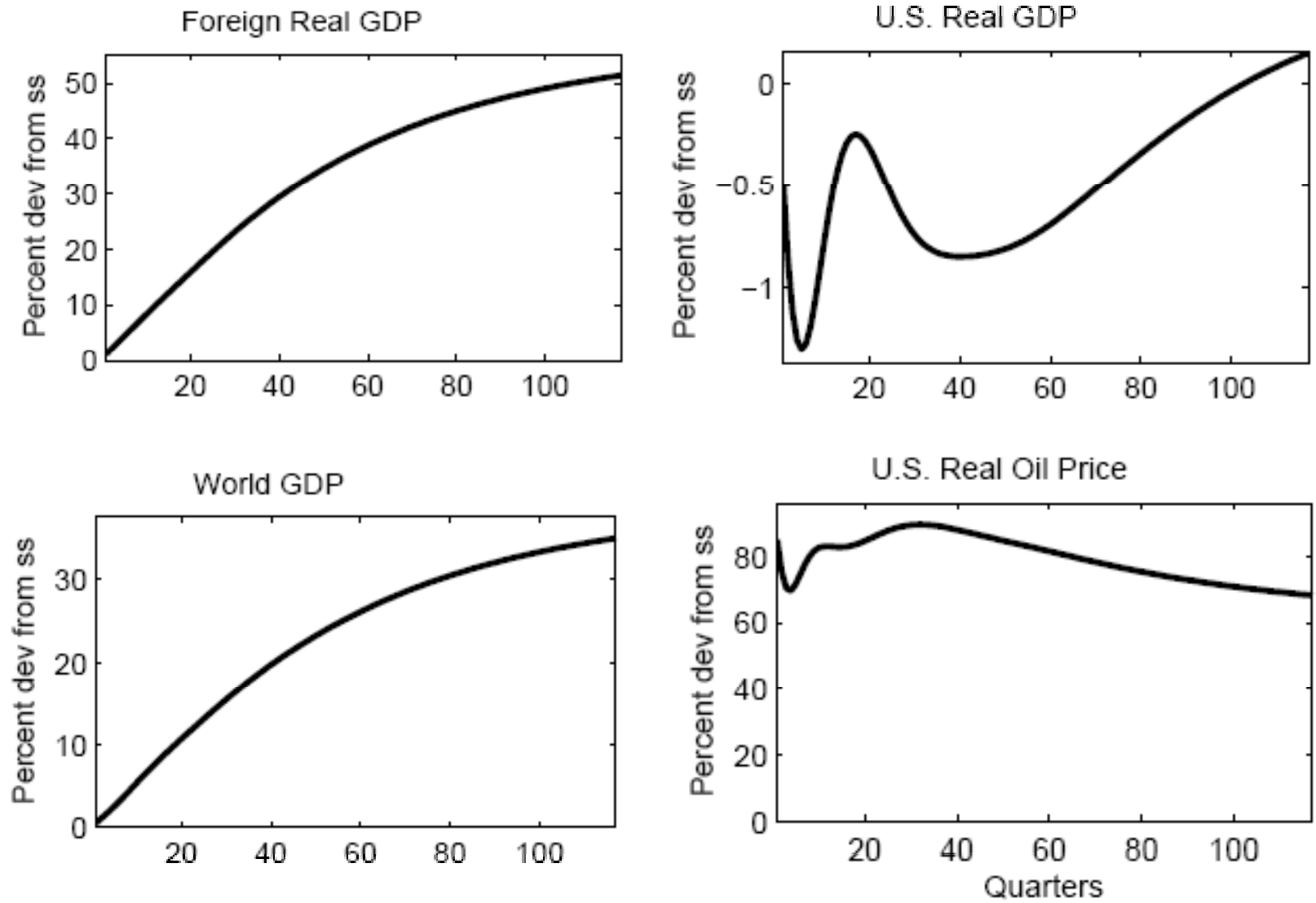
Figure 4: U.S. Monetary Policy Shock



## Higher Foreign Productivity Growth

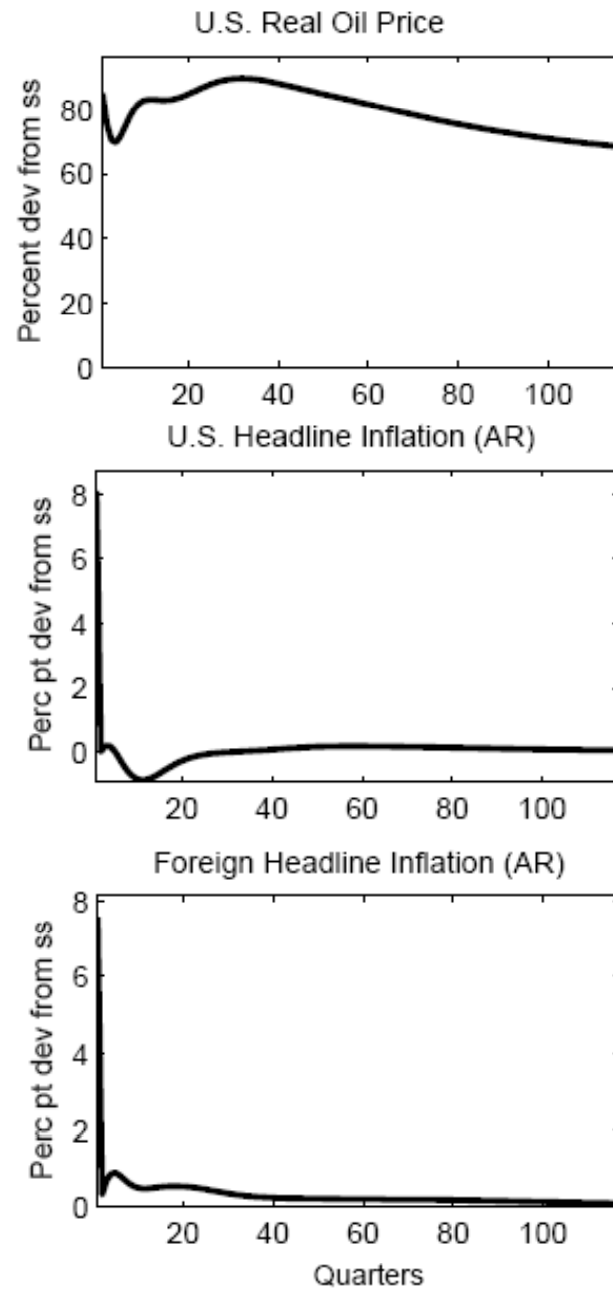
- Positive shock to foreign productivity growth that boosts foreign GDP growth about 1.5 percentage points above baseline very persistently.
  - This shock is consistent with a rise in world growth to 5 percent during 2004-2007, about 1 percentage point higher than average in the preceding 2 decades.
- Long-run rise in world output of 35 percent boosts oil price by 70 percent. – However, price jumps immediately reflecting that even small rise in demand initially has large price effect given low elasticity
  - Subsequently, fall in demand due to gradual price substitution almost exactly balanced by higher demand.

**Figure 10: Foreign Technology Growth Shock**





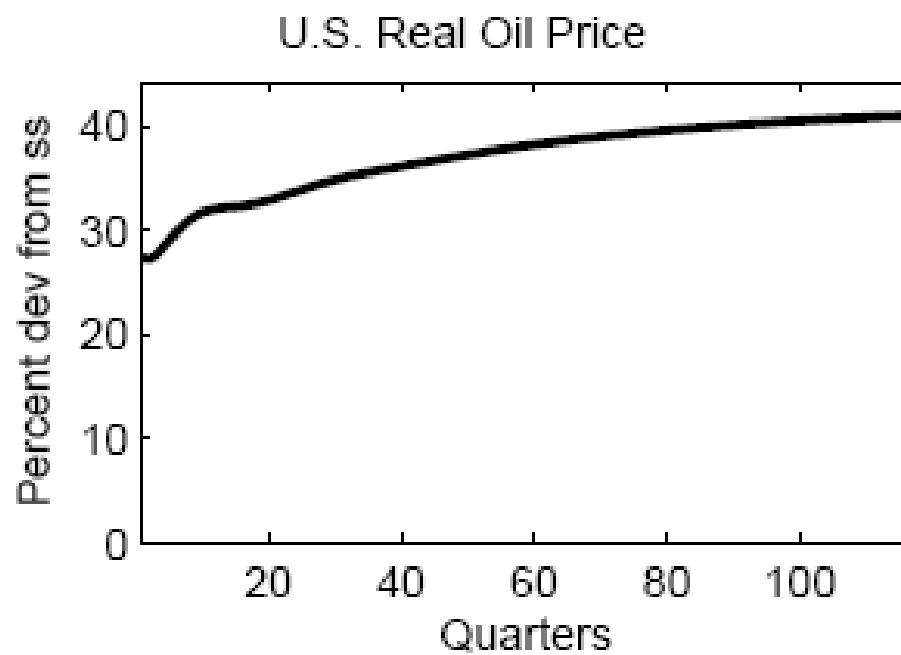
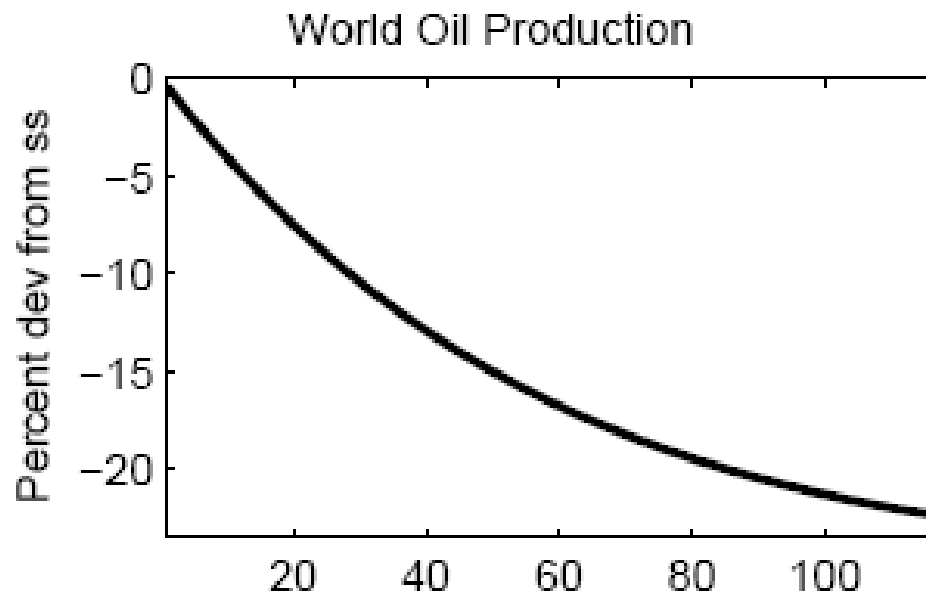
**Figure 11: Foreign Technology Growth Shock**



## Lower Growth of Oil Production

- Negative shock to supply that lowers growth of global oil production 1.5 percentage points baseline baseline.
  - Consistent with a fall in growth of world oil production from about 2 percent annually to 1/2 percentage point during 2004-2007.
  - Long-run fall in oil production of about 30 percent.
- Persistent adverse shocks to growth rate of supply can explain highly persistent decline in the relative price of oil.

**Figure 12: Negative Oil Supply Shock**



**Figure 13: Negative Oil Supply Shock**

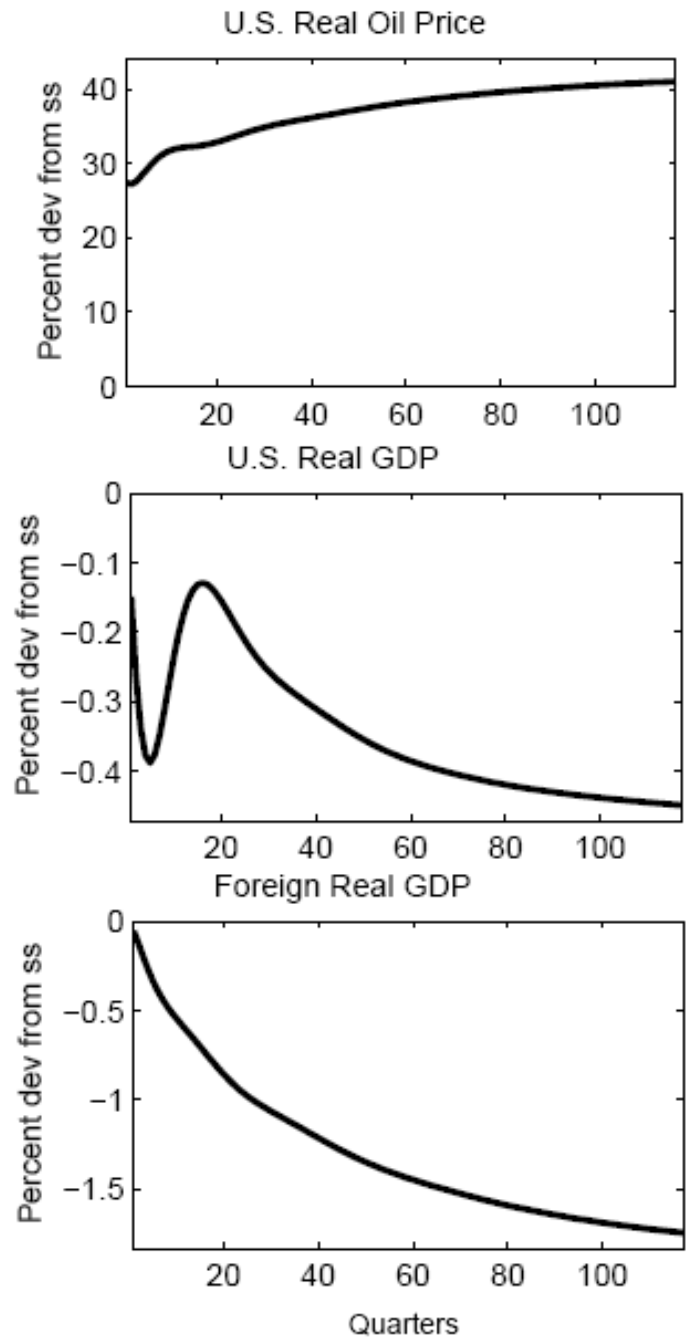
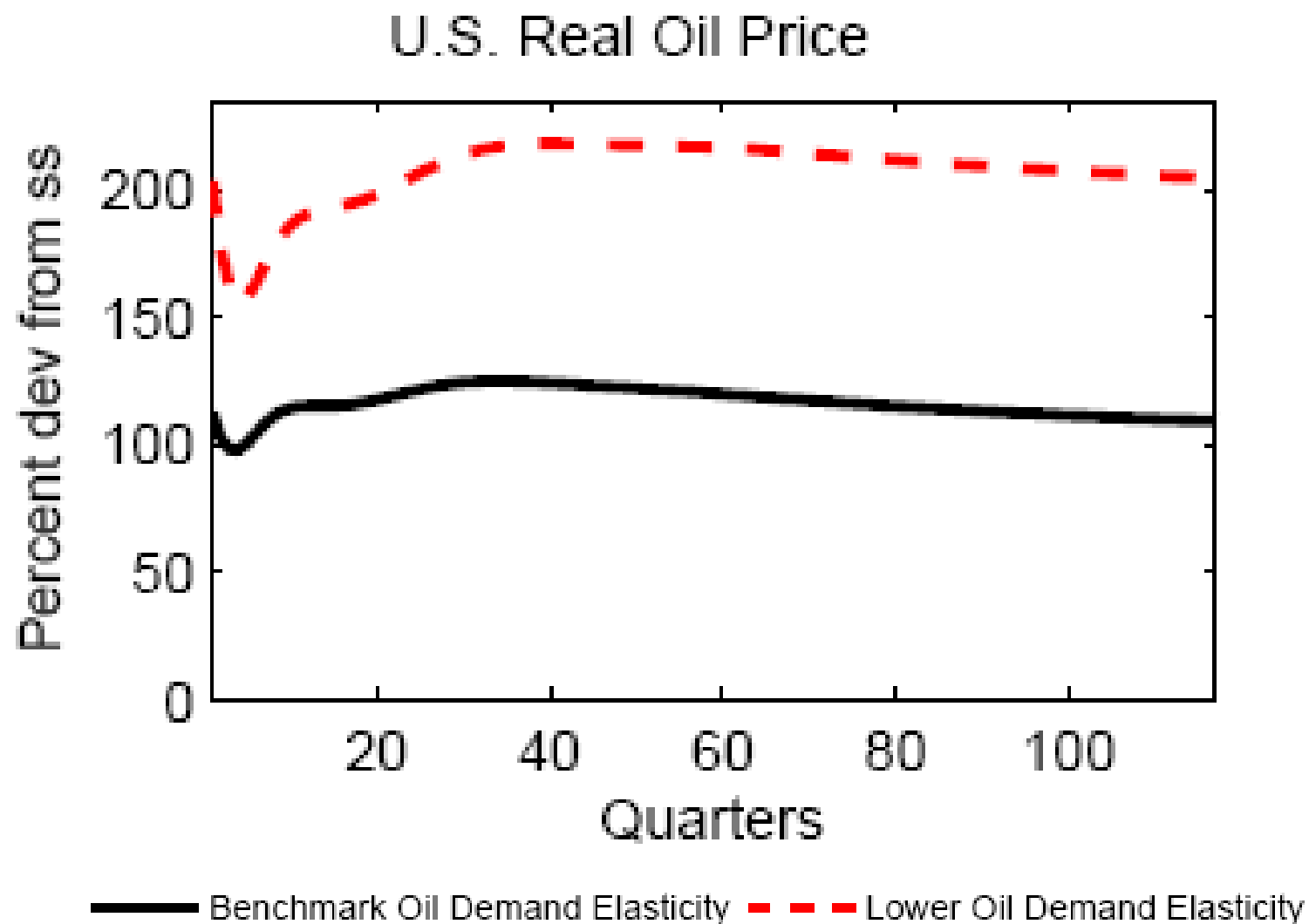


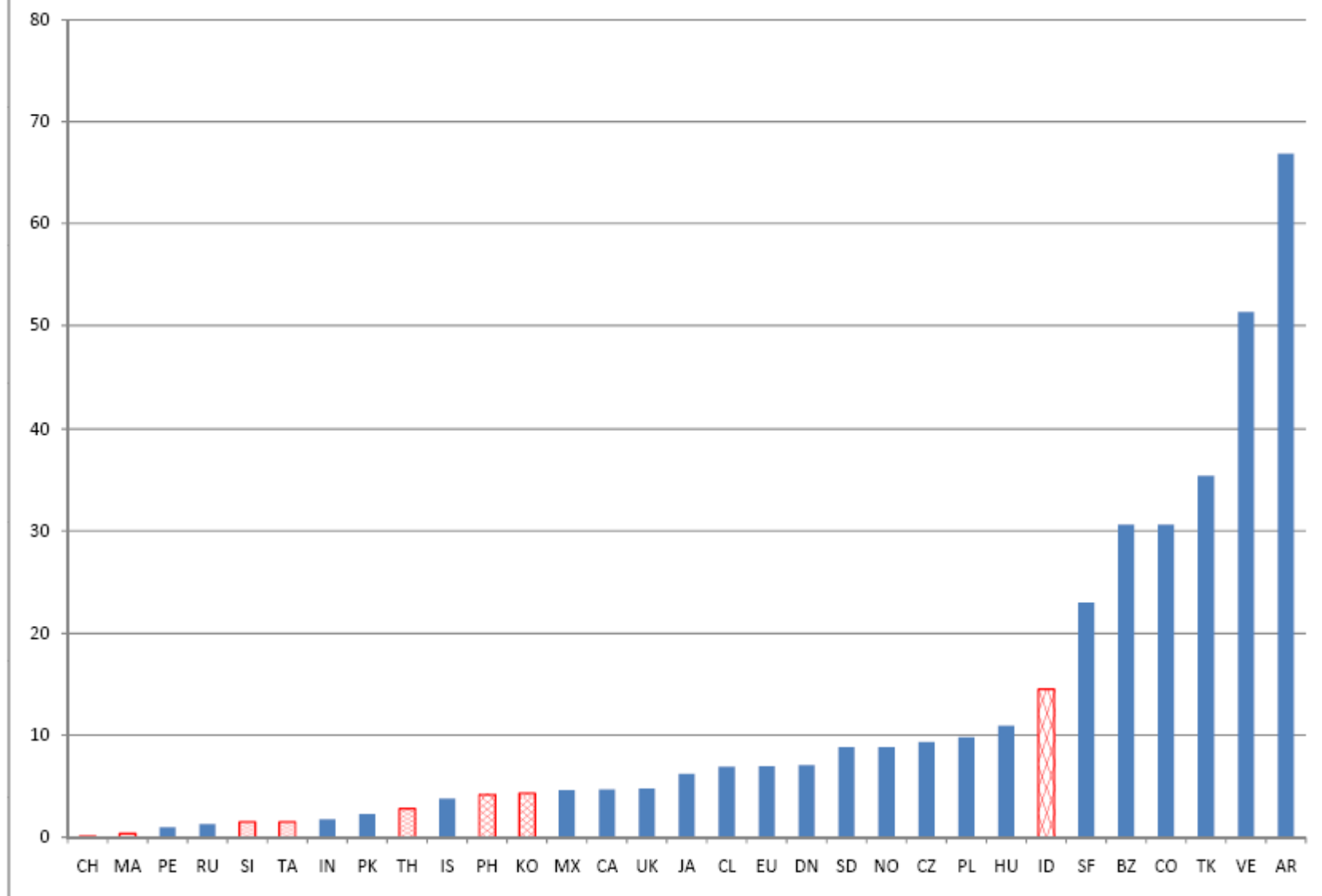
Figure 15: Combined Positive Foreign GDP and Negative Oil Supply Shocks



## How Realistic is the “Dollar Bloc” Premise?

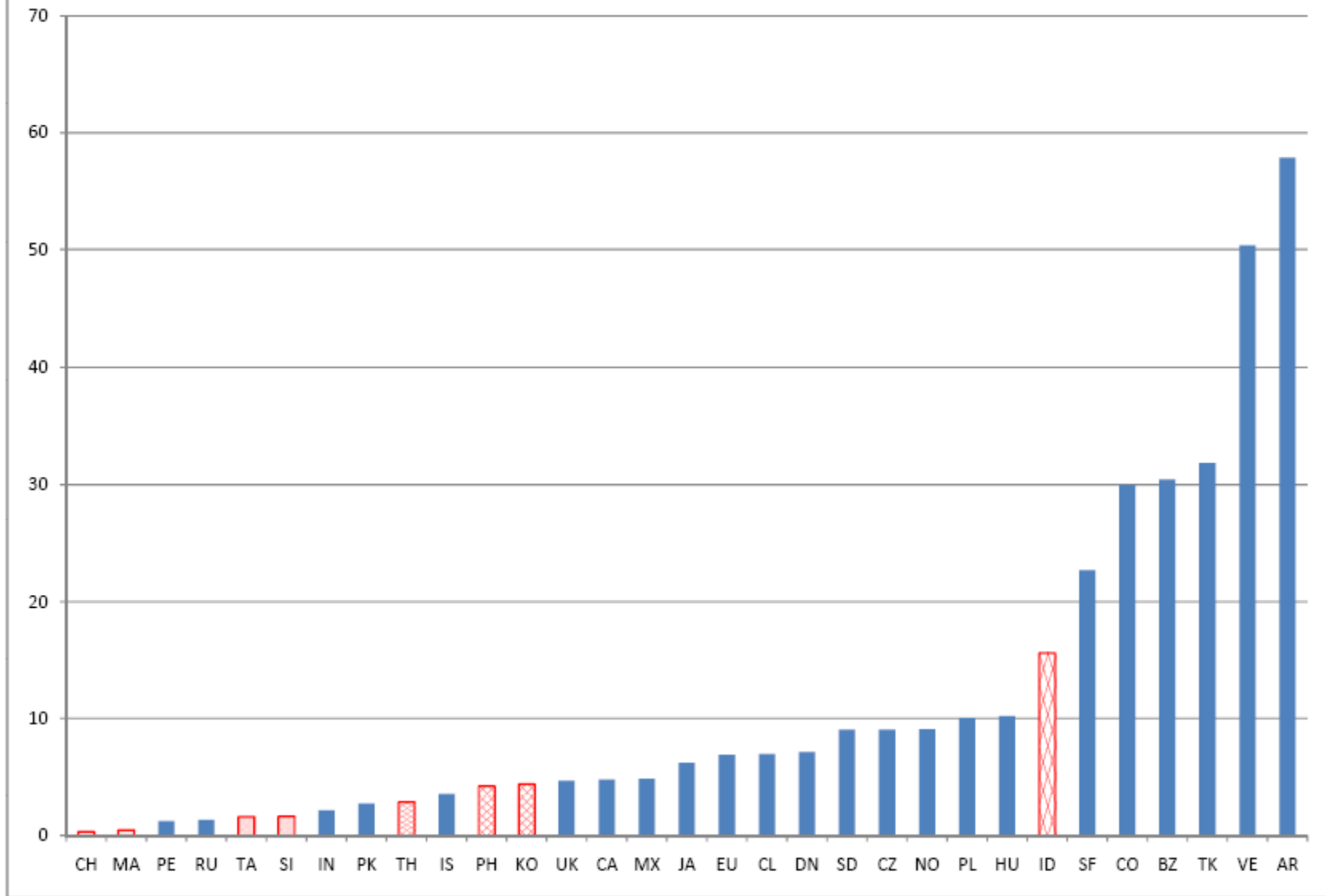
- Currencies of East Asian countries do show less volatility relative to the dollar than most industrial country currencies. Even so, the won moves about as much as the pound or peso.
- Policy interest rates of East Asian currencies show little comovement with U.S. policy rates, weakening case for a dollar bloc.

Figure 16: Variance of Percent Changes in Nominal Exchange Rate Against Dollar\*



\* Montly data, calculated over 2000-2007

Figure 17: Variance of Percent Changes in Real Exchange Rate Against Dollar\*



\* Monthly data, calculated over 2000-2007; deflated by U.S. and other countries' CPIs.



## Conclusion

- “Dollar bloc” story can account for transitory increases in oil prices, but not the very durable runup that occurred between 2002 and 2007.
- Faster GDP growth in emerging market economies and sluggish expansion of capacity better explain the sustained rise in oil prices.
- The “dollar bloc’ appears less rigidly tied to the dollar than the name suggests.

## Conclusion

- It remains difficult to account for some features of oil/commodity price behavior:
  - the astounding runup in prices in 2007-2008 amidst financial turmoil in industrial countries.
  - the enormous drop in spot prices relative to future in early 2009.
- More sophisticated models of oil/commodity market behavior are desirable, including models that include oil inventories (Bodenstein and Guerrieri), and endogenous determination of oil supply.