



Macroeconomic Effects of Disruptions in Global Food Commodity Markets: Evidence for the United States

Jasmien De Winne
UGent

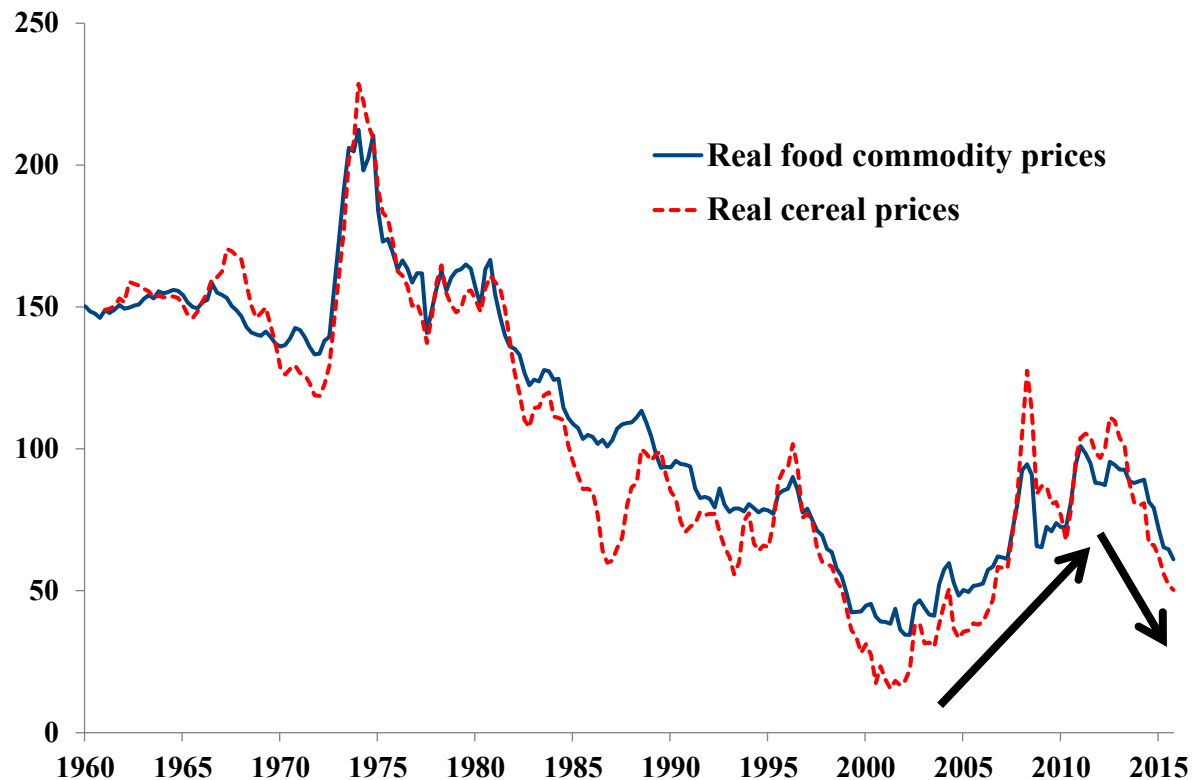
Gert Peersman
UGent

Fall 2016 Conference of Brookings Papers on Economic Activity



Motivation

- **Agricultural fluctuations considered very important for business cycles of advanced economies until beginning of 20th century, but attention vanished as agricultural sectors in developed countries contracted**
- **“Global Food Crisis” and subsequent collapse of food commodity prices has reignited interest in causes and consequences of developments in food markets**



Motivation

- **Very little is known about effects of disruptions in food commodity markets on business cycles of advanced economies (e.g. no quantitative evidence)**
 - **Surprising given high share of food and beverages in household spending (17%), and growing share of biofuels in energy consumption**
 - **... also vital to examine the optimal monetary policy response to changes in food prices or usefulness of public food security programs**
 - **... needed to analyze effects of policy measures that may influence food prices: food trade policies, ethanol subsidies, carbon offset programs, ...**
 - **... in case of increased likelihood of significant weather shocks in agriculture, it should help to assess consequences of climate change**



This paper

- **Empirical evidence on the macro effects of disturbances in global food commodity markets on the US economy over period 1963Q1–2013Q4**
- **Main challenge: food prices respond substantially to both supply and demand conditions, implying that reverse causality effects are present**
- **Two strategies to identify exogenous food commodity market shocks: novel quarterly global food production index embedded in SVAR and a narrative approach**

Quarterly composite global food production index

- We explore time lag of at least 1 quarter between decision to produce (planting) and actual production (harvest): unanticipated harvest shocks (e.g. due to weather variation) are exogenous to economy
- FAO publishes annual production data of four most important staples (corn, wheat, rice and soybeans) for 192 countries since early 1960s
 - Combine annual production data with crop calendars of each country

Country	Crop	Month											
		J	F	M	A	M	J	J	A	S	O	N	D
Kazakhstan	Wheat												

 Planting  Harvesting

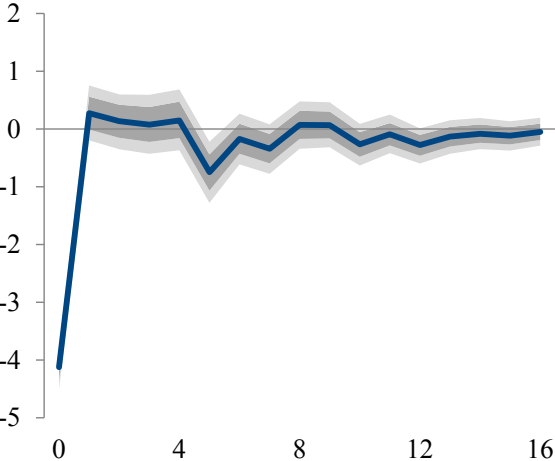
- Caloric weighted aggregate of four crops to construct quarterly global food commodity production index

VAR model for global food market and US economy

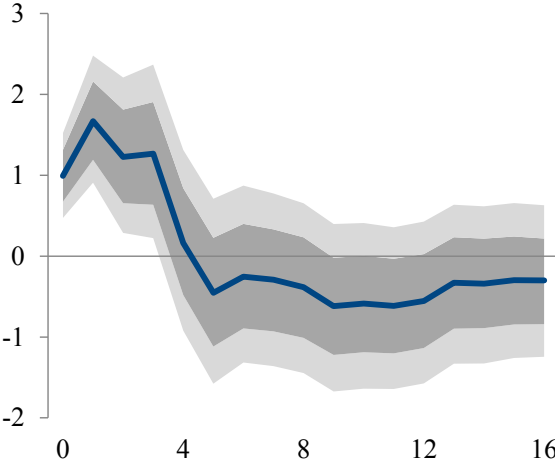
- **Embed global food commodity production index in standard VAR model:**
 - **Global food production index, real food commodity prices, volume of seeds set aside for planting**
 - **Global economic activity, oil production, real oil price**
 - **US real GDP, real personal consumption, CPI and Federal Funds rate**
 - **Cholesky decomposition: innovations to food production index are by construction exogenous**

VAR results: impact of global food market disruptions

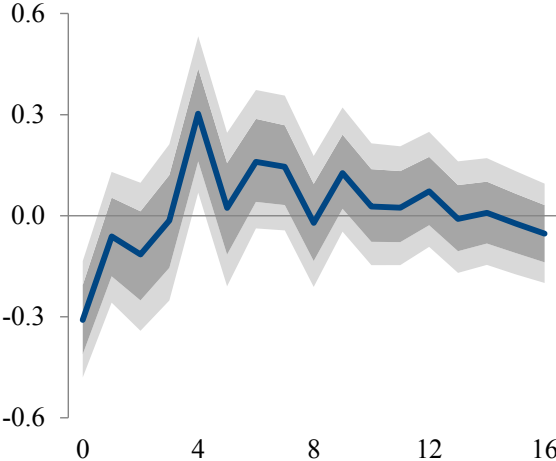
Global food production index



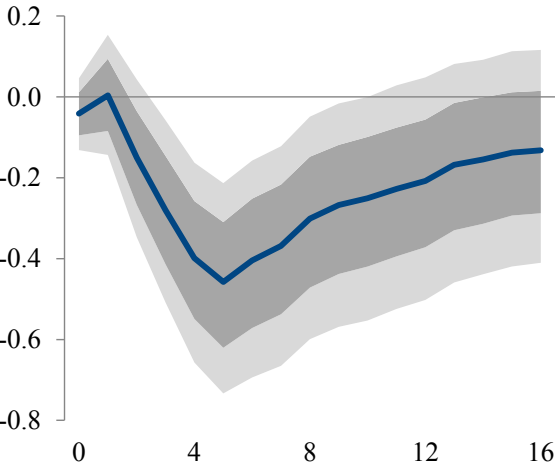
Real food commodity prices



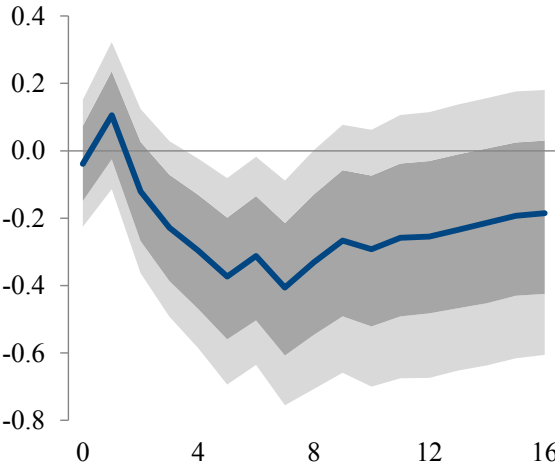
Volume of seeds set aside for planting



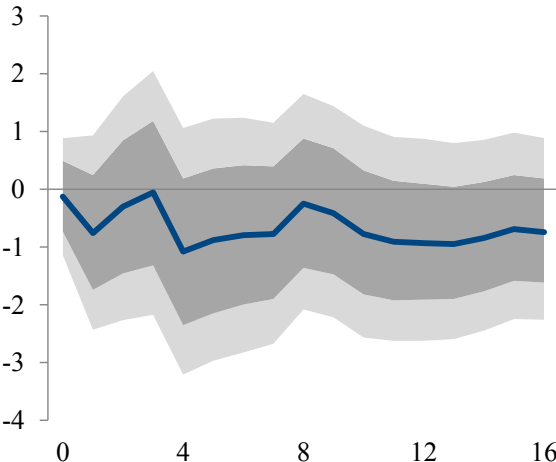
Global economic activity



Global oil production



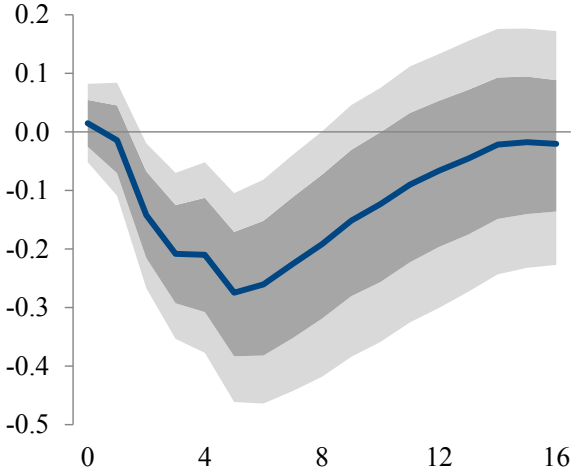
Real oil price



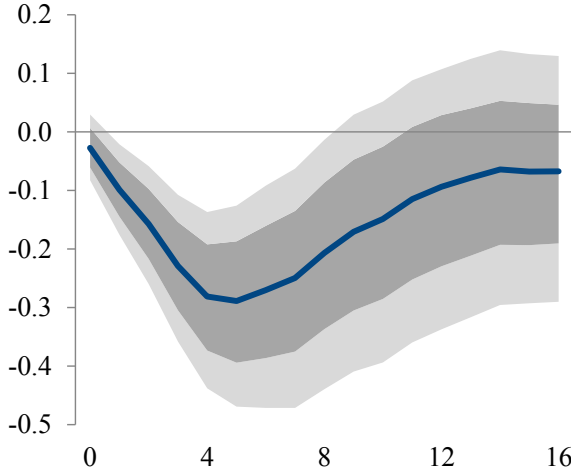
16th and 84th percentiles
 5th and 95th percentiles

VAR results: impact of global food market disruptions

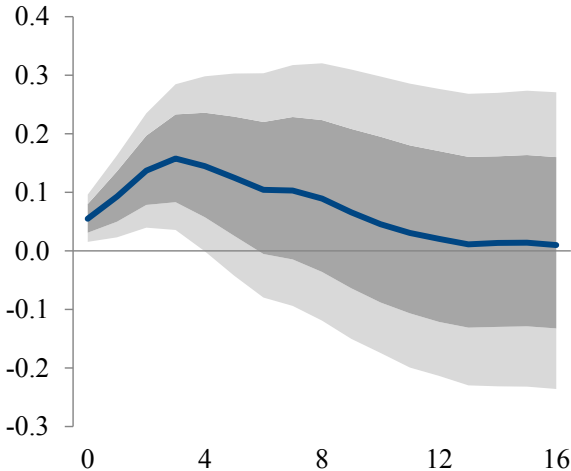
US real GDP



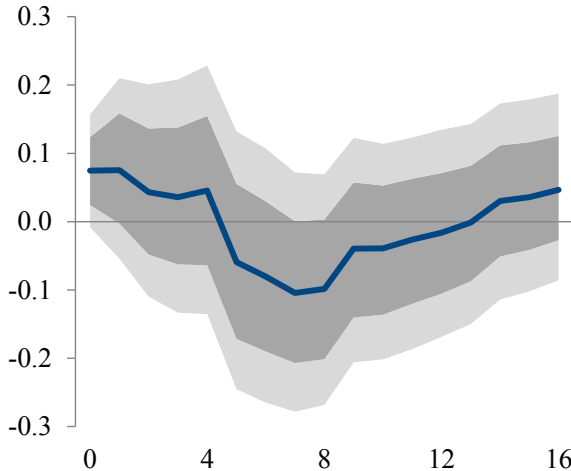
US real personal consumption



US CPI



Federal Funds rate



Sensitivity and robustness analysis

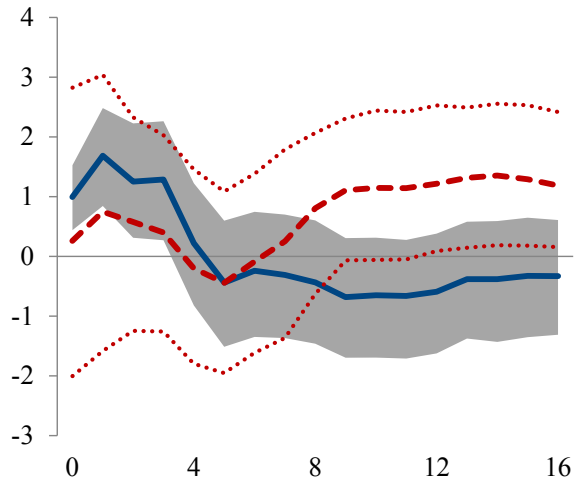
- **Innovations do not pick up other shocks and do not seem to have meaningful direct effects on the economy beyond food commodity markets**
- **Results robust for alternative food production measures (excluding US food production and production yields), and for using real cereal prices**
- **Macroeconomic effects (output, inflation) similar across subsamples**
 - **However: significant effect on crude oil price and CPI energy since 2003**
- **Narrative approach to identify food commodity market shocks confirms VAR analysis: considerable macro effects of food price shocks**

Pass-through to consumer prices and economic activity

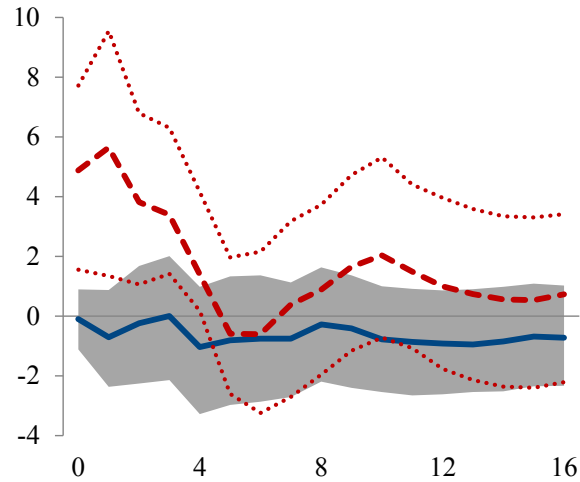
- **Additional stylized facts and try to better understand the mechanisms**
- **Extend the baseline VAR along two dimensions:**
 - **Compare food commodity supply shocks with oil supply shocks**
 - **Re-estimate VAR by adding an additional variable of interest each time**

Comparison with oil supply shocks

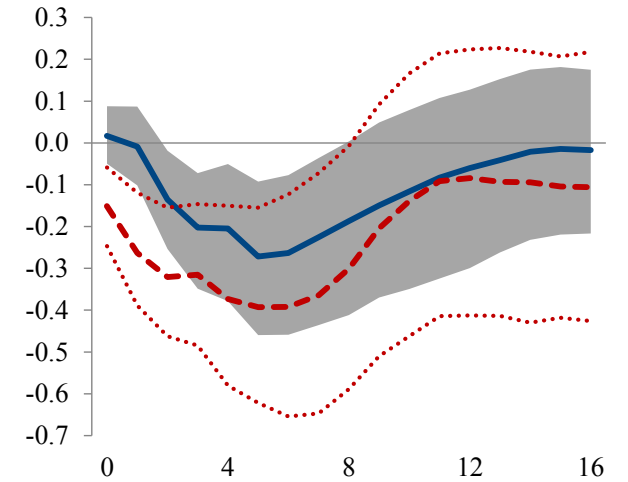
Real food commodity prices



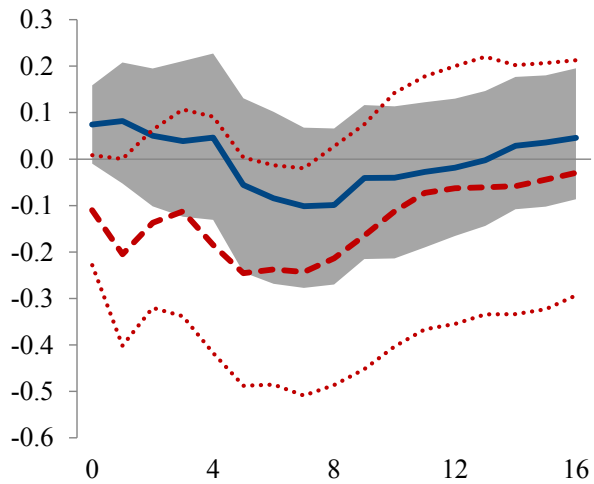
Real oil price



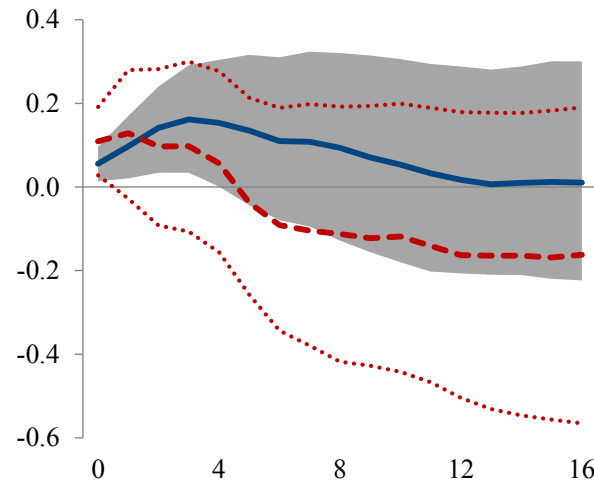
Real GDP



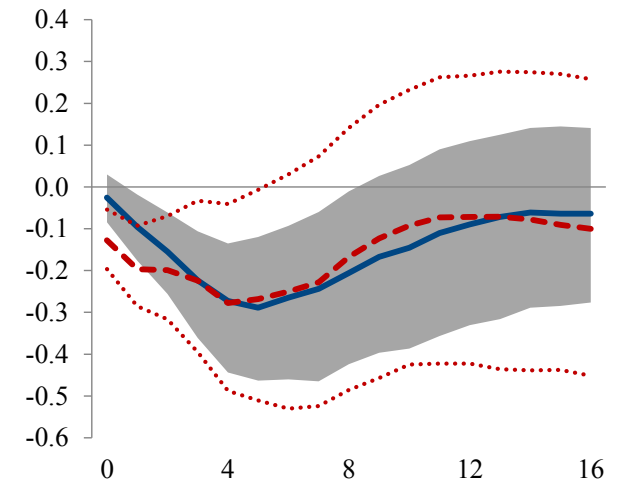
Federal Funds rate



CPI

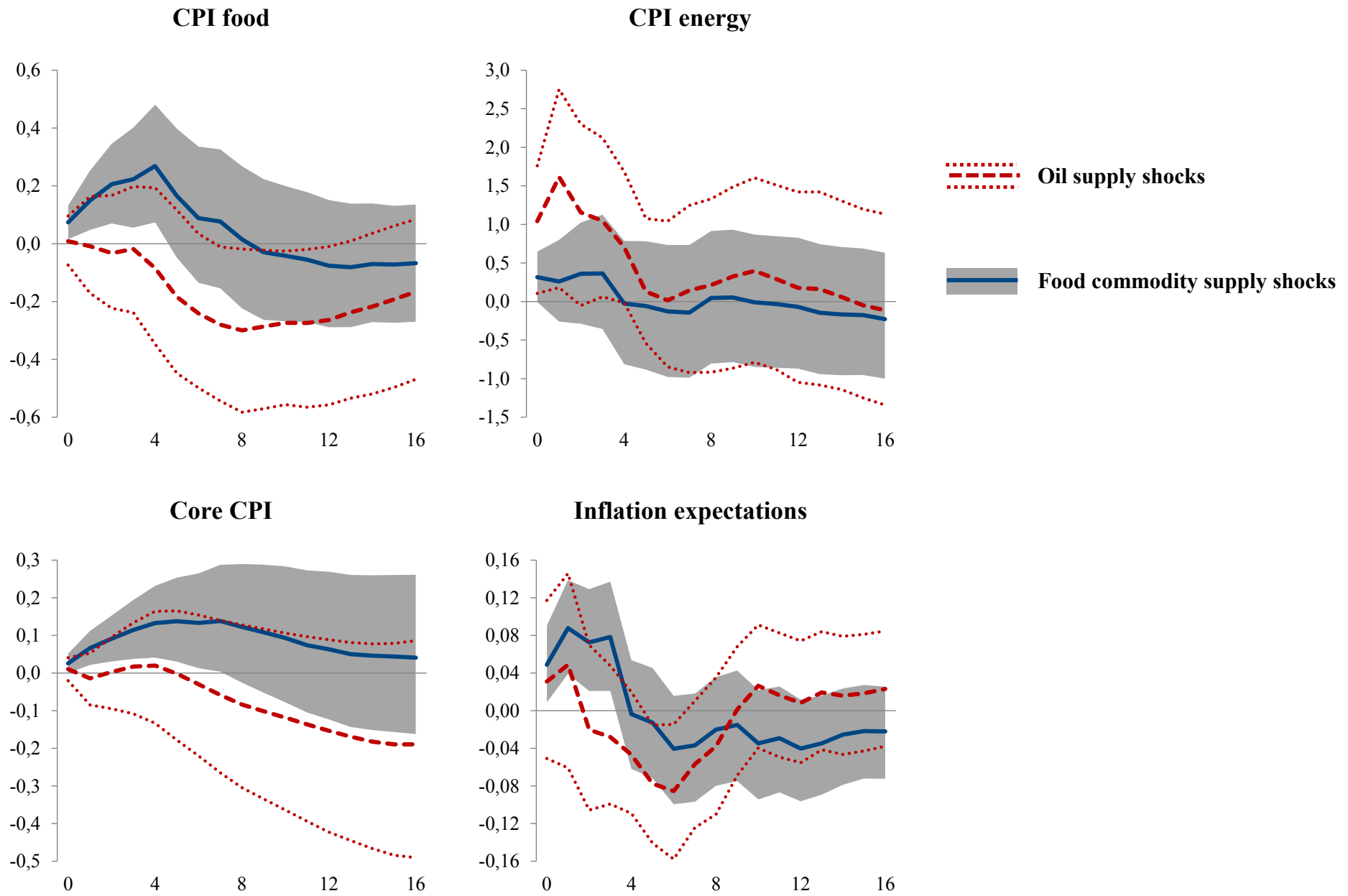


Real personal consumption

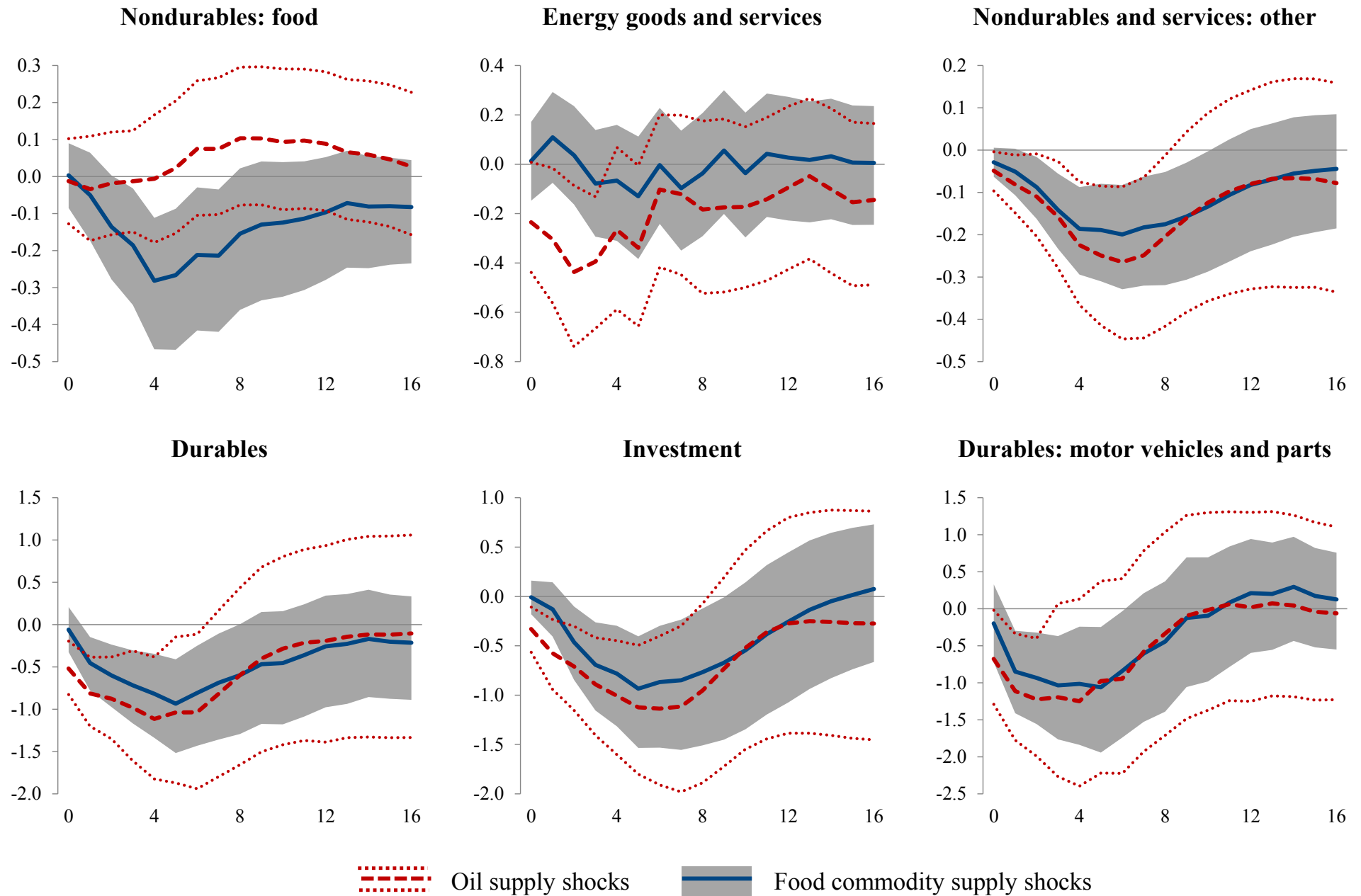


 Oil supply shocks  Food commodity supply shocks

Pass-through to consumer prices



Pass-through to household expenditures and economic activity



Conclusions

- **Disruptions in global food commodity markets have sizeable impact on US economy**
 - **Effects 4-6 times larger than impact implied by share of food commodities due to very strong impact on durable consumption and investment**
 - **Important for analysis of business cycles, countercyclical policies, public food security programs, trade policies and climate change**
- **Future research: better understanding of transmission mechanism, cross-country differences, ...**