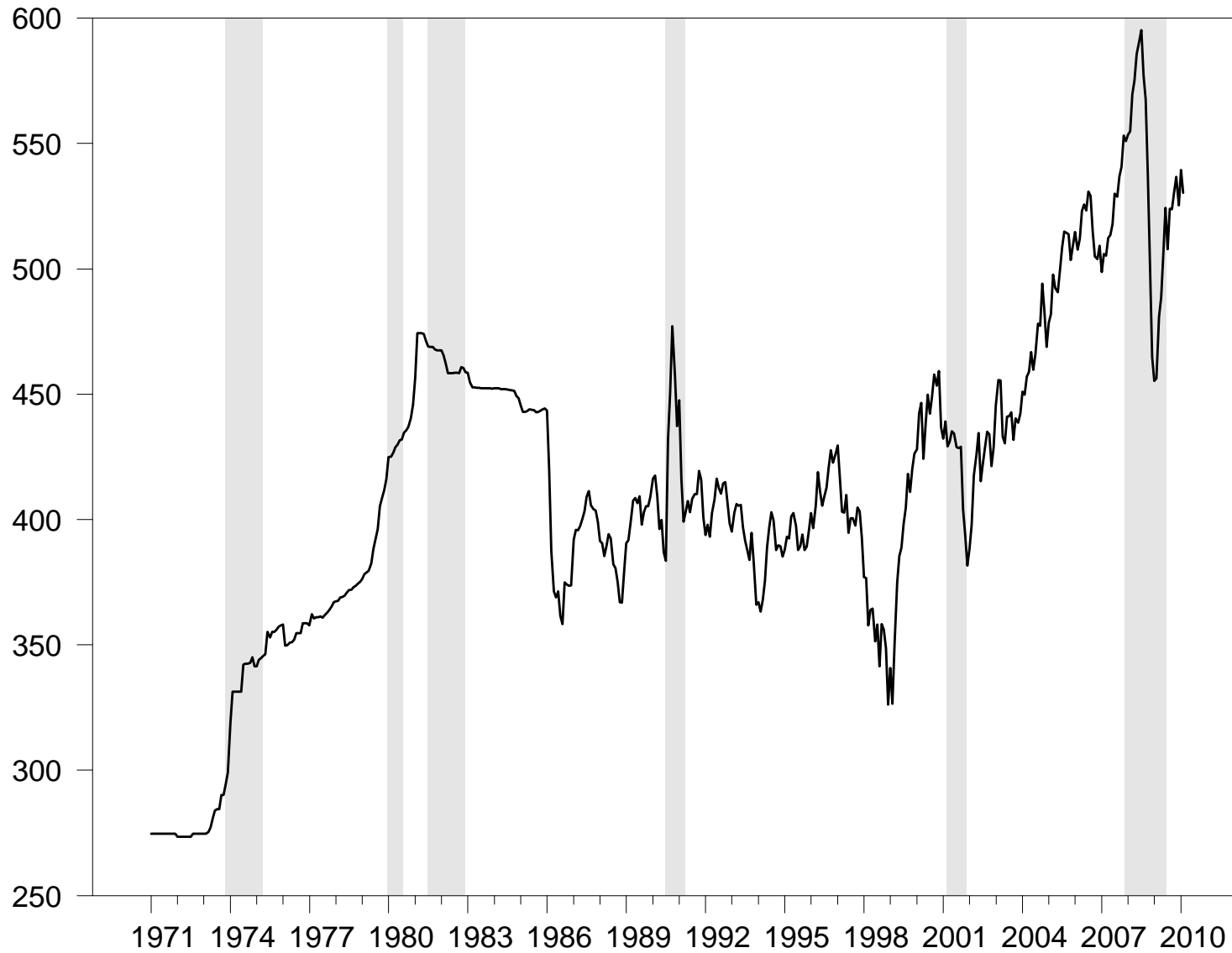


The Macroeconomic Effects of Oil Price Shocks

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Crude oil producer price index and U.S. recessions



1. Effects on potential GDP

K = capital stock

N = employment

E = energy

$Y = F(K, N, E)$

$$Y = F(K, N, E)$$

$$\frac{\partial Y}{\partial E} = P_E/P$$

$$\Rightarrow \frac{\partial \ln Y}{\partial \ln E} = \frac{P_E E}{PY}$$

$$\frac{\partial \ln Y}{\partial \ln(P_E/P)} = \frac{\partial \ln Y}{\partial \ln E} \frac{\partial \ln E}{\partial \ln(P_E/P)}$$

$$= (\text{expenditure share}) \times (\text{elasticity})$$

2. Effects on aggregate and sectoral demand

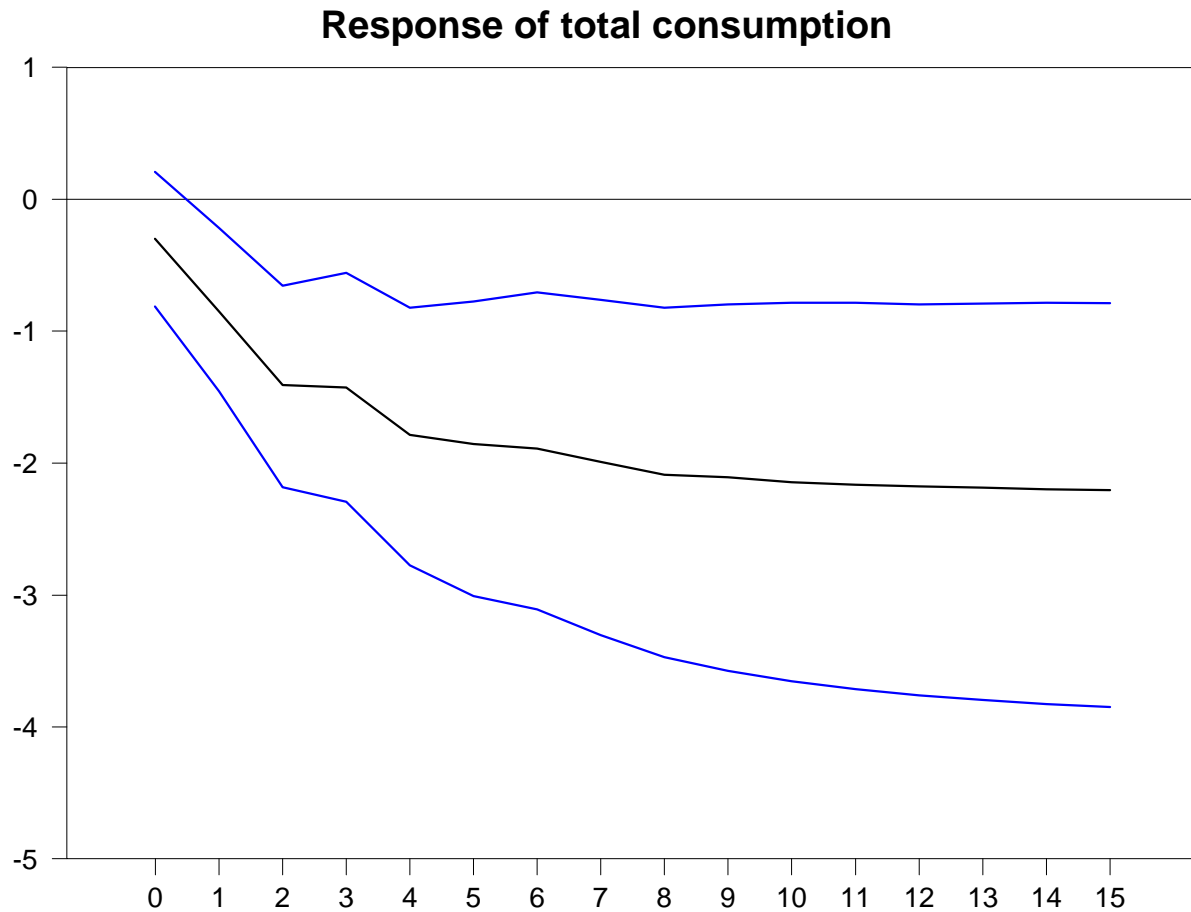
E.g., if

- 5% of consumer spending goes to energy ($\alpha_t = 0.05$)
- energy price goes up 20%
- consumers purchase same quantity of energy

then

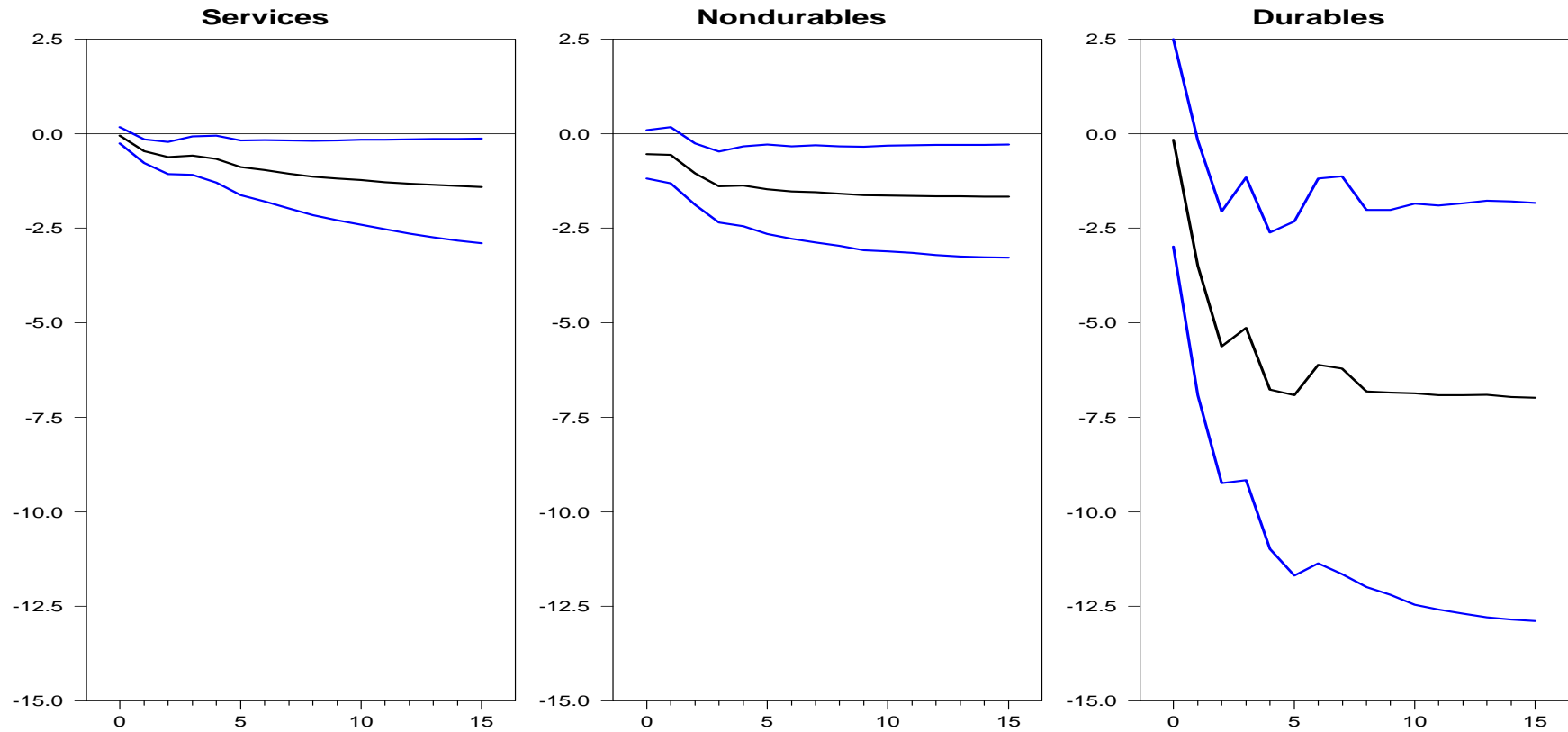
- saving or other spending must decline by 1%

Pre-2007 estimated impulse-response function (and 95% confidence intervals) relating 100 times log of real consumption spending to energy price increase that would reduce spending power by 1%



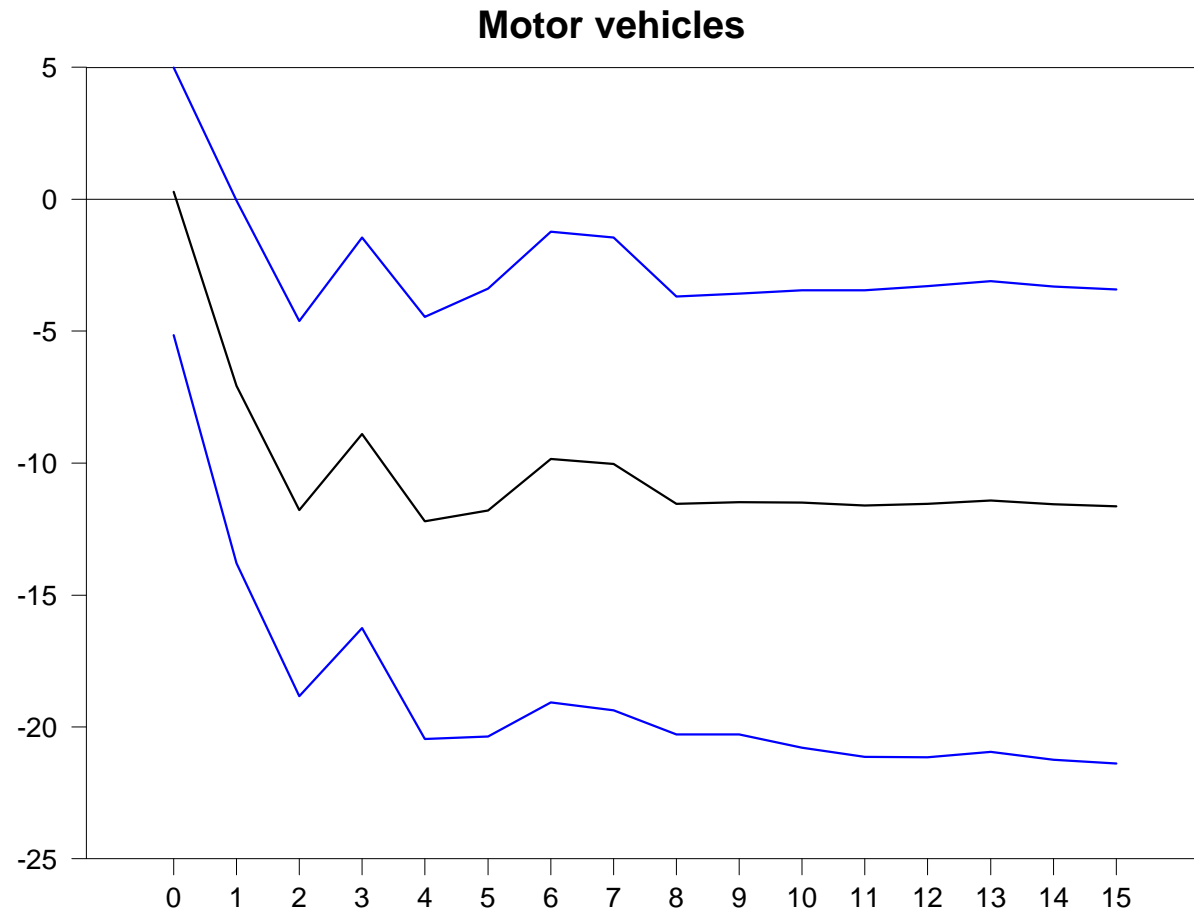
Reproduces Figure 8a in Edelstein and Kilian (2007)

Pre-2007 estimated impulse-response functions.



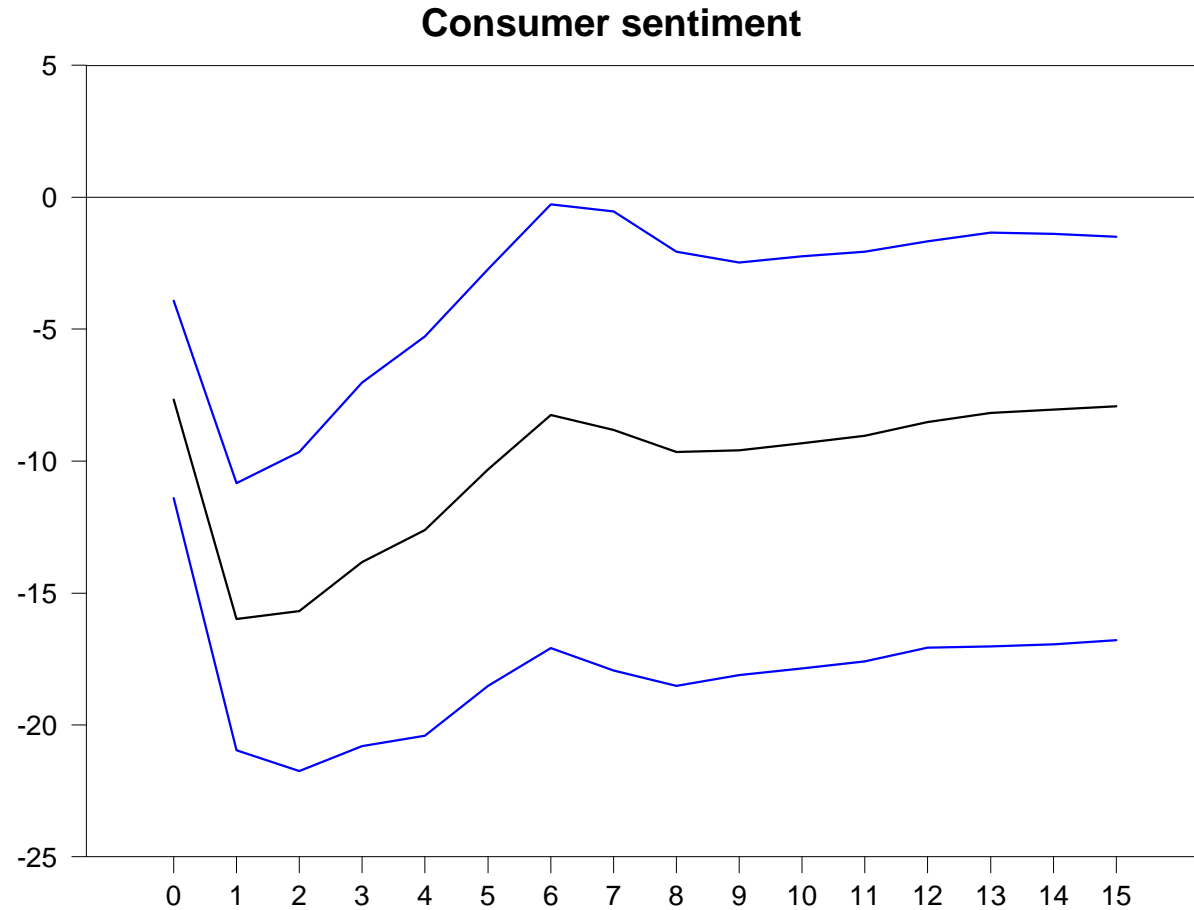
Reproduces Figure 8b-d in Edelstein and Kilian (2007)

Pre-2007 estimated impulse-response functions.



Reproduces Figure 8e in Edelstein and Kilian (2007)

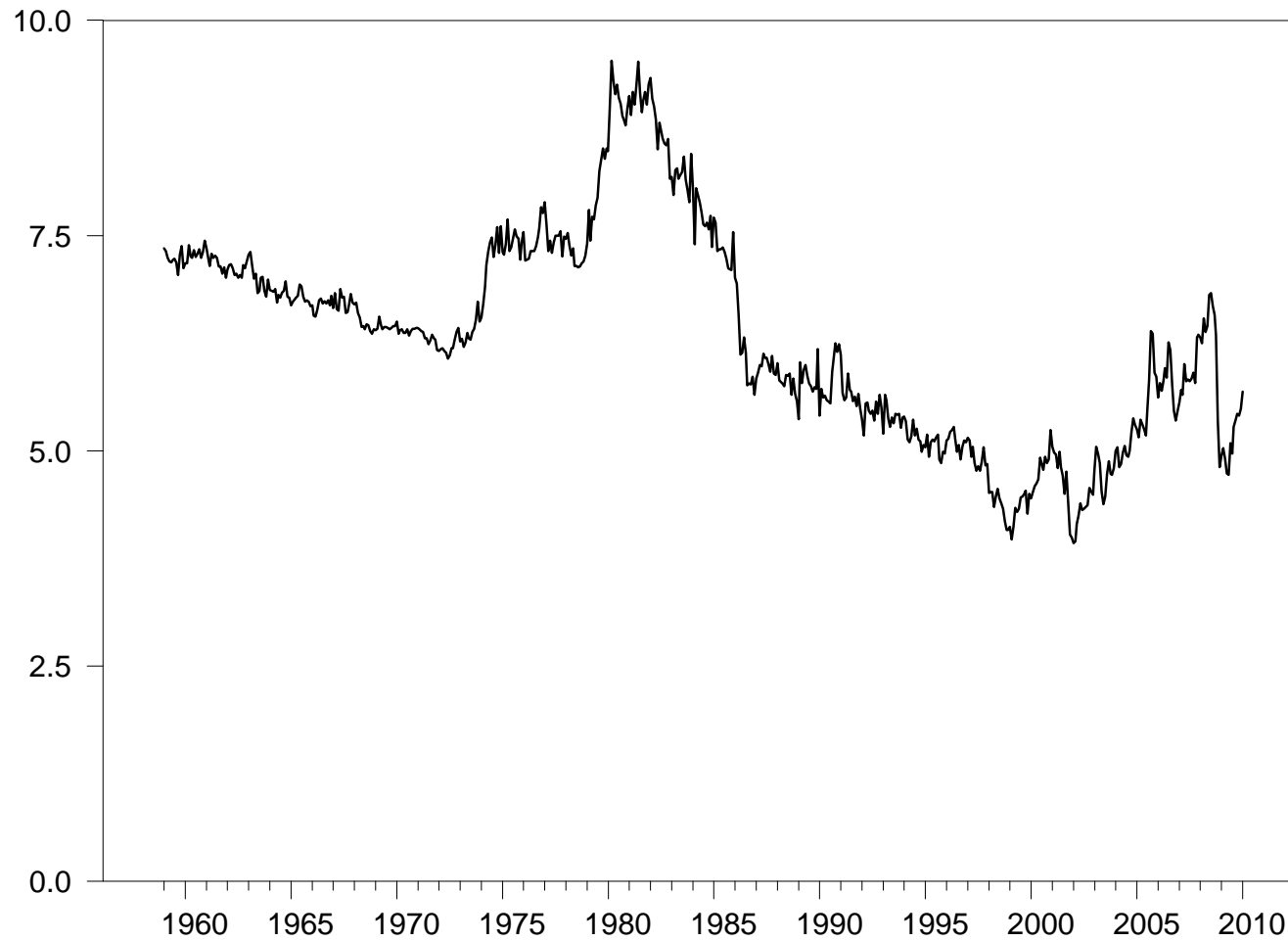
Pre-2007 estimated impulse-response functions.



Reproduces Figure 11a in Edelstein and Kilian (2007)

3. What's changed?

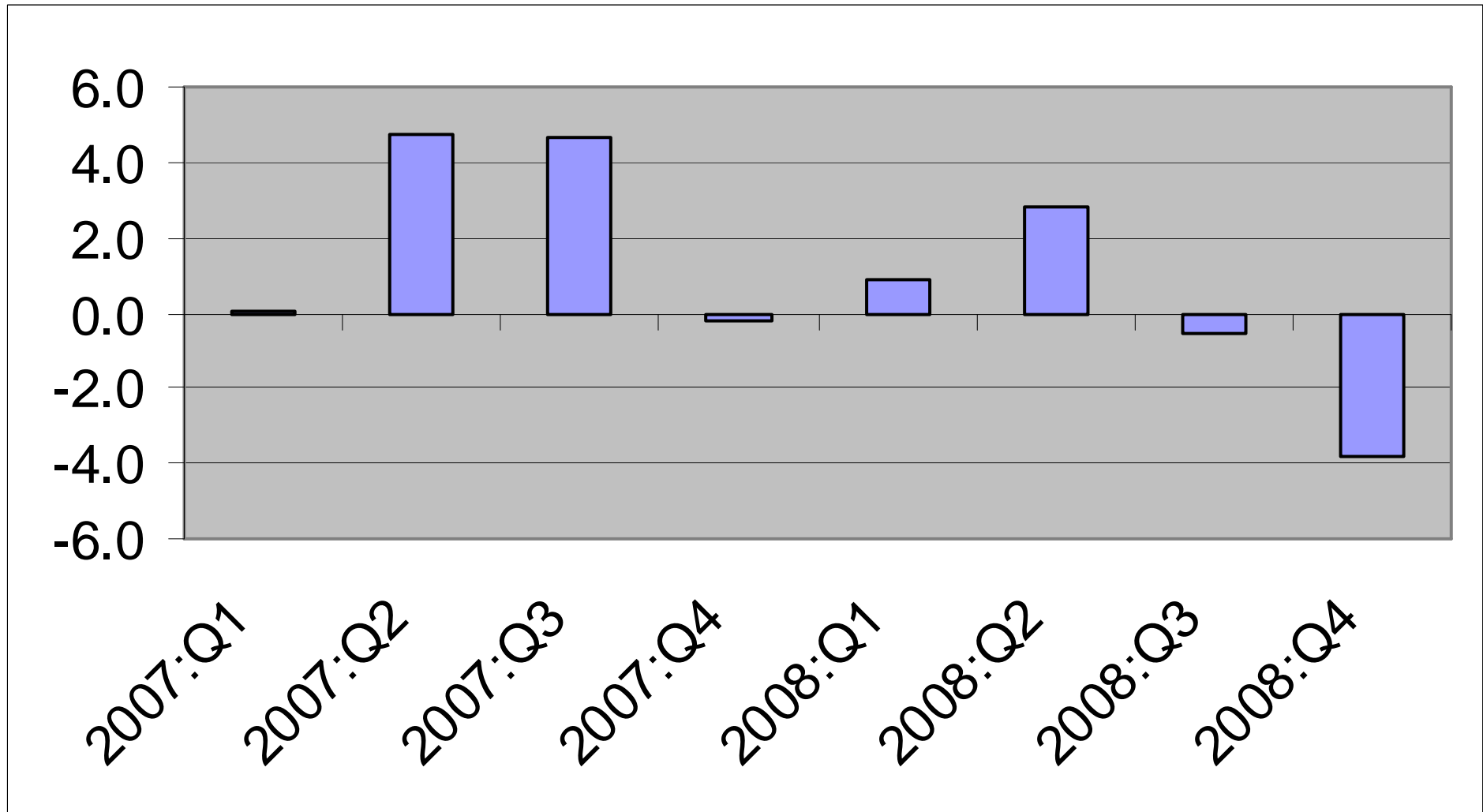
Energy expenditures as a share of total consumption



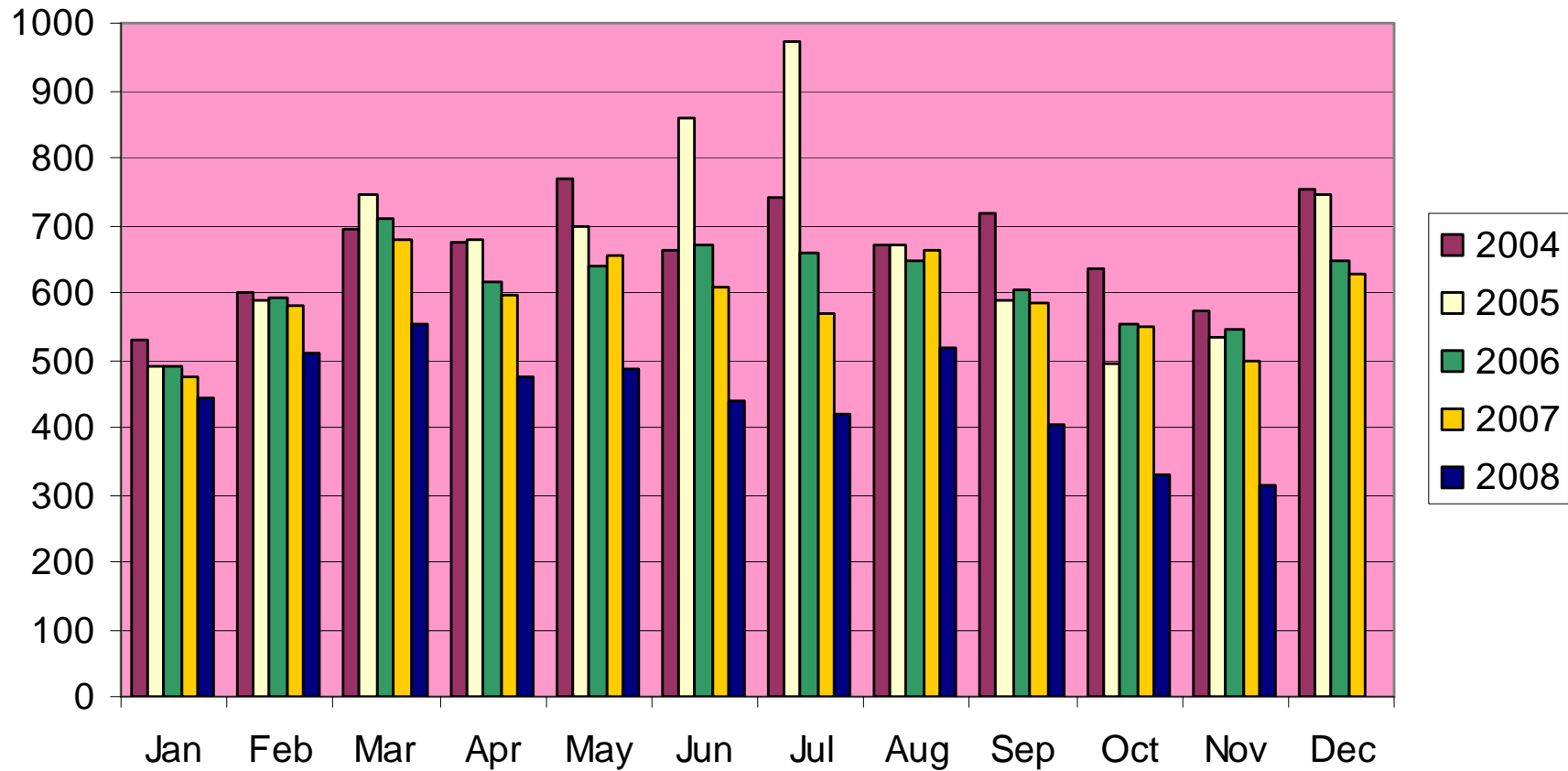
		Share of GDP <i>(percent)</i>	Standard deviation <i>(quarterly percent changes, annual rate)</i>	Share of GDP volatility <i>(percent)</i>
Goods and services	1967 to 1985 [†]	100	4.3	100
	1986 to 2007	100	2.1	100
	1986 to 2009Q3	100	2.5	100
.. Goods	1967 to 1985 [†]	37	9.2	54
	1986 to 2007	30	5.0	51
	1986 to 2009Q3	30	5.6	50
.. Motor vehicles	1967 to 1985 [†]	4.0	38.1	22
	1986 to 2007	3.5	19.2	14
	1986 to 2009Q3	3.3	24.9	16

Source: Ramey and Vine (2010)

4. Experience in the 2007-2009 recession

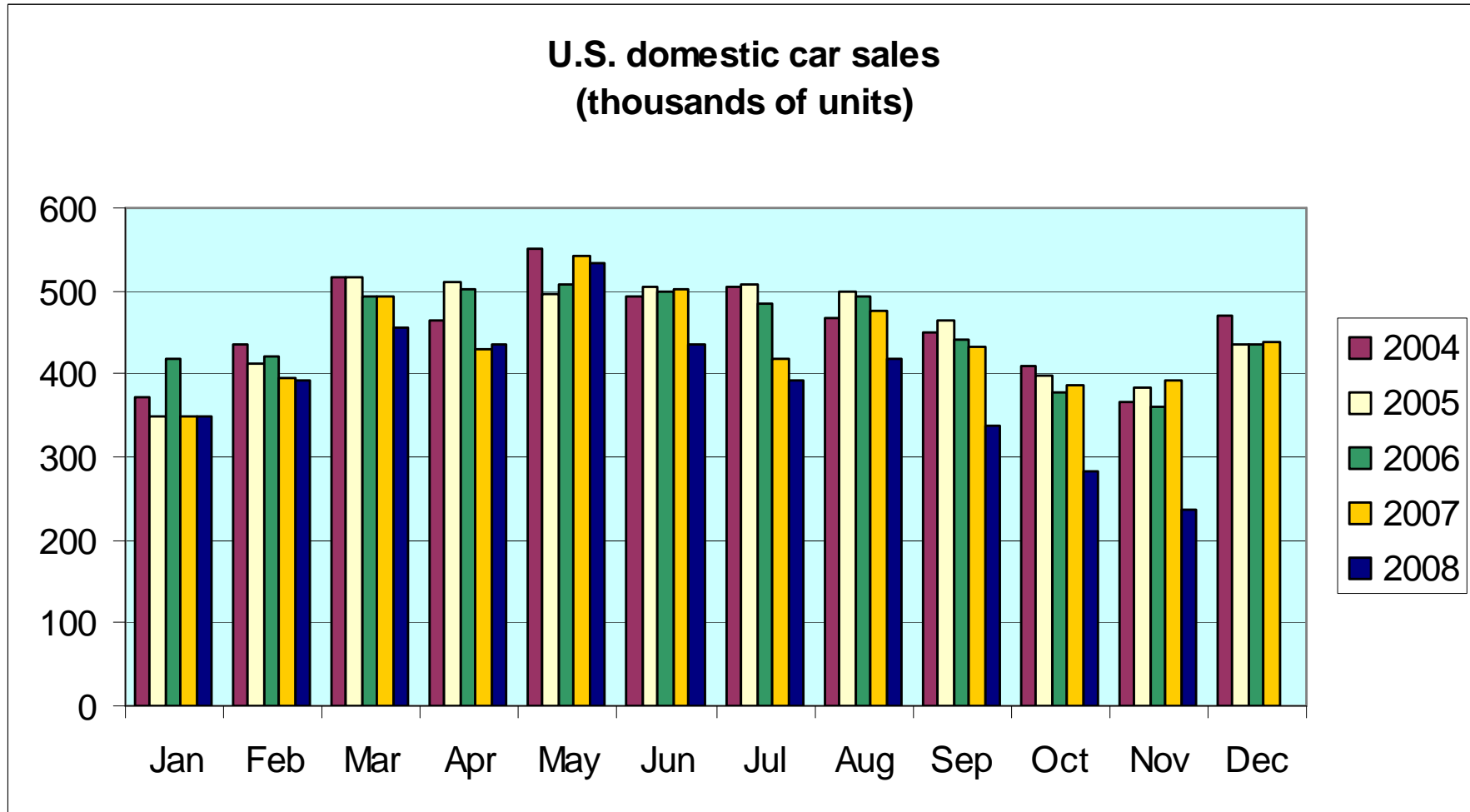


U.S. domestic light truck sales (thousands of units)

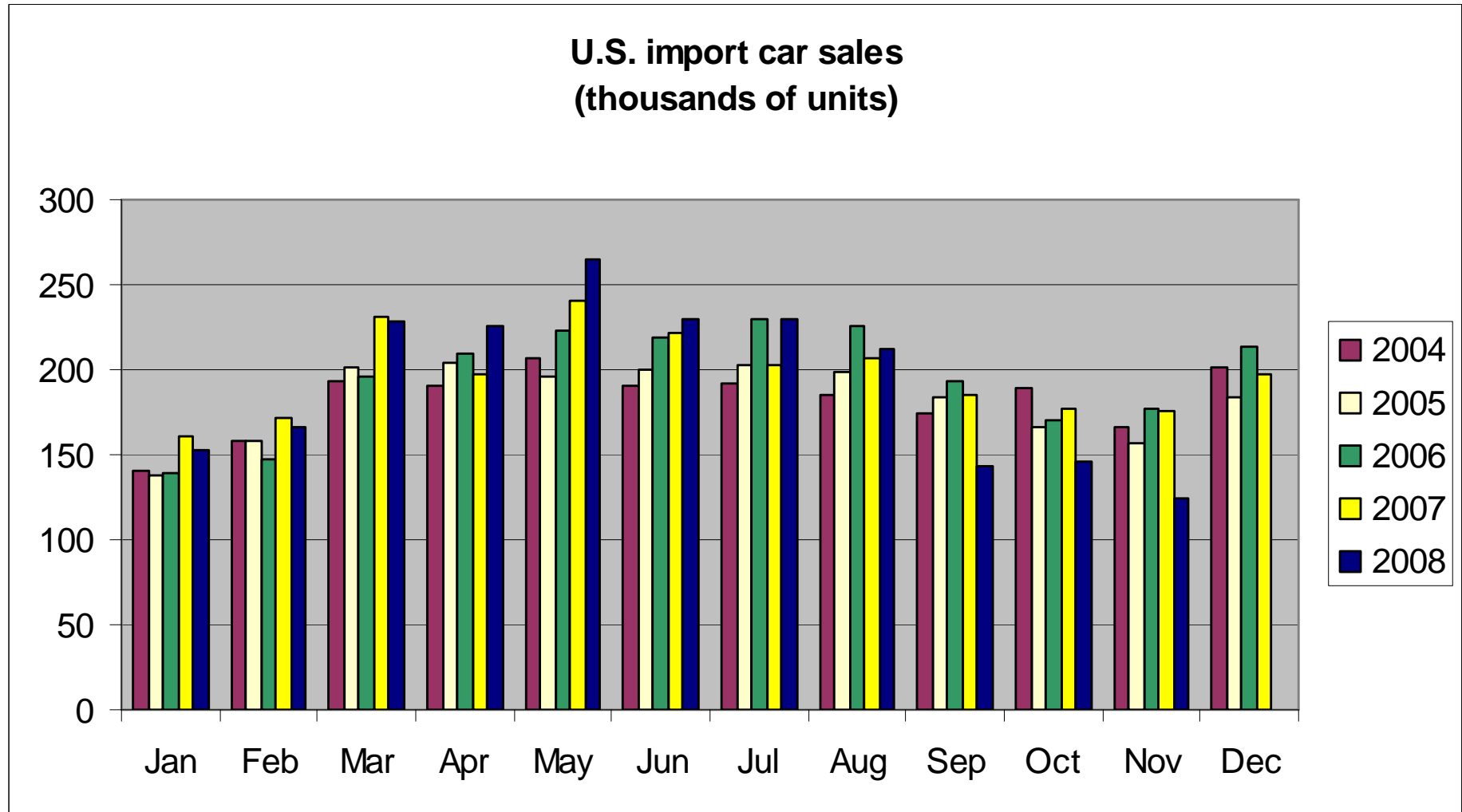


Down 26% July 07 to July 08

Down 6% July 07 to July 08

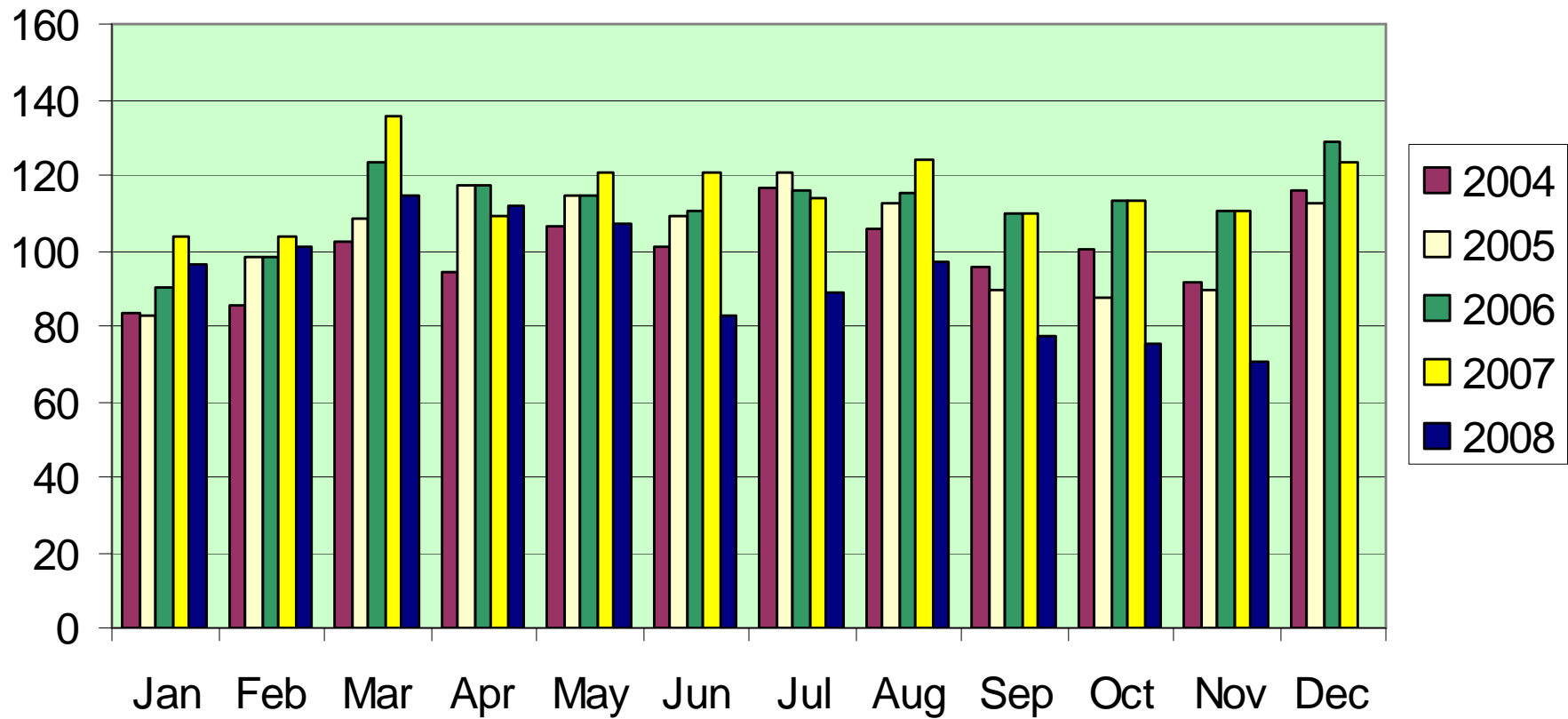


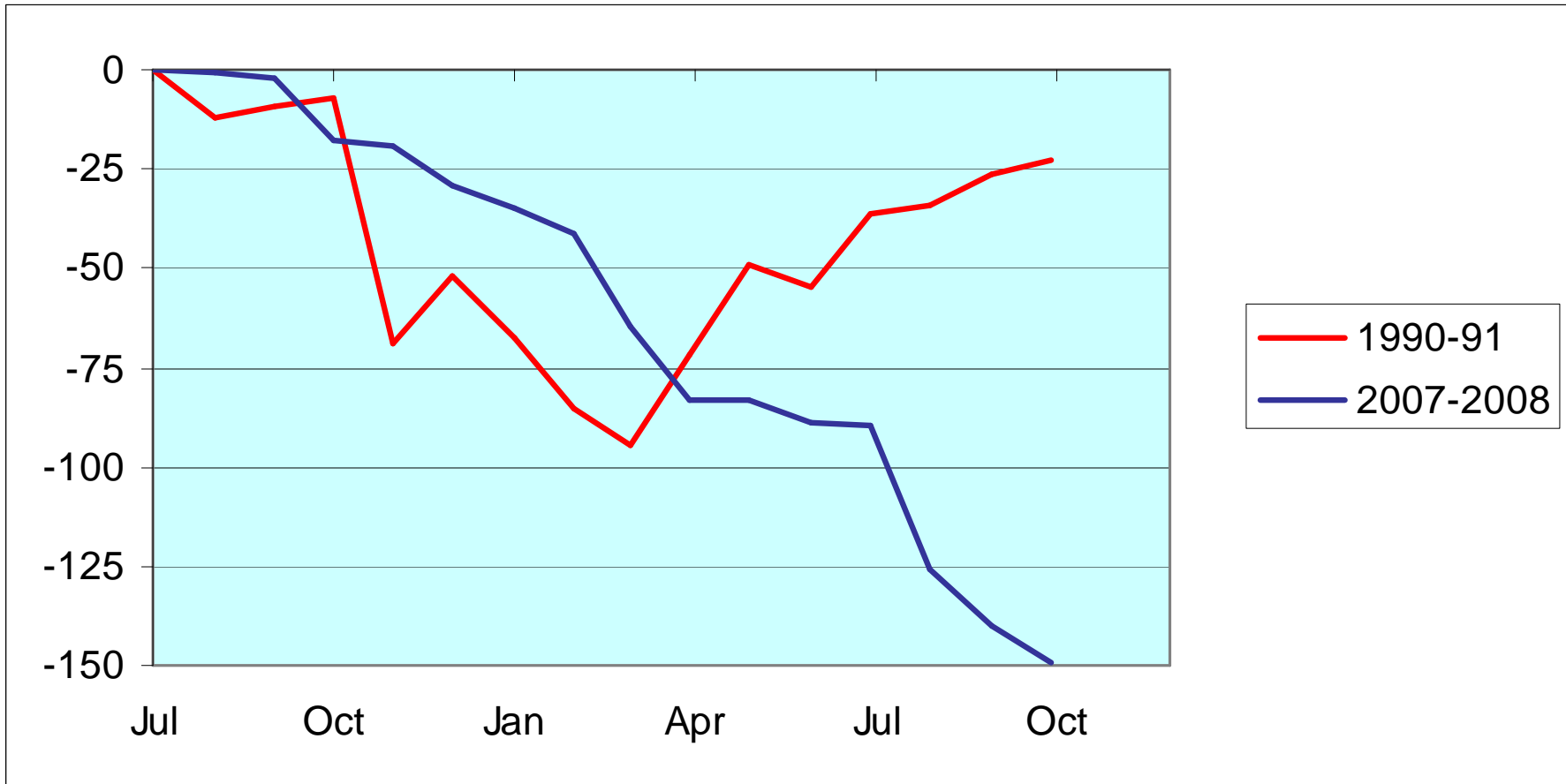
Up 14% July 07 to July 08



Down 22% July 07 to July 08

U.S. import light truck sales
(thousands of units)



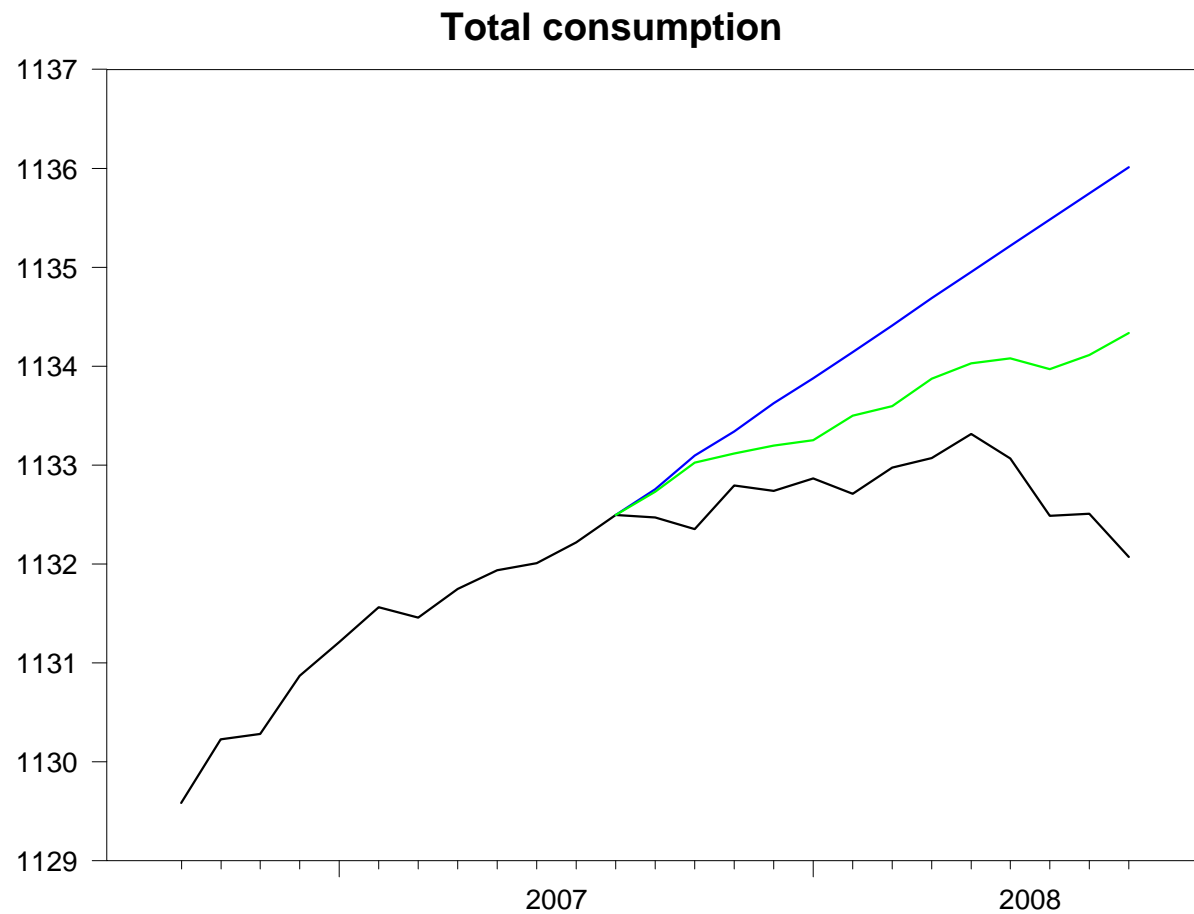


Cumulative change in seasonally adjusted number of workers in motor vehicles and parts manufacturing between July, 1990 or July 2007 and indicated month, in thousands of workers. (Total employment: 1990 = 109 million; 2007 = 138 million)

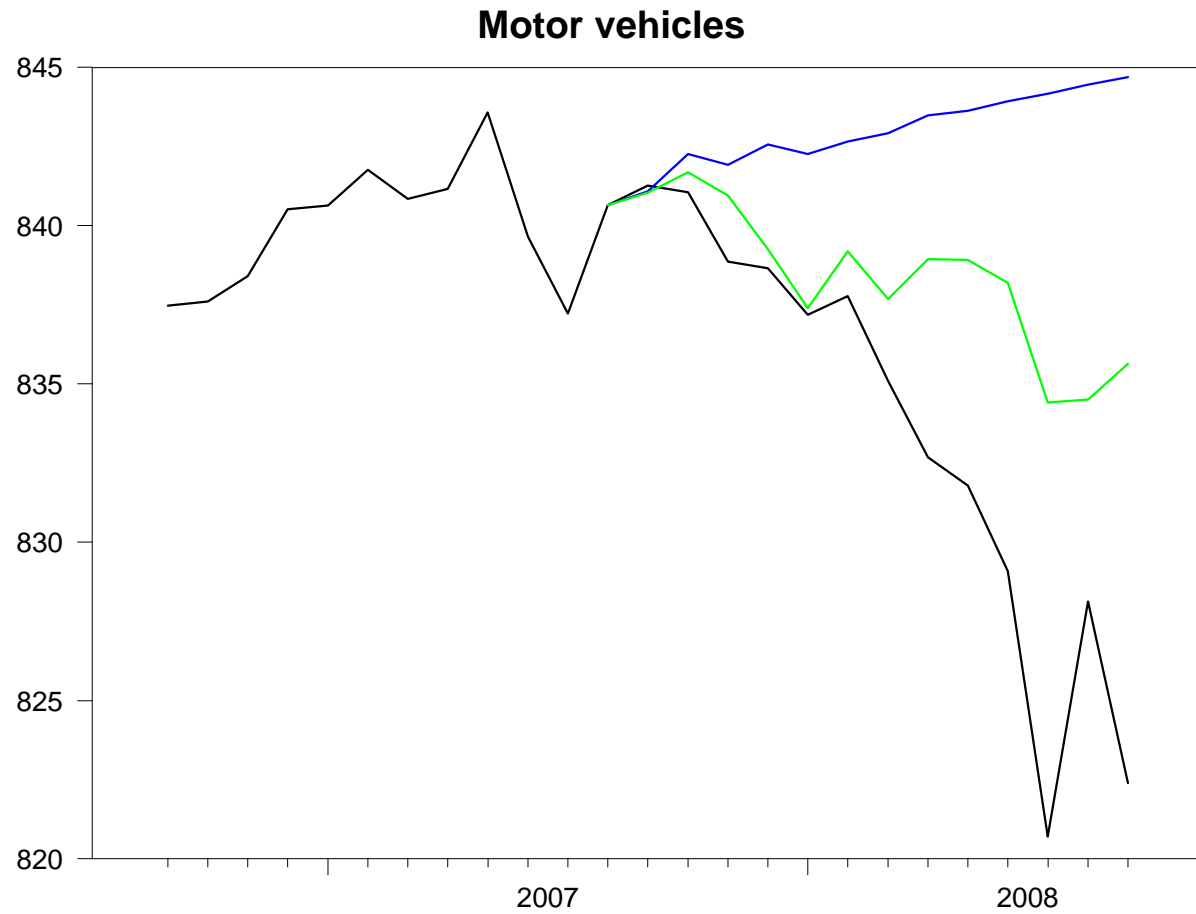
Black: 100 times log of actual real consumption

Blue: forecast formed 2007:M9

Green: Edelstein-Kilian forecast if we knew ex-post innovations energy price



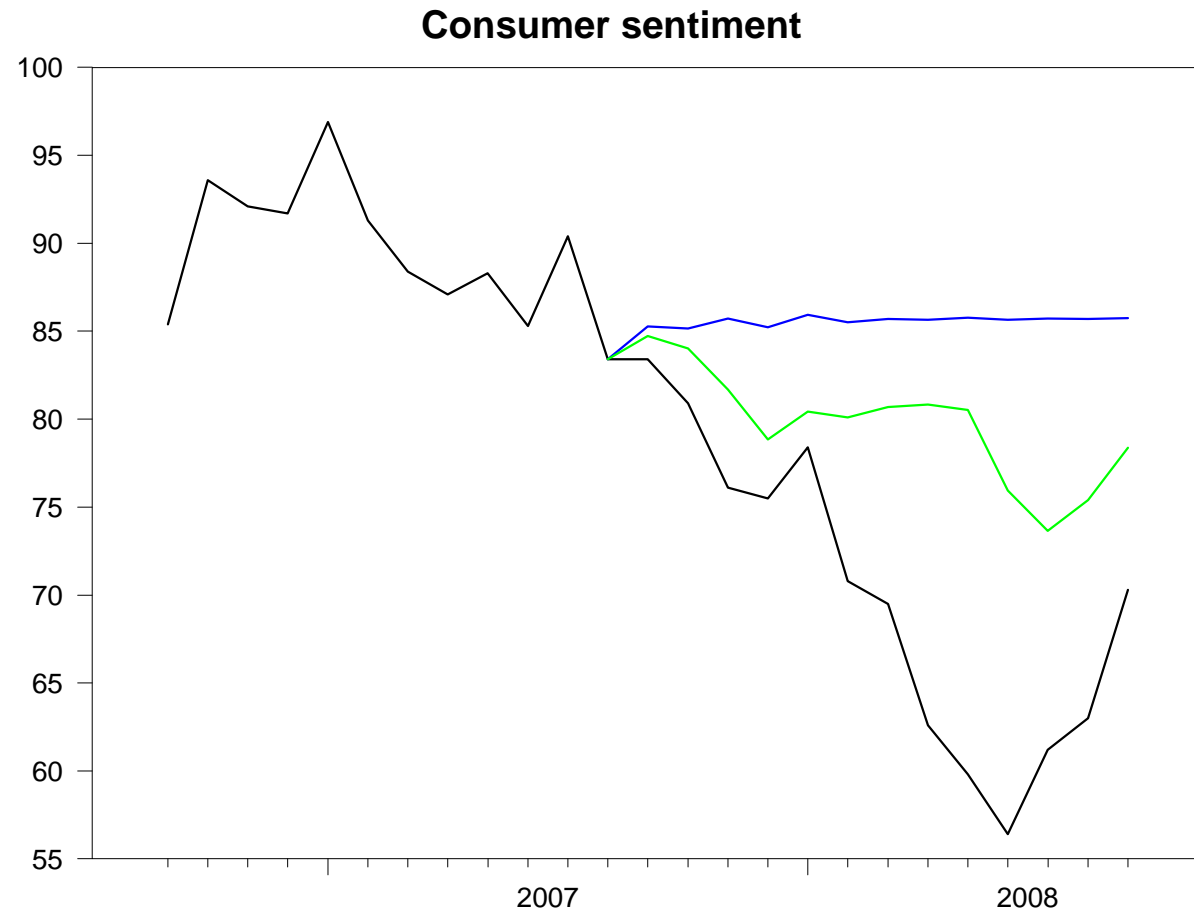
Black: 100 times log of actual real spending on motor vehicles & parts
Blue: forecast formed 2007:M9
Green: forecast if we knew ex-post innovations in energy price



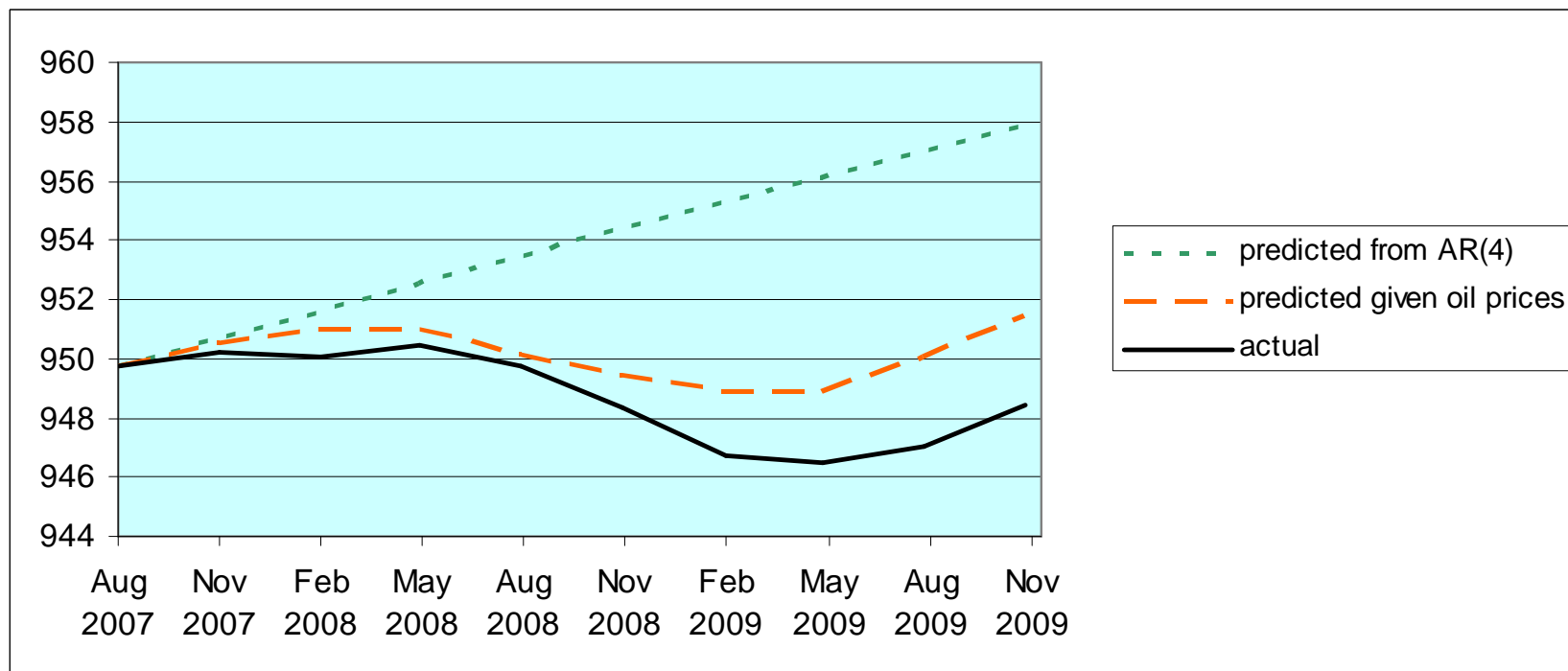
Black: Actual value for Michigan index of consumer sentiment

Blue: forecast formed 2007:M9

Green: forecast if we knew ex-post innovations in energy price



Dynamic simulation of eq. (3.8) in Hamilton (2003) using oil prices of 2007:Q4-2008:Q3



But what about housing?

(a) Average contribution of residential fixed investment to annual GDP growth rate

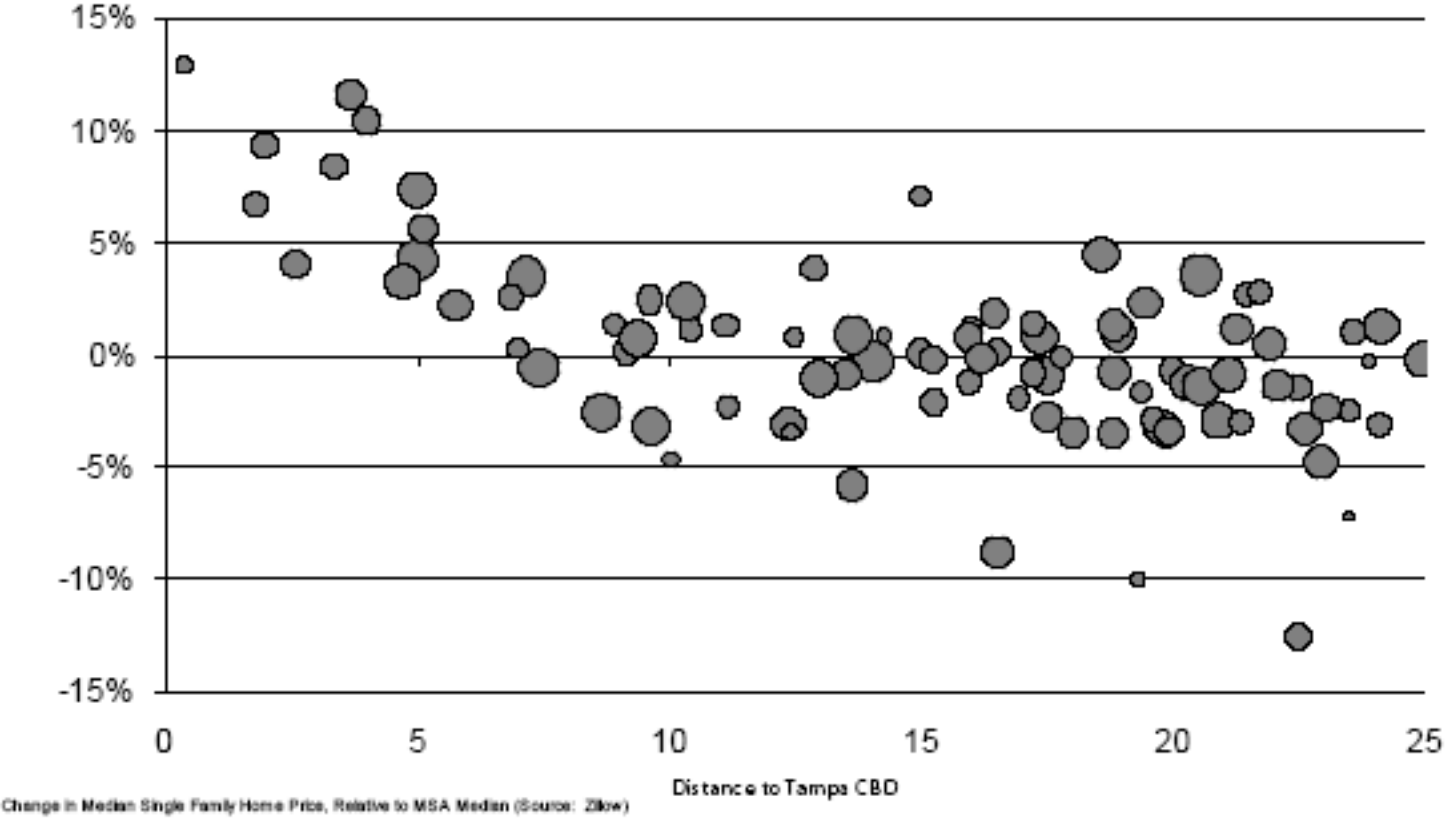
2006:Q2 - 2007:Q3 -1.04%

2007:Q4 - 2008:Q3 -0.91%

(b) Depressing effect of oil shock on income also hit housing

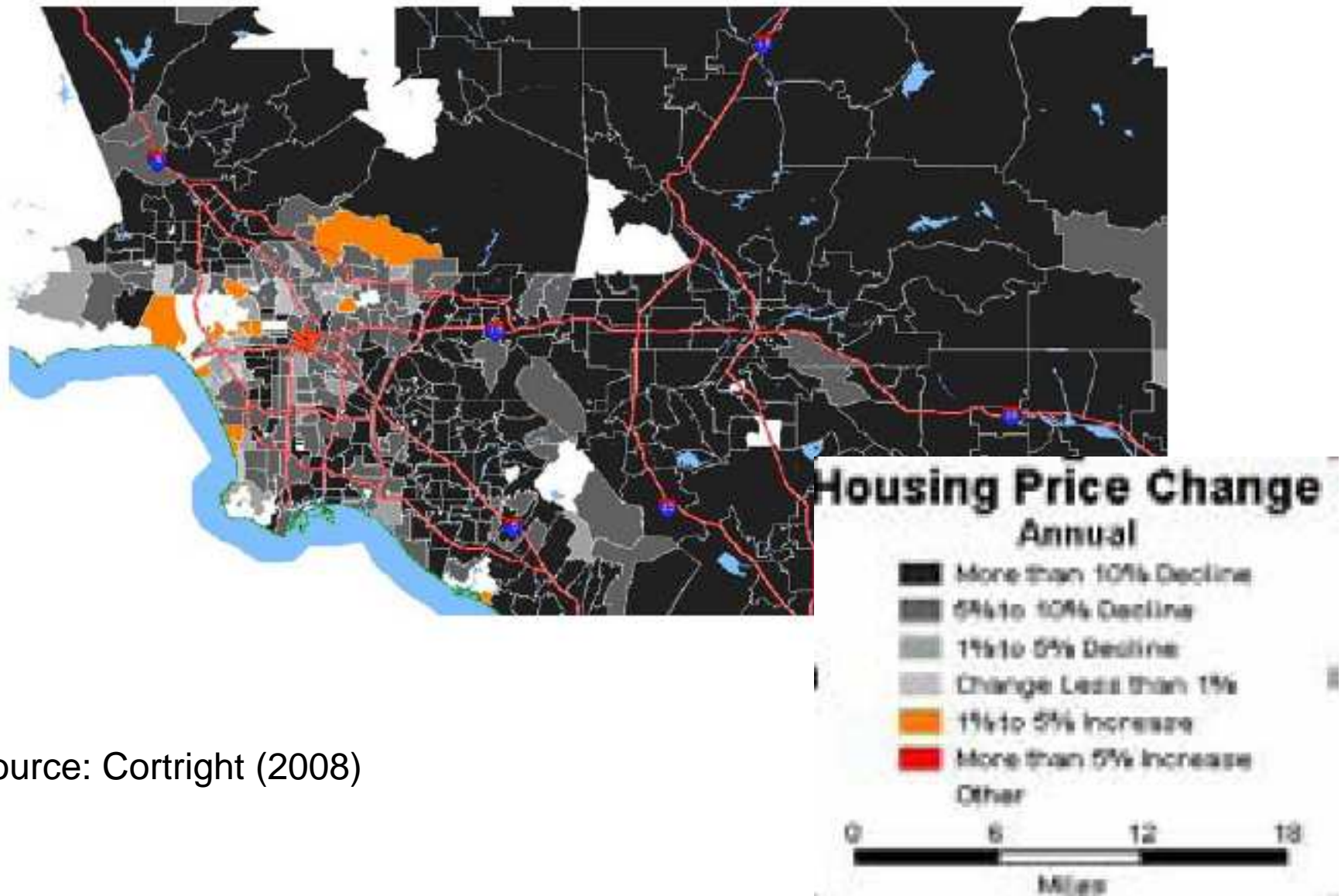
(c) Exurbs saw biggest housing price declines and highest default rates

Housing Prices Declines Greatest at the Suburban Fringe
Tampa MSA



Source: Cortright (2008)

Los Angeles



Source: Cortright (2008)