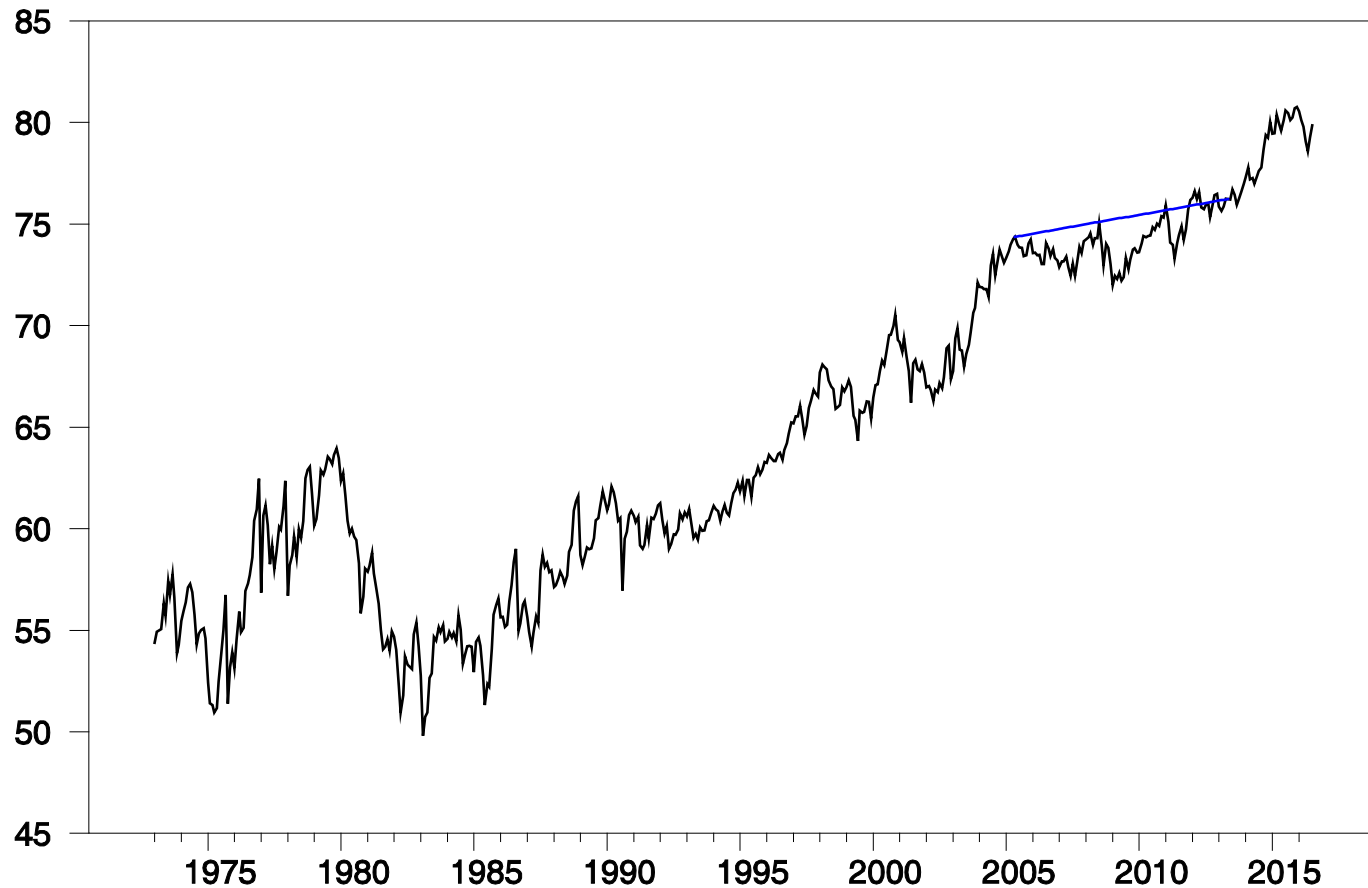


Effects of the Oil Price Decline in 2014-2015 on the U.S. Economy

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World oil production surged 2013-2014 after long period of stagnation



Monthly, in million b/d. Excludes natural gas liquids, refinery process gains, and biofuels

Why did oil price fall in 2014-2015?

(1) Technological advances in fracking

- U.S. oil production up 3.5 mb/d Jan 2012 to March 2015

(2) Postwar investments in Iraq

- Production up 1.3 mb/d since Jan 2013

(3) Iran sanctions lifted

- Production up 1 mb/d since Jan 2013

(4) Signs of weak world economic growth (Europe, China)

- Frictionless neoclassical model predicts (1)-(3) should unambiguously be good news for the U.S. economy
 - U.S. imports 6 million more barrels of crude oil and refined products than it exports every day
- Resources devoted to domestic oil production should shift to where they are more productive
- But frictionless neoclassical model is not a good description of short-run economic fluctuations

Baumeister and Kilian, Brookings Papers on Economic Activity, Fall 2016

- The oil price decline stimulated U.S. consumption spending
- But this was mostly offset by drop in investment spending in the oil sector
- Result was close to net wash for the economy

Theory predicts an oil price decline should have increased U.S. consumption spending

- Closed economy:
 - Increased productivity in domestic oil industry means more of everything
 - Since oil demand is price inelastic, it also means lower share of total spending going to oil producers
 - Oil consumers have higher marginal propensity to consume than owners of oil companies
- Open economy:
 - Improved terms of trade mean we can consume more of everything
 - Foreign oil producers have lower marginal propensity to spend on U.S. goods than U.S. oil consumers

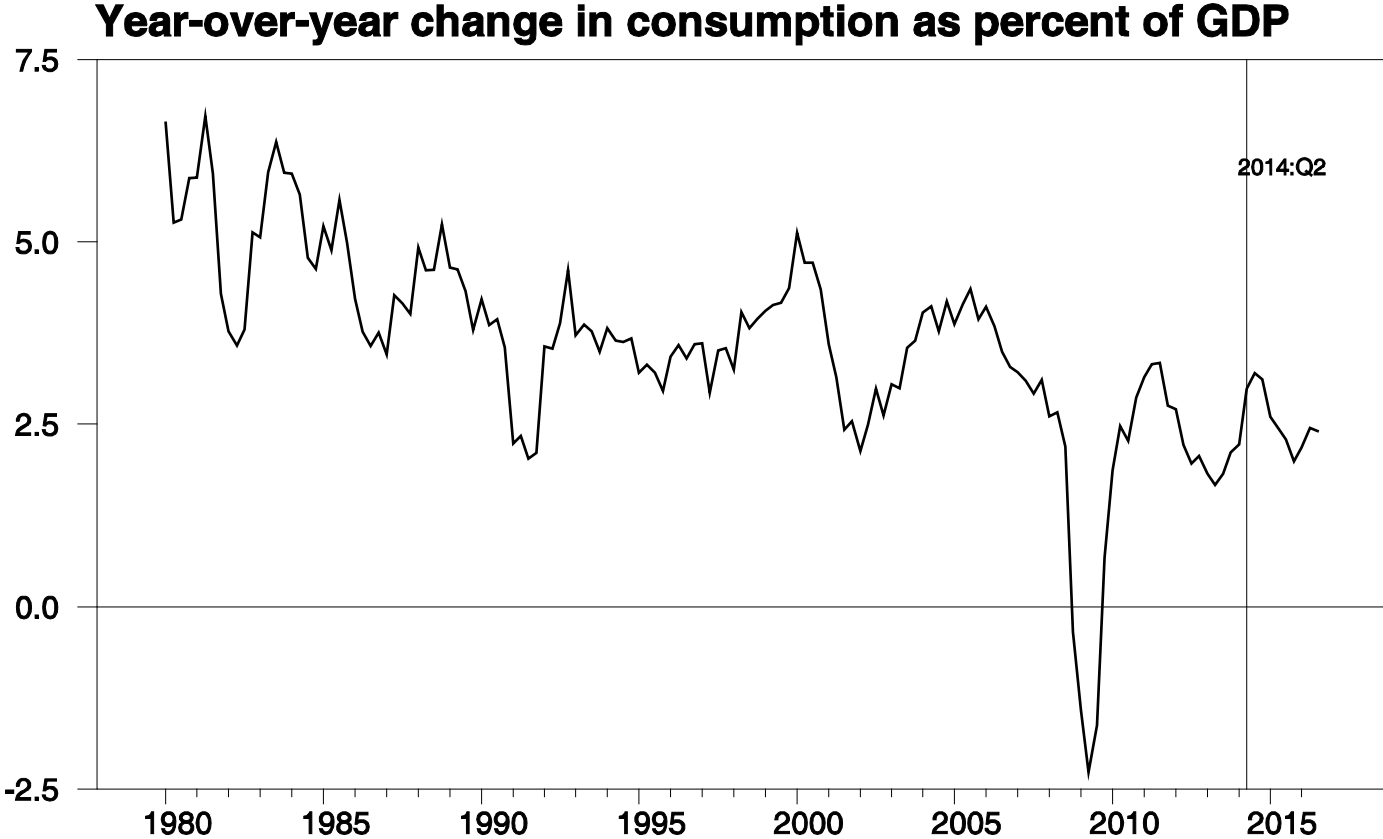
Historical evidence was that U.S. consumption spending responds strongly to changes in oil prices

- Edelstein and Kilian (2009)
- Hamilton (2009)

And the latest evidence supports the conclusion that the oil price decline in 2014-2015 boosted consumption

- Farrell and Greig (2015)
 - Examined debit, credit and bank transactions of 25 million Americans
 - Found that those individuals who had been spending more on gasoline before the drop increased their spending
- Gelman, et al. (2016)
 - Examined smart-phone app recording financial transactions of 1 million Americans
 - Found the same thing

We see an increase in aggregate consumption consistent with this

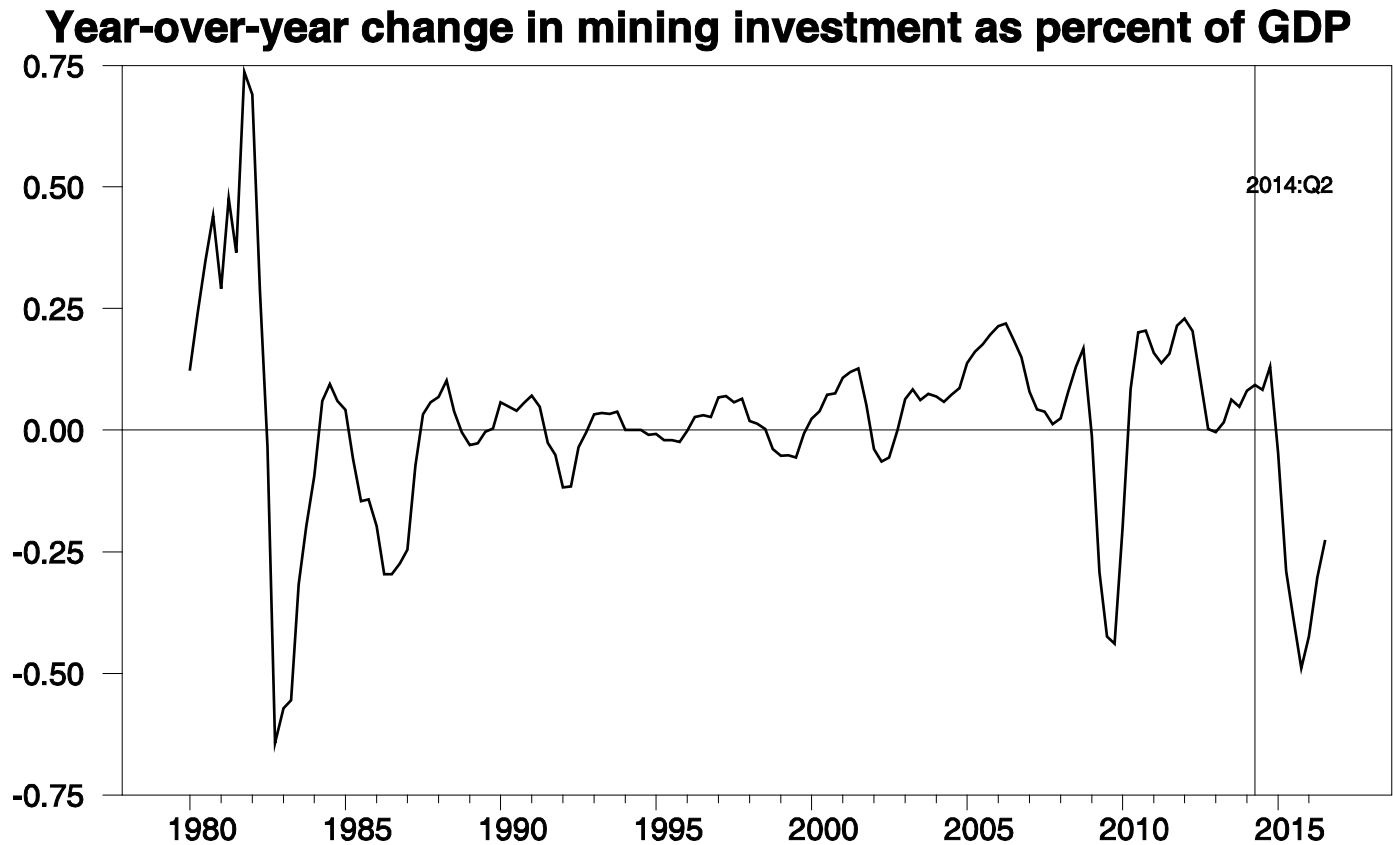


Calculations similar to those in Baumeister and Kilian (2016)

- Share of gasoline in total consumer expenditures in June 2014 was 3.2%
- Real price of gasoline fell 45% between June 2014 and March 2016
- Frees up $(0.032)(0.45) = 1.4\%$ to spend on other goods and services
- Aggregate private U.S. consumption spending was observed to grow at 2.9% annual rate 2014:Q3-2016:Q1 compared with 1.9% over 2012:Q1-2014:Q2

- About 15% of higher consumption spending went to imports
- Some also went to buying more gallons of gasoline
- So stimulus to GDP would be less than simple calculation
- Still, should have seen significant acceleration in GDP growth
- In fact real GDP grew at 1.8% rate 2012:Q1-2014:Q2 and 2.2% rate 2014:Q3-2016:Q1

Lower spending by oil sector subtracted 0.5% from GDP



- But shouldn't lower oil prices raise the marginal product of capital and increase investment?
- Capital is not homogenous lump of stuff that can be costlessly directed to new activities
- 75% drop in utilization of drilling rigs
- 30% drop in rail transport of petroleum and products
- Total nonresidential investment grew at 5.1% rate 2012:Q1-2014:Q2 versus 1.5% rate 2014:Q3-2016:Q1

- Less utilization of specialized capital hurts GDP for any big increase *or decrease* in oil prices
 - Increases: auto companies that were tooled to produce fuel-inefficient vehicles are idled (Bresnahan and Ramey, 1993)
 - Decreases: specialized capital in oil-producing sector is idled (drilling rigs, rail cars)
- But consumption spending falls when oil prices go up, rises when oil prices go down
- Result: oil price increases reduce GDP growth, oil price decreases have little net stimulus

Empirical evidence of asymmetry

- U.S. macro data [Loungani (1986); Mork (1989); Lee, Ni and Ratti (1995); Balke, Brown, and Yücel (2002); Hamilton (2003); Ferderer (1996); Elder and Serletis (2010); Carlton (2010); Ravazzolo and Rothman (2010)]
- U.S. micro data [Davis and Haltiwanger (2001); Herrera, Lagalo, and Wada (2011)]
- International data [Cuñado and Pérez de Gracia (2003), Jiménez-Rodríguez and Sánchez (2005); Engemann, Kliesen and Owyang (2011); Kim (2012); Jo (2014)]

Is this time different?

- Using the coefficients in equation (3.8) from Hamilton (2003) exactly as published with no updating
 - Did a good job describing data observed through 2008:Q4 (Hamilton, BPEA 2009)
 - Did a good job describing data observed through 2010:Q1 (Hamilton, Macro Dynamics 2012)
 - Would have predicted that oil price decline of 2014-2015 would have zero net effect on U.S. real GDP growth

Conclusions

- To interpret economic fluctuations, have to get away from frictionless neoclassical model
- The nature of the key frictions is technological, not nominal
- This view of the economic effects of oil prices is consistent with historical evidence as well as what we observed in 2014-2015