

Discussion of  
'Modeling the Asymmetric Effects of an Oil Price Shock'  
by Lance Bachmeier and Benjamin Keen

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# The paper

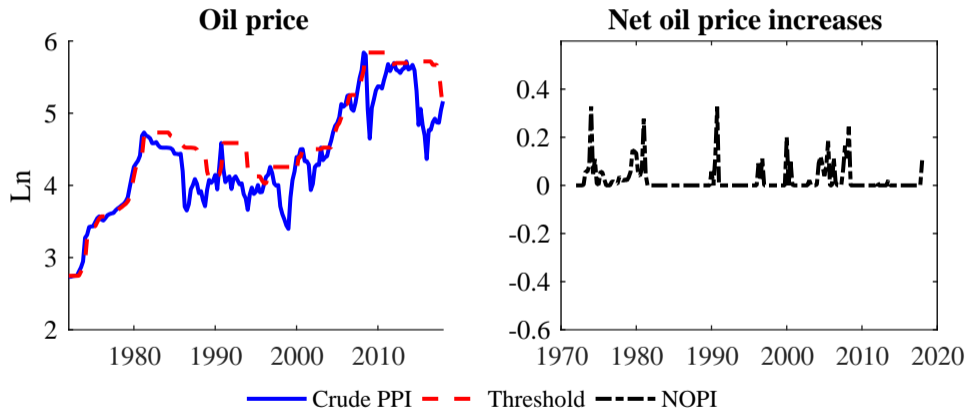
- ▶ Large literature on the effect of oil on US economy
  - ▶ Effect of an exogenous oil price shock
  - ▶ Tobin puzzle
  - ▶ Role of monetary policy
- ▶ Very nice contribution to this literature
  - ▶ Starts from empirical observation
  - ▶ Builds tractable theoretical model with clear mechanism
  - ▶ Describes and explains very clearly
- ▶ Key argument
  - ▶ Only (large) increases in the oil price matter
  - ▶ The reason is downward nominal wage rigidity (DNWR)

# Questions for the sceptical reader

- ▶ Are (large) increases in the oil price the only changes that matter?
- ▶ Are nominal wages really downward rigid?
- ▶ Does DNWR generate asymmetric effects of oil price movements for the right reasons?
  - ▶ Labour market transmission
  - ▶ Modelling oil

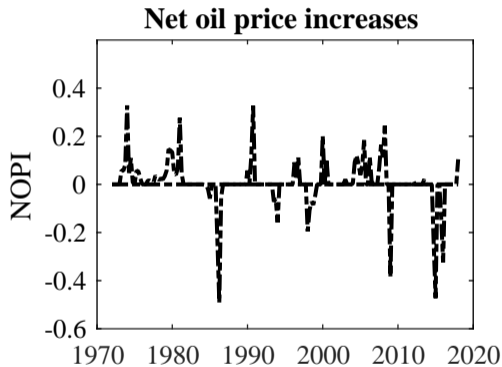
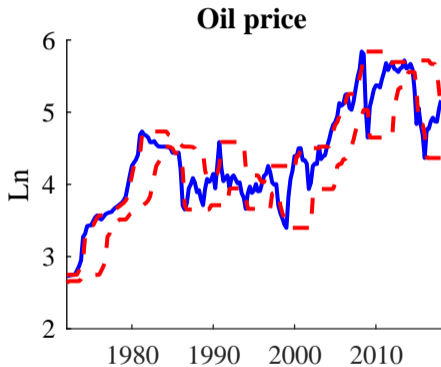
# Net Oil Price Increase (NOPI) model

Hamilton (1996, 2003, 2011); Mork (1989); Mork, Olsen and Mysen (1994)



# Net Oil Price Change (NOPC) model

A nod to Kilian and Vigfussen (2013)



— Crude PPI - - Threshold - - - NOPI

# The labour market

## Intuition and model responses

- ▶ Intuition that DNWR enhances decline in output by preventing the nominal wage from falling after oil price increase
  - ▶ Firms reduce their demand for labour
  - ▶ Households increase their supply of labour
- ▶ But the DNWR binds because the nominal wage increases initially
  - ▶ Firms increase their demand for labour?
  - ▶ Households reduce their supply of labour?
- ▶ Distinction between product and consumption real wages important

# The labour market

## Consumption bundles and price indices

Options	$C_t$	$P_t$
CES	$(a_1 e_{h,t}^{v_h} + a_2 c_{n,t}^{v_h})^{\frac{1}{v_h}}$	$\left( a_1^{\frac{1}{1-v_h}} P_{e,t}^{\frac{v_h}{v_h-1}} + a_2^{\frac{1}{1-v_h}} P_{n,t}^{\frac{v_h}{v_h-1}} \right)^{\frac{v_h-1}{v_h}}$
Cobb-Douglas	$\frac{c_{n,t}^{1-\varpi} e_{h,t}^{\varpi}}{\varpi^{\varpi} (1-\varpi)^{(1-\varpi)}}$	$P_{n,t}^{1-\varpi} P_{e,t}^{\varpi}$

# The labour market

## A simple model

- ▶ Labour demand

$$\frac{W}{P_n} = (1 - \alpha)N^{-\alpha}$$

- ▶ Labour supply

$$\frac{W}{P_c} = N^\zeta$$

- ▶ Relative prices

$$\frac{P_c}{P_n} = \frac{P_{n,t}^{1-\bar{\omega}} P_{e,t}^{\bar{\omega}}}{P_n} = \left( \frac{P_e}{P_n} \right)^{\bar{\omega}}$$

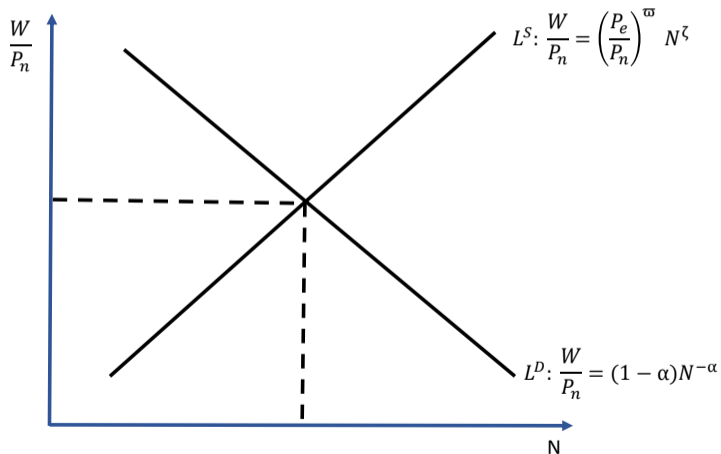
- ▶ Labour market equilibrium

$$(1 - \alpha)N^{-\alpha} = \left( \frac{P_e}{P_n} \right)^{\bar{\omega}} N^\zeta$$



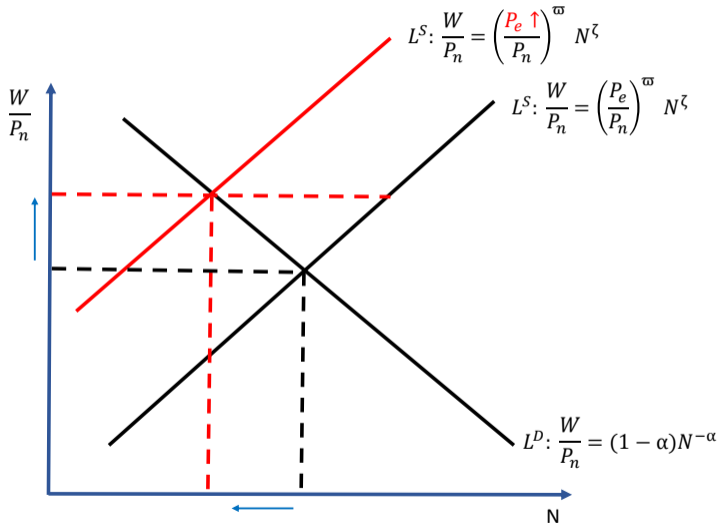
# The labour market

Equilibrium



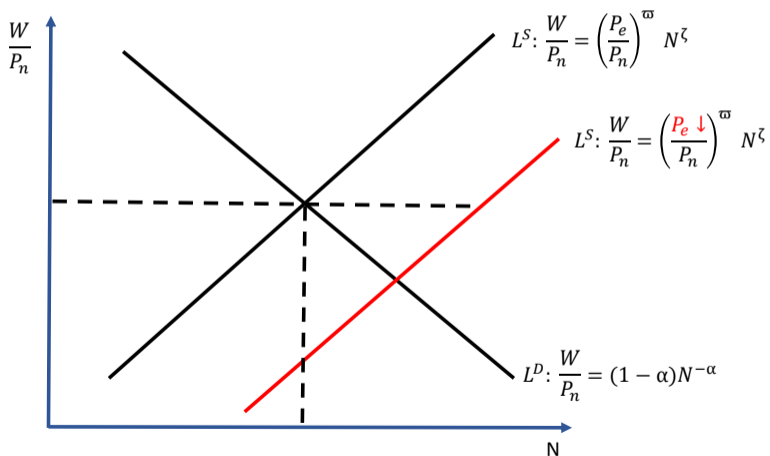
# The labour market

Higher oil price



# The labour market

Lower oil price



# Modelling oil

Extraction as in Rotemberg and Woodford (1996)

- ▶ Exogenous oil price

$$p_{e,t} = \rho_e p_{e,t-1} + \varepsilon_t$$

- ▶ Extraction to meet demand

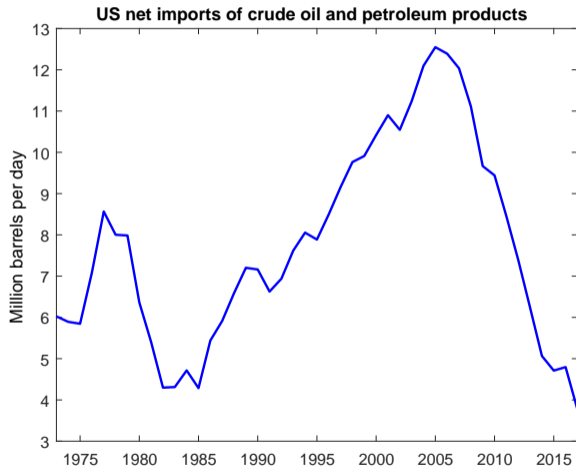
$$e_t = e_{h,t} + e_{f,t}$$

- ▶ Model of 'Railroad Commission of Texas' before 1970s
- ▶ If global oil price, oil imports should be paid for with exports as in Wei (2003) and Blanchard and Galí (2009)

$$y_t = c_{n,t} + i_t + \frac{P_{e,t}}{P_{n,t}} (e_{h,t} + e_{f,t})$$

# Modelling oil

Net imports of crude oil and products into the United States

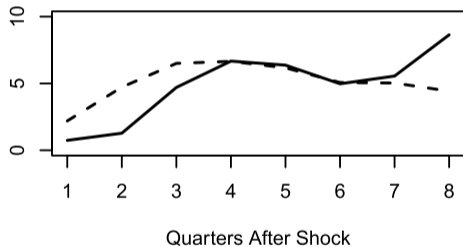


Source: U.S. Energy Information Administration

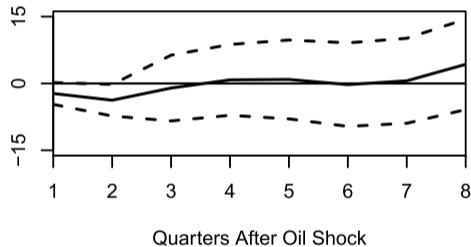
# Modelling oil

Oil price and mining structures

Mining Structures: Response to an Oil Shock



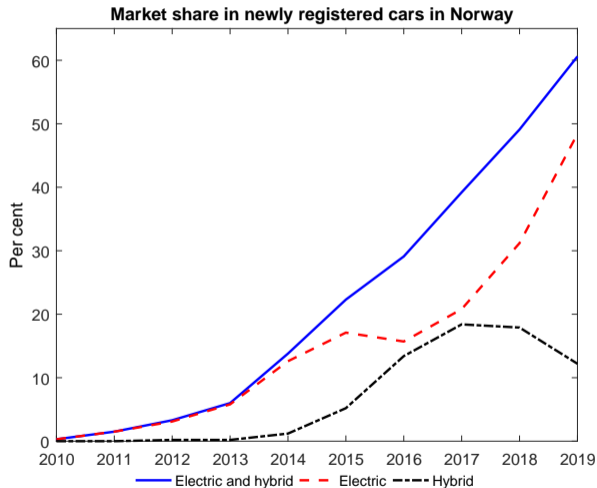
Mining Structures: Difference Across Regimes



Copied from Bachmeier and Keen (2018)

# Modelling oil

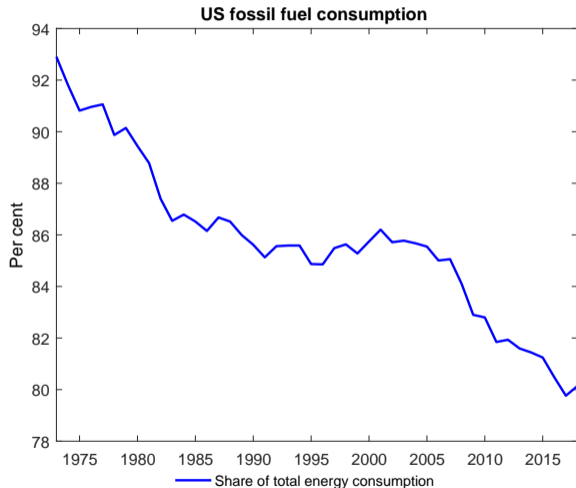
The electric car revolution in Norway



Source: European Alternative Fuels Observatory

# Modelling oil

Reduced oil intensity also in the United States



Source: U.S. Energy Information Administration



# Modelling oil

Oil is not the future

- ▶ Fundamental changes in energy underway
- ▶ 2°C target makes oil reserves ‘unburnable’ (McGlade and Etkins, 2015)
- ▶ Climate change and central banking
  - ▶ Carney (2015, 2016, 2019)
  - ▶ Batten, Sowerbutts and Tanaka (2016), Batten (2018)
- ▶ Maybe it is time for a conference on ‘Climate change, the future of energy and monetary policy’
  - ▶ Bjørnland, Maih and Seneca (2019)

# Conclusion

- ▶ Very nice paper that sheds new light on an important issue
- ▶ The sceptical reader would appreciate some further discussion
  - ▶ Robustness of the empirical NOPI model
  - ▶ Empirical validity of DNWR
  - ▶ Modelling assumptions for the oil sector
  - ▶ The distinction between consumption and product real wages
  - ▶ ...and the labour market transmission mechanism
- ▶ Next step would be implications for monetary policy