

The state of macroeconomics: A story of shocks



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- **Waxman:** In other words, you found that your view of the world, your ideology, was not right, was not working?
- **Greenspan:** Precisely. That's precisely the reason I was shocked because I had been going for 40 years or more with very considerable evidence that it was working exceptionally well...

What went wrong with economics?



- Robert Lucas, 1995 Nobel Prize winner in Economics

“The central problem of depression-prevention has been solved, for all practical purposes”.

- Paul Krugman, 2008 Nobel Prize winner in Economics

“Macroeconomics of the past 30 years has been spectacularly useless at best, and positively harmful at worst”.

Theme of my talk today



- I believe there is by now little to be added to the narrative of the financial crisis and the analysis of proximate and remote causes.
- Close to two years into the US recession, I think instead a debate on the lessons of the crisis for economics as a discipline and for its practitioners is much more fruitful.

To anticipate some of my conclusions



- Business cycle is an inherent feature of our economy, no matter how countercyclical fiscal policy or optimal monetary policy is.
- There will always be some new unforeseen shocks...
- The inefficiency of financial markets will exacerbate these.
- Need to build models that can account for interaction between macroeconomic policies, business cycles and asset prices, yet explain sudden drops in real activity, seen the last two years.
- We have a foundation with the current suite of models. Now we need to add the difficult part, inefficient markets. BUT forget about the ultimate super model - build many!

A model should provide answers to:



- 1) Is the model broadly consistent with our view of the business cycle?**
 - Can it explain the sudden drops in real activity that we have seen following the financial crisis?

- 2) Is the model broadly consistent with the transmission mechanism of various shocks?**
 - Is the reaction in asset prices following, say, a monetary policy shock consistent with what we observe in the data?

Outline



- I.** Why and how do economic aggregates fluctuate so much? How can we forecast these economic fluctuations?
- II.** What are the sources of economic fluctuations? I.e., what shocks are most important?
- III.** What is the role of asset prices in the monetary policy transmission mechanisms?
- IV.** Conclusion - policy implications

I. Why and how do economic aggregates fluctuate so much? How can we forecast these economic fluctuations?



“Just as waves following each other on the sea do not repeat each other perfectly, so economic cycles never repeat earlier ones exactly either in duration or in amplitude. Nevertheless, it is almost always possible to detect, ... , marks of certain approximate uniformities and regularities.”

Eugene Slutsky, 1937

Google trends: Recession



- Business cycles are an inherent feature of our economies. Yet:

Interest in business cycle analysis fluctuates. Increasing in periods of crisis for so to fade out in periods of stable growth.



Business cycles – on and off the research agenda



- 20's and 30's a period of crisis. Business cycle analysis in focus. Research centers established all over the world (NBER in USA).
- Post world war & Keynes moved focus from the study of business cycles to macroeconomic policy designed to eliminate the cycles. Large scale econometric models. The business cycle is obsolete!
- Norway no exception. Students in the 1950s and 60s were taught that the cycle did not exist.
- Instability of the 1970s brought business cycles back on the research agenda. Large scale models criticized as:
 - Empirical: Incapable of explaining the phenomenon of both high unemployment and high inflation, i.e. stagflation.
 - Theoretical. Robert Lucas: As expectations are not stable across different policy regimes, models are useless for the purpose of policy analysis.

It takes a new model to beat an old model



- Lucas: Reconcile business cycles with the dynamic competitive general equilibrium theory, which relies on rational expectations.
- Real business cycle models (RBC): Early 1980s, Kydland and Prescott, emphasized real productivity shocks, as opposed to (Keynesian) demand shocks, as a source of economic fluctuations in these models.
- Dynamic stochastic general equilibrium models (DSGE): Price stickiness and slow adjustment to forward looking rational expectations equilibria – role for monetary policy in understanding business cycles.
- 1990s: The great moderation - Good policies or good luck. But the business cycle was not under control. So, what now?

Need to go back to data



- *“Theory is crucial in selecting which facts to report...However, the reporting of facts – without assuming the data are generated by some probability model – is an important scientific activity”.*

Kydland and Prescott (1990)

Studies of the business cycle



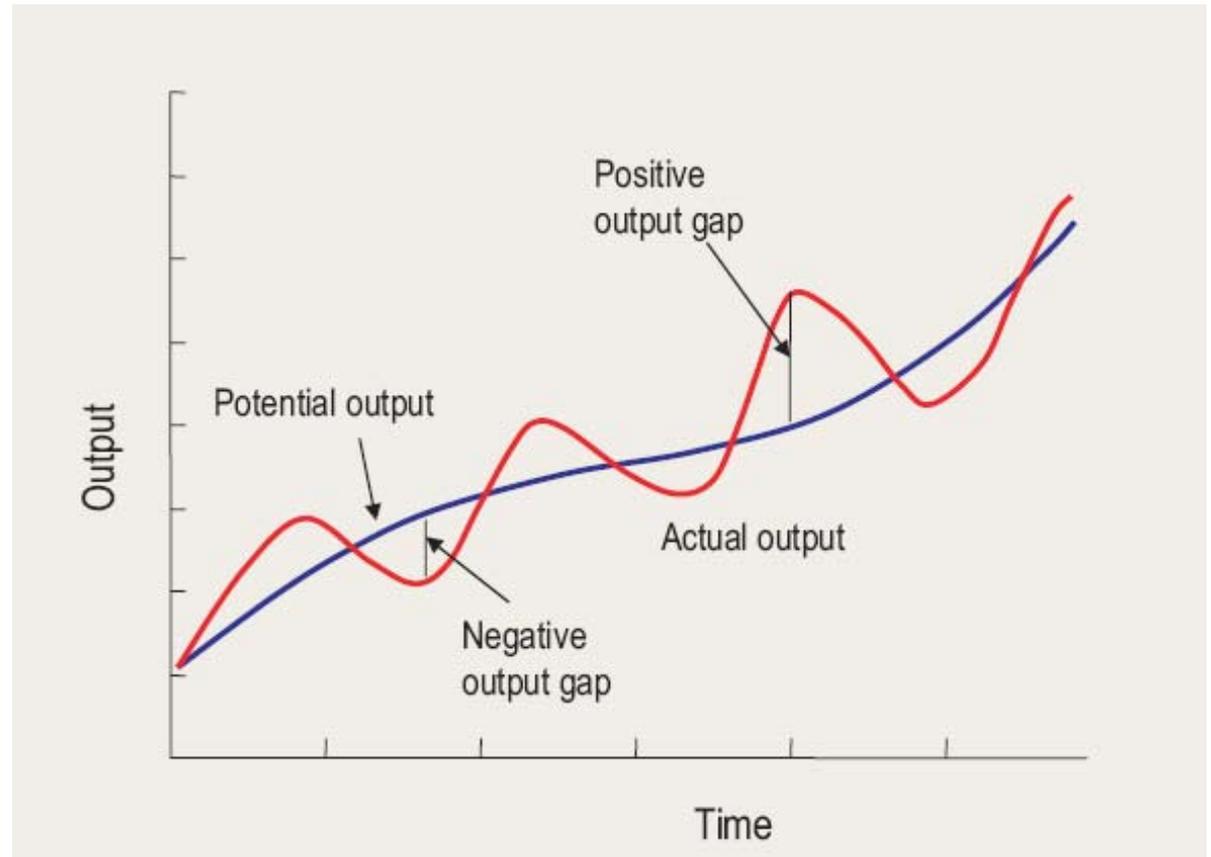
- Bjørnland (1999, 2000, 2002)
 - Bjørnland, Leitemo and Maih (2009)
 - Bjørnland, Brubakk and Jore (2008)
 - Bjørnland, Gerdrup, Jore, Smith & Thorsrud (2008, 2009)
- 1) Evaluate different methods of extracting the business cycle – in time domain and the frequency domain.
 - 2) Establish some stylized facts that are robust to all of these methods.
 - 3) Improve forecasting

Stylized facts of business cycles



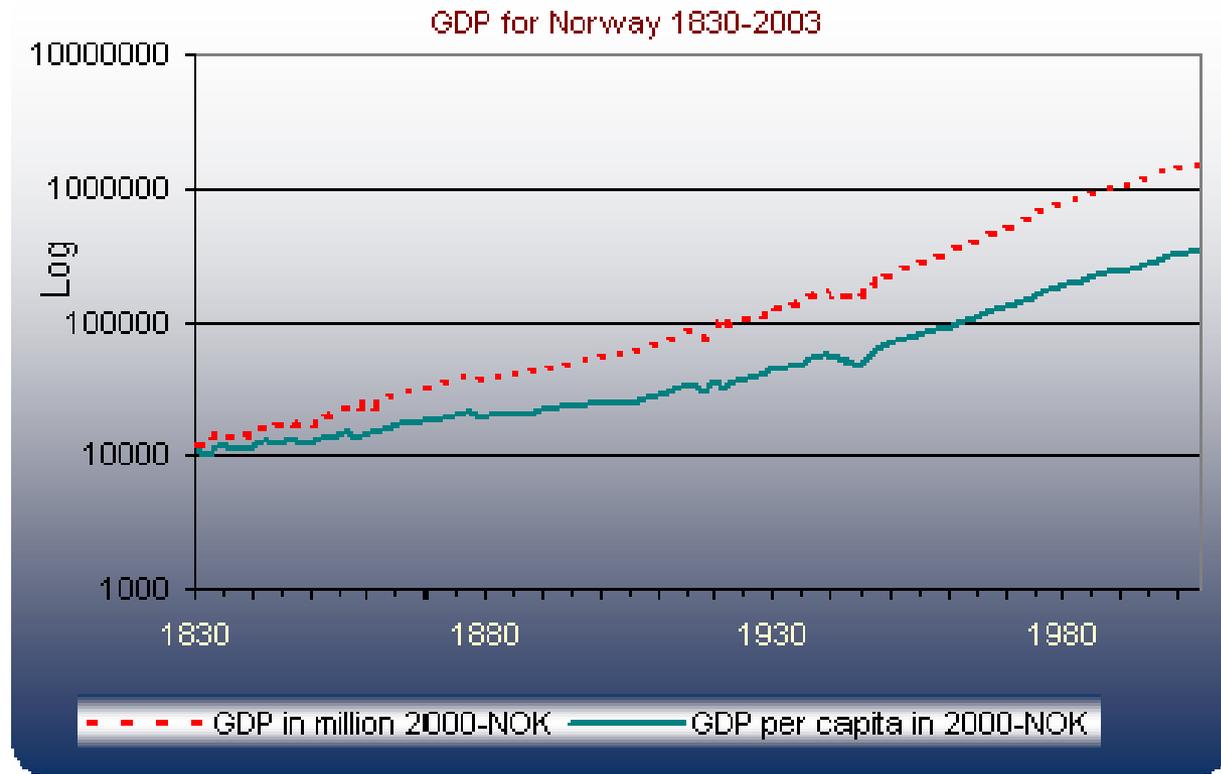
- Norway in the 1970s, export was pro-cyclical and leading the business cycle.
- Bjørnland (1999, 2000, 2002): Found nothing of the sort.
 1. Consumption, investment and import are pro-cyclical. If anything, export acyclical - lagging the business cycle.
 2. Money and credit expansion pro-cyclical and leading the cycle.
Nominal factors
 3. Productivity and real wage pro-cyclical, prices countercyclical.
Real factors
- Do artificial RBC data match sample moments? No. Different shocks dominate in different periods.

The business cycle



**The business cycle as the output gap
– an indicator of inflation**

Where are the cycles?

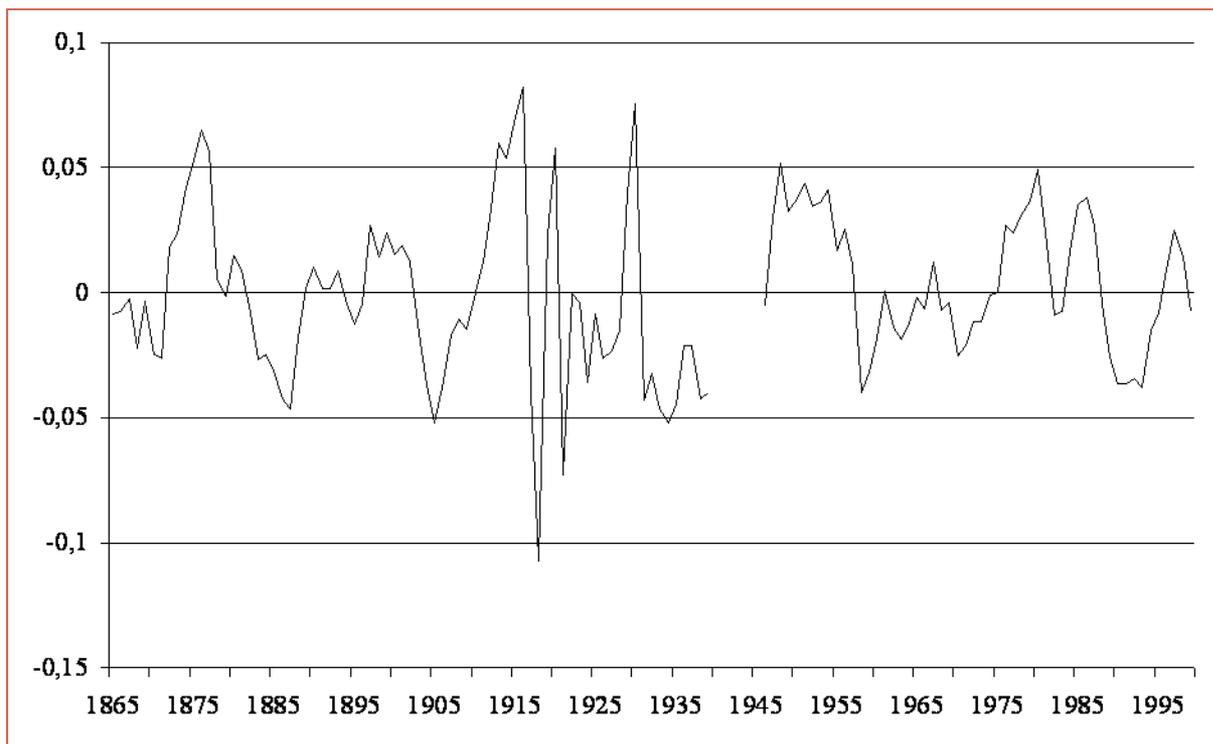


Source: <http://www.norges-bank.no/>

Here they
are:

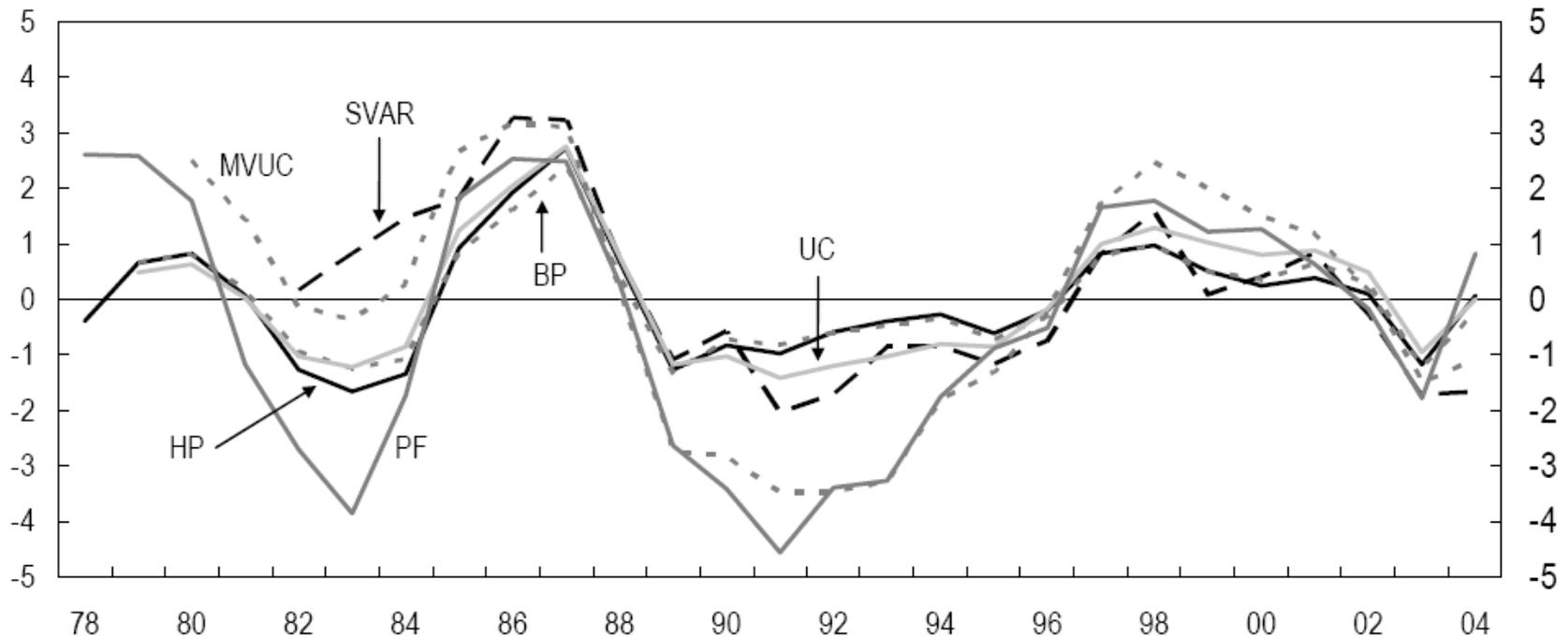
Stable over
time!

Cyclical component of GDP for Norway 1865-2000



Bjørnland (2002)

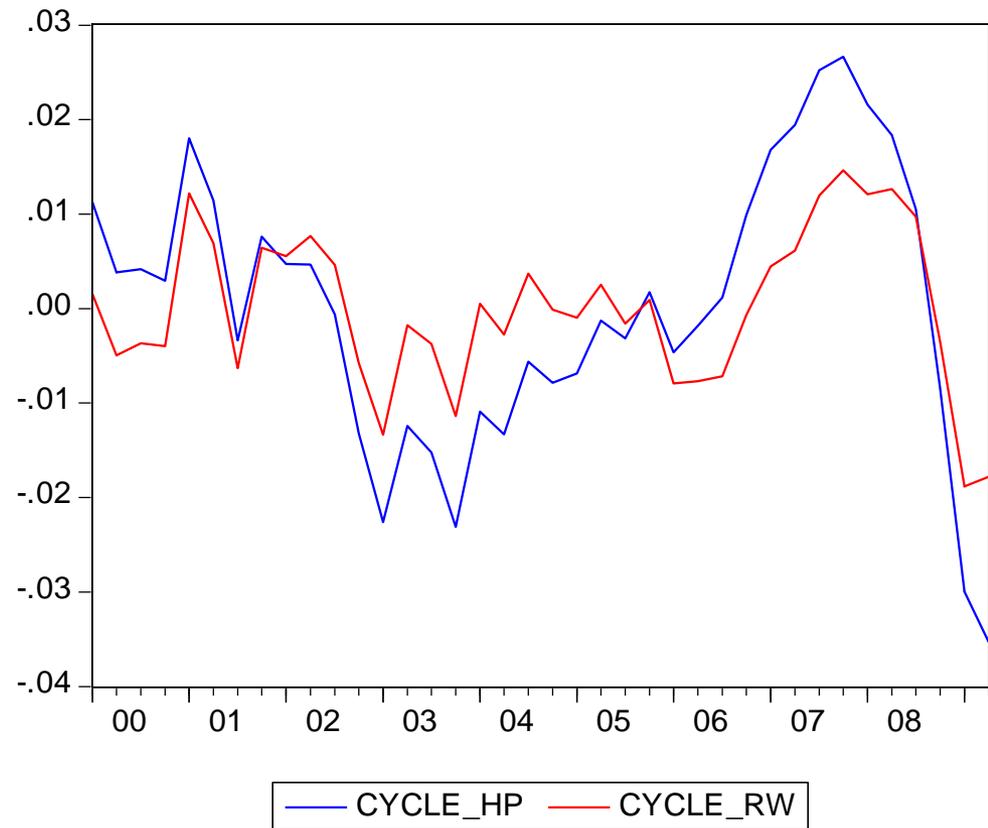
BUT: Substantial variation in business cycle estimates across sophisticated methods, 1978-2004



Bjørnland, Brubakk and Jore (2008)

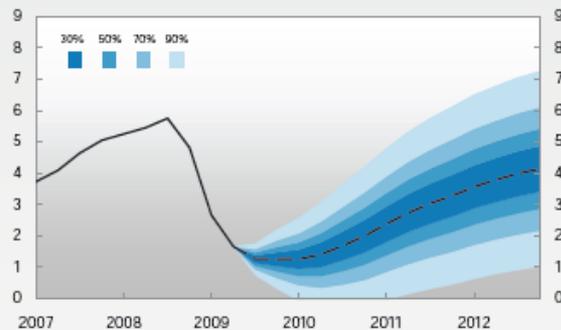
Always an
end of
sample
problem!

Cyclical component of GDP for Norway 2000-2009



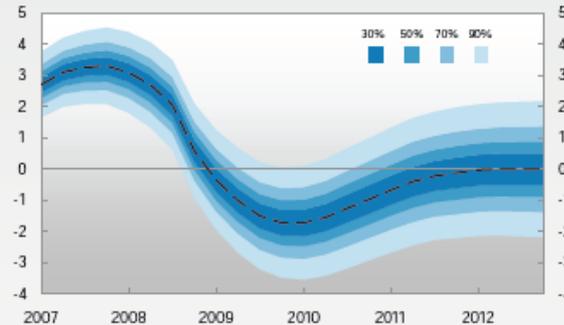
Central Banks do care about uncertainty, but not the dangerous one - wrong model.

Chart 1.15a Projected key policy rate in the baseline scenario with fan chart. Quarterly figures. Per cent. 2007 Q1 – 2012 Q4



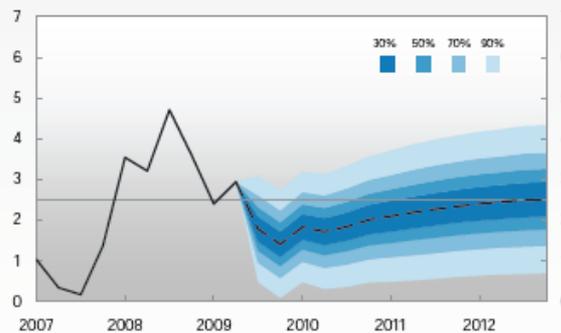
Source: Norges Bank

Chart 1.15b Estimated output gap in the baseline scenario with fan chart. Quarterly figures. Per cent. 2007 Q1 – 2012 Q4



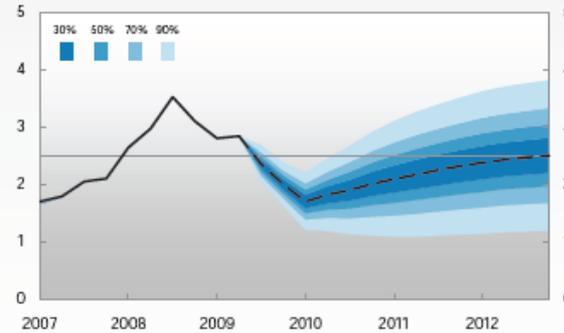
Source: Norges Bank

Chart 1.15c Projected CPI in the baseline scenario with fan chart. 4-quarter change. Per cent. 2007 Q1 – 2012 Q4



Sources: Statistics Norway and Norges Bank

Chart 1.15d Projected CPIXE¹⁾ in the baseline scenario with fan chart. 4-quarter change. Per cent. 2007 Q1 – 2012 Q4



1) CPI adjusted for tax changes and excluding temporary changes in energy prices. See *Staff Memo 2008/7* and *Staff Memo 2009/3* from Norges Bank for a description of the CPIXE.

Sources: Statistics Norway and Norges Bank

Source: Norges Bank MPR 2/2009

Output gap and forecasting



- Bjørnland, Leitemo & Maih (2009)
 - A simple framework in which to derive the natural rates and gaps in New Keynesian model setting for US. Derive plausible time-varying estimates of the natural rates and the corresponding interest rate and output gap.
- Bjørnland, Brubakk & Jore (2008)
 - Evaluate gaps by how well predict inflation. Alternative indicators: Industrial Confidence Index.
 - A weighted average of the various gaps (weights chosen using a Bayesian procedure), gives the best outcome.
- Bjørnland, Gerdrup, Jore, Smith & Thorsrud (2008, 2009)
 - Forget output gap. Use a weighted model average based on (ex-ante) performance of various models to predict inflation. Can that improve upon the forecast from Norges Bank? **Yes**

II. What are the sources of economic fluctuations? I.e., what shocks are most important?



“Large scale econometric models are identified via incredible (non-justified) exclusion restrictions, that are neither innocuous nor essential for the constructing of a model that could be used for policy analysis and forecasting.”

Chris Sims, 1980

Structural vector autoregressive (VAR) models



- Sims (1980): VAR models alternative to the large scale econometric models. All variables endogenous. No black box. Focus on shocks.
- Lucas and Sims critiques generated new approach to policy evaluation. Questions like ‘How should a central bank respond to shocks in macroeconomic variables?’ answered within framework of quantitative monetary general equilibrium models of the business cycle.
- With Sims; new role attributed to empirical analysis of providing evidence on the stylized facts to include in the theoretical model adopted for policy analysis.
- The solution of a DSGE model can be well approximated by a VAR. Structural VARs have become the natural tool for model evaluation.

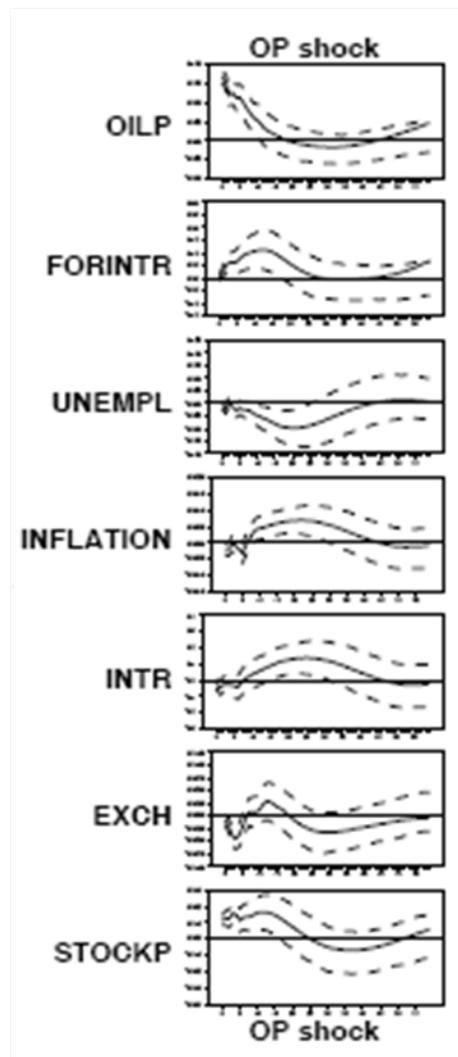
What are the effects of an oil price shock?



- Analyze different oil importing and exporting countries. Although Norway an oil producer, little known on the effects of oil price shocks.
- ...Most done through simulation of large scale models, focusing on benefits and costs of energy discoveries.
- Bjørnland (1998, 2000, 2004): Real economy boomed when oil prices increased. UK behaved very much in line with other oil importing economies, i.e. Germany and the US, where output contracts.
- Bjørnland (2009): The Norwegian economy responds to higher oil prices by increasing both aggregate wealth (stock market) and real demand. Hence, unemployment falls and inflation picks up gradually.

Norway

Dynamic effects of an oil price shock



Bjørnland (2009)

III. What is the role of asset prices in the monetary policy transmission mechanisms?



“The main lesson we should take away [from the crisis] for policymaking purposes is the futility of trying to deal with crisis and recessions by finding central bankers and regulators who can identify and puncture bubbles. If these people, exist we will not be able to afford them.”

Robert Lucas, 2009

When the economy is overheated



- **Orthodox theory: Central Banks should not respond to asset price bubbles. Efficient markets. But also, too difficult to calculate.**
- **But is it easier to calculate an output gap? The 'bubble' of the economy?**
- **Conventional economic theories do not include mechanism like, the loss of trust and confidence, the role of corruption and the sale of bad products in booms, and the role of their revelation when the bubble burst.**
- **Periods of expansions, economy may get overheated. Confidence goes beyond normal bounds. Buy assets as if it is their last chance ever. Credit explodes.**
- **We may rationally pursue our economic interest. But, not only guided by economic motives, also noneconomic motivation that may not always be rational (animal spirit). Hence, likely to be bubbles.**

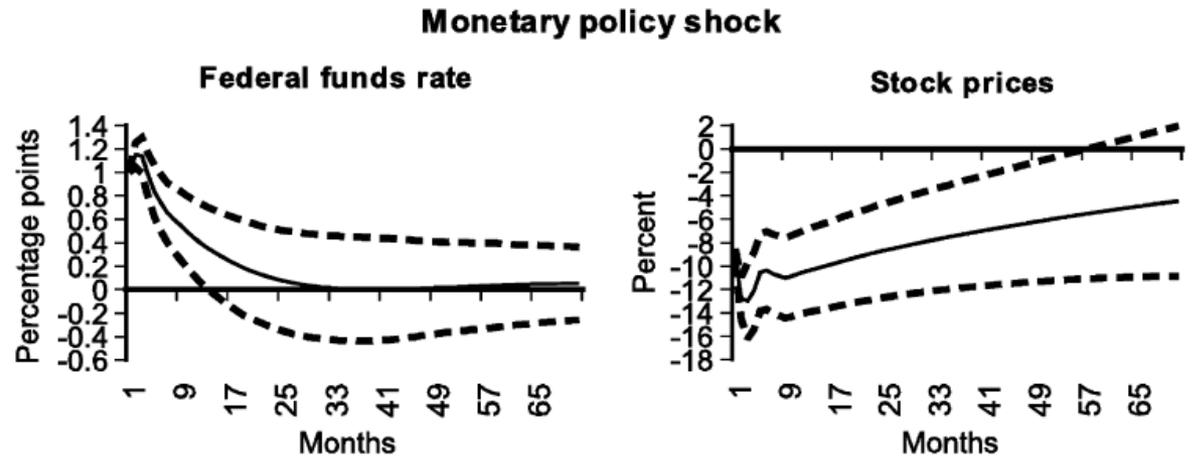
i) Stock prices and monetary policy



- Bjørnland and Leitemo (2009) analyze interaction between stock prices and monetary policy in the U.S., using a VAR model that takes full account of the potential simultaneity between variables.
- Allow for simultaneity between monetary policy and financial markets , as the central bank and the private sector will both affect and be affected by the other, leading to considerable interdependence.
- Identify models by imposing a combination of short-run and long-run restrictions on multipliers of shocks, leaving the contemporaneous relationship between interest rate and stock prices intact.
- Contrary to previous studies, found strong and simultaneous interaction effects between the stock market and interest rate setting.

US

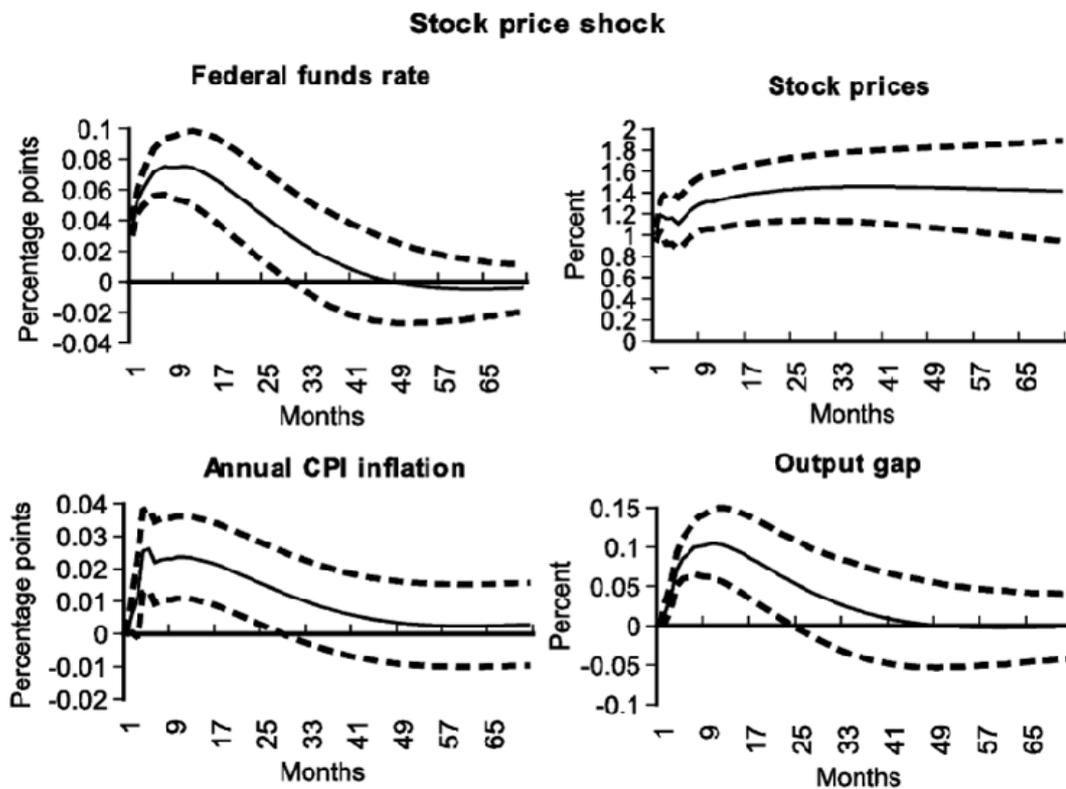
The effect of a monetary policy shock



Bjørnland and Leitemo (2009)

US

The effect of a (non-fundamental) stock price shock



Bjørnland and Leitemo (2009)

ii) Housing bubbles – boom/bust cycles

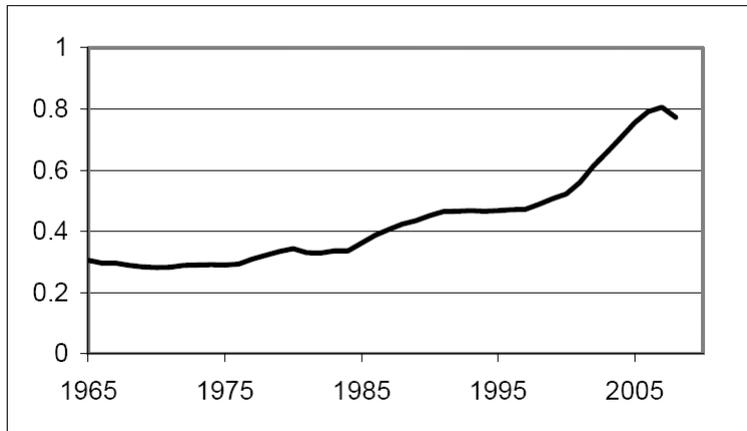


- Prior to many recessions, steep increase in credit growth. Expansionary monetary policy and deregulation of credit markets.
- Housing bubble - expectations on future prices increases push prices up to unsustainable levels. Irrationality increased by overoptimistic projections by market participants and media.
- As house prices increase, loan activity grow and finance consumption and investment, exaggerates the business cycles.
- If market driven by expectations of easy profit (non-fundamentals), will lead to unstable prices. Bubble burst and prices fall. Real problem!

US (left) and Norway (right)

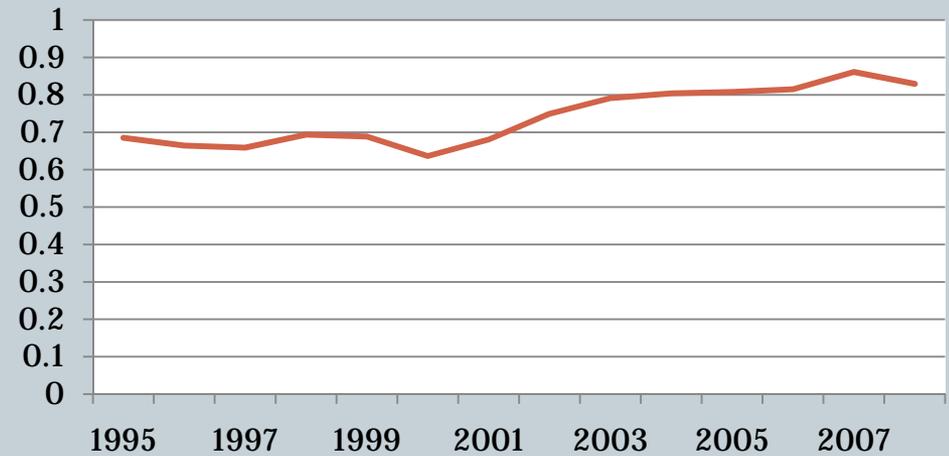


Figure 7. Ratio of home mortgage debt to GDP, 1965-2008.



USA

Household debt/GDP



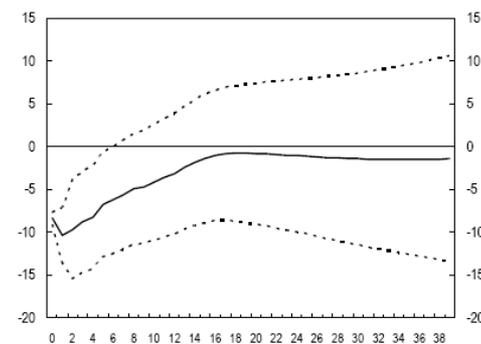
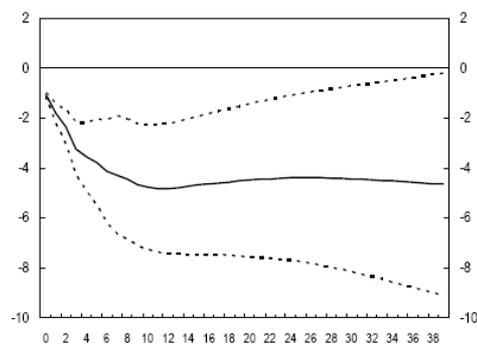
Norway

Source: Kredittilsynet and own calculations

USA

The effect of a monetary policy shock

Real house price (left); Real stock price (right)

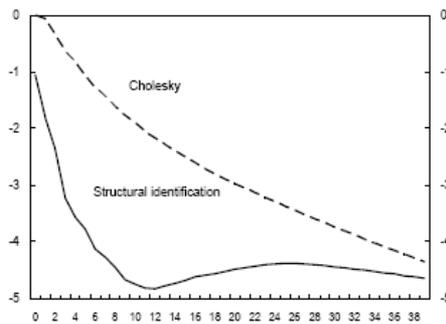


Bjørnland and Jacobsen (2008)

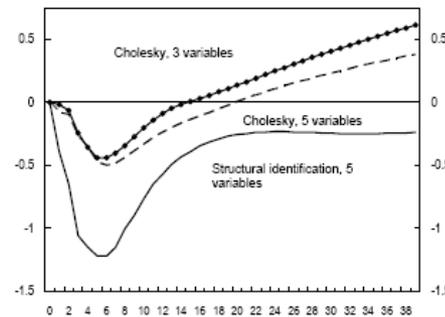
The effect of the financial accelerator ...



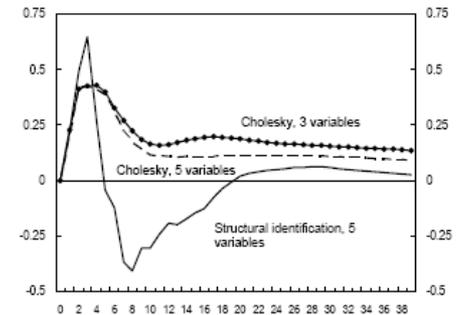
Effect of a monetary policy shock in the US, with and without asset prices



(a) House prices (per cent)



(b) GDP (per cent)



(c) Inflation (per cent)

Bjørnland and Jacobsen (2008)

Norway, Sweden and the UK

Does
monetary
policy
respond to
house prices?

Figure 13a Response to a house price shock.
Norway: Interest rate (percentage points)

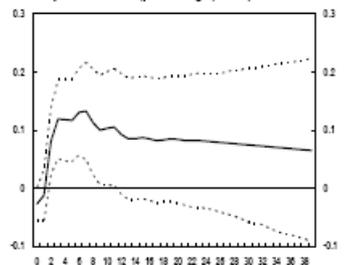


Figure 13b Response to a house price shock.
Norway: Inflation (percentage points)

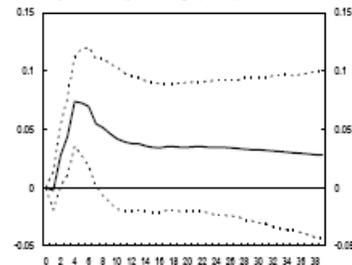


Figure 14a Response to a house price shock.
Sweden: Interest rate (percentage points)

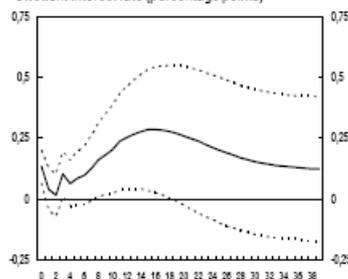


Figure 14b Response to a house price shock.
Sweden: Inflation (percentage points)

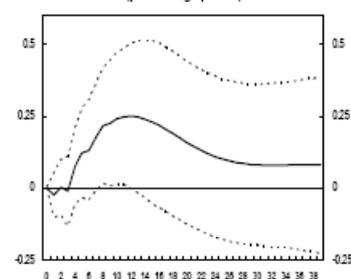


Figure 15a Response to a house price shock.
UK: Interest rate (percentage points)

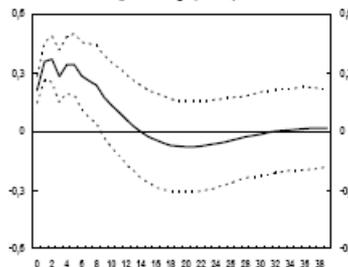
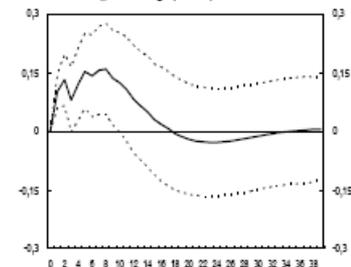


Figure 15b Response to a house price shock.
UK: Inflation (percentage points)



Bjørnland and Jacobsen (2009)

iii) Monetary policy and the exchange rate

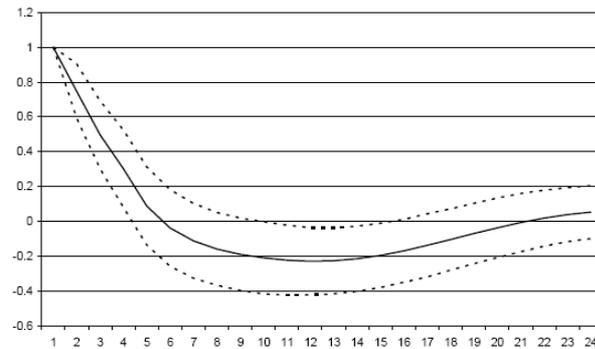


- An increase in the interest rate - exchange rate should immediately appreciate in line with uncovered interest parity (UIP).
- Confronted with data, few empirical studies find support for UIP.
- Results have been so pervasive that many recently developed DSGE models have sought to replicate the puzzles themselves.
- Caution about letting puzzles develop into consensus.
- Bjørnland (2009) and Bjørnland and Halvorsen (2008): Allowing for simultaneity between monetary policy and exchange rate. Find:
- A monetary policy shock has a strong effect on the exchange rate: An increase in the interest rate, then the exchange rate appreciates on impact, for so to gradually depreciates back to baseline in line with UIP.

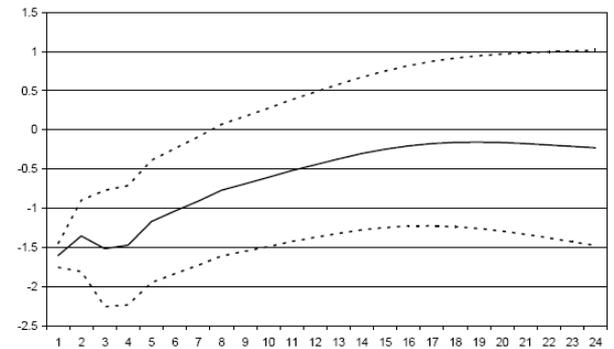
Sweden:

The effect of a monetary policy shock

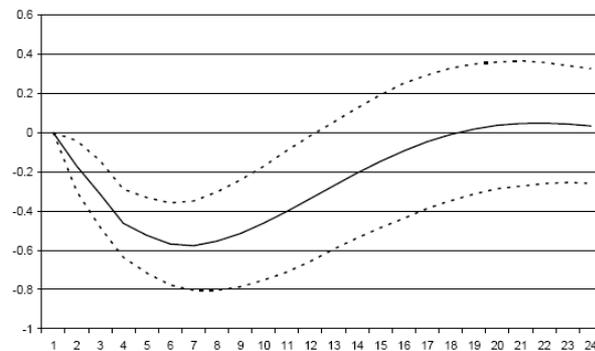
A) Interest rate (percentage point)



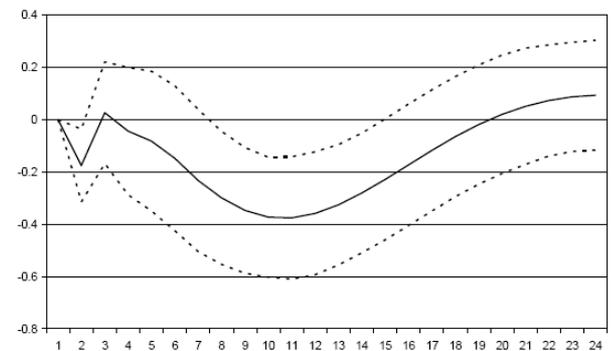
B) Real exchange rate (percentage)



C) GDP (percentage)



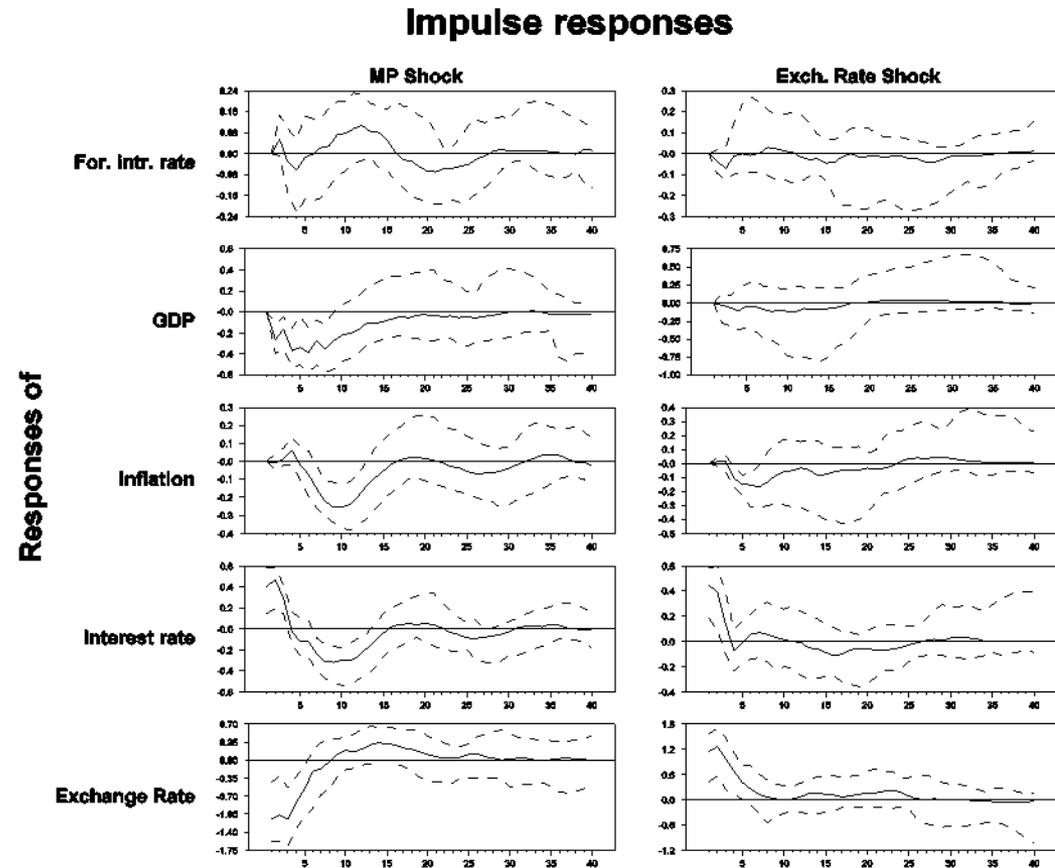
D) Inflation (percentage)



Bjørnland (2009)

Do central banks respond to the exchange rate?

Norway: The effect of a monetary policy shock and an exchange rate shock



Bjørnland and Halvorsen (2008)

IV. Policy implications



“There is a genuine tendency for readers to be more interested in answers they wanted to find than questioning the assumptions that generate the answers.”

Paul Krugman, 2009

So, who's to blame?



- So why did we not have models that were capable of including these mechanism I have discussed and predict the recession?
- DSGE models are not designed to predict any sort of crisis. Explain very small fluctuations around a fixed steady-state. Useful for “normal” times as a way of understanding economic fluctuations, and for learning about optimal policy.
- Predicting the crisis would have required going far beyond our models. Foresee the risks posed by the shadow banking system.
- But mainstream media are confusing a failure to anticipate the crisis with failure to have research available to comprehend it.

Inefficient markets



- Quantitative macro models that incorporate financial factors existed well before the crisis.
- Some even argue for policy intervention, i.e. when non-fundamental movements in asset prices cause distortions in the consumption/investment decision by influencing the cost of capital.
- The real problem is still the conventional wisdom of efficient markets that underlies much of current economic theory.
- Have gone too far in interpreting rational expectations efficiency markets that have failed to consider the most important dynamics following shocks, like those seen in the financial crisis.

Required actions



- If people are not always rational and do not act entirely out of economic motives, it makes sense to have a government that plays a role in the regulation of markets and engage in activist policy affecting aggregate demand.
- But then it also makes sense to have models that allow for market inefficiencies.
- Adopt a financial instability hypothesis as *one* of our working assumption of how our financial system really works (Minsky theory). Develop many models – not one SUPER model.
- Confront the ‘bubble’ before it reaches a point at which its bursting becomes a systemic risk to the system. Will be hard!



Conclusion

- **Allow for recurrent business cycles, also sudden drops**
- **Incorporate asset prices and inefficient markets into traditional macromodels.**
- **Policymakers and regulators should ‘confront the storms’ from bubbles in asset prices.**

Publications referred to in this presentation.

For a full list of my publications, see: <http://home.bi.no/a0310125/papers.html>



Publications in international journals

- "Monetary policy and exchange rate overshooting: Dornbusch was right after all". Forthcoming in *Journal of International Economics*
- "Identifying the Interdependence between US Monetary Policy and the Stock Market" (coauthor: Kai Leitemo). *Journal of Monetary Economics*, 56, 2009, 275–282.
- "Estimating the Natural Rates in a simple New Keynesian Framework" (coauthors: Kai Leitemo and Junior Maih). Forthcoming in *Empirical Economics*.
- "Oil price shocks and stock market booms in an oil exporting country". *Scottish Journal of Political Economy*, 56, 2009, 232-254.
- "Forecasting inflation with an uncertain output gap" (coauthors: Leif Brubakk and Anne Sofie Jore). *Empirical Economics*, 35, 2008, 413-436.
- "Monetary Policy and Exchange Rate Interactions in a Small Open Economy", *Scandinavian Journal of Economics*, 110, 2008, 197-221.
- "The role of the exchange rate as a shock absorber in a small open economy". *Open Economies Review*, 15, 2004, 23-43.
- "Identifying Domestic and Imported Core Inflation". *Applied Economics*, 33, 2001, 1819-1831.
- "The Dynamic Effects of Aggregate Demand, Supply and Oil Price Shocks - A comparative study". *The Manchester School of Economic Studies*, 68, 2000, 578-607.
- "Detrending Methods and Stylized Facts of Business Cycles in Norway - An international comparison". *Empirical Economics*, 25, 2000, 369-392.
- "Structural breaks and stochastic trends in macroeconomic variables in Norway". *Applied Economics Letters*, 6, 1999, 133-138.
- "The Economic Effects of North Sea Oil on the Manufacturing Sector". *Scottish Journal of Political Economy*, 45, 1998, 553-585.

Work in progress:

- "How does monetary policy respond to exchange rate movements? New international evidence" (coauthor Jørn Inge Halvorsen).
- "The role of house prices in the monetary policy transmission mechanism in the U.S." (coauthor Dag Henning Jacobsen).
- "Does forecast combination improve Norges Bank inflation forecasts?" (coauthors Karsten Gerdrup, Anne Sofie Jore, Christie Smith and Leif Anders Thorsrud).
- "There is more than one weight to skin a cat: Combining densities at Norges Bank" (coauthors Karsten Gerdrup, Anne Sofie Jore, Christie Smith and Leif Anders Thorsrud).