

# 'Quantifying the Lasting Harm to the U.S. Economy from the Financial Crisis'

Bob Hall

Discussion, Martin Eichenbaum

# The Great Questions in the wake of the Great Recession

- What caused it?
- What are the 'mechanical' sources of the enormous and persistent declines in output?
  - Capital, Labor, TFP.....
- What, if anything, can we do to hasten the recovery?
- The 'deeper' research issue: what class of models are most useful for thinking about this seminal economic event?

- The 'War and Peace' of what happened in the aftermath of the crisis.
  - Fascinating, exhaustive and exhausting.
  - Primary focus: the mechanical sources of the declines in output.
- Nuanced discussion of what policy might be able to achieve in the short and intermediate run.
- Closely connected to the implicit stand that Bob takes (in this paper) on what the best models are for thinking about the Great Recession.

# My discussion

- Summarize Bob's main conclusions.
- Complementary calculations and potential sensitivities.
- Why is the recovery so slow?
  - Kill the vampire squid 'mismatch' theory of low employment (again).
  - It's not policy uncertainty.
  - It's not credit frictions
- What's left?
  - Models which explain the depth and persistence of the Great Recession as confluence of the fall in aggregate demand with a binding ZLB.
- CET (2014) and this paper agree there's a large role for 'demand policy', even in the short run.

# Decomposing the shortfall in output

- Project business output using simple trend calculated over sample 1990 - 2007.
  - Calculate 'shortfall' as difference between projected and actual level of output.
- Project input values of capital and different components of labor input using trends calculated over sample 1990 - 2007.
  - Calculate 'shortfall' of inputs as difference between projected and actual input levels.
- Contribution of TFP is calculated as residual so that the decomposition is additive.

# Components of the current shortfall in output

Employment rate = (1 - unemployment rate).

<i>Year(s)</i>	<i>Output</i>	<i>Productivity</i>	<i>Capital contribution</i>	<i>Population</i>	<i>Labor-force participation</i>	<i>Employment rate</i>	<i>Hours per week</i>	<i>Labor quality</i>	<i>Business fraction</i>
2008	4.9	3.0	0.2	0.3	0.0	0.8	0.5	-0.3	0.3
2009	7.4	1.7	0.8	0.3	0.6	2.4	1.6	-0.4	0.4
2010	0.1	-1.6	1.0	0.3	0.6	0.3	-0.5	0.0	0.0
2011	0.5	0.3	0.8	0.4	0.5	-0.4	-0.2	0.1	-0.9
2012	-0.1	0.1	0.6	-0.1	0.4	-0.6	-0.4	0.0	-0.1
2013	0.5	0.1	0.5	0.3	0.3	-0.3	-0.2	0.3	-0.3
2007 through 2010	12.4	3.1	2.1	0.8	1.2	3.5	1.6	-0.6	0.7
2007 through 2013	13.3	3.5	3.9	1.3	2.4	2.2	0.8	-0.3	-0.5

# Cumulative output shortfall relative to 2007 base level

Calculated using Hall (2014) methodology, data

Year(s)	Output	Productivity	Capital contribution	Population	Labor-force participation	Employment rate	Hours per week	Labor quality	Business fraction
2008	4.9	3.0	0.2	0.3	0.0	0.8	0.5	-0.3	0.3
2009	12.3	4.7	1.1	0.5	0.6	3.2	2.1	-0.7	0.7
2010	12.4	3.1	2.1	0.8	1.2	3.5	1.6	-0.6	0.7
2011	12.9	3.4	2.9	1.2	1.8	3.1	1.4	-0.6	-0.1
2012	12.9	3.5	3.4	1.1	2.1	2.5	1.0	-0.6	-0.2
2013	13.3	3.5	3.9	1.3	2.4	2.2	0.8	-0.3	-0.5
<b>Cumulative output short-falls:</b>									
2007 through 2010	29.6	10.8	3.4	1.6	1.8	7.6	4.2	-1.6	1.8
2007 through 2013	68.6	21.2	13.6	5.2	8.1	15.3	7.4	-3.0	0.9

## 'Demand policy' and the output shortfall

- One upper bound for 'demand' policy to affect output in short-run: its potential effect on labor input.

Contribution of labor to per capita output shortfall, 2013	Hall, 2014 All trends 1990-2007	Hall, 2014 TFP trend 1972 - 2007	All trends 1972-2007
	38%	36%	45%

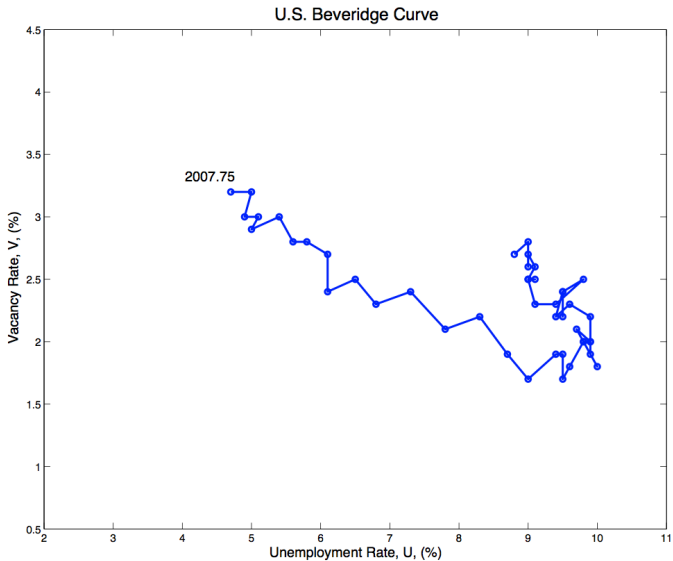
- If part of productivity movements are due to labor hoarding and capacity utilization, upper bound for demand policy would be higher.
- Over time, upper bound rises because we can eliminate the capital shortfall.
- By affecting investment, demand policies can hasten the elimination of the capital shortfall.



# Affecting Labor Input

- Key issue: how much of labor shortfall is cyclical, how much reflects low frequency, structural factors.
- Hall's paper contains a nuanced discussion of these issues.
  - Labor force participation, unemployment benefits, Social Security disability benefits, implicit taxes from food stamp like programs.
- LFPR: demographics are undeniably important, probably account for about 1/3 of the fall in LFPR.
- Hall attributes a relatively minor role to the next three categories.
- That leaves the mismatch hypothesis to limit potential effectiveness of 'demand policy'.

# Motivating the mismatch hypothesis



# Reasons to be skeptical about the mismatch hypothesis

- Reduced form evidence from Shierholz (2014).
- Davis et. al. (2013): cyclical variations in recruiting intensity.
- Hall's heterogeneity hypothesis.
- Theory doesn't predict a strictly downward sloping Beveridge Curve in a severe, prolonged recession
- All these explanations are consistent with 'demand policy' having a large expansionary impact on employment.

# Doubts about the mismatch hypothesis: Shierhlotz (2014)

- Unemployment is high at *all* levels (even including for those with college degrees) relative to 2007.
- Unemployment is high in *all* occupations relative to 2007.
- The number of unemployed vastly outnumber the number of job openings in *all* occupations.
- There's no evidence of an increase in number of hours worked in any occupation (except legal).

# Doubts about the mismatch hypothesis

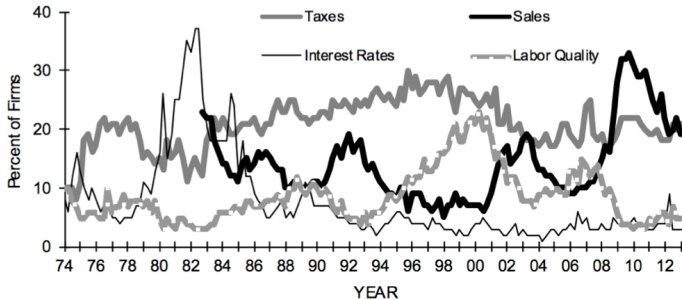
- Suppose that what's holding firms back from hiring is inability to find right type of workers.
- Then wages of some types of workers (the 'right types') should be skyrocketing.
- But wages across lots of occupations are rising at pretty modest rates.
- In fact, wages are rising at less than average productivity in all *occupations*.

# Doubts about the mismatch hypothesis

- Since the early 1970s, National Federation of Independent Business, a small business association, has surveyed its members to find out what their 'top problem is'.
  - Ten categories:
  - Taxes, Inflation, Poor sales, Finance & interest rates, Cost of labor, Government regulations & red tape, Competition from large businesses, Quality of labor, Cost/availability of insurance, Other.
- Since 2008
  - 'Poor sales' surged to 'top problem' selected by the largest number of firms.
  - Number of firms reporting 'Labor quality' as top problem has collapsed.

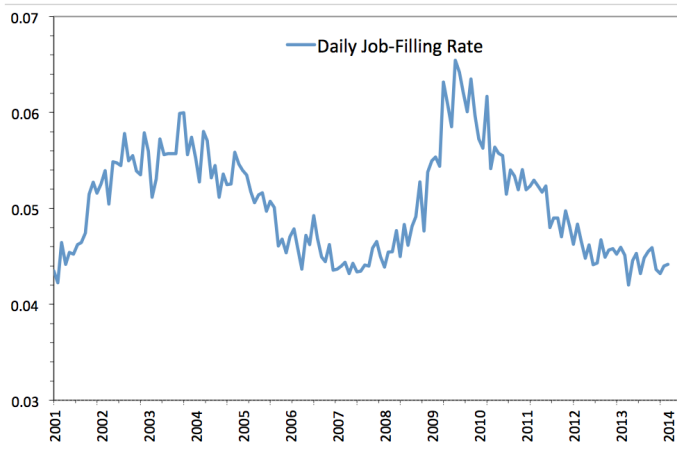
## SELECTED SINGLE MOST IMPORTANT PROBLEM

Sales, Fin. & Interest Rates, Labor Cost, Labor Quality, and Taxes  
*January Quarter 1974 to January Quarter 2013*



# What about the decline in match efficiency?

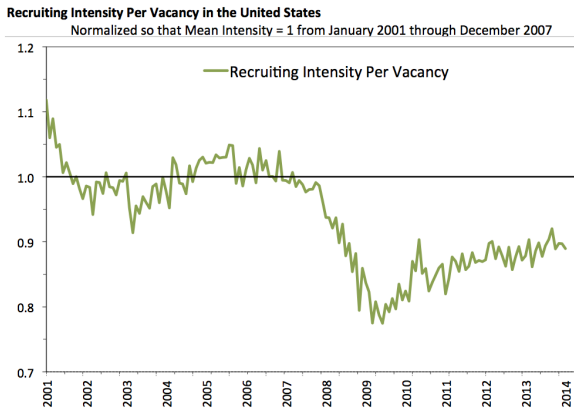
Daily job filling rate, 1/2001-2/2013





- Job-filling rate rises strongly with gross hires rate in cross section of establishments.
- One way to reconcile this empirical relationship with standard search theory
  - Assume recruiting intensity per vacancy covaries positively with vacancy rate in the cross section.
- Davis et. al. apply this idea to aggregate time series in their AER PP (2012).
- Recruiting intensity function is parametrized to be consistent with how the finding rate varies with gross hires in the cross section.

# Davis et. al. provide evidence that recruiting intensity has declined sharply



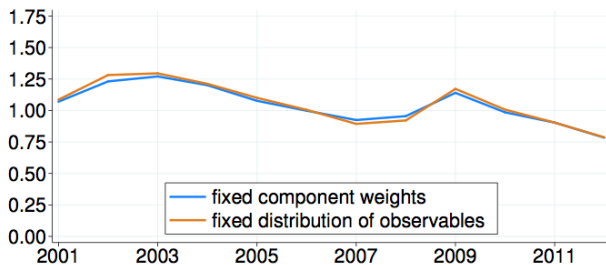
- They argue this decline accounts for most of *apparent* decline in match efficiency.

# Hall and Schulhofer-Wohl (2013)

- Match efficiency differs across workers as a function of why they became non-employed.
- Categories with lowest normal exit rate (lowest match efficiency) expanded dramatically during the post-2007 period

<i>Source</i>	<i>Normal exit rate, percent per month</i>	<i>Change in percent of unemployment, 2007 to 2009</i>
Layoff	64.7	-2.2
Permanent loss	41.4	17.7
Temp job	51.1	-0.9
Quit	55.7	-5.0
New entrant	49.2	-1.6
Reentrant	48.7	-8.0

# Overall Composition-Adjusted Matching Efficiency



# Beveridge curve *should* appear to shift in a severe recession

- Simplest DMP style model

$$U_{t+1} - U_t = (1 - \rho)(1 - U_t) - f_t U_t$$

$$f_t = \sigma_{m,t} \left( \frac{V_t}{U_t} \right)^\alpha = (1 - \rho) \frac{(1 - U_t)}{U_t} - \frac{U_{t+1} - U_t}{U_t}$$

$$V_t = \left[ (1 - \rho) \frac{(1 - U_t)}{\sigma U_t^{1-\alpha}} - \frac{U_{t+1} - U_t}{\sigma U_t^{1-\alpha}} \right]^{1/\alpha}$$

- The variable  $U_{t+1} - U_t$  is positive in downturn phase of recession, then becomes negative as economy recovers.
- This force generates what looks like a shift in the Beveridge curve (the 'hook pattern')

# Standard Approximation

- Standard derivation assumes

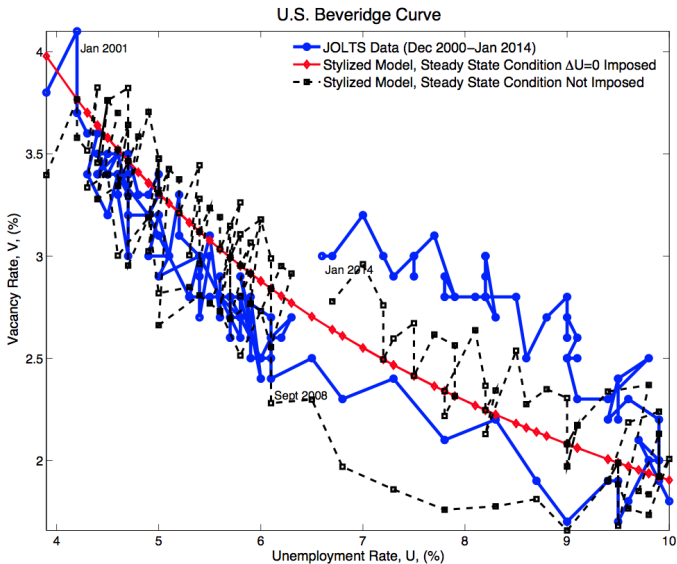
$$U_{t+1} = U_t$$

- We obtain a standard Beveridge Curve

$$V_t = \left[ (1 - \rho) \frac{(1 - U_t)}{\sigma U_t^{1-\alpha}} \right]^{1/\alpha}$$

- Only way to capture a cyclical shift in relationship between  $V_t$  and  $U_t$  are changes in match efficiency,  $\sigma$ .
- But they could just reflect cyclical movements in  $U_{t+1} - U_t$ .

# How important is this argument empirically?

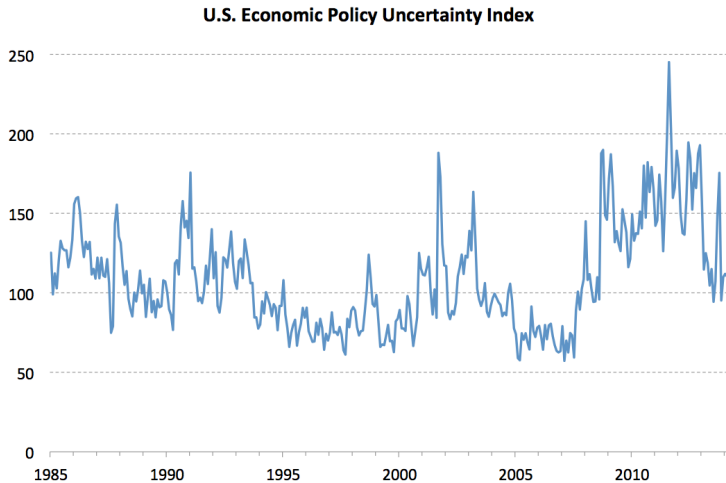


# Is the recovery slow because of policy uncertainty?

- If employers are holding back from hiring new workers because of policy, then we should see them using their existing work force more intensely.
  - There's no evidence of this effect in average weekly hours data.
- Baker, Bloom and Davis construct a measure of economic policy uncertainty, and this indeed shows an elevated level after 2007.
- Index has been declining, little evidence that employment is increasing in response to the decrease in uncertainty.



# Baker, Bloom and Davis Uncertainty Index

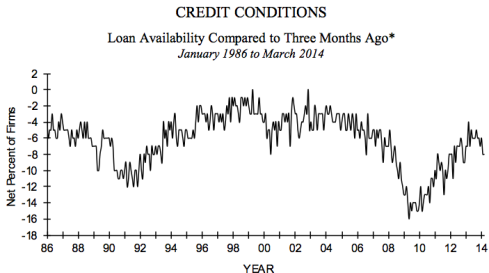


Source: Baker, Bloom, Davis

# Is the recovery slow because of credit constraints?

- Large corporations have no trouble borrowing at historically low interest rates.
- Small firms don't cite credit conditions as an important problem
  - In NFIB small business survey, sales is by far the biggest problem.

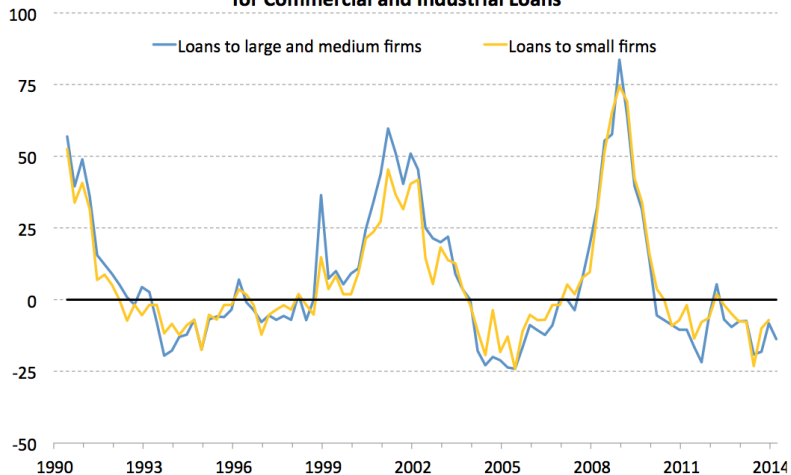
## SMALL BUSINESS CREDIT CONDITIONS



\* For the population borrowing at least once every three months.

# Senior Loan Officer Survey on Bank Lending Practices

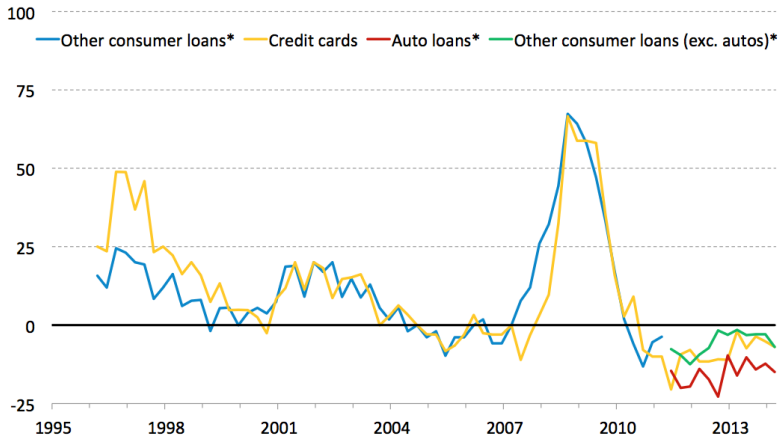
## Net Percent Reporting Tightening Standards for Commercial and Industrial Loans



Source: Board of Governors of the Federal Reserve System

# Senior Loan Officer Survey on Bank Lending Practices

## Net Percent Reporting Tightening Standards for Consumer Loans

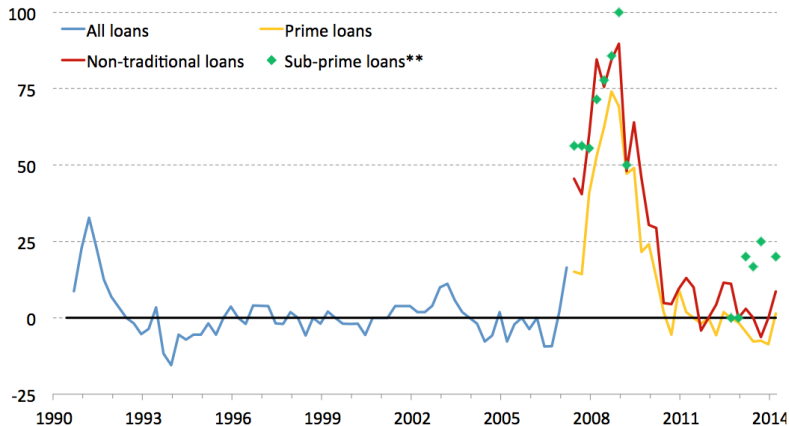


\* From 2011Q2, auto loans are split out from the other consumer loans category.

Source: Board of Governors of the Federal Reserve System

# Senior Loan Officer Survey, Housing

## Net Percent Reporting Tightening Standards for Mortgage Loans



\* From 2007Q2, loans are split into prime, sub-prime and non-traditional loans.

\*\* Sub-prime series is not reported when the number of respondents is three or fewer.

Source: Board of Governors of the Federal Reserve System

# What's left?

- The collision of low aggregate demand and a binding ZLB.
- Implicit subtext of Hall's paper: this is the key force driving the cyclical shortfall in output.
- Along with his quantitative analysis of the input shortfalls, that assumption is the basis of his Table 10.

Component	Contribution to shortfall	Immediately	Within a few years	Ultimately
Productivity	3.5	No	No	Possibly
Capital	3.9	No	A little	Yes
Unemployment	2.2	Partly	Mostly	Yes
Participation	2.4	Partly	Partly	Partly

## Relationship to CET (2014) and some numbers

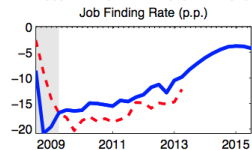
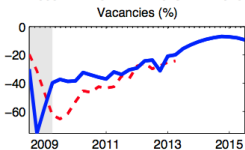
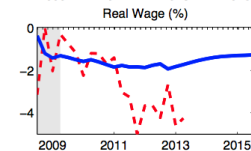
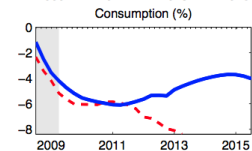
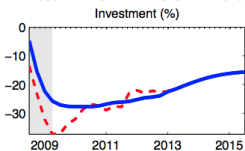
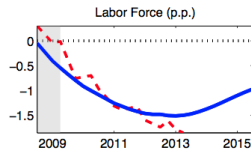
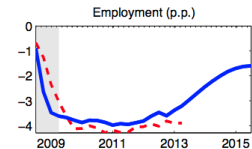
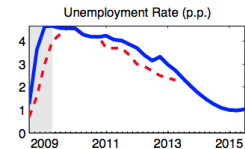
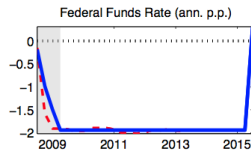
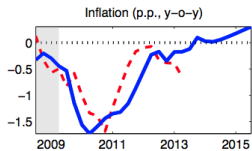
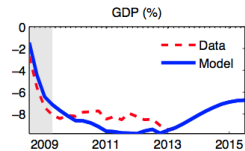
- NK model in which firms face moderate degrees of price rigidities, no nominal rigidities in wage setting process.
- Hall-Milgrom wage bargaining in DMP-like environment.
- Endogenize LFPR so there's three state labor market.
  - employment, unemployment, not in labor force (home production).
- Estimate model using data on 11 variables, pre-2008 sample.
- Project behavior of these variables using simple trends calculated over sample 2001 - 2007.
  - Calculate 'shortfall' as difference between projected and actual level of these variables.

# Accounting for the shortfalls

- Allow for four shocks and a binding ZLB
- First shock motivated by literature stressing reduction in consumption as trigger for ZLB episode.
  - Perturbation to intertemporal Euler equation governing the accumulation of risk-free asset: *consumption wedge*.
- Second shock motivated by sharp increase in credit spreads observed in post-2008 period.
  - Wedge in households' first order condition for optimal capital accumulation: *financial wedge*.
- Third and fourth shocks: TFP and government purchases.



# CET (2013): Data and Model



Notes: Data are the differences between raw data and forecasts, see Figure 4.

# Substantial potential for 'demand' policy

- CET attribute vast bulk of decline in economic activity to financial wedge and, to somewhat smaller extent, consumption wedge.
- Shortfall in per capita output as of end of 2012:
  - CET: 9%
  - Hall: 11.8%
- From this perspective we're more conservative than Hall (different output measures, different trends).
- We estimate that cyclical component of labor accounts for about 65% of output shortfall.
- Hall upper bound on labor contribution to output shortfall as of end of 2012 is a bit over 40%
- In this sense, we're less conservative than him.

# Concluding remarks

- Hall's paper is a must read for anyone interested in accounting for the aftermath of the financial crisis.
- Aside from pure accounting, it provides an estimate of upper bound for what demand policy could do in short-run.
  - Abstracts from labor hoarding, capacity utilization which could raise this upper bound.
- Key conclusion
  - Stimulating product demand would help eliminate an important portion of output shortfall in short run.
- Demand policy would also help encouraging investment, thereby more quickly eliminating drag due to capital shortfall.

# One big complaint:

- Why in 2014 is anyone still working with  $I/K$  rather than  $\dot{I}$  adjustment costs?