Hiring Uncertainty: A New Indicator

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Motivation

In many countries, hiring activity is still down compared to pre-crisis levels

Reasons:

- Expected return from hiring low?
- Uncertainty about returns from hiring?

Policy debates

- *[...] the recurrent uncertainties about the government budget, even if no large scale crisis erupts, are detrimental to business investment and hiring [...].*(LINK Global Economic Outlook, October 2013)
- *Meanwhile, uncertainty about growth prospects continues to play a role in firms' investment decisions.* (IMF World Economic Outlook, October 2013)
- *There is a level of uncertainty which is hampering decision makers from investing and from creating jobs.* (Christine Lagarde, October 2012)
- *The indecision of policy makers in several countries has led to uncertainty about future conditions and reinforced corporate tendencies to increase cash holdings or pay dividends rather than expand capacity and hire new workers.* (ILO Global Employment Trends, January 2013)

Measures of uncertainty in the literature

Number of press articles citing *economic uncertainty*

Disagreement of forecasters

Cross-sectional dispersion of productivity shocks in micro firm-level data

Conditional variances of inflation, GDP, industrial production etc estimated with GARCH models

Implied option-implied volatility of equity prices

Objectives of this paper:

- Focus on economic uncertainty as perceived by employers
- Develop uncertainty indicator that is forward-looking in nature
- Develop uncertainty indicator that can be derived for many countries
- Develop sector-specific uncertainty indicator

Model (I)

Apply investment model of McDonald and Siegel (1986) to hiring and lay-off decisions of firms

Return to hiring (cost of laying off) workers V_{it} is uncertain and evolves according to a Geometric Brownian motion

$dV_{it} = \eta V_{it} dy_t$ with Wiener process $dy_t = \epsilon_t \sqrt{dt}$ and $\epsilon_t \sim N(0,1)$

V_{it}: value added of hired (laid off) workers per unit of labour cost (labour productivity) in firm i at time t

dy_t: economy-wide productivity shock

η: uncertainty parameter

Model (II)

Firms maximize the value of the option to hire workers and to lay off workers respectively

Solution consists of productivity thresholds

- $V^{\star}_{H,i}$, above which firm i hires workers
- $V^{\star}_{L,i}$, below which firm i lays off workers

Solution can be derived as

- $V^{\star}_{H,i} = \frac{\beta}{\beta-1} > 1$
- $V^{\star}_{L,i} = \frac{\beta-1}{\beta} < 1$

where $\beta = \frac{1}{2} + \sqrt{\frac{1}{4} + \frac{2\rho}{\eta^2}} > 1$ and ρ is the (economy-wide) time-discount rate

Note that, given our assumptions, $V^{\star}_{H,i} = V^{\star}_{H}$ and $V^{\star}_{L,i} = V^{\star}_{L}$

Re-arrange to solve for uncertainty $\eta = \sqrt{\frac{2\rho}{\left(\frac{V^{\star}_H}{V^{\star}_H - 1} - \frac{1}{2}\right)^2 - \frac{1}{4}}} = \sqrt{\frac{2\rho}{\left(\frac{1}{1-V^{\star}_L} - \frac{1}{2}\right)^2 - \frac{1}{4}}}$

Data

Productivity: OECD *Quarterly Benchmarked Unit Labour Cost Indicators*

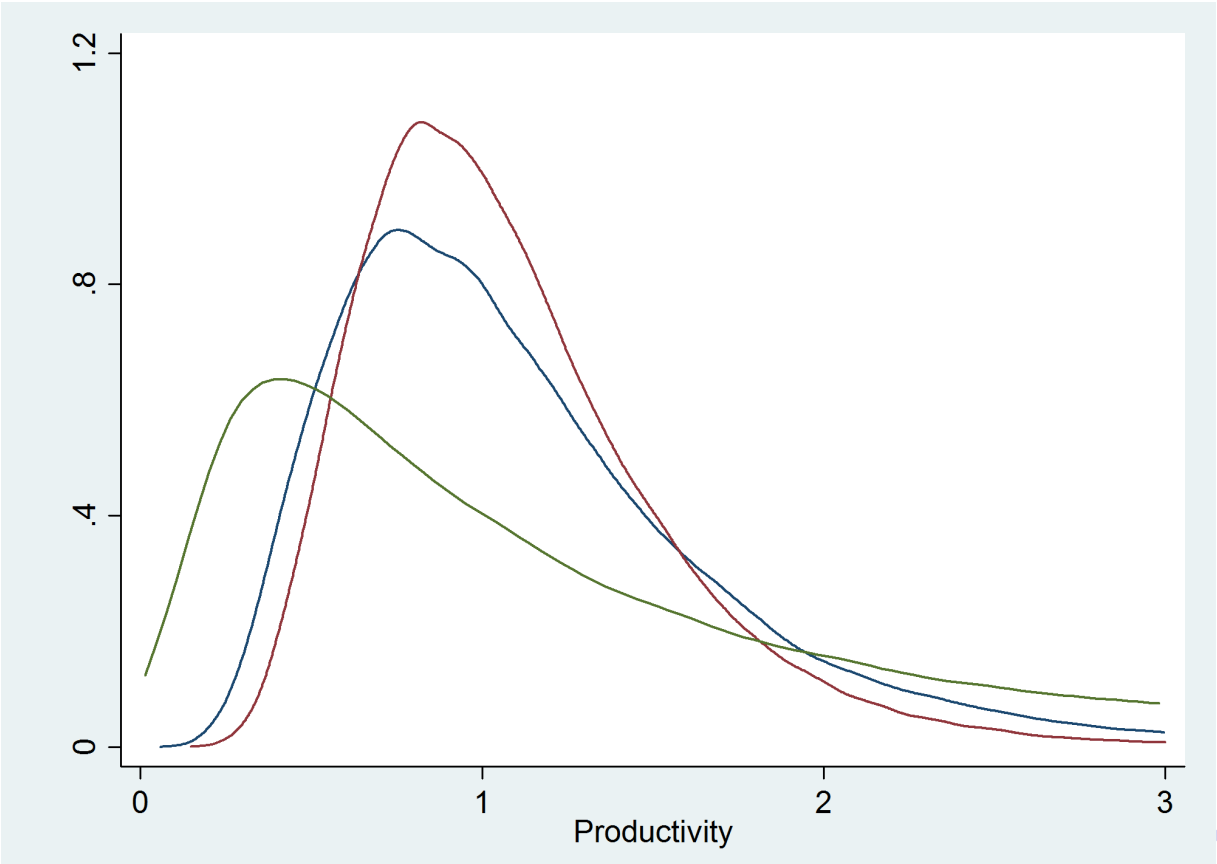
- Data on the level of unit labour costs
- Inverse of unit labour costs corresponds to productivity as defined in the model

Hiring demand: Manpower *Employment Outlook Survey*

- Data from a quarterly survey among 40.000 employers worldwide
- Survey question: How do you anticipate employment to change at your location over the next quarter?
- Data on the share of employers anticipating an increase, a decrease or no change in workforce

Deriving the productivity thresholds (I)

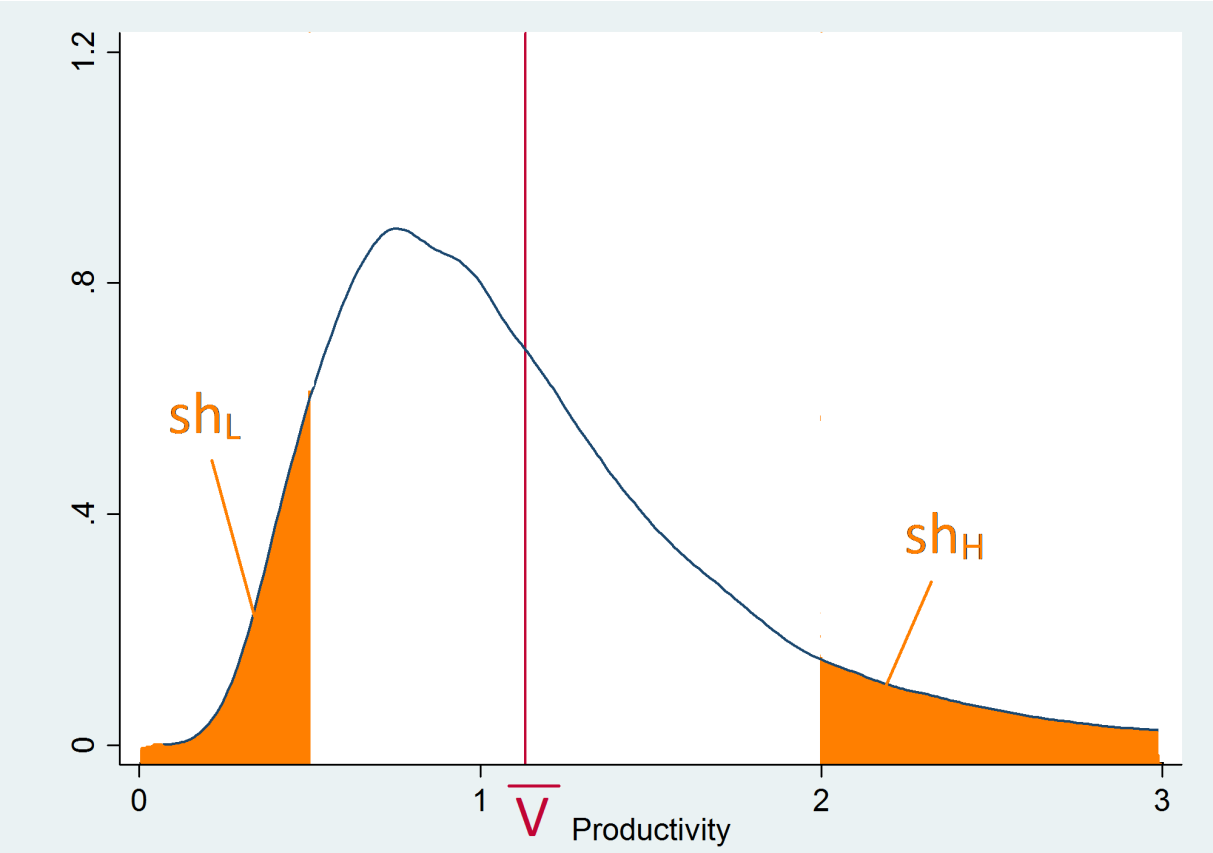
Assume productivity is log-normally distributed across firms i.e. $V_t \sim \ln \mathcal{N}(\mu, \sigma)$...but what are μ and σ?



Deriving the productivity thresholds (II)

Deduct μ, σ and productivity thresholds from average labour productivity ($\bar{V}$), share of employers that intend to hire (sh_H) and to lay-off workers (sh_L)

$\bar{V} = 1.133$, $sh_L = 0.083$, $sh_H = 0.083 \Rightarrow \mu = 0$, $\sigma = 0.5$, $V_L^\star = 0.5$, $V_H^\star = 2$



Deriving the productivity thresholds (III)

Conditions:

$$\ln \bar{V} = \mu + \frac{1}{2}\sigma^2$$

$$F^{-1}(sh_L) = \frac{\ln V_L^\star - \mu}{\sigma}$$

$$F^{-1}(1 - sh_H) = \frac{\ln V_H^\star - \mu}{\sigma}$$

$$\ln V_L^\star = -\ln V_H^\star$$

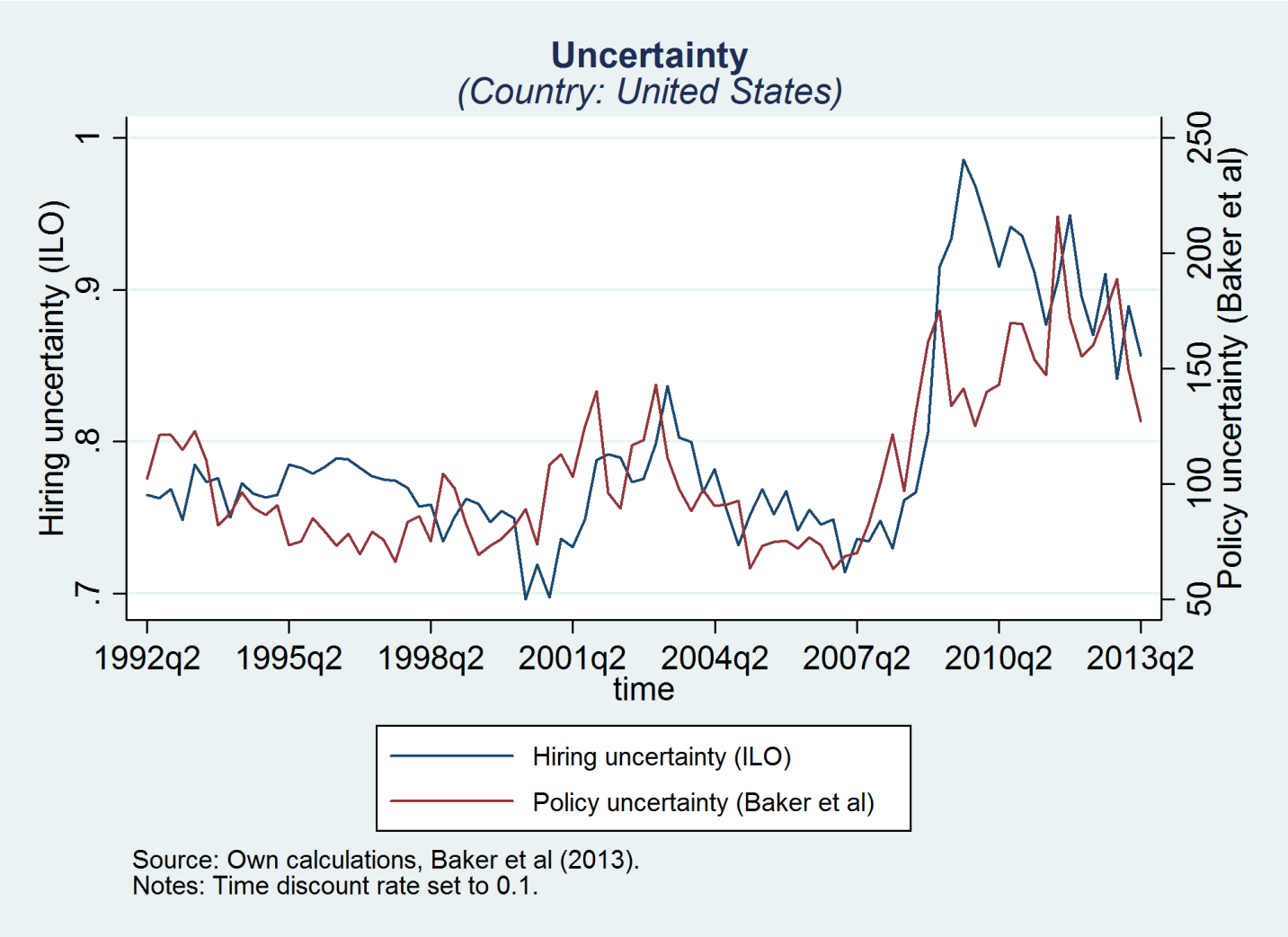
Solve for μ, σ, $V_L^\star$ and $V_H^\star$

Solution for productivity thresholds (to be plugged into equation for uncertainty):

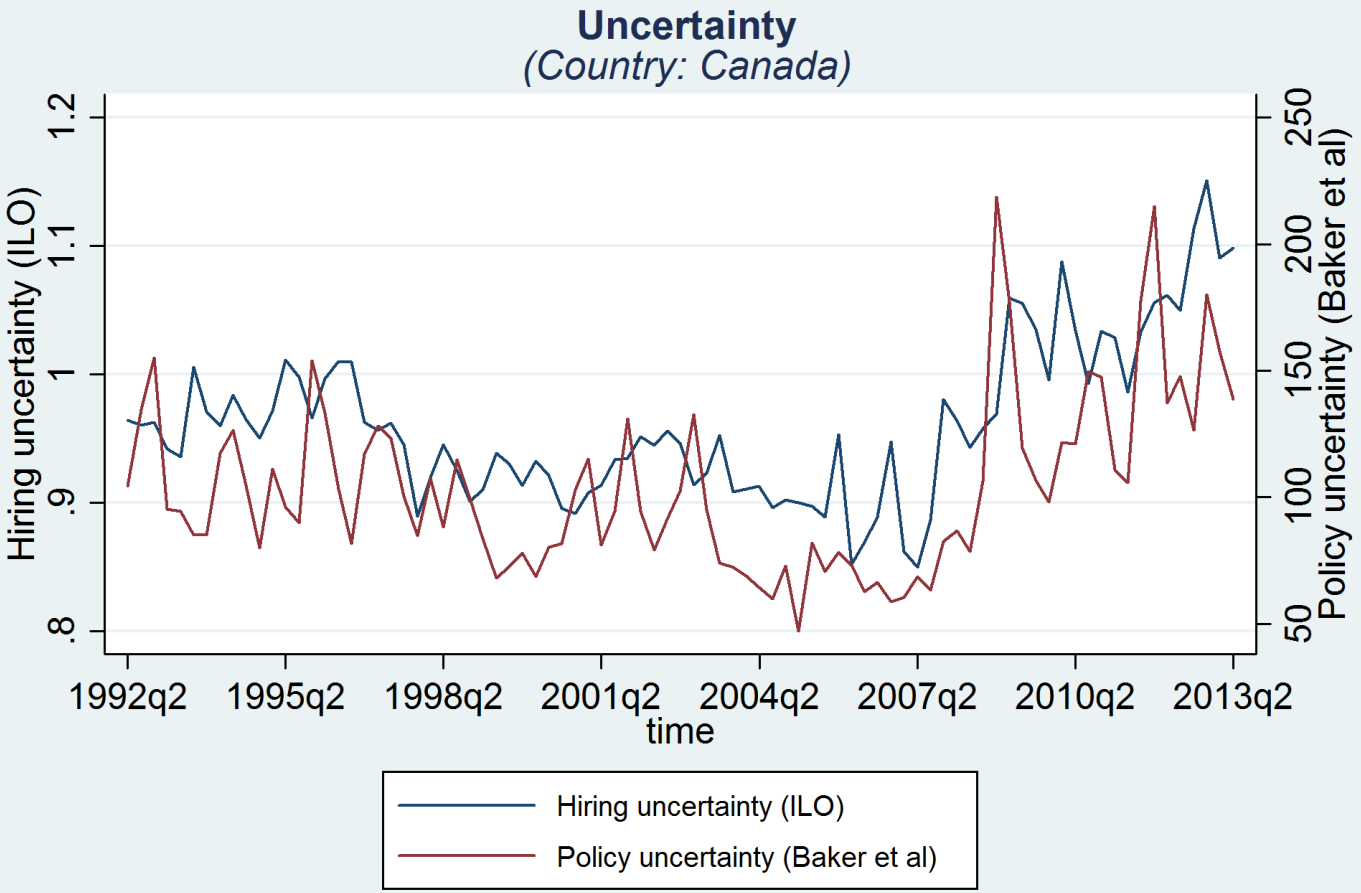
$$V_L^\star = e^{\ln \bar{V} + \left(F^{-1}(sh_L) - \frac{1}{2}\right)\left(\left(\frac{F^{-1}(sh_L) + F^{-1}(1-sh_H)}{2}\right) + \sqrt{\left(\frac{F^{-1}(sh_L) + F^{-1}(1-sh_H)}{2}\right)^2 + 2\ln \bar{V}}\right)}$$

$$V_H^\star = e^{-\ln \bar{V} - \left(F^{-1}(sh_L) - \frac{1}{2}\right)\left(\left(\frac{F^{-1}(sh_L) + F^{-1}(1-sh_H)}{2}\right) + \sqrt{\left(\frac{F^{-1}(sh_L) + F^{-1}(1-sh_H)}{2}\right)^2 + 2\ln \bar{V}}\right)}$$

USA


Uncertainty
(Country: United States)
Hiring uncertainty (ILO)
.7
.8
.9
1
Policy uncertainty (Baker et al)
50
100
150
200
250
1992q2
1995q2
1998q2
2001q2
2004q2
2007q2
2010q2
2013q2
time
Hiring uncertainty (ILO)
Policy uncertainty (Baker et al)
Source: Own calculations, Baker et al (2013).
Notes: Time discount rate set to 0.1.

Canada



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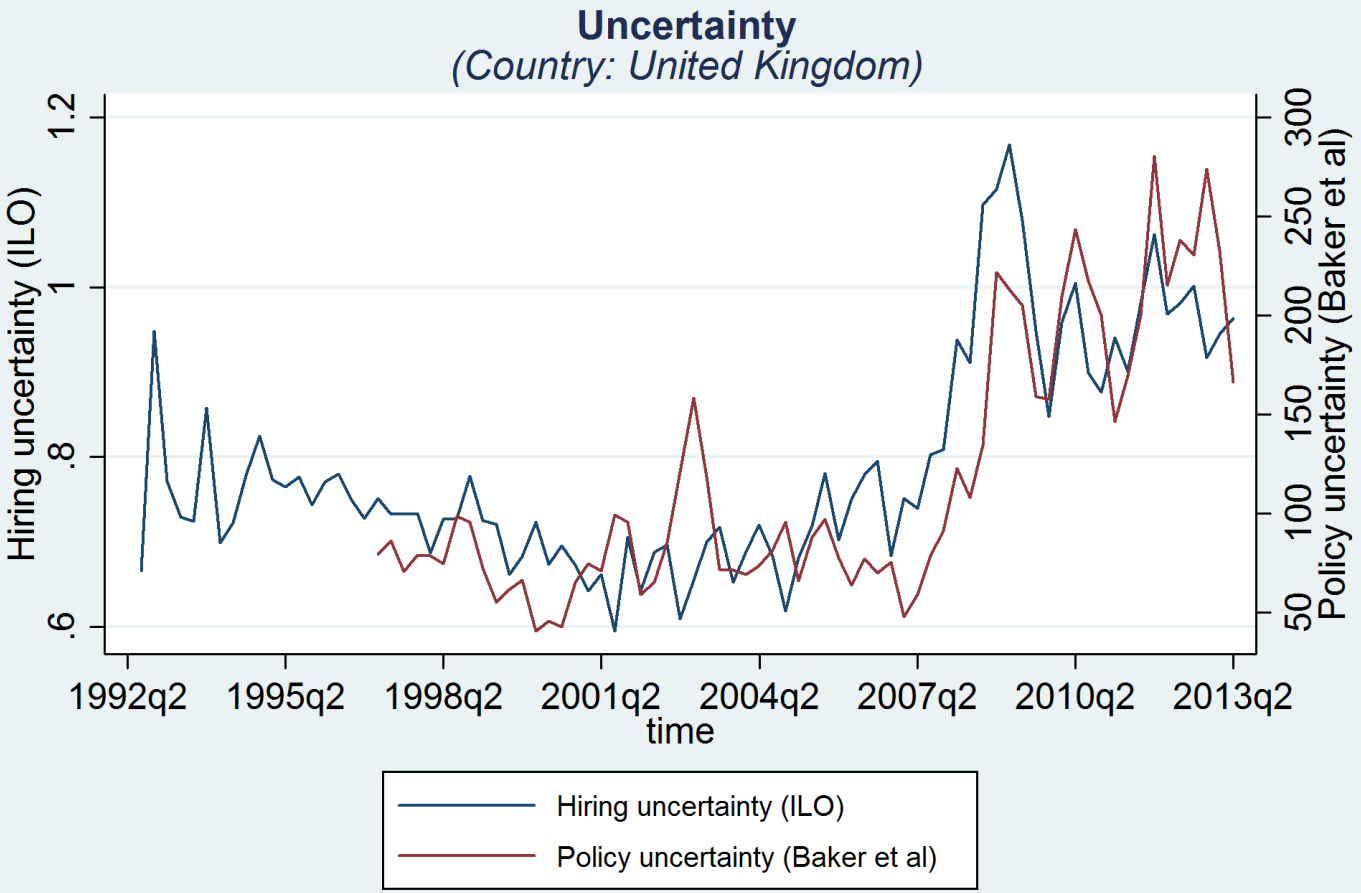
Notes: Time discount rate set to 0.1.

United Kingdom



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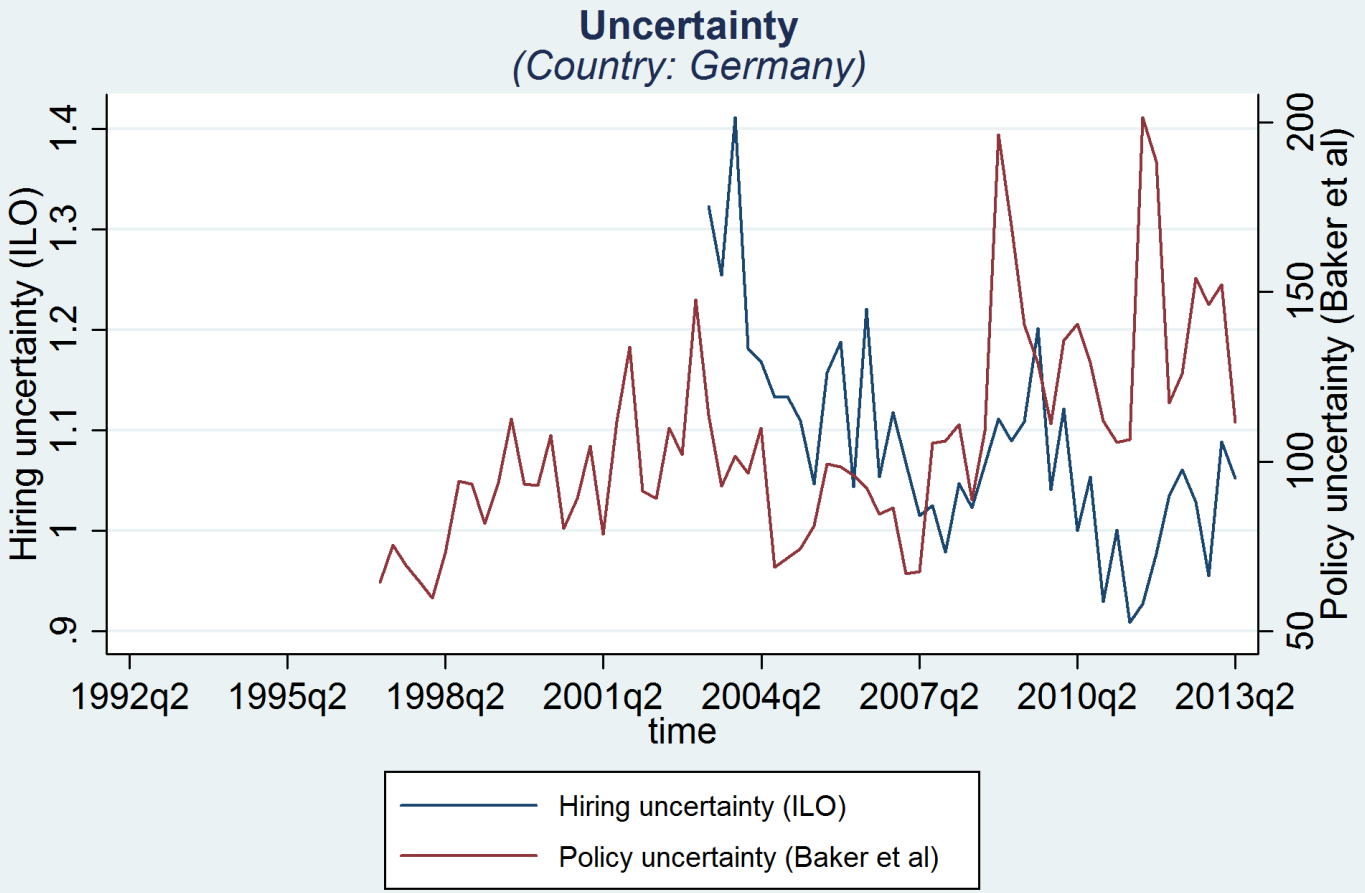
Germany



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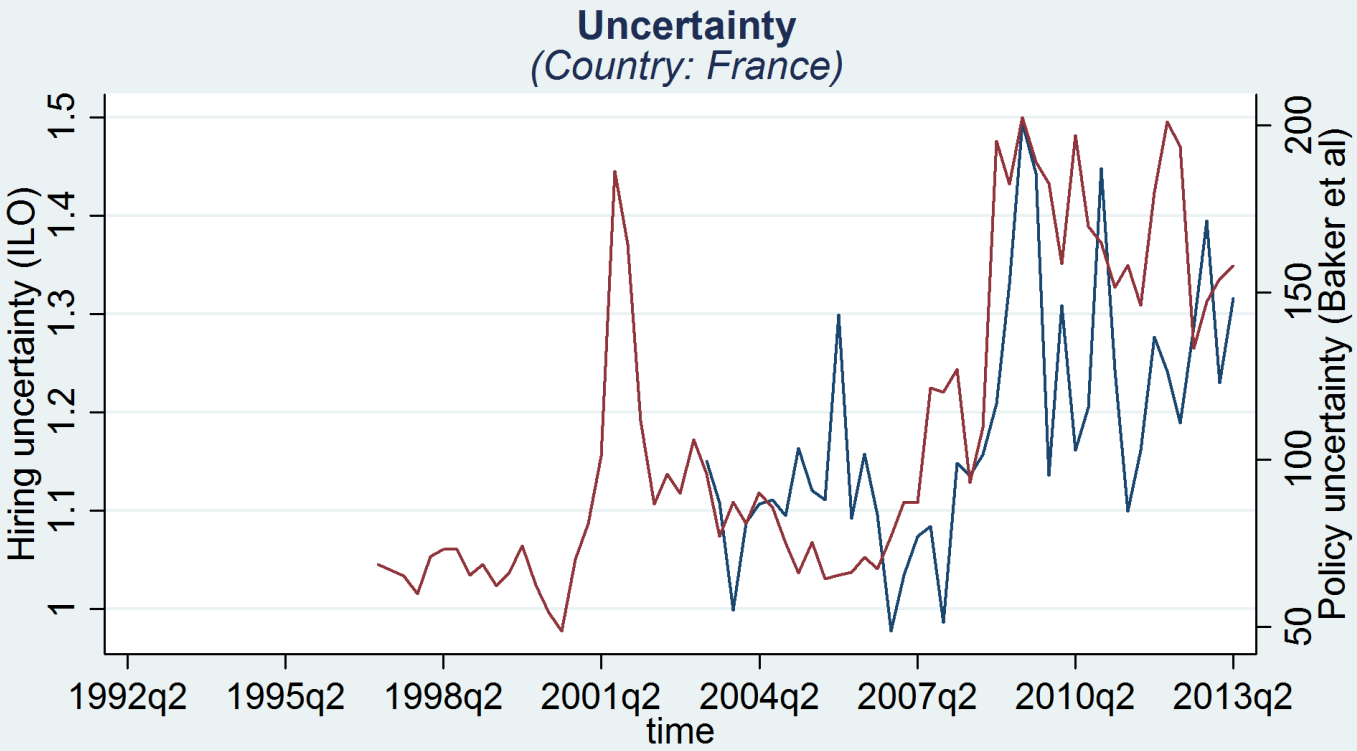
Notes: Time discount rate set to 0.1.

France



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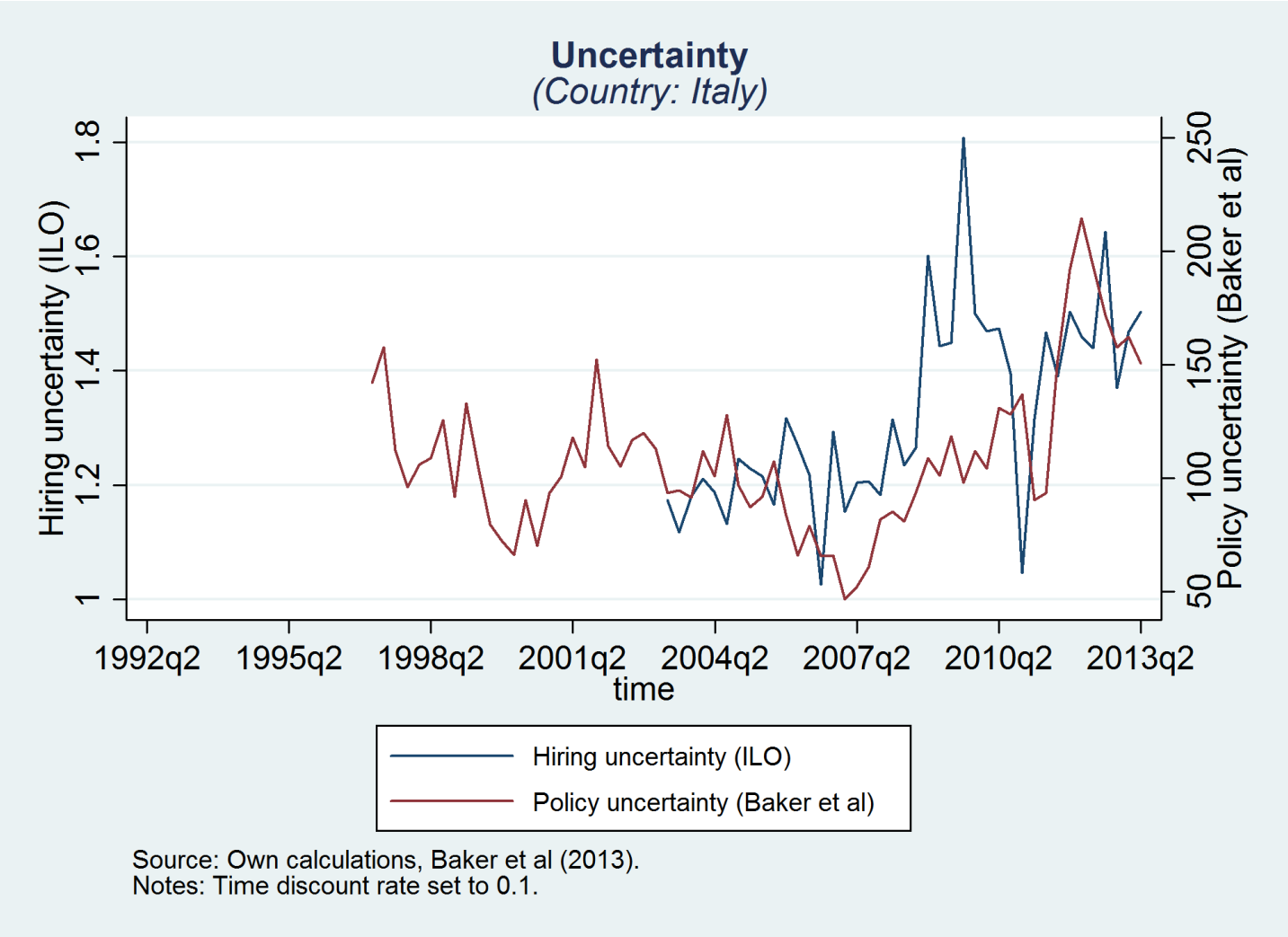
Notes: Time discount rate set to 0.1.

Italy



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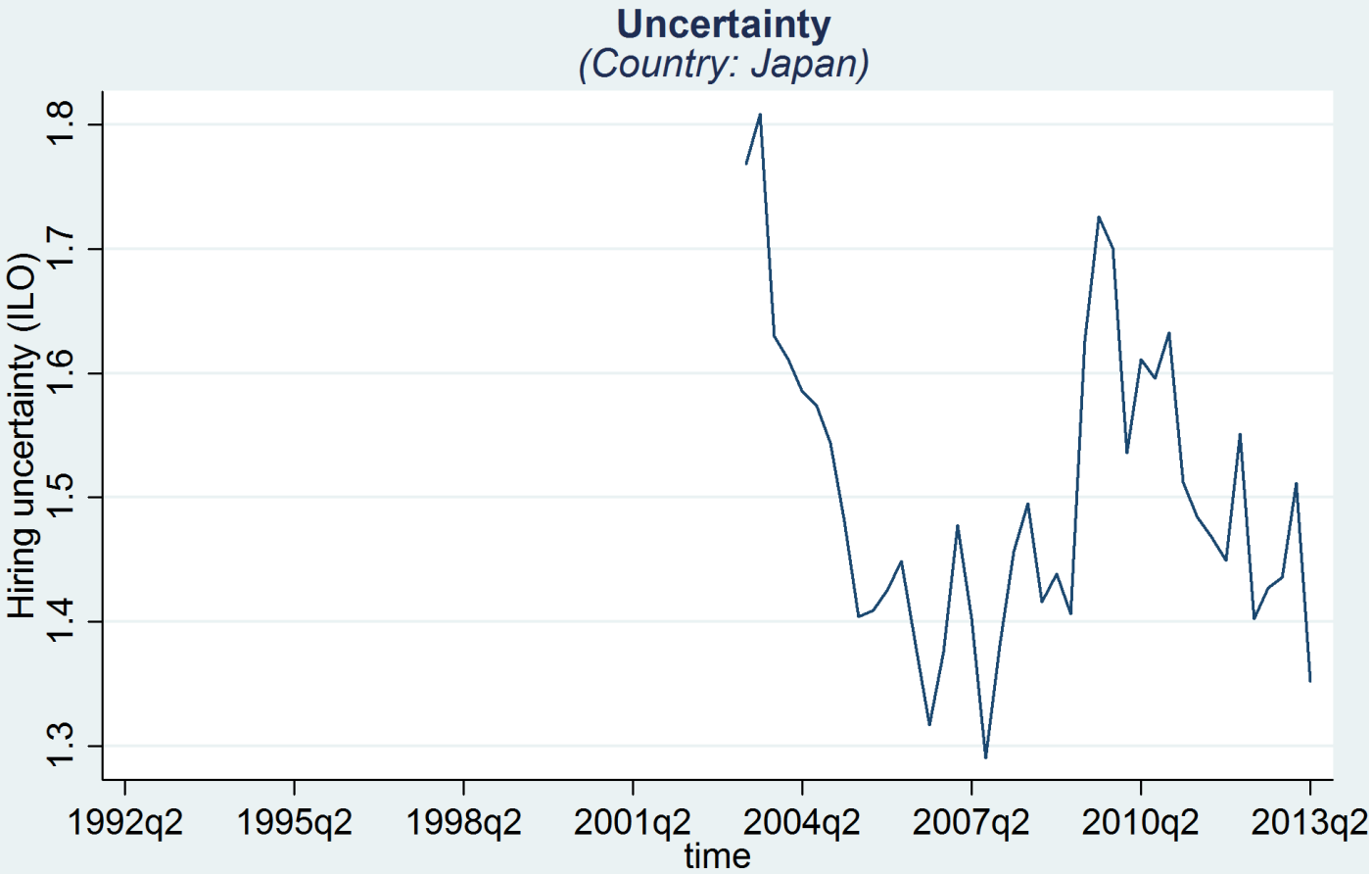
Notes: Time discount rate set to 0.1.

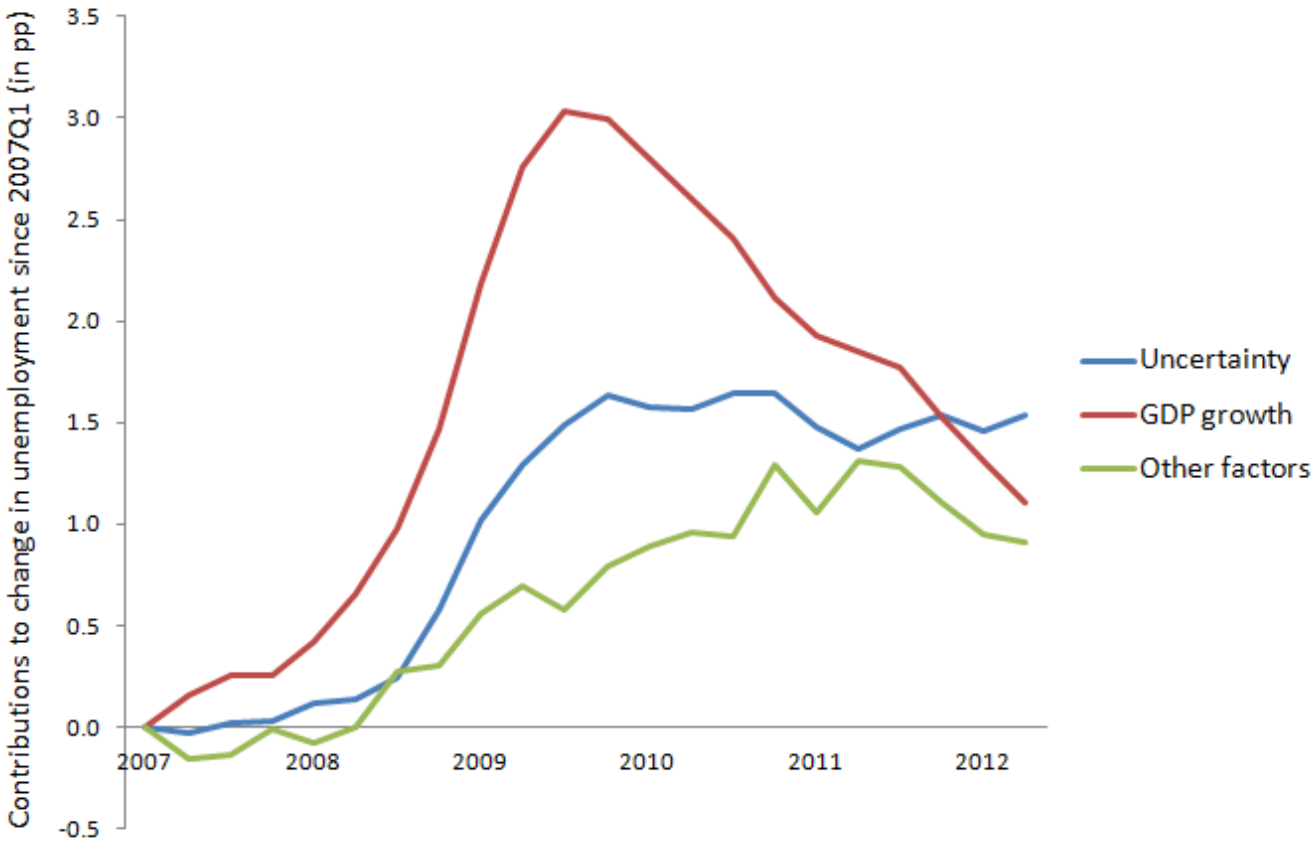
Japan



Source: Own calculations.
Notes: Time discount rate set to 0.1.

Contributing factors to the increase in the US unemployment rate since 2007

Historical decomposition from S-VAR model



Current work

Compute indicator for a larger number of countries and by sector

Compare with other uncertainty indicators

Add new features to the uncertainty indicator

Investigate determinants of hiring uncertainty