INSTITUTE FOR EMPLOYMENT RESEARCH
The Research Institute of the Federal Employment Agency

Structural Change and Hysteresis Effects on the Labour Market

Euroframe conference

The Hague, 12.06.2026

Christian Hutter
joint work with Michael Göschl and Enzo Weber

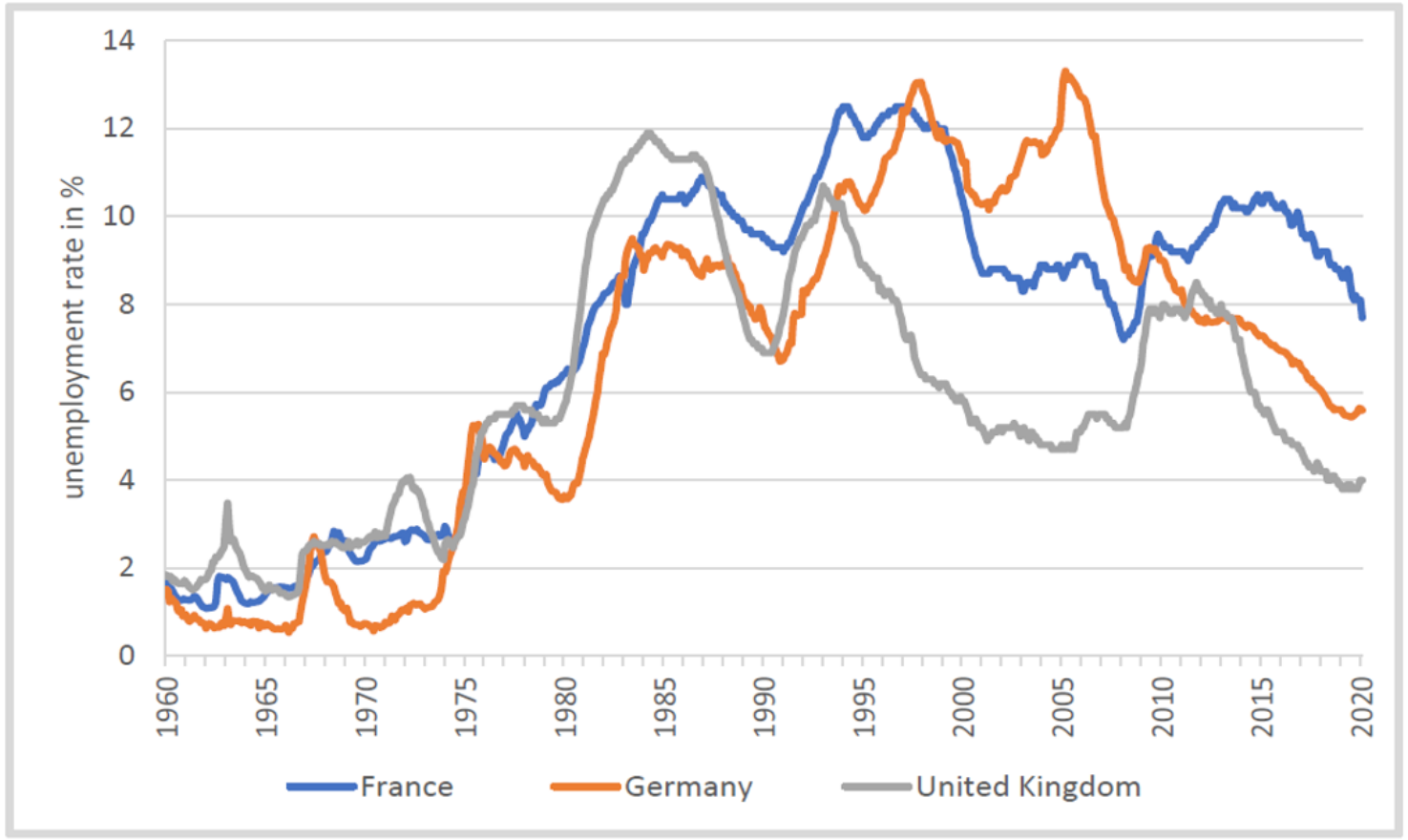
MOTIVATION AND RESEARCH QUESTION

- The economy and labour market are preoccupied with managing the consequences of various crises (COVID-19, energy crises).
- In addition, other fundamental developments are underway: climate transformation, digitalisation, AI, etc. ➔ profound transformation
- In the labour market: the risk of hysteresis: cyclical unemployment becomes permanent because
    - work experience is devalued
    - job search intent decreases
    - increased negotiated wages can act as a barrier to entry

MOTIVATION AND RESEARCH QUESTION

- Literature on the significance of hysteresis effects is inconsistent:
  - Subordinate role? Institutional frameworks and productivity shocks are more decisive (Blanchard and Wolfers 2000, Marjanović and Mihajlović 2014)
  - Significant influence on structural unemployment? (Chang and Lee 2011, Klinger and Weber 2015, Ball and Onken 2022)
- Our contribution to the literature: Investigation of the relationship between hysteresis and the intensity of structural change
- Hypothetical mechanism: more severe structural change devalues work experience and human capital more quickly ➔ hysteresis is more prevalent in times of stronger structural change.

DEVELOPMENT OF UNEMPLOYMENT RATES



Sources:

- Germany: Statistics of the Federal Employment Agency
- United Kingdom: Bank of England, from February 2017 Office for National Statistics
- France: Centre for Prospective Studies and International Information, from January 1983 OECD

MODEL

- Unobserved components (UC) model: unemployment broken down into trend τ_t and cyclical component c_t.

$$u_t = \tau_t + c_t$$

$$\tau_t = \tau_{t-1} + \mu + \Delta k S_{t-1} c_{t-1} + \gamma S_{t-1} c_{t-1} x_{t-1} + \eta_t$$

$$c_t = \sum_{i=1}^{p} \phi_i c_{t-i} + \alpha S_t - \alpha(1 - S_t) r + \varepsilon_t$$

- Cyclical unemployment c_t is a stationary process of order p and also influenced by recession indicator S_t.
- Trend component τ_t is a random walk with drift μ; hysteresis effects are incorporated into the trend equation through the interaction of delayed cyclical unemployment with the delayed recession indicator.
- The relationship between structural change and the entrenchment of cyclical unemployment is represented by an interaction between hysteresis and the structural change measure x_{t-1}.

ESTIMATION METHOD & DATA

- Estimation carried out using Bayesian approach
- Samples of the a posteriori distribution of the model parameters are generated using Gibbs sampling
- Estimation method is based on Kim and Nelson (1999) and the code by Gehrke and Weber (2018).

- Monthly observations for unemployment rates, yearly observations for structural change measures; we try to get data since 1950s, we try Germany, UK, France, USA, ...

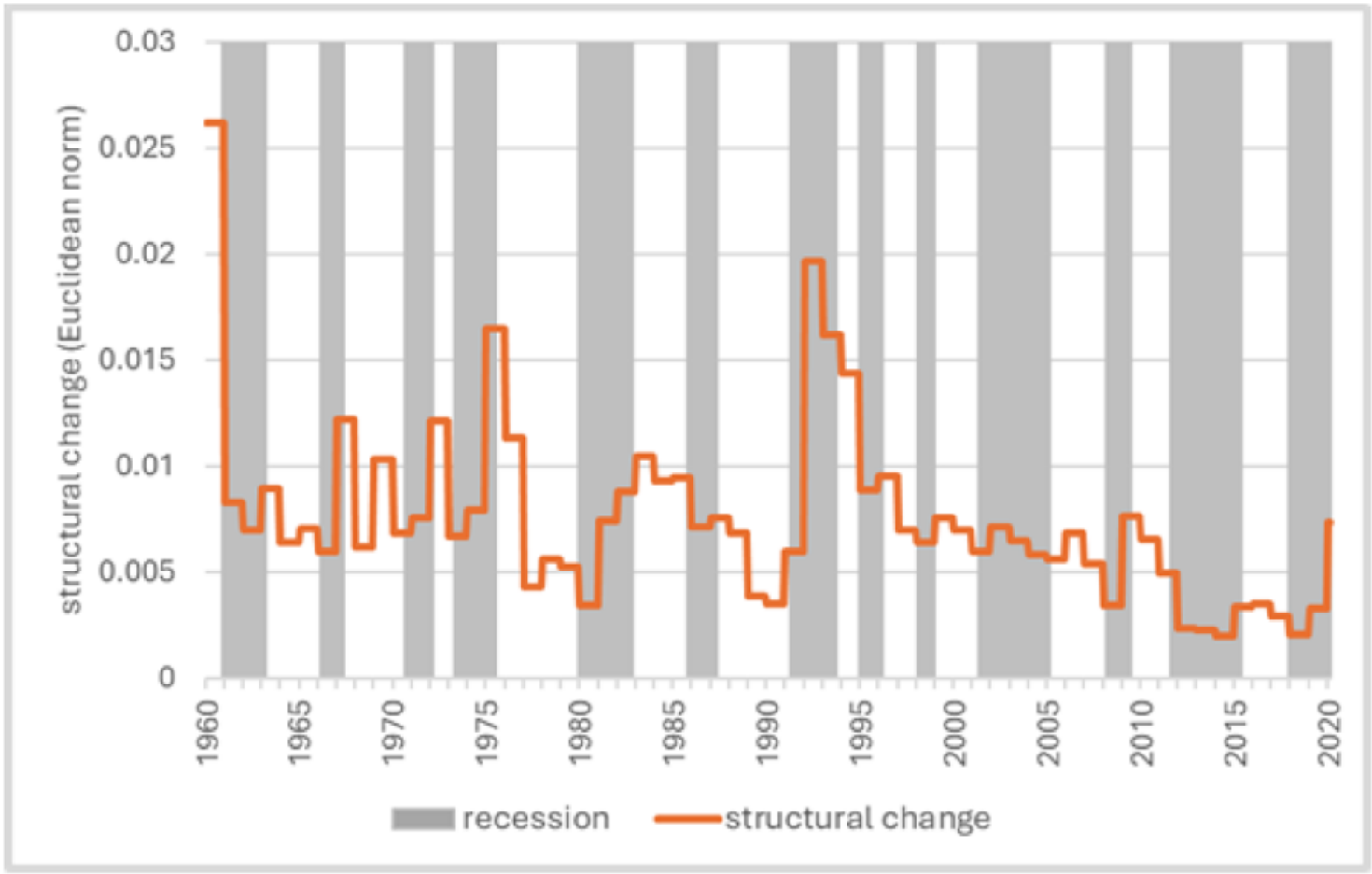
MEASURING THE SPEED OF STRUCTURAL CHANGE

- Determined based on sectoral change (employment shares in 10 economic sectors)
- Specifically, we use the Euclidean Norm:

$$x_t = \sqrt{(\Delta shemp_{1,t})^2 + \ldots + (\Delta shemp_{10,t})^2}$$

- Δ*shemp*: annual change of employment share in sector i; i = 1, 2, ... , 10

MEASURING THE SPEED OF STRUCTURAL CHANGE



Exemplary data for Germany; sources: structural change indicator: own calculations based on sectoral employment data taken from the Groningen Growth and Development Centre (GGDC), from 1991 from the Federal Statistical Office; recession indicator taken from Federal Reserve Bank of St. Louis

PRELIMINARY RESULTS

- Germany:

Parameter	**Mean**	**Median**	**90% HPD**	**Likelihood (x<0)**
AR(1) coefficient (ϕ_1)	1.1328	1.1368	[0.975; 1.277]	0.000
AR(2) coefficient (ϕ_2)	-0.1452	-0.1472	[-0.284; 0.003]	0.946
Recession (α)	0.0252	0.0256	[0.010; 0.040]	0.002
Drift (μ)	0.0016	0.0019	[-0.015; 0.018]	0.430
Drift (μ) after reforms	-0.0469	-0.0460	[-0.071; -0.026]	1.000
Hysteresis (Δk)	0.0205	0.0037	[-0.065; 0.161]	0.476
Hysteresis & structural change (γ)	11.4944	11.1186	[3.068; 21.479]	0.015

PRELIMINARY RESULTS

- United Kingdom:

Parameter	Mean	Median	90% HPD	Likelihood (x<0)
AR(1) coefficient (ϕ_1)	1.2463	1.2439	[1.125; 1.375]	0.000
AR(2) coefficient (ϕ_2)	-0.2502	-0.2479	[-0.378; -0.130]	0.999
Recession (α)	0.0227	0.0222	[0.007; 0.039]	0.005
Drift (μ)	-0.0008	-0.0008	[-0.013; 0.012]	0.548
Hysteresis (Δk)	0.0114	0.0093	[-0.040; 0.069]	0.382
Hysteresis & structural change (γ)	8.7460	8.2991	[2.260; 16.536]	0.012

SUMMARY

- Plain hysteresis effects are small and insignificant.
- However, in combination with structural change, significant hysteresis effects were found for Germany and the United Kingdom
- After a period of recession, around 11% of the cyclical unemployment of the previous period became entrenched in Germany and around 8% in the United Kingdom.
- In case of Germany, this total hysteresis effect fluctuates between 4% and 32% depending on the intensity of structural change.

IMPLICATIONS

- The current risk of unemployment becoming entrenched must be taken seriously:
    1) Currently significant structural change (climate transformation, digitalisation, AI)
    2) Germany has been experiencing 3 years of recessionary phase
    3) Unemployment has been rising
- The combination of these three factors is perfect starting point for hysteresis effects.
- Preventing unemployment or quickly leaving unemployment should have priority.
- Measures preventing the devaluation of work experience recommended, e.g. expanding support for further training and retraining measures (Weber and Zika 2023).

CONTACT

Christian Hutter
www.iab.de
+49 911 179 3057
christian.hutter@iab.de