The slope of the price Phillips curve in the euro area Evidence from regional data

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Motivation

This paper is the first to estimate the price Phillips curve using **regional data** for the euro area

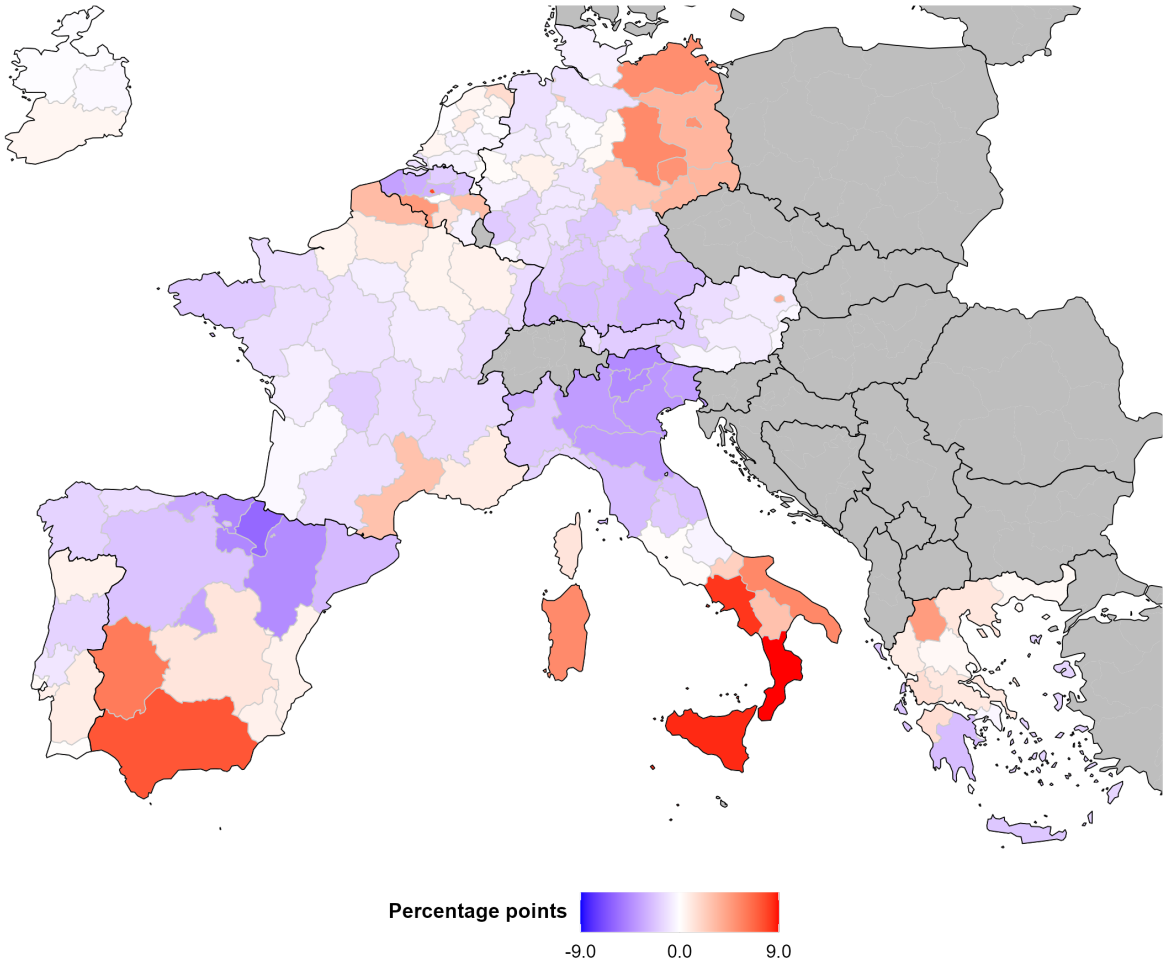
- Why using regional level data to better identify Phillips curves?

1. Greater variability of the data improves inference.
2. By controlling for a rich set of fixed effects, our approach accounts for
   - cost-push shocks
   - national inflation expectations
   - variations in FP at the national level
   - differential effects of MP
3. Allows for the detection of non-linearity

- Our **results** suggest an alive but relatively flat price Phillips curve in the EA.

Regional labor market disparities

- Plot the difference between regional and national unemployment rates.



- Large differences in within-country dispersion of unemployment rates.

Identification strategy

$$\pi_{i,t} = \psi u_{i,t} + \delta \mathbf{X}_{c,i,t} + \varepsilon_{i,t}$$

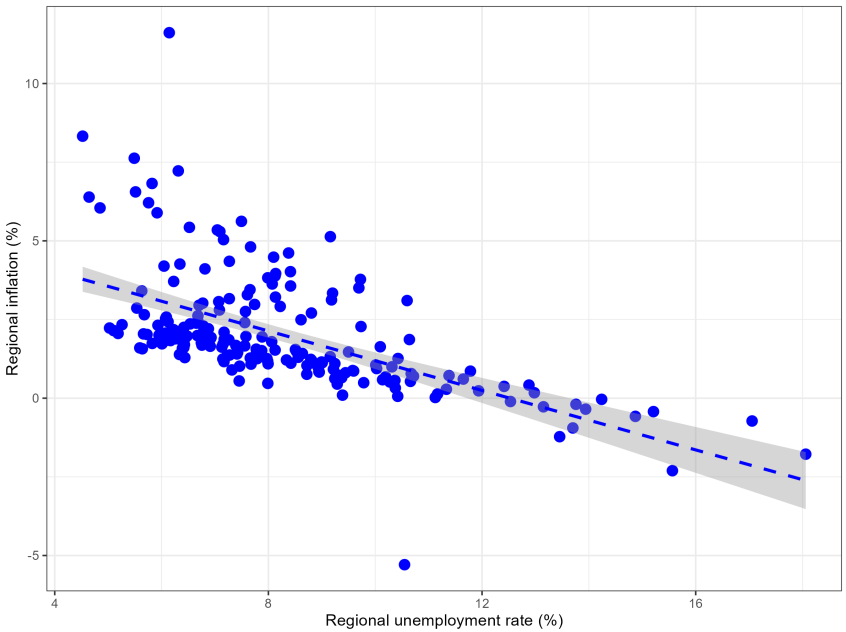
We estimate our baseline equation using different set of fixed effects:

1. **Country fixed effects** control for any time-invariant characteristics common across regions within a country.
   - Captures persistent differences in the national natural rate of unemployment
2. **Region fixed effects** control for any time-invariant regional characteristics.
   - Captures time-invariant differences in regional natural unemployment rate
3. **Time fixed effects** capture any aggregate shocks common to all EA regions.
   - Captures common long-run inflation expectations, aggregate MP effects, oil prices
4. **Country-Time fixed effects** capture any country-specific time-varying fluctuation.
   - Captures the differential effects coming from a MP response to cost-push shocks or changes in national inflation expectations

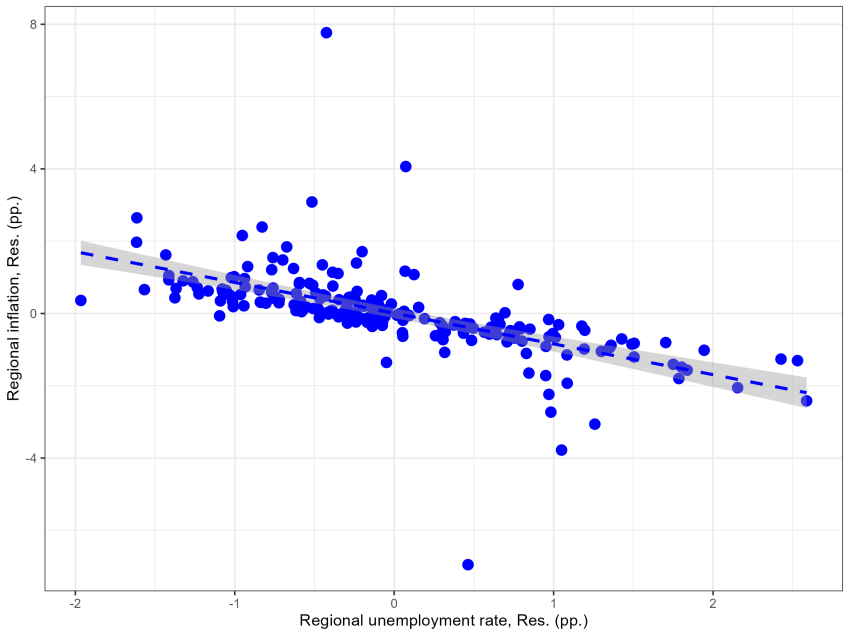
Nonlinearity of the PC

▷ Plot the residualized inflation against residualized unemployment, controlling for fixed effects and national expectations.

Without fixed effects



With region and time fixed effects



Note: The dashed lines represent the best linear fit for both specifications, and the associated confidence intervals are shown by the grey areas.

Conclusion

▷ Using regional-level data and controlling for country-specific time-varying factors, we find an alive, relatively flat price Phillips curve in the euro area, but steeper than estimated before.

▷ Our results suggest weakening evidence of non-linearity once you control for "proper" inflation expectations.

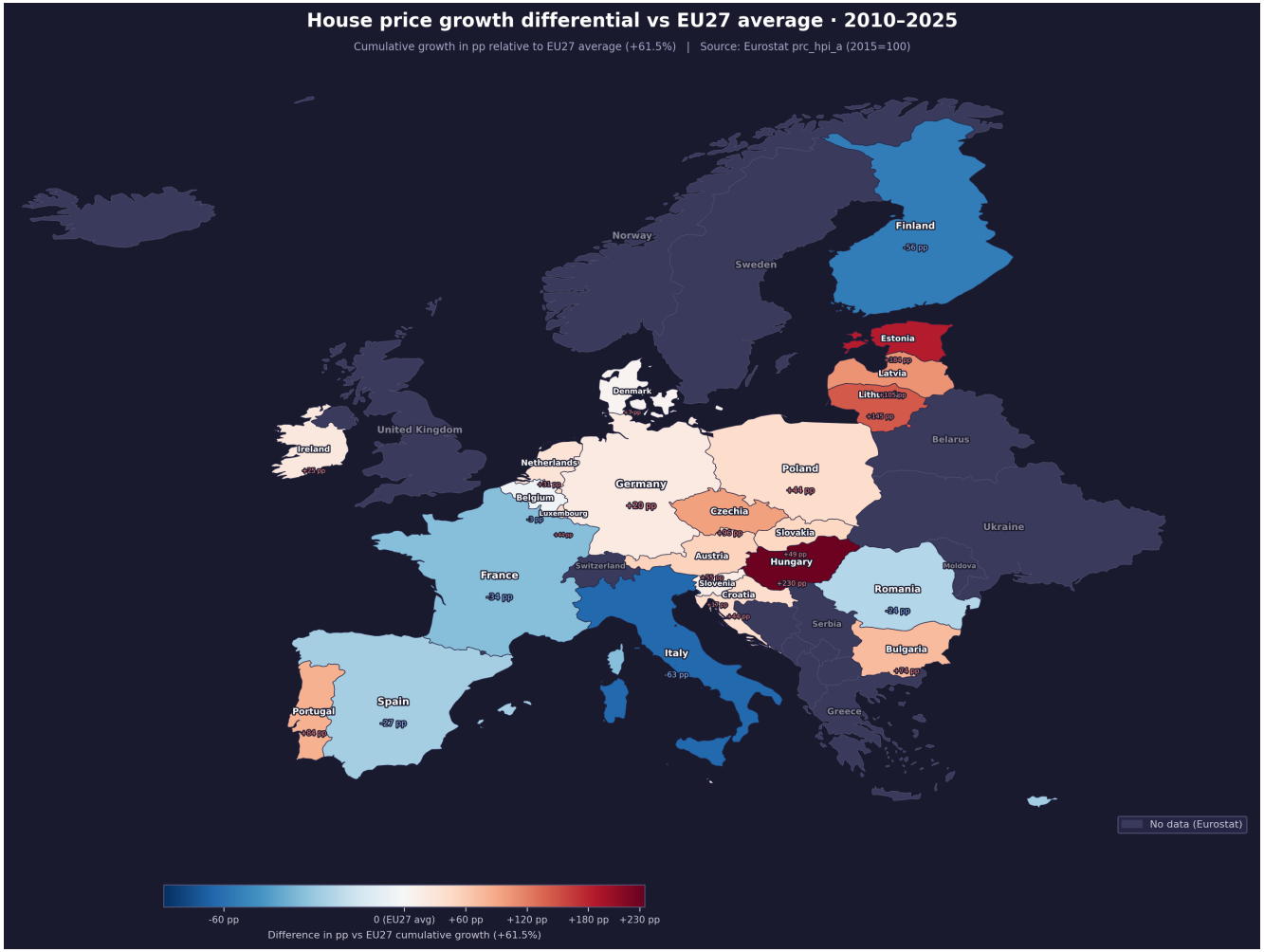
▷ We find little cross-country heterogeneity once we use "proper" fixed effects.

▷ **Policy implications:**

- The central bank faces greater challenges in counteracting inflationary pressures through the demand channel. Increased importance of expectation channel.
- When using regional data, important to control for national factors (inflation expectations) when analyzing the Phillips curve in the context of the euro area.

Implications for our session

- Housing prices disparities: difference between country and EU27 rates.



- The importance of regional data: large differences in country dispersion, but what about within country and across regions comparison?

Fixed Effects in a Regional Housing Price Panel

Fixed Effect	Phillips Curve Analogy	Housing Market Interpretation
Country (λ_c)	National natural unemployment rate	Mortgage structure, tenure culture, planning law, national tax treatment
Region (μ_r)	Regional natural unemployment rate	Amenity endowment, supply constraints, inherited stock, structural migration pull
Time (τ_t)	Common oil shocks, ECB policy, global inflation expectations	ECB rate cycle, QE, global construction costs, common asset repricing
Country $\times$ Time (ψ_{ct})	Differential MP transmission, national cost-push responses	National macroprudential cycles, fiscal housing interventions, differential rate pass-through, national construction cycles

Notes: The dependent variable is the regional house price level (or growth rate) and the key regressor is regional GDP per capita. Each fixed effect layer absorbs a distinct source of confounding variation, with identification in the most demanding specification (all four layers included) coming exclusively from within-country, cross-regional variation in GDP per capita over time.