**Research Design Paper**

## Mapping Intra-Year Real-Wage Erosion in the OECD, 1999-2024

### **Course:** Inequality and Social Conflict: Research Design and Methods

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# Introduction

# Prices move every month; pay cheques usually do not. When consumer prices rise faster than nominal wages, workers’ **real wages**—their purchasing power—shrink in the gap between pay adjustments. I call this predictable slide the **real-wage erosion curve**. Economists often assume that firms and workers foresee the slide and negotiate wages that keep real earnings flat (Taylor, 1980). Yet we lack cross-country evidence that this actually happens on a month-to-month basis.

# This study asks: *How large, how long, and under what conditions does real-wage erosion occur within a year?* Answering matters for two reasons. First, wage erosion can trigger labour turnover, hurting productivity and widening the GDP gap—an issue for economic stability. Second, erosion erodes living standards and may influence social conflict, the core concern of this seminar.

# The paper proceeds as follows. Section 2 defines key terms and reviews what we already know. Section 3 states my research questions and testable hypotheses. Section 4 describes the data and how I will measure erosion. Section 5 outlines a feasible quantitative design. Section 6 discusses weaknesses and how I will mitigate them.

# **Theory & Literature**

# **Key terms**

* **Nominal wage:** Pay expressed in current money terms.
* **Real wage:** Nominal wage divided by the Consumer Price Index (CPI).
* **Real-wage erosion:** The cumulative shortfall of monthly real wages below a perfectly CPI-indexed benchmark during the interval between pay reviews.

# **What theory predicts**

**Staggered-contract models** (Taylor, 1980; Calvo, 1983) assume wages are fixed for predefined periods. If inflation is fully anticipated, workers and firms can set a nominal wage path that keeps real earnings roughly constant. Under this “perfect foresight” view, erosion should be minimal.

**Wage rigidity literature** (Blanchard & Katz, 1999) finds that pay reacts slowly to macro shocks, suggesting larger erosion when inflation accelerates.

**Behavioural and institutional critiques** argue that bounded rationality (Kahneman & Tversky, 1979) and collective bargaining rules (Traxler, Blaschke & Kittel, 2001) prevent perfect foresight. These factors may amplify or damp erosion.

# **Empirical state of the art**

Most evidence is annual or firm-level. Jäger and Wiedemann (2018) show wage indexation lags in OECD data but do not map monthly paths. Studies on inequality and protest (Solt, 2015) highlight welfare loss but measure it yearly. No research, to my knowledge, combines monthly frequency with cross-country breadth.

# **The gap**

Because we lack a high-frequency map, we cannot test whether standard models or behavioural critiques better describe reality. Filling this gap is my first contribution.

# **Research Questions & Hypotheses**

**RQ1. Magnitude** – What is the month-by-month path of real wages relative to a fully indexed benchmark in OECD countries, 1999-2024?

**H1.** Periods of higher inflation volatility produce deeper and longer erosion curves.

**RQ2. Moderators** – How do labour-market institutions influence erosion?

**H2.** Countries with **higher union density** and **coordinated bargaining** experience smaller erosion gaps.

# **Data & Measurement**

**Monthly Panel** (i =1 …. 38; t= Jan 1999…. Dec 2024)

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Variable (plain- English name)** | **Source** | **Construction / notes** |
|  | Average monthly earnings (local currency) | OECD Labour Force Statistics | |  | | --- | | Local currency; linear interpolation for rare gaps |  |  | | --- | |  | |
|  | Consumer Price Index | OECD Prices DB | Seasonally adjusted |
|  | Purchasing-power-adjusted wage | Derived via Eq. 1 below | CPI rebased so |
|  | % shortfall of real wage vs. perfect indexation | Eq. 2 below | 0 ＝ no erosion |
|  | Monthly inflation rate (y-o-y %) | OECD series | Already in percentage terms |
|  | 12-month rolling Standart Deviation of inflation | Derived from π | Captures volatility risk |
|  | Union membership rate (% of employees) | ICTWSS v.7 | Annual → copied into each month |
|  | Wage-bargaining coordination (0–5) | ICTWSS v.7 | Annual → monthly |
|  | |  | | --- | | Controls: unemployment, output gap, manufacturing share |  |  | | --- | |  | | OECD Economic Outlook | All monthly or interpolated |
|  | Global energy-price volatility | World Bank pink-sheet | Monthly |
|  | Energy imports / total imports | OECD Trade Statistics | Time-invariant 1999-2024 average |

**Key Equations:**

Real wage calculation:

**​**

Here T is the month of the last contract renewal (baseline = January; rotated ±3 months in robustness tests).

Eq. 2 – Erosion gap (percentage shortfall):

A value of 0 means no erosion; positive values show the % loss of purchasing power in month *t*.

# **Research Design & Methods**

# **Descriptive stage**

For each country-year, plot against the flat benchmark = 1, visually flagging low (< 2 %), moderate (2–5 %), and high (> 5 %) inflation years.

# **Main regression (Monthly fixed-effects Panel)**

* : country fixed effects remove time-invariant differences (e.g., labour law traditions).
* : month-year dummies absorb global shocks and seasonality.
* : Error term.

# **Instrumental-variable Strategy**

To address potential endogeneity of inflation, instrument (and thus ) with:

This interaction captures exogenous global energy-price volatility weighted by each country’s import exposure—plausibly unrelated to domestic wage-setting decisions. First-stage F! > 10 and Hansen J-tests will assess strength and validity.

# **Robustness & sensitivity**

**Yearly aggregate check (Appendix B):** Average all variables to year level and re-estimate to reassure readers who prefer annual data.

**Contract-month rotation:** Recompute Eqs 1–2 with *T* = April and *T* = July.

**Subsample splits:** High vs. low inflation years; high vs. low bargaining coordination.

**Monte-Carlo uncertainty bands:** Draw replacement parameters to gauge confidence intervals around

# **Power & transparency**

*Sample size:* 38 countries × 312 months ≈ 11 800 observations. Simulations show 90 % power to detect at α = 0.05 with clustered standard errors.

Software*:* R, full code and raw data will be archived on GitHub.

# **Limitations & Feasibility**

**Data gaps:** A few smaller OECD members do not report monthly wages for the full 1999-2024 window. I will (a) interpolate short gaps of ≤ 3 months and (b) run a robustness check that drops countries with > 24 missing months. Results from the balanced and unbalanced samples will be compared side-by-side.

**Benchmark month** *T*  **:** Assuming January as the universal contract-renewal month may misallocate the “zero point” for some countries. To test sensitivity, I will recompute the real-wage series with *T*=April and *T*=July; key coefficients will be reported for all three scenarios.

**Institutional proxies:** Union density and coordination indices are annual averages applied to each month. This may blur within-year shifts (e.g., sudden strikes). Given that institutional change is slow, the bias is likely small, but I will cluster standard errors by country to remain conservative.

**Instrument validity:** The energy-shock instrument must affect wage erosion only through inflation. Over-identification (Hansen J) and first-stage F-statistics will be reported. If the instrument fails these tests, I will fall back on a lagged-inflation IV approach pre-specified in an online appendix.

**Measurement error in** ErosionGap : CPI and wage indices are aggregate averages; heterogeneity across sectors or contract types could attenuate estimated effects. Sector-level exploratory plots will gauge the size of this issue.

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