# Kaldorian Cumulative Causation in the Euro Area

An empirical Assessment of divergent Export competitiveness

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On the relevance of the circular and cumulative causation theory (price-export-productivity feedback mechanism)

- Given the divergence in terms of competitiveness, industrial production, exports, productivity across the members of the Euro area
  - Test empirically the medium-run relevance of the p-e-p nexus (Is it relevant on macroeconomic level?)
  - Quantify the PEP effects in the Euro area on panel & country level

 By-product: Assessing whether export strategies based on wage moderation have beneficial effects on productivity growth

The theory of the price-export-productivity feedback mechanism

- Circular cumulative causation (Myrdal, 1957)
- Export-led growth theory (Kaldor, 1970)
- Export-led growth model (Dixon & Thirlwall, 1975)

...predict macroeconomic divergence across interrelated regions enabled through

increasing returns to scale, price-sensitive exports & exogenous wages





Kaldorian theory of export-led growth predicts (in case of regional different key quantities)

- Stable growth rate differences
- Divergence in levels in terms of
  - exports and output across countries
  - productivity
  - competitiveness (defined as nominal unit labour cost)
    - Central indicator and transmitter of divergence
    - partly exogenous / partly endogenous

 $ULC = \frac{Nominal Wages}{Real Productivity}$ 

### **IDEA**

The theory of the price-export-productivity feedback mechanism

- Idea has been more and more abandoned in further theoretical developments (partic. BOPCG models):
  - Empirical estimates of key parameters were not indicating self-reinforcing divergence: "not too much cumulative causation" (Blecker, 2010)
  - Different reservations against the price export channel:
    - Exports not sensitive to prices/ULC (Paradoxical findings by Kaldor, 1978)
    - Exports not very sensitive to prices/ULC (Elasticity pessimism)
    - Purchasing power parity (Thirlwall & Dixon, 1979)

...blocking effectively the price channel of the P-E-P feedback mechanism

The Euro area and the price-export-productivity feedback mechanism

- Common currency since 1999, almost fixed exchange rates already before
- Price-sensitive exports (Breuer & Klose, 2015; Keil, 2023)
- Divergent competitiveness (ULC) in the period 1997 2009
  - No equilibrating mechanism regarding this divergent export competitiveness
  - No purchasing power parity
  - Nominal wages as central driver of the divergent competitiveness (Tober, 2021)

...currency union may constitute a conducive environment for the P-E-P mechanism being a significant aspect of macroeconomic reality in the medium-run



**Figure 2. Euro area divergence in cost and prices.** Root mean square deviation (Export weighted, four quarters moving average) of 10 Euro area countries (higher values indicate stronger divergence). Source: authors calculation based on EUROSTAT data.



If exports are sensitive to changes in international prices and the latter do diverge in the short and medium run, the feedback mechanism between prices, export and productivity may represent a considerable driving force behind the observed macroeconomic dynamics and shape a "period of cumulative non-equilibrium growth" (Setterfield, 2002, p. 228)



### **MECHANISMS & CHALLENGES**

#### **Genuine Price Elasiticity of Exports**

Biased coefficients likely (endogeneity / simultaneity)

#### Account for the double character of nominal wages

- Competitiveness effect (through price-sensitive exports)
- Domestic demand productivity effect

#### Separate Kaldor-Verdoorn effect

- Demand-led productivity progress
- Seperate (artificially) the effect
  - Verdoorn effect of foreign demand (exports)
  - Verdoorn effect of domestic demand components

### **EMPIRICAL APPROACH**

#### Dataset

- IO Euro area countries (AUT, BEL, ESP, FIN, FRA, GER, GRC, ITA, NDL, PRT)
- Quarterly data from 1995q1 to 2020q4

#### **Econometric technique**

Taking simultaneity and endogeneity in the system seriously

 Estimate 'genuine' I-r price elasticities (allowing for causal interpretations)

 Panel: 2SLS-FE-ARDL / 2SIV-MG-ARDL
 Time Series: 3SLS-ARDL

### **EMPIRICAL APPROACH**

(1.1)  $X = f(FD, ULC^{R}, NPC)$ 

(1.2)  $ULC^{R} = f(NW, PROD, ULC^{f})$ 

(1.3) PROD = f(INV, X, NW)

(2.1)  $\Delta X_t = c + \alpha X_{t-1} + \eta_1 F D_{t-1} + \eta_2 U L C_{t-1} + \beta_1 \Delta X_t + \beta_2 \Delta F D_t + \beta_3 \Delta U L C_t^R + \epsilon_t$ 

(2.2)  $\Delta ULC_t^R = \beta_2 \Delta NW_t + \beta_3 \Delta ULC_t^f + \beta_4 \Delta PROD_t + \epsilon_t$ 

(2.3)  $\triangle PROD_t = c + \beta_7 \triangle INV_t + \beta_8 \triangle X_t + \beta_9 \triangle NW_t + \varepsilon$ 

|             | Export equation (DV: X)     |                            |                          |           |          |           | Productivity equation (DV: PROD)    |                     |                                      |                                       |                                 |
|-------------|-----------------------------|----------------------------|--------------------------|-----------|----------|-----------|-------------------------------------|---------------------|--------------------------------------|---------------------------------------|---------------------------------|
| MODEL       | $IE\left(\gamma_{1}\right)$ | $PE\left(\gamma_{2} ight)$ | NPC<br>(γ <sub>3</sub> ) | ALPHA     | F TEST   | ARDL      | $\mathbb{INV}\left(\beta_{8} ight)$ | X (β <sub>9</sub> ) | $\mathrm{NW}\left(\beta_{10}\right)$ | $\mathrm{GOV}\left(\beta_{11}\right)$ | $\mathbb{RW}$<br>$(\beta_{12})$ |
| 2SLS-<br>FE | 1.697***                    | -1.029***                  | -                        | -0.24***  | 24.79*** | (2 2 2)   | 0.001                               | 0.501***            | 0.163***                             | -                                     | -                               |
|             | (0.124)                     | (0.263)                    | -                        | (0.68)    |          |           | (0.008)                             | (0.067)             | (0.034)                              | -                                     | -                               |
|             | 1.698***                    | -1.047***                  | -                        | -0.24***  | 25.03*** | (2 2 2)   | 0.001                               | 0.438***            | -                                    | -                                     | 0.331***                        |
|             | (0.133)                     | (0.259)                    | -                        | (0.068)   |          |           | (0.006)                             | (0.066)             | -                                    | -                                     | (0.083)                         |
|             | 1.581***                    | -0.942***                  | -                        | -0.229**  | 32.16*** | (2 2 2)   | 0.083**                             | 0.411***            | -                                    | 0.325                                 | -                               |
|             | (0.106)                     | (0.361)                    | -                        | (0.101)   |          |           | (0.042)                             | (0.051)             | -                                    | (0.219)                               | -                               |
|             | 1.766***                    | -1.148***                  | 0.299*                   | -0.264*** | 15.11*** | (2 2 2 2) | 0.001                               | 0.525***            | 0.168***                             | -                                     | -                               |
|             | (0.079)                     | (0.208)                    | (0.178)                  | (0.078)   |          |           | (0.006)                             | (0.064)             | (0.036)                              | -                                     | -                               |
| MG-IV       | 2.026***                    | -0.873***                  | -                        | -0.206*** | 8.94***  | (2 2 2)   | 0.177***                            | 0.186*              | 0.199**                              | -                                     | -                               |
|             | (0.676)                     | (0.213)                    | -                        | (0.031)   |          |           | (0.066)                             | (0.112)             | (0.081)                              | -                                     | -                               |
|             | 1.974***                    | -0.907***                  | -                        | -0.23***  | 9.42***  | (2 2 2)   | 0.154**                             | 0.185*              | -                                    | -                                     | 0.443***                        |
|             | (0.649)                     | (0.223)                    | -                        | (0.035)   |          |           | (0.069)                             | (0.103)             | -                                    | -                                     | (0.069)                         |
|             | 0.68                        | -0.792***                  | -                        | -0.255*** | 8.71***  | (2 2 2)   | 0.227**                             | 0.192*              | -                                    | 0.377***                              | -                               |
|             | (0.514)                     | (0.148)                    | -                        | (0.032)   |          |           | (0.103)                             | (0.102)             | -                                    | (0.101)                               | -                               |
|             | 1.912                       | -0.551***                  | 0.248                    | 0.296***  | 3.17*    | (2 2 2 2) | 0.173***                            | 0.192*              | 0.198**                              | -                                     | -                               |
|             | (1.408)                     | (0.118)                    | (0.186)                  | (0.044)   |          |           | (0.064)                             | (0.1)               | (0.084)                              | -                                     | -                               |

**Table 6.** Panel coefficients. Entire timespan (1995q1-2020q4), different specifications. \*, \*\*, and \*\*\* indicate significance at the 90%, 95%, and 99% level respectively.

**Roughly Averaged Effects:** 

- Price elasticity of exports:
- Export-Verdoorn effect:
- Verdoorn effect of wage-induced domestic demand: +0.2
- Alternative: Verdoorn effect of governm. spending:
- 1% gain in ULC through lower growing nominal wages gives an additional 1% rise in Exports and subsequently a 0.2% gain in productivity

-1.0

+0.2

+0.3

 For example, P-E-P mechanism can explain ~1/2 of the accumulated productivity difference between Germany and Italy

## **RESULTS (TIME SERIES)**

|         | 1              | 995q1-2008   | q4                  | 2              | 2009q1-2020  | q4                  | 1995q1-2020q4  |              |                     |
|---------|----------------|--------------|---------------------|----------------|--------------|---------------------|----------------|--------------|---------------------|
| COUNTRY | $PE(\gamma_2)$ | $X(\beta_9)$ | NW ( $\beta_{10}$ ) | $PE(\gamma_2)$ | $X(\beta_9)$ | NW ( $\beta_{10}$ ) | $PE(\gamma_2)$ | $X(\beta_9)$ | NW ( $\beta_{10}$ ) |
| AUT     | -1.06          | 0.10         | 0.15                | -0.71          | 0.44         | 0.09                | -1.13          | 0.44         | 0.01                |
| BEL     | -0.27          | 0.19         | 0.39                | -0.05          | 0.39         | 0.44                | -0.22          | 0.39         | 0.40                |
| FIN     | -1.21          | -0.24        | 0.19                | -1.53          | -0.25        | 0.38                | -7.19          | -0.32        | 0.18                |
| FRA     | -1.14          | -0.03        | 0.60                | 0.06           | 0.06         | 0.66                | -1.35          | 0.02         | 0.62                |
| GER     | -0.40          | 0.19         | 0.16                | -0.92          | 0.40         | 0.07                | -1.13          | 0.33         | 0.13                |
| GRC     | -0.38          | 0.11         | 0.26                | 0.03           | 0.15         | 0.25                | -0.20          | 0.39         | 0.25                |
| ITA     | -1.43          | 0.13         | 0.14                | -0.66          | 0.24         | 0.12                | -0.20          | 0.25         | 0.15                |
| NDL     | -1.42          | -0.33        | 0.14                | -0.96          | -0.48        | 0.09                | -1.09          | -0.58        | 0.13                |
| SPA     | -1.12          | -0.09        | 0.84                | -0.89          | 0.34         | 0.56                | -0.01          | 0.22         | 0.60                |
| PRT     | 0.06           | 0.04         | 0.07                | -0.58          | 0.36         | 0.08                | 0.01           | 0.31         | 0.07                |

**Table 3.** 3SLS coefficients of central variables for different periods. Coefficients that are significant at the 90% level are reported in bold. Detailed estimation results reported in Table 2 as well as in Tables C1 and C2 (in Appendix C).

#### **Country level evidence:**

- PEP effects detected in the cases of Austria, Belgium, Germany, Spain and Portugal
- PEP coefficients showing correct sign: France and Italy
- No PEP effects: Finland, Greece, Netherlands

... in countries heavily dependent on exports, the PEP mechanism can become the primary driver of productivity growth!

#### Wage moderation effect on productivity:

- Positive net effect of low wage growth on productivity: Austria and Germany (strong PEP effects, weak domestic demand effects)
- Contrary effect: France and Spain (stronger domestic demand effects)

### **General evidence**

- Estimates indicate the presence of the P-E-P feedback mechanism
- EZ: Divergence triggered by differences in wage growth has been reinforced by the P-E-P nexus
  - particularly in the pre-crisis period 1995-2009, in which persistent wage growth differences fueled the ULC divergence
  - Productivity differences have been amplified by the PEP nexus

#### **THANK YOU VERY MUCH!**

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