Labor share

Gilbert Cette
Lorraine Koehl
Thomas Philippon

Outline

1. **Introduction**
2. A theoretical model
3. Empirical results
4. Conclusion
5. Annexe

1. Introduction

- Accepted wisdom among economists: there has been a global and quasi general gradual **decline in the labor share** over the last decades in developed countries. *"The shift in aggregate factor shares has been seen in the data for many countries, especially among the advanced countries."* Grossman *et al.* (2017).
  IMF (2017) and OECD (2018): **downward trend in a large majority of developed countries** since the early 1990s.

- This general decline is **independent of the post adjustment to the "*wage push*" phenomenon** described by Blanchard (1998).
  During the 1970s, in Europe mainly, wages failed to adjust to:
  - the decline of the terms of trade from the petrol/gas price shocks;
  - the decline of underlying factor productivity growth.

  From that, **labor share increase, followed by a decrease.**

1. Introduction

- **Numerous explanations**. Among others:
  - **Technological factors**, driven by a **decline in the relative price of investment goods**. Karabarbounis and Neiman (2014), …
  - **Expansion of global value chains** and of **offshoring of the most labor intensive tasks**. Elsby *et al.* (2013), Acemoglu and Autor (2010), …
  - **Emergence of large superstar firms** (such as the GAFA) in specific activities. "*winner takes most*" mechanism => average labor share decline. Autor *et al.* (2017), …
  - Impact of **information and communication technologies** (ICT) => growth of large firms with high productivity and low labor share. Aghion *et al.* (2019),….
  - **Decrease of the wage bargaining power** from the decline of unionisation, lower labor market regulation, threat of offshoring ... IMF (2017), Kramarz (2016).
  - The **imputation of labor income for the self-employed** could partly explain the measured decline in the labor share. Elsby *et al.* (2013), …

Outline

1. Introduction
2. **A theoretical model**
3. Empirical results
4. Conclusion
5. Annexe

2. A theoretical model

- **Production function:** $Y = [(1-\alpha)^{\frac{1}{\eta}} N^{\frac{\eta-1}{\eta}} + \alpha^{\frac{1}{\eta}} K^{\frac{\eta-1}{\eta}}]^{\frac{\eta}{\eta-1}}$

  Where *Y, N, K*: volume of output, labor and capital
- Substitution elasticity: $\sigma = \eta$
- **Marginal production cost:** $\chi = [\,(1-\alpha)W^{1-\eta} + \alpha R^{1-\eta}]^{\frac{1}{1-\eta}}$

  Where *W, R*: wage and rental rate, exogenous
- **Price:** $P = \mu\chi$

  Where μ: mark up rate
- **Labor share:** $\Lambda = \frac{WN}{PY} = \frac{(1-\alpha)^{\frac{1}{\eta}}}{\mu}\left(\frac{Y}{N}\right)^{\frac{1-\eta}{\eta}}$
- **At the productor optimum:** $\Lambda = \frac{1}{\mu}\frac{1}{1+\frac{\alpha}{1-\alpha}\left(\frac{W}{R}\right)^{\eta-1}}$

  In case of a Cobb-Douglas, $\eta = 1$ and then $\Lambda = \frac{1-\alpha}{\mu}$

2. A theoretical model

- **Labor share:** $\Lambda = \frac{1}{\mu}\frac{1}{1+\frac{\alpha}{1-\alpha}(\frac{W}{R})^{\eta-1}}$

- **Higher markups** ($\mu \nearrow$) => labor share decline

- **Offshoring labor intensive tasks** ($\alpha \nearrow$) => labor share decline

- **Capital bias technology from decline in investment price** (R ↘)
  - If $\eta > 1$ => labor share decline
  - If $\eta = 1$ => no change in the labor share
  - If $\eta < 1$ => labor share increase

  Empirical estimates of the substitution elasticity: η in the range of 0.4-0.8 (Oberfield and Raval (2014); Raval (2019); …)

2. A theoretical model

In the following part, **three methodologic choices** discussed in the measure of labor share:

- biases from improper **choice of starting periods**;
  - "Wage push" phenomenon
- accounting for **self-employment**;
  - Variation in the number of self-employed
  - Method of imputation
- accounting for **residential real estate income**.
  - Imputed rentals

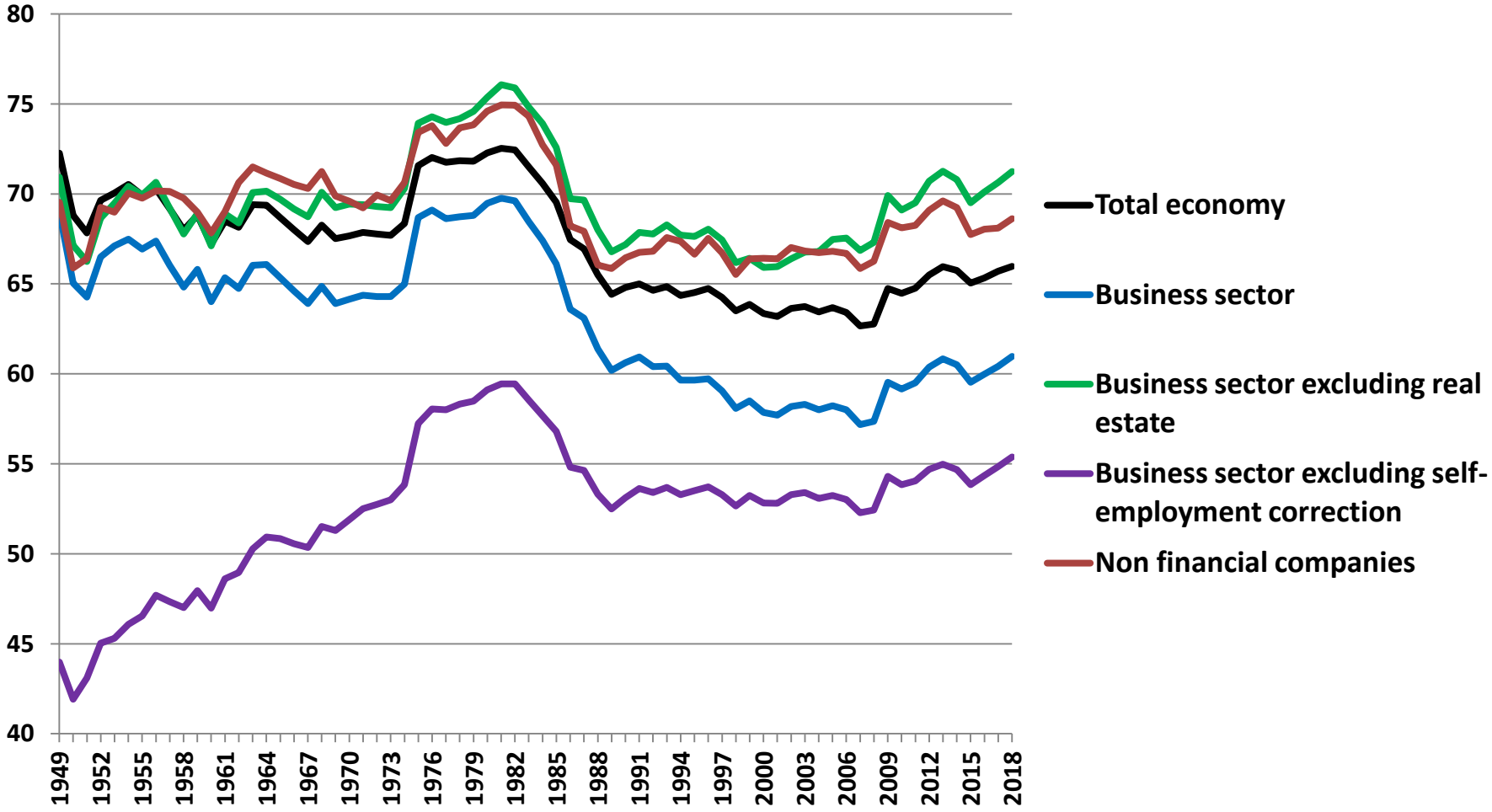
Outline

1. Introduction
2. A theoretical model
3. **Empirical results**
4. Conclusion
5. Annexe

4. Empirical results

➢ **Labor share in France** – In %

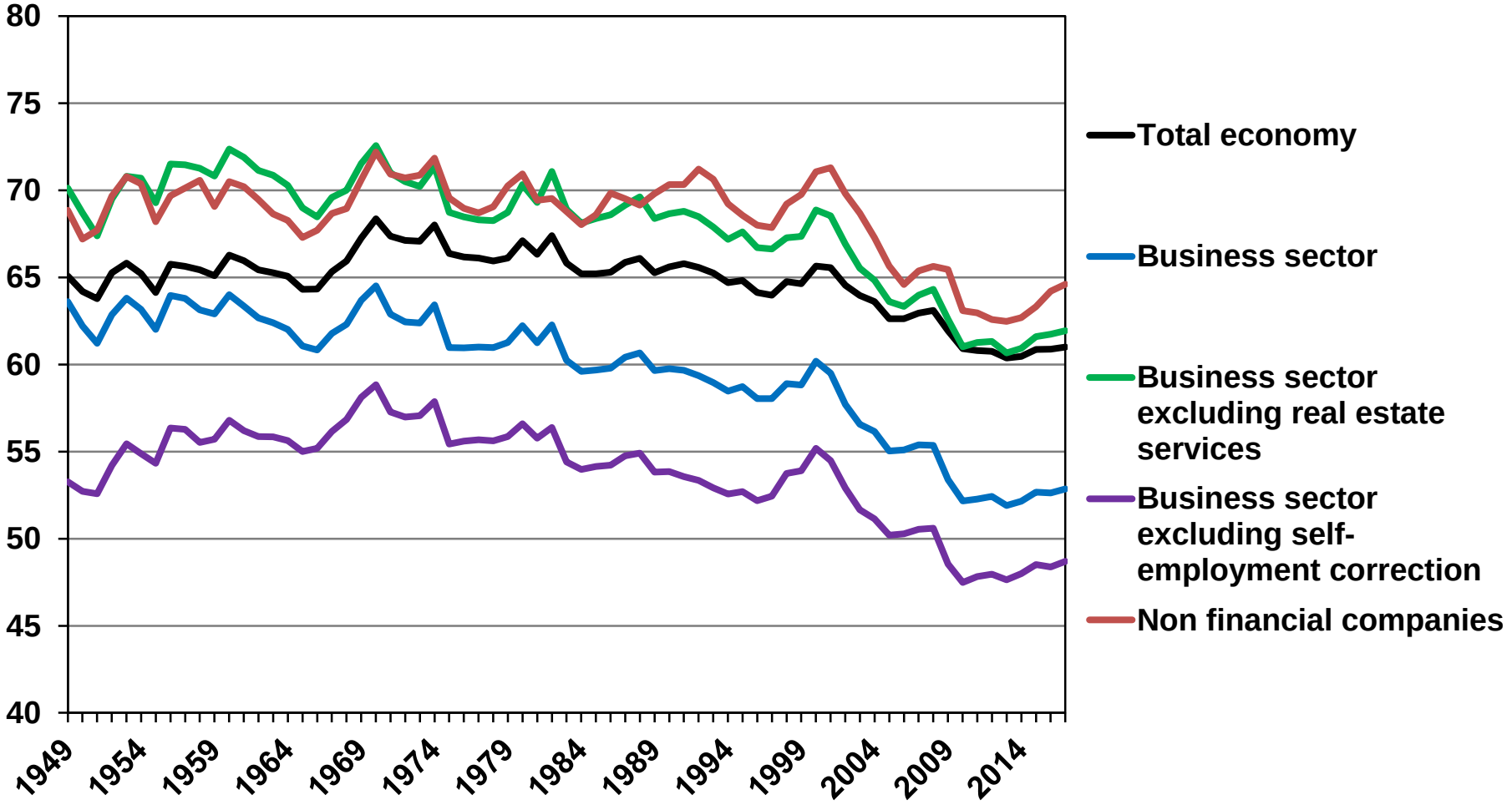
Source: Author's calculation from national account data



4. Empirical results

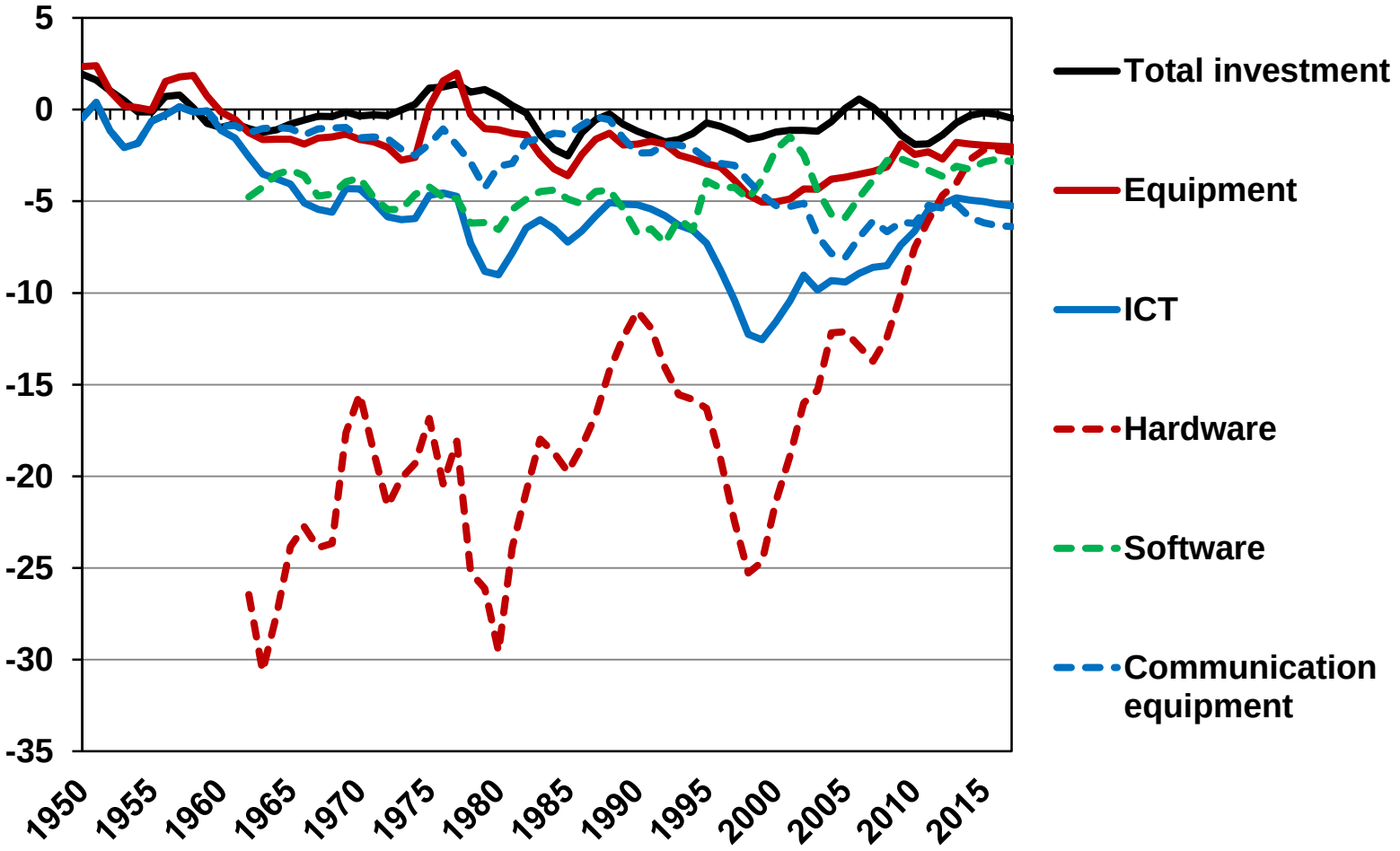
- **Labor share in the US** – In %

Source: Author's calculation from national account data



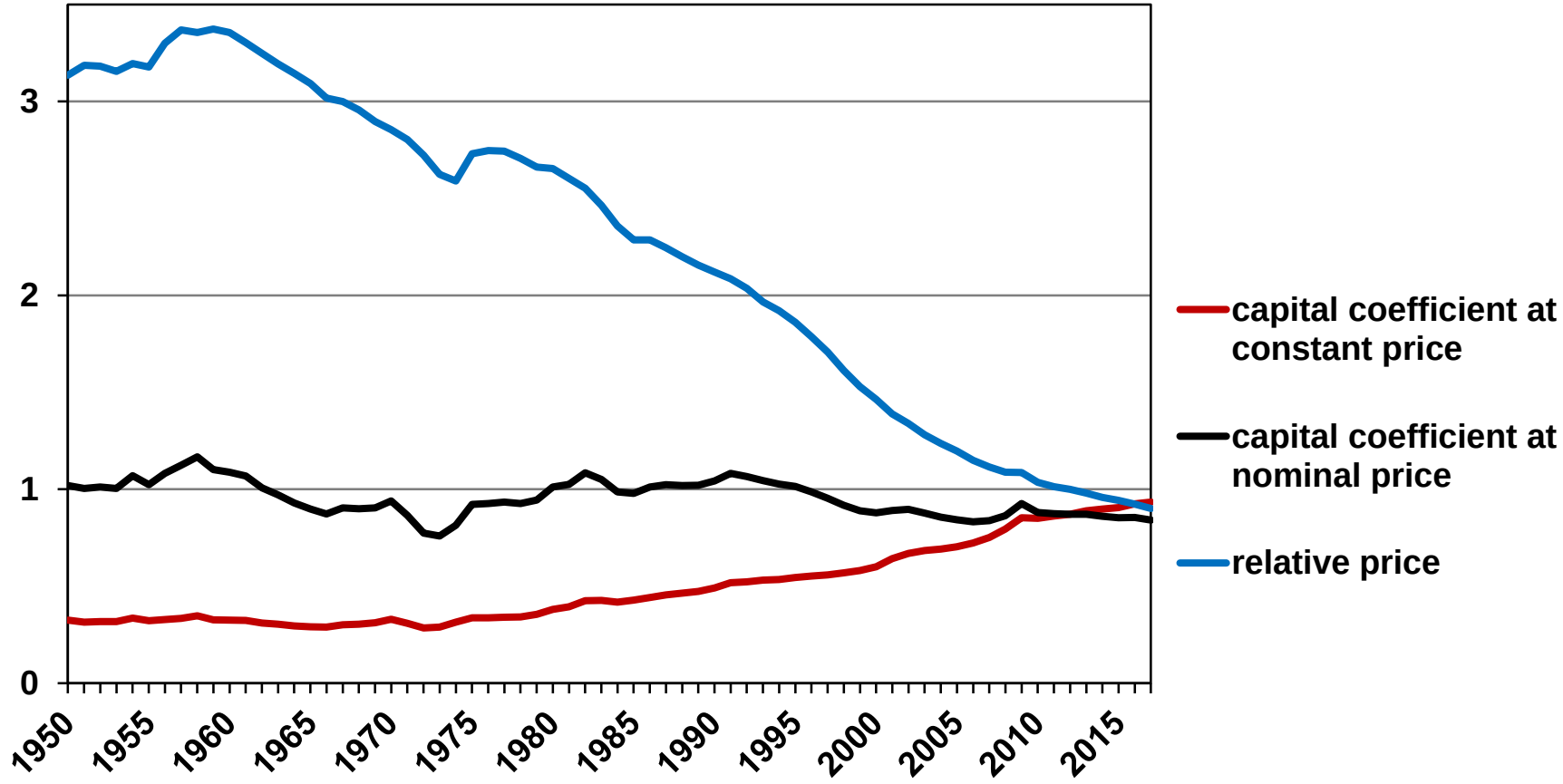
4. Empirical results

➢ **Growth rate of the investment price relative to the GDP price in the US** – In %
Source: Author's calculation from US BEA data
These growth rates are smoothed using a three year moving average



A theoretical model: substitution elasticity

- **Capital coefficient (ratio capital / GDP) – Equipment**
  Source: GDP in constant price, investment and GDP price: National accounts – BEA; Equipment capital in constant price: Bergeaud, Cette and Lecat (2016) calculation, from national accounts – BEA investment data. See www.longtermproductivity.com.

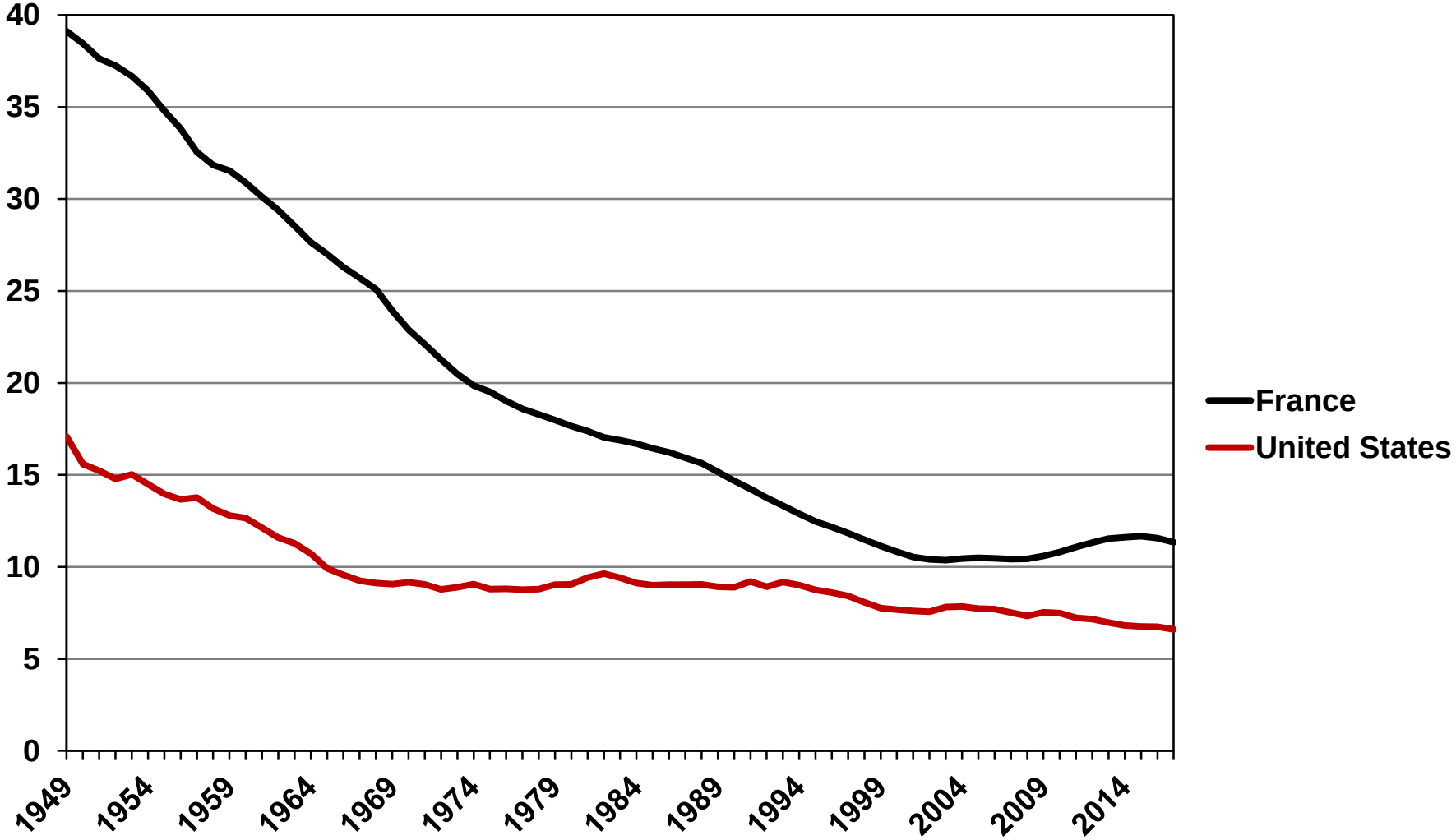


- Suggest a substitution elasticity close to but inferior to the unity

4. Empirical results

➢ **Share of self-employed workers in the total employment** – In %

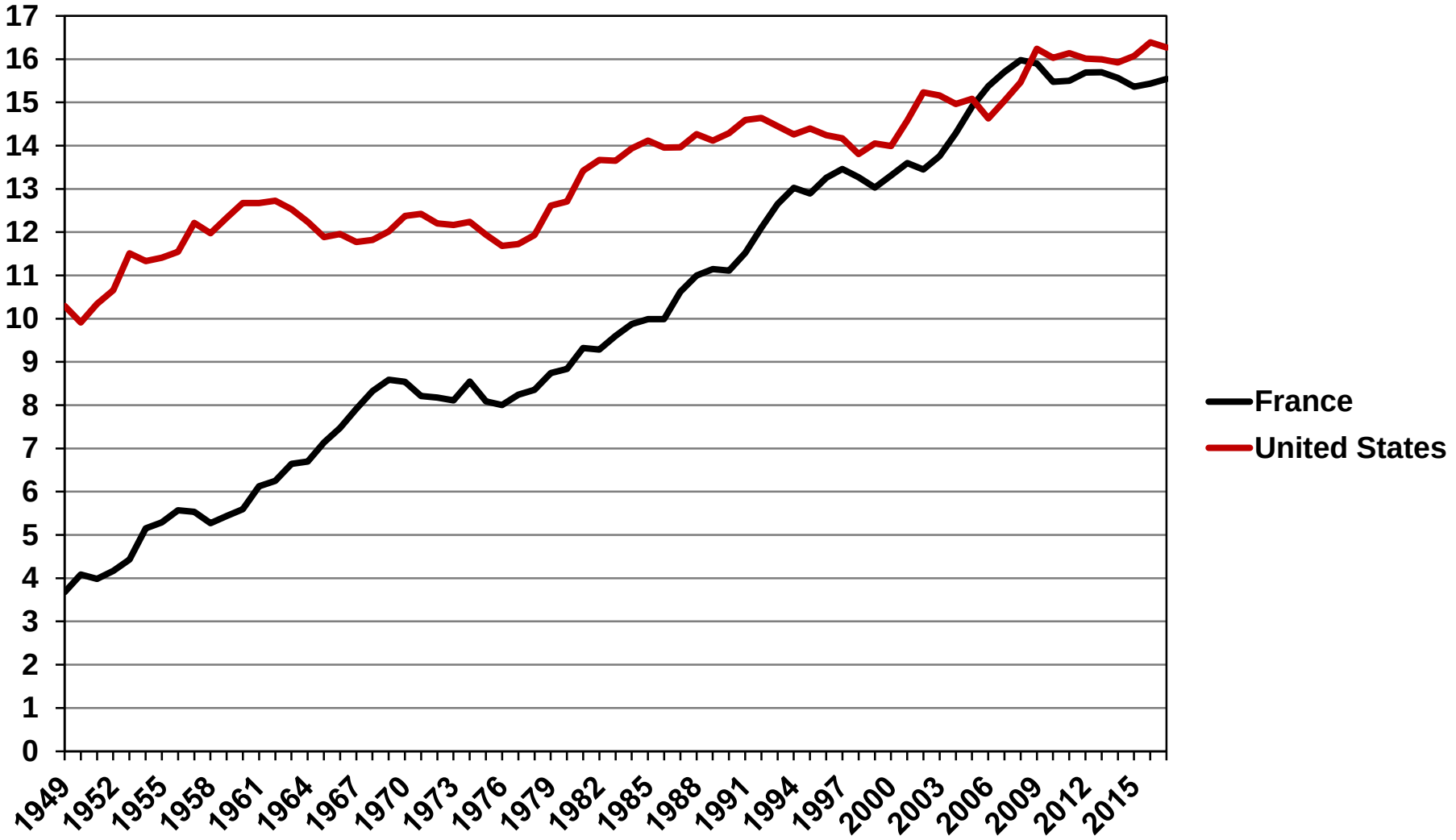
Source: Author's calculation from national account data



4. Empirical results

➢ **Share of real estate services in the total value added** – In %

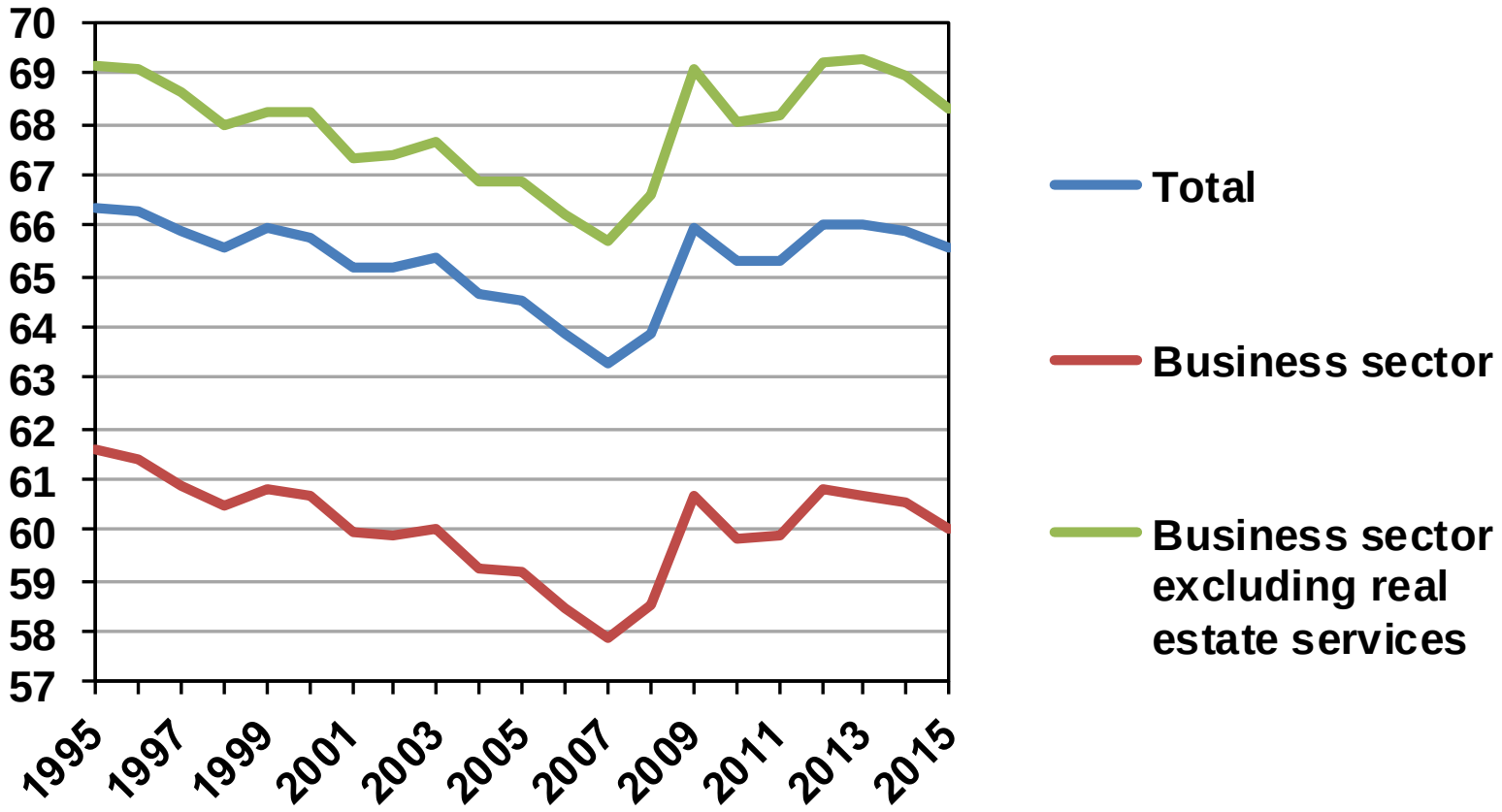
Source: Author's calculation from national account data



4. Empirical results

- **Labor share in the Euro Area**– In %

Sources: Author's calculation from the STAN OECD database

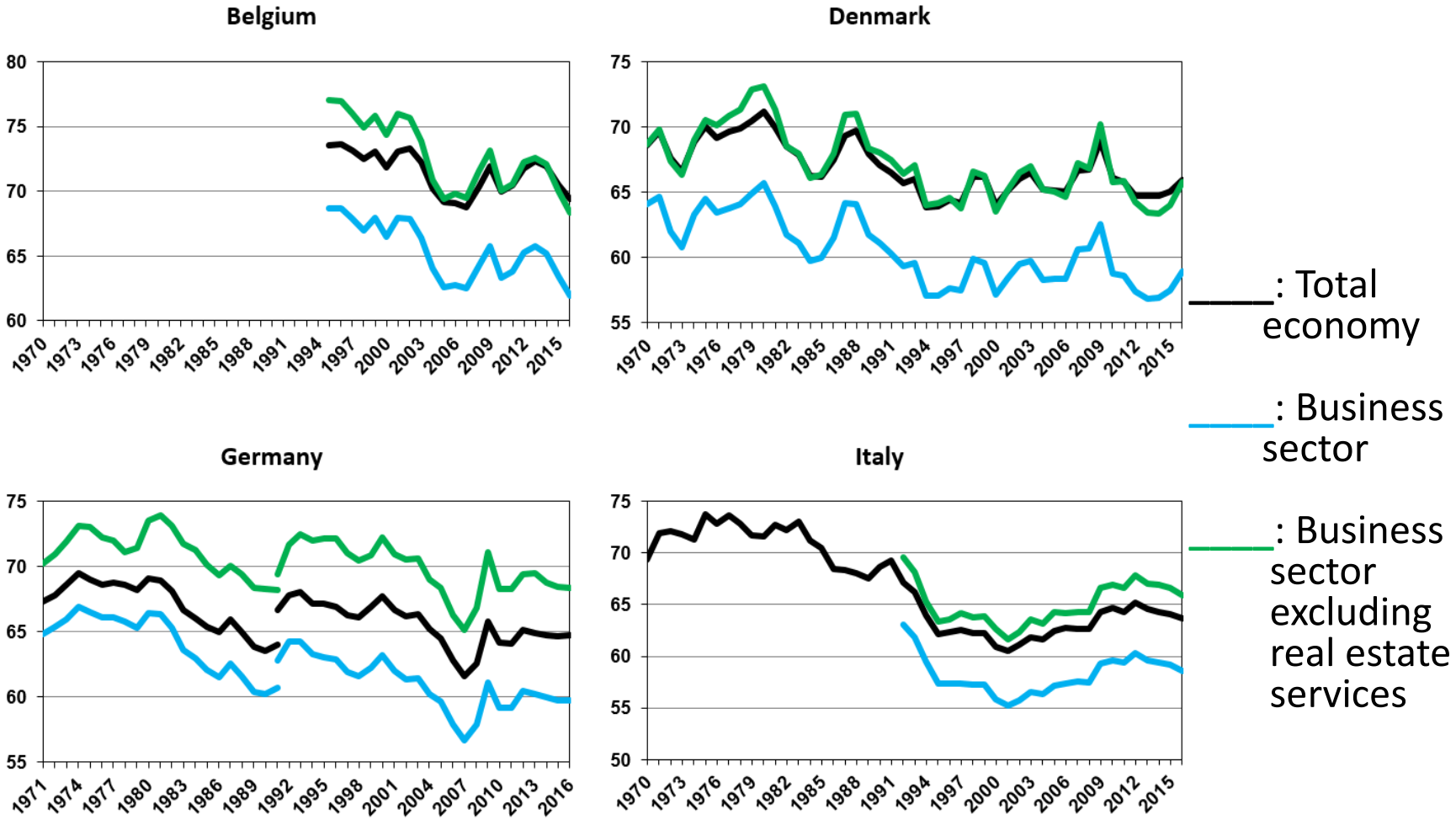


Euro Area contains: France, Germany, Italy, Spain, the Netherlands and Belgium. In 2017, these six countries corresponded to 86% of the GDP of the whole Euro Area.

4. Empirical results

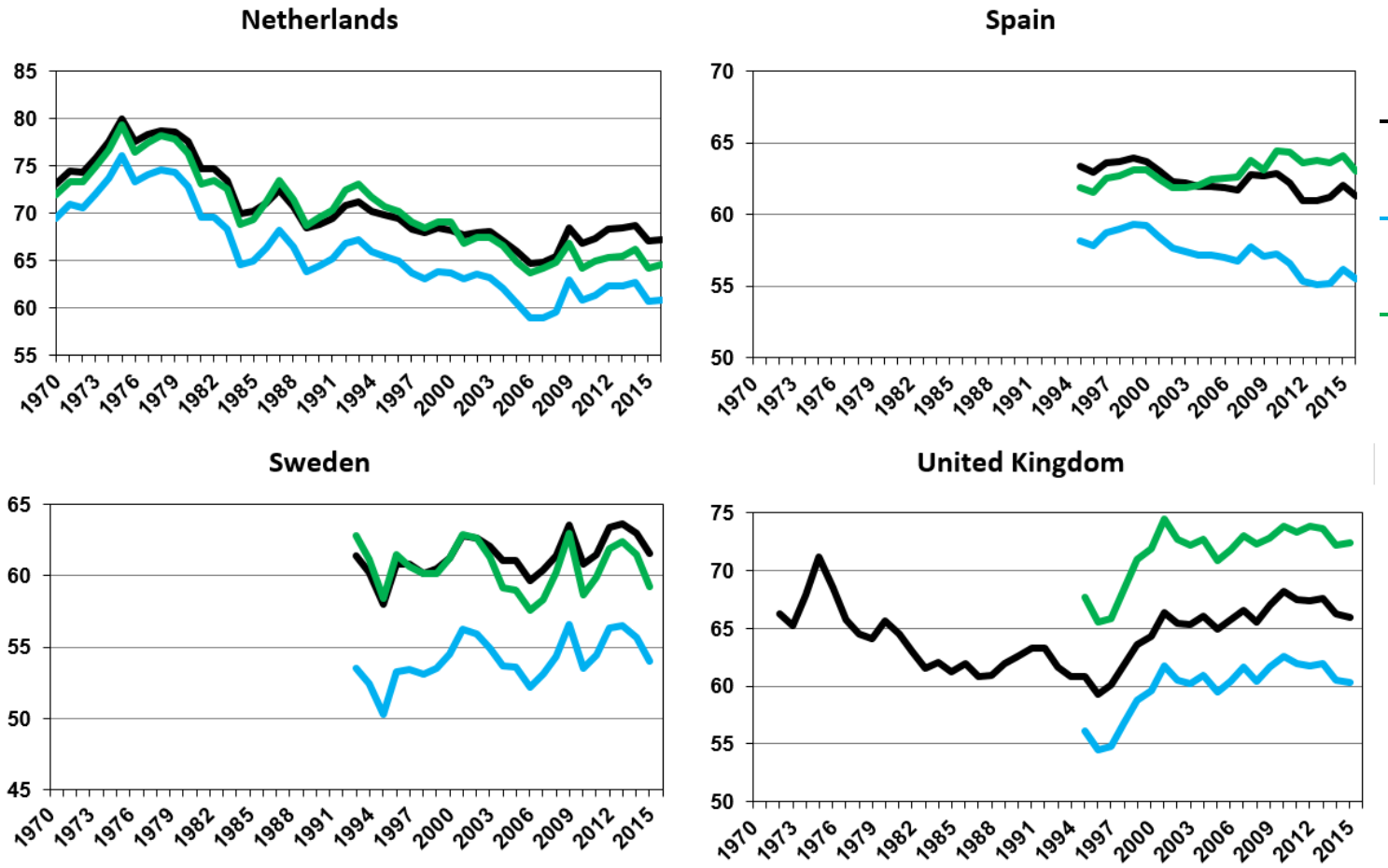
➢ **Labor share in Belgium, Denmark, Germany and Italy** – In %

Sources: Author's calculation from the STAN OECD database



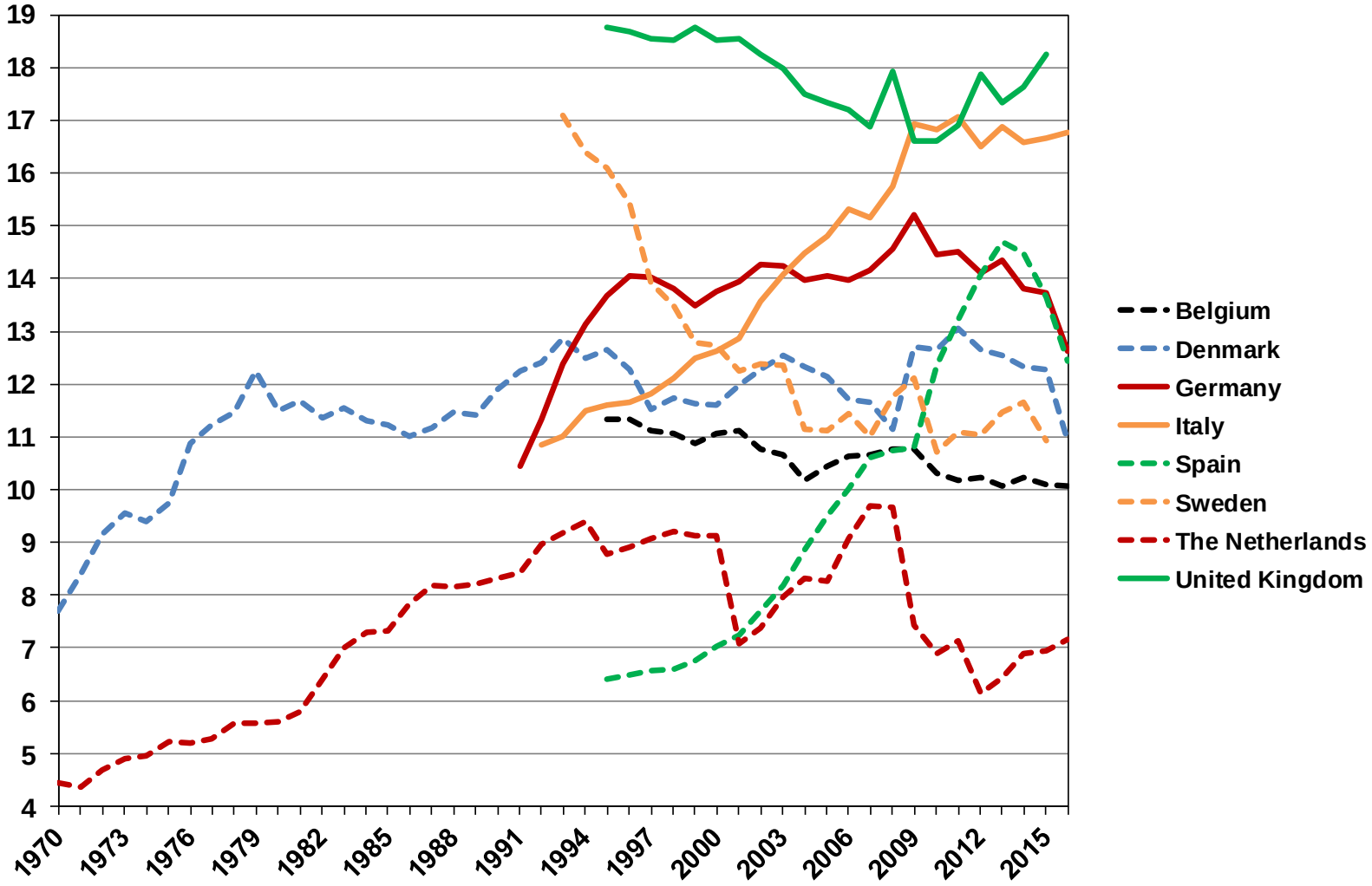
4. Empirical results

- **Labor share in The Netherlands, Spain, Sweden and the United Kingdom**
  – In %
  Sources: Author's calculation from the STAN OECD database



4. Empirical results

➢ **Share of real estate services in the business sector value added** – In %
Source: Author's calculation from the STAN OECD database



4. Empirical results

- **Labor share orientation in the business sector, from the earlier available data to the current period …**

Source: Author's calculation from national accounts and the STAN OECD database

		… With real estate services		
		Decrease	**Stability**	**Increase**
… Without real estate services	**Decrease**	Belgium Denmark Germany The NDL The US		
	Stability	Euro Area France		Sweden
	Increase	Spain	Italy	The UK

We consider that the labor share increases (decreases) if the slope of the linear trend over the available period is above (below) 0.02 (-0.02) percentage points per year.

Outline

1. Introduction
2. A theoretical model
3. Empirical results
4. **Conclusion**
5. Annexe

5. Conclusion

- Three important aspects influence the labor share orientation diagnosis:
  - The choice of starting periods;
  - The accounting for self-employment;
  - The accounting for residential real estate income.

- **When we remove real estate services, the usual diagnosis of a general downward orientation of the labor share in the developed countries over the last decades is not confirmed on our dataset of ten developed countries.**

Outline

1. Introduction
2. A theoretical model
3. Empirical results
4. Conclusion
5. **Annexe**

Data sources

- **Data sources**
  - National statistical institutes for France and the US.
  - Database STAN (Structural Analysis) of the OECD for the other eight countries.

- **Labor share calculation methodology**
  - We computed the labor share as the remuneration of labor in the value added at factor costs. As such, it is equal to remuneration of employees (D.1) divided by value added (B.1G) minus taxes (D.29) less subsidies on production (D.39).

$$LS = \frac{D.1}{B.1 - (D.29 - D.39)}$$

  - We made an exception for France, where we allocated taxes paid on wage to the labor share

Data sources

- **Two adjustments** to the labor share calculation.

  - **Self-employment adjustment**
    - Self-employed's mixed income constitutes remuneration for both capital and labor;
    - In France, share of self-employed drops from 39% in 1949 to 13% in 2017;
    - Labor share for self-employed is computed by attributing to them the mean hourly wage of their industry ;
    - Level of detail in industries is 17 for France and the US in recent years, 12 for earlier years in the US and 34 for the eight other countries.
    - Non financial companies: no self –employment in France and US, but contains self-employment in other countries (Pionnier and Guidetti, 2015)

  - **Curves continuation**
    - Adjustments for the US in 1987 and 1997: two breaks in series due to a change in the basis of the national accounts (changing from 1972 SIC to 1987 SIC in 1987, and from SIC to NAICS in 1997);
    - For the two years, computation of labor share with two sets of data; trend of earlier years, then fitted to the value of later years by applying the difference between the labor share computed for the key year;

Data sources

- **Branches of activities** and **choice of field**
  - Three different fields: total, business sector and business sector excluding housing services.
  - Non-Business industries: Public administration and defense services, Compulsory social security services (Section O), Education services (Section P), Human health and social work services (Section Q), Arts, entertainment and recreation services (Section R), Other services (Section S) and Private households as employers (Section T).

- **Housing services and imputed rentals**
  - In France, in 2015, real estate services' value added is composed at 97% by total rentals, with 61% made up of imputed rentals alone.
  - Imputed rentals are applied to owner-occupied dwellings, assuming they are paying a virtual rent to themselves.
  - Imputed rentals correct bias coming from different levels of home ownership.

Empirical results: contribution in France

- **Annual contribution to labor share variations in the business sector excluding real estate services** – In percentage points

Source: Author's calculation from national account data