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# Staff Working Paper No. 811

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## Revisiting the global decline of the (non-housing) labor share

Germán Gutiérrez<sup>(1)</sup> and Sophie Piton<sup>(2)</sup>

### Abstract

We show that cross-country comparisons of corporate labor shares are affected by differences in the delineation of corporate sectors. While the US excludes all self-employed and most dwellings from the corporate sector, other countries include large amounts of both — biasing labor shares downwards. We propose two methods to control for these differences and obtain 'harmonized' non-housing labor share series. Contrary to common wisdom, the harmonized series remain stable across all major economies except the US, where the labor share still declines, primarily due to manufacturing. These new facts cast doubts on most technological explanations for the labor share decline.

**Key words:** Labor share, residential real estate, self-employment, national accounts.

**JEL classification:** E22, E25, L85.

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## 1. Introduction

Much has been written on the global decline of the corporate/non-housing labor share, defined as the share of corporate value added going to wages, salaries and benefits. The IMF and OECD worry about this trend, linking it to decreasing wages and rising inequality (OECD, 2018; IMF, 2017). And economists are hard at work looking for an explanation. Most prominent hypotheses emphasize some form of technological change that applies across countries and industries: declining relative price of capital (Karabarbounis and Neiman, 2014); capital-biased technical change and automation (e.g. Acemoglu and Restrepo, 2018; Martinez, 2018); or network effects leading to ‘superstar’ firms (Autor et al., 2017a,b).

But is there really a global decline in the non-housing labor share? This short paper revisits the evidence, using data across countries and industries. It emphasizes two measurement challenges hitherto undocumented in the literature: the inclusion of housing services and self-employed workers in the corporate sector of most countries. For example, 19% of fixed assets in the EU corporate sector are in dwellings (reaching 30% for France); while self-employed workers contribute 15% of total hours worked in Italy’s corporate sector.

The importance of self-employment and housing for *aggregate* labor shares is well-known, as emphasized by Gollin (2002) and Rognlie (2015), respectively. What remained largely undocumented is that similar issues affect *corporate* labor shares.<sup>1</sup> This is our contribution. We document this fact, and propose two methods to obtain ‘harmonized’ non-housing labor share series. The first method uses industry accounts to exclude all real estate activities from both wages and value added. This method covers the entire business sector and fully controls for housing, but it has two limitations: (i) it ‘over-controls’ by excluding commercial in addition to residential real estate and (ii) it relies on imputed wages for the self-employed, which are difficult to estimate.<sup>2</sup> Our second method mitigates these limitations by focusing on the corporate sector. The corporate sector excludes self-employment in some but not all countries. We use national account data to estimate the contribution of housing to corporate value added and – where possible and relevant – estimate wages for the self-employed. Data limitations restrict the sample for the second measure but where available, it behaves similar to the labor share excluding real estate.

Contrary to common wisdom, the harmonized series do not exhibit a global decline in the labor share. In fact, the non-US global corporate labor share today is at about the same level as in 1970. This is our main result, illustrated by the black line in Figure 1, where we focus on the four major European economies and the US (see Figure 3 below for global and country-level series).<sup>3</sup>

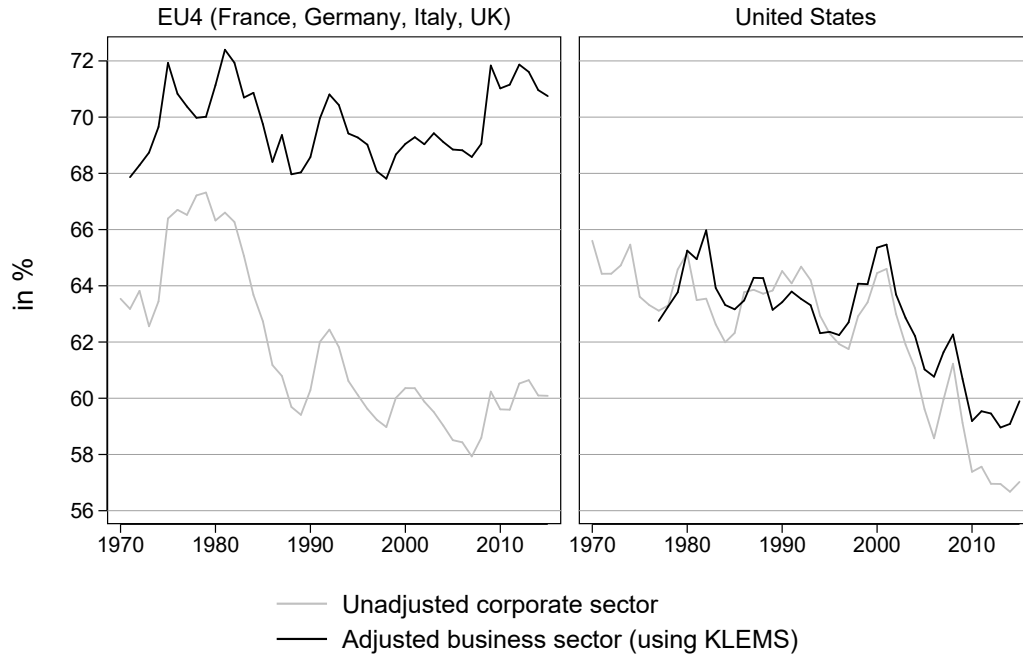
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<sup>1</sup>Pionnier and Guidetti (2015) emphasize the importance of self-employment for corporate profit shares since 1995 but do not study their implications for the long-run decline of the labor share.

<sup>2</sup>We rely on multiple vintages of EU KLEMS to obtain as long a time-series as possible. These vintages have been criticized in the literature (e.g. Autor and Salomons, 2018). We discuss our approach and several validation analyses in the Data Appendix.

<sup>3</sup>In order to cover as large a sample as possible and avoid the difficulties in measuring depreciation, we focus on

**Figure 1** – Domestic gross labor share, EU vs. US, 1970-2015



Note: Unadjusted series from [Karabarbounis and Neiman \(2014\)](#), extended using OECD. Adjusted series based on non-farm market industries in KLEMS, excluding real estate. See Section 3 for details. EU4 plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates and the effects have been normalized to equal the average labor share in 1995.

The EU4 labor share increased in the 1970s, declined in the 1980s and recovered after the Global Financial Crisis. Today, it exceeds the labor share in 1970.<sup>4</sup> Importantly, the US corporate labor share is largely unaffected by housing or self-employment. It still exhibits a sharp decline after 2000. Looking within regions, across industries, we find that labor shares have remained largely stable across EU industries and US non-manufacturing industries – on average. Thus, most of the decline in the US labor share is due to manufacturing.

The uniqueness of US trends and the critical role of manufacturing cast doubts on most technological explanations for the decline of the labor share, which apply both across regions and across

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gross labor shares throughout the paper. Given the global rise in depreciation, using net shares would only strengthen our conclusions (see appendix Figure A.7).

<sup>4</sup>Most of the prior literature – including [Karabarbounis and Neiman \(2014\)](#); [Autor and Salomons \(2018\)](#) – begin their analyses at the peak of the cycle (in the late 1970s) and end them right before the Great Recession (in 2007). This over-states the decline in the labor share, as discussed further below and emphasized in [Cetty et al. \(2019\)](#).

industries. They either point towards US-specific explanations – perhaps a decline in competition as emphasized by [Gutiérrez and Philippon \(2018\)](#) – or at least an offsetting mechanism keeping non-US and non-manufacturing labor shares flat.

The remainder of this paper is organized as follows. Section 2 describes how the treatment of housing and self-employment in national accounts affects corporate sector labor shares. Section 3 constructs two harmonized measures of the non-housing labor share, which are compared to common measures in the literature in section 4. Section 5 discusses industry trends, and section 6 concludes.

## 2. Corporate Sectors Outside the US: Two Undocumented Measurement Challenges

In principle, measuring the labor share should be straightforward. For each sector/industry of the economy, value added measures the value generated by production activities (output less intermediate consumption).<sup>5</sup> Value added can be decomposed into income paid to capital (operating surplus), income paid to labor, and net taxes on production; and the (gross) labor share can be defined as the ratio of income paid to labor to nominal gross value added.<sup>6</sup>

In practice, however, measuring the labor share is a challenging endeavor. Total economy labor shares require a difficult estimation of wages for the self-employed ([Gollin, 2002](#); [Elsby et al., 2013](#)). The series are also affected by rising capital depreciation ([Koh et al., 2015](#)); and conflate two very different dynamics: those of the housing and non-housing (i.e., business) sectors ([Rognlie, 2015](#)). In response to these challenges, researchers have focused on corporate sector labor shares as a “common way to deal with... measurement difficulties... including ambiguity in the labor/capital split of mixed income [i.e., self-employment], as well as the crucial role of housing.” [Rognlie \(2018\)](#) summarizes the prevailing view, calling the net labor share of the corporate sector “the single best measure” of the [US] labor share.

[Rognlie \(2018\)](#)’s conclusions are largely true in the US, where the integrated macroeconomic accounts include a corporate and a non-corporate business sector. The latter combines activities that would be mapped to the corporate as well as the household sectors under SNA guidelines ([Moulton, 2014](#)), leaving only legally organized corporations required to file corporate tax returns in the corporate sector.<sup>7</sup> But this is not true outside the US.

Most non-US countries follow the 2008 SNA ([United Nations, 2008](#)). Under the SNA, all units engaged in market production that act independently of their owners belong to the corporate sector.

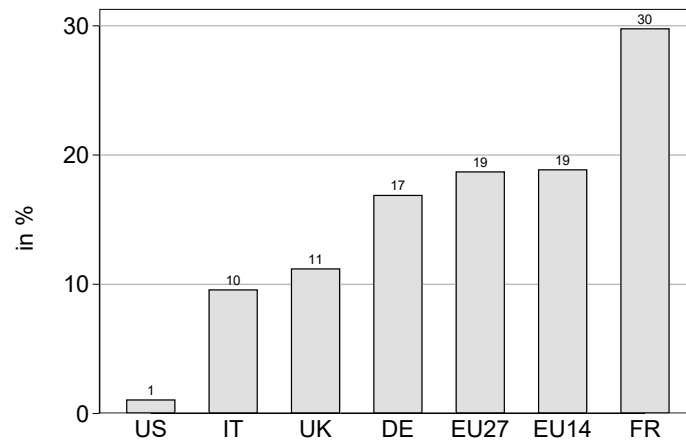
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<sup>5</sup>By aggregating GVA (at basic prices) over the total economy, we get a measure of gross domestic product (at market prices) less net taxes on products.

<sup>6</sup>Note that income paid to labor includes stock options when employees exercise them ([Elsby et al., 2013](#)).

<sup>7</sup>Tenant-occupied dwellings owned by corporations are included in the corporate sector, but these account for 5% of the stock of tenant-occupied housing and 1% of the total stock of housing in 2015. See Figure A.12 in the Appendix.

**Figure 2** – Share of dwellings in total fixed assets, corporate sector, Europe and United States, 2015



Source: authors' calculations using OECD.

Note: Total assets include all produced non-financial assets and thereby intangibles (see Table A.2 in Appendix for a definition). Dwellings exclude commercial real estate or other buildings. EU14 includes France (FR), Germany (DE), Italy (IT), and the UK as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. EU27 includes all European countries except Malta. Similar numbers for the year 1995 are presented in figure A.9 in Appendix.

This includes legally constituted corporations (as in the US), as well as cooperatives, limited liability partnerships, notional resident units and quasi-corporations.<sup>8</sup> The broader definition of corporations introduces two additional challenges for measuring corporate labor shares outside the US:

1. **Inclusion of residential real estate.** Cooperatives, limited liability partnerships, notional resident units and quasi-corporations can all own and operate housing. As a result, non-US corporate sectors own a substantial amount of dwellings. As shown in Figure 2, 19% of the produced fixed assets in the EU27 corporate sector are dwellings, reaching 30% for France (which includes all social housing and 'HLM' in the corporate sector).<sup>9</sup> The US is the outlier, with only a 1% housing share.<sup>10</sup> The inclusion of housing biases the corporate labor share downward, for the

<sup>8</sup>Quasi-corporations are unincorporated enterprises owned by households, governments, or non-residents. They have no legal status separate from their owners but are engaged in market production and act independently of their owners – hence are included in the corporate sector.

<sup>9</sup>Land is excluded from produced fixed assets, but it obviously influences the contribution of housing to value added. A rise in the value of land underlying housing assets would, therefore, also affect labor shares. We control for land when building harmonized series.

<sup>10</sup>An example may help clarify the inclusion of housing. Consider France, which has the highest share of housing in corporate fixed assets among the major economies. As shown in Figure A.11 in the Appendix, social entities (including HLM, i.e., rent-controlled housing) owned ~15% of the French housing stock in 2015. These entities act independently from their owners and are therefore classified as corporations. Their housing stock accounts for 30% of produced fixed assets in the corporate sector. The remaining housing stock includes owner-occupiers (65%)

reasons emphasized in [Rognlie \(2015\)](#): housing has a low labor share relative to the rest of the corporate sector (~6% vs. ~66%, respectively), so an increase in the housing share of corporate value added pushes the corporate labor share downwards.

2. **Inclusion of self-employed workers.** In addition, several of these entities include a substantial share of self-employed workers. This is the case in the UK, where there is an increasing number of ‘incorporated’ self-employed as documented by the [ONS \(2017\)](#).<sup>11</sup> It is also the case in countries with a vast network of small and medium enterprises, such as Italy and Germany. In Italy, for example, quasi-corporations include unlimited partnerships and sole proprietorship provided they have more than five employees and produce a complete set of accounts ([ISTAT, 2012](#)). This includes artisans, farmers, small businessmen and other self-employed persons. As a result, 15% of hours worked in the Italian corporate sector are by self-employed workers, and one-fourth of total hours worked by self-employed are in the corporate sector (see Figure A.18 in Appendix).

The inclusion of self-employed workers in the corporate sector has important implications for the labor share. Earnings of the self-employed – and thereby their labor compensation – are included in corporate gross operating surplus ([Lequiller and Blades, 2014](#); [Pionnier and Guidetti, 2015](#)). Thus, gross operating surplus of corporations is analogous to mixed income of households: it requires an assumption to separate labor and capital income. Absent such an assumption, the corporate labor share is underestimated.<sup>12</sup>

This issue was first discussed in the Appendix of [Piketty and Zucman \(2014\)](#), who focus on the case of small businesses with partners. They note that partner earnings should logically be recorded as mixed income, but are sometimes treated as dividends of corporations. [Pionnier and Guidetti \(2015\)](#) study the issue in more detail, estimating the impact of self-employment on corporate sector profit shares in the US and four European economies, but only since 1995. They do not consider the long-run evolution of the labor share nor the importance of housing

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and tenant-occupied dwellings owned by households (20%), both of which are included in the household sector. Tenant-occupied dwellings owned by private corporations account for less than 1% of the French housing stock – in line with the US. Similar ownership structures/definitions apply to the remaining countries, explaining the sizable but heterogeneous share of housing in total assets across corporate sectors. See Figure A.10 for the corporate sector share of dwellings over time, by country; and Figure A.13 for the sectoral composition of rental income (both residential and commercial) in the UK.

<sup>11</sup>[ONS \(2017\)](#) discusses the rising number of self-employed incorporating and paying themselves entirely in dividends as opposed to wages. This population is growing at a 7% annual rate between 2000 to 2014. The majority of the rise in self-employment has been of owner-managers, and of high-income sectors (consultants for financial companies, for example).

<sup>12</sup>A distinct but related issue is the remarkable rise of S-Corporations in the US. Partners of S-corporations are classified as employees but have a tax incentive to shift labor income to profits, biasing downward the trend in the corporate wage share ([Smith et al., 2019](#)).

for the corporate sector.<sup>13</sup>

Unfortunately, since employment data by institutional sector are only available in Italy, this problem is quite difficult to identify and solve in practice. We know from [ONS \(2017\)](#) and Destatis<sup>14</sup> that this is important for the UK and Germany. We know from INSEE that France does not include any self-employed workers in the corporate sector. It instead publishes a separate non-corporate business sector account (the 'unincorporated enterprises' account in INSEE's website). We do our best to estimate corrections for Italy, Germany and the UK in section 3, but are unable to estimate corrections for the rest. Thus, some of our 'harmonized' series may still be biased downward. Industry accounts provide some solace, however: data on self-employment are available at the industry-level, and can be used to estimate an adjustment. Indeed, this is why our primary measure is based on industry accounts.<sup>15</sup>

### 3. Two Methods for Obtaining Harmonized Non-Housing Labor Shares

The differential treatment of housing and self-employment across countries implies that cross-country comparisons of corporate labor shares are flawed. Let us now propose two methods to obtain harmonized non-housing labor share series. The first method is based on industry accounts while the second uses sector accounts. Industry accounts include both corporate and noncorporate businesses and divide activity according to an industrial classification (usually the International Standard Industrial Classification). Sector accounts divide the economy into five institutional sectors: households, nonprofit institutions serving households, general government, financial corporations, and non-financial corporations. Both sets of accounts rely on the accounting identities defined earlier (and in the System of National accounts, [United Nations, 2008](#)).

**Method 1: excluding all real estate activities from industry accounts.** Our first method is the most straightforward: we simply exclude real estate activities from the calculation of the labor share, using KLEMS. In particular, we compute the labor share for the business sector<sup>16</sup> excluding

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<sup>13</sup>[Pionnier and Guidetti \(2015\)](#) emphasize self-employment in quasi-corporations. They report that 7 out of 28 EU countries do not include quasi-corporations in their national accounts (Cyprus, France, Hungary, Luxembourg, Romania, Slovakia and Spain) and that Netherlands allocates all quasi-corporations to the household sector to suggest that self-employment may affect a wide range of countries. The issue is, in fact, even larger since self-employment may also appear in partnerships or limited liability companies ([ONS, 2017](#)). Self-employment, therefore, is likely to affect the corporate sector of most countries, albeit to different degrees.

<sup>14</sup>Destatis was able to confirm that the German corporate sector includes self-employed workers. They estimate that self-employment concerns about 600,000 corporations, and the income of these corporations is entirely included in dividends of corporations.

<sup>15</sup>[Pionnier and Guidetti \(2015\)](#) reach similar conclusions, recommending the use of industry accounts for cross-country comparisons of factor shares.

<sup>16</sup>The business sector is composed of 18 industries, as shown in the Appendix Table A.1. Non-market services (real estate, public administration, health, education, activities of households as employers and activities of non-profits serving households) are excluded because their output is often valued at the cost of production, so the net operating



Real Estate (RE):

$$LS^{ex RE} = \frac{\sum_k W^k (N^{self,k} + N^{emp,k}) - W^{RE} (N^{self,RE} + N^{emp,RE})}{Y - Y^{RE}} = \sum_{k \text{ ex RE}} LS^k \omega^k \quad (1)$$

where  $LS$  is the labor share of the business sector and  $LS^k$  is the labor share in sub-sector  $k$ .  $W^k$  is the average hourly wage of employees and  $(N^{self,k} + N^{emp,k})$  are total hours worked (of both employees, *emp*, and self-employed, *self*), so that  $W^k (N^{self,k} + N^{emp,k})$  is total labor compensations in sector  $k$  and  $W^{RE} (N^{self,RE} + N^{emp,RE})$  total labor compensations in the real estate sector.  $Y$  is total gross value added and  $Y^{RE}$  the real estate sector gross value added.  $\omega^k$  is sector  $k$ 's share in total gross value added.

Since all dwellings are included in the real estate sector, excluding it fully controls for the rise of housing. And, since data on self-employment are available at the industry-level, an adjustment is included for all self-employed workers.<sup>17</sup> But this measure is not perfect: it relies on imputed wages for the self-employed – which are notoriously difficult to estimate; and it requires that we exclude commercial in addition to residential real estate.<sup>18</sup>

### Method 2: adjusting for real estate and self-employment activities in the corporate sector.

Our second method aims to mitigate these issues by focusing on the corporate sector. The benefit is that self-employment affects only some countries, and we can control for housing directly. The downside is that information documenting the prevalence of self-employment in the corporate sector is fairly limited.

The goal is to estimate adjusted corporate labor shares as follows:

$$LS^{corp \text{ ex } H} = \frac{W^{emp,corp} N^{emp,corp} + W^{self,corp} N^{self,corp}}{Y^{corp} - Y^{H,corp}} \quad (2)$$

where  $Y^{H,corp}$  denotes housing value added in the corporate sector and  $(W^{emp,corp} N^{emp,corp} + W^{self,corp} N^{self,corp})$  is total labor compensations in the corporate sector, adjusted for self-employed where possible. We proceed in two steps.

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surplus is null and the labor share is close to one. The government also plays a significant role in these sectors. Farm activities are excluded because of the large share of self-employment, which introduces substantial measurement error to the labor share (estimates often exceed 1). Importantly, our conclusions do not depend on which industries are excluded beyond real estate, as shown in appendix Figure A.6.

<sup>17</sup>We use KLEMS' estimates of labor income for the self-employed, which assume the average earning per hour worked for self-employed is the same as for employees at the industry-level. Self-employment represents, on average, 14% of total employment, with the highest share in Italy (31%) and the lowest share in the United States (8%). On average, the labor share is thus 1.16 ( $1/(1-14\%)$ ) times the wage share.

<sup>18</sup>Table A.8 in the appendix provides additional details on the composition of the real estate sector. Housing accounts for ~70% of activity in most countries, with the remainder composed of non-residential rental activities (~15%), fee-based activities (~10%) and buying and selling of own real estate (~5%)

First, we estimate self-employment adjustments for Italy, Germany and the UK.<sup>19</sup> For Italy, IS-TAT provides the number of hours worked by self-employed and employees in the corporate sector ( $N^{self,corp}$  and  $N^{emp,corp}$ , respectively). We follow standard methods, and estimate  $W^{self,corp}N^{self,corp}$  assuming the hourly earnings of the self-employed are the same of those of employees,  $W^{self,corp} = W^{emp,corp}$ . The adjustment results in a 10p.p. increase in the level of the labor share, on average, over 1995-2015.

For Germany and the UK, we use KLEMS and data on mixed income to estimate labor compensations of the self-employed outside the household sector, and allocate this income across the remaining institutional sectors (and thereby the corporate sector). In particular, we estimate:<sup>20</sup>

$$W^{self,corp}N^{self,corp} = \left( \sum_{k \in business} W^{comp,k}N^{self,k} - \delta MI^{HH} \right) \frac{N^{self,business}}{N^{self,total}} \quad (3)$$

where we compare KLEMS total economy labor compensations of the self-employed ( $\sum_{k \in business} W^{comp,k}N^{self,k}$ ) to the labor compensation part of mixed income in the household sector ( $\delta MI^{HH}$ , where we split mixed income into labor and capital assuming that  $\delta$  equals the total economy labor share in KLEMS).<sup>21</sup> This provides an estimate of total labor compensations of self-employed outside the household sector. We allocate this remaining income to the corporate sector using the share of the business sector in total hours worked by self-employed in KLEMS ( $\frac{N^{self,business}}{N^{self,total}}$ ).<sup>22</sup>

Next, we estimate the contribution of housing to corporate value added. We obtain actual and imputed rents on housing from SNA table 5 and gross operating surplus in the household sector from SNA table 14A ( $Rents$  and  $GOS^{HH}$ , respectively).<sup>23</sup>  $Rents$  include all housing expenditures in the economy, while  $GOS^{HH}$  “capture the income generated from households’ housing activities” (Piketty and Zucman, 2014, Data Appendix pp. 42).<sup>24</sup> Thus, the difference between  $Rents$

<sup>19</sup>We do not apply adjustments for any of the remaining countries (i.e., we let  $W^{self,corp}N^{self,corp} = 0$ ). This is correct for France and the US since neither include self-employed in the corporate sector; and is conservative for the remaining countries.

<sup>20</sup>As a validation, we confirm that this method yields similar results for Italy as using hours worked.

<sup>21</sup>Figure A.15 in the Appendix compares total economy labor shares adjusted using information on mixed income and hours worked by self-employed. If all self-employed were included in the household sector (and so none in the corporate sector), both estimates should give similar results. This was the case in Germany before 1995, but not since: the two series diverge after 1995 – with the gap rising from 1p.p. to 3p.p. by 2015. This suggests that there is a growing share of self-employed included in the corporate sector (and so excluded from mixed income), and that the unadjusted corporate labor share is increasingly biased. It results that the unadjusted corporate labor share is similar to the wage share (not adjusted for self-employed) in the business sector in KLEMS (see Figure A.16 in the Appendix).

<sup>22</sup>This implicitly assumes that self-employed included in the household and the corporate sectors are equally distributed over industries.

<sup>23</sup>Ideally, we would use the household sector alone, but data is often missing, so we combine the households and non profit institutions serving households instead.

<sup>24</sup>See also SNA (United Nations, 2008), §7.9, p.2: “In practice, all unincorporated enterprises owned by households that are not quasi-corporations are deemed to have mixed income as their balancing item, except for owner-occupiers

and  $GOS^{HH}$  isolates rents outside the household sector. Most, but not all, of the housing stock outside the household sector is owned by corporations so we allocate rental income according to the distribution of residential structures:

$$\gamma^{H,corp} = (Rents - GOS^{HH}) \frac{ResK^{corp}}{ResK - ResK^{HH}} \quad (4)$$

where  $ResK$  denotes the current-cost value of residential structures in the economy, and  $ResK^j$  the value for sector  $j$ . We acknowledge that  $Rents$  and  $GOS^{HH}$  are not entirely consistent: they are compiled separately, and sometimes use different definitions (e.g., rents include spending on repairs, while value added does not). As a result,  $GOS^{HH}$  exceeds  $Rents$  in a few countries with limited housing ownership outside the household sector (e.g., Luxembourg). Appendix C provides additional details on the calculation, and discusses several alternate methods that avoid these limitations. All of them yield similar conclusions.

## 4. Results

Let us now compare our harmonized measures of the labor share against the raw corporate sector labor share from Karabarbounis and Neiman (2014).<sup>25</sup> Figure 3 reports results for the 4 major European economies (France, Italy, Germany and the UK), the United States and the world excluding the US. Gray lines report raw series and black lines report harmonized ones.

Consistent with the *exclusion* of housing and self-employment from the US corporate sector, all measures behave similarly. They exhibit a ~6p.p. decline from 1980 to 2015, concentrated in the post-2000 period.

By contrast, the series evolve quite differently outside the US. Consistent with the *inclusion* of housing services and self-employment in non-US corporate sectors, the harmonized series are much larger and far more stable than the raw ones. The series based on KLEMS are higher in 2015 than in 1970 in all major European economies except for France, where our data starts at the historical peak. It is also higher for the EU4, EU14 and EU27 aggregates (unreported); and only slightly lower for the Global series excluding the US. The global labor share increases in the late 1970s; falls in the late 1980s; and recovers in the 2010s.<sup>26</sup>

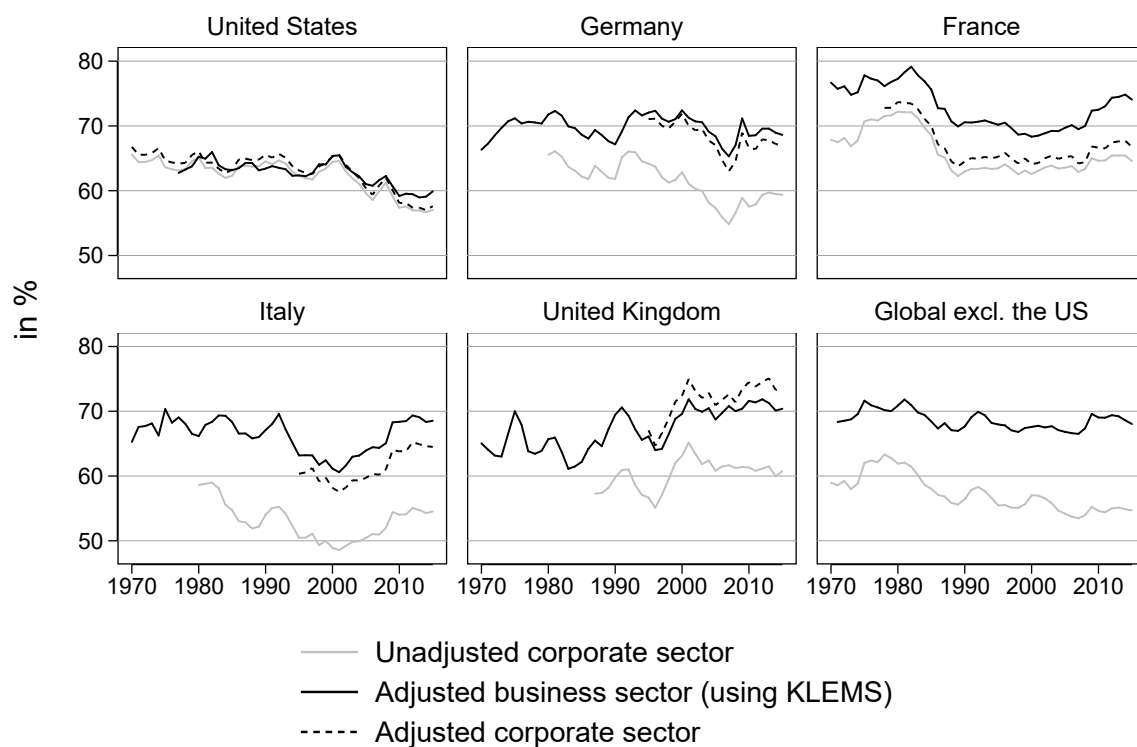
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in their capacity as producers of housing services for own final consumption, households leasing dwellings and households employing paid domestic staff. For owner-occupiers and those leasing dwellings, all value added is operating surplus."

<sup>25</sup>See Figure A.2 in the appendix for a comparison with total economy labor shares from Piketty and Zucman (2014) and KLEMS.

<sup>26</sup>The symmetric rise and fall of the capital share in Europe was well understood in the late 1990s. Blanchard (1998), for example, argues that the initial rise was due to a large adverse labor supply shift – which increased wages and decreased profits. Firms reacted to the shock by moving away from labor, so that – by the early 1980s – the labor share had returned to its 1970s level. But the labor share continued to fall through the mid-1990s. Blanchard interprets the continued fall, as resulting from an adverse labor demand shock – perhaps due to a rise in mark-ups or

**Figure 3** – Gross domestic labor share by country/region, 1970-2015, in %



Source: authors' calculations using OECD, KLEMS, ISTAT and Karabarbounis and Neiman (2014).  
 Note: Unadjusted series from Karabarbounis and Neiman (2014), extended using OECD. KLEMS adjusted series based on non-farm market industries, excluding real estate. Adjusted corporate sector series includes housing adjustment for all countries and self-employment adjustments for Italy, Germany and the UK. See text for details and data appendix for global sample of countries. Global chart shows the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates and the effects have been normalized to equal the average labor share in 1995.

The adjusted corporate sector series – available only since 1995 – behave similar to the KLEMS-based series, validating the use of KLEMS for a longer period. The only slight divergence is for France, where the KLEMS labor share rises faster than the adjusted corporate series. This is likely because of an over-estimation of wages for the self-employed in KLEMS, given the prevalence of ‘auto-entrepreneuriat’ with relatively low income compared to their industry (Askenazy and Palier, 2018).<sup>27</sup> Regardless, using other series to backfill the French adjusted corporate labor share before 1970 shows that the harmonized French labor share today is essentially the same as in 1960: there is no substantial decline (see also Cette et al., 2019).

To contrast our results with Karabarbounis and Neiman (2014), we estimate country-level trends in the KLEMS labor share excluding real estate and compare them with the raw corporate sector series. Trends using KLEMS exhibit a smaller decline in most countries, and for a few countries, a much bigger increase (Figure A.3 in the Appendix). Starting from 1970 instead of the 1980 historical peak used by Karabarbounis and Neiman (2014) further strengthens the results (Figure A.4): the trend is stable for the EU4, EU14 and EU27 aggregates (zero p.p. change per decade). Last, we can focus on the post-2000 period, when the US experienced the sharpest decrease. As shown in Figure A.4, Italy, France and the UK as well as all European aggregates exhibit an increasing trend. Only Germany experiences a decline – and it is much lower than the US (2p.p. vs. 5p.p. per decade, respectively). EU labor shares have remained stable or increased since 2000. This is also true using either the adjusted or even the raw corporate sector series.

## 5. Industry Trends

To conclude, let us study the evolution of labor shares within regions, across industries using a shift-share decomposition. Such decompositions are common in the labor share literature (see Reshef and Santoni, 2019, for a recent overview). Typically, the share contribution is defined as the product of changes in the industry share of gross value added and initial (or average) labor shares. (Comparatively) growing industries then have positive share contributions, while shrinking industries have negative contributions. This is correct mathematically, of course, but such decompositions are hard to interpret. Consider real estate: its share of value added increased so it would appear

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capital-biased technical change. The critical insight for us – however – is Blanchard’s forecast that the unemployment rate would eventually fall and the labor share would recover as firms reacted to higher profits by investing. This is precisely what happened in Europe from the late 1990s to the Great Recession.

<sup>27</sup>In France, INSEE provides data on mixed income by industry. Since the corporate sector in France includes no self-employed, mixed income should reflect the total income of self-employed. We can thus measure the labor share for the business sector using data on mixed income by industry ( $MI^k$ , with  $W^{self,k} N^{self,k} = MI^k (W^{self,k} N^{self,k} / (Y^k - MI^k))$ ). Figure A.17 compares both adjustments. The adjustment using hours worked is larger than with mixed income. The adjustment using mixed income is very close to the corporate sector series (adjusted for dwellings). It suggests that KLEMS overstates the income of self-employed in France. This might be particular to France since self-employment is a precarious status in this country (Askenazy and Palier, 2018), whereas it is much less so in other countries, like in the UK for example (ONS, 2017).

to have a positive share effect. But we know that its growth pushes the aggregate labor share down given its low labor share relative to the economy. This is because – in standard shift-share decompositions – the negative effect is distributed among all the other shrinking industries.

We instead borrow from the productivity literature (namely [Melitz and Polanec, 2015](#)) and decompose the change in the labor share into shift and share effects, where the share effect is measured relative to the aggregate labor share:

$$\begin{aligned}\Delta LS_i &= \sum_k \Delta (LS_{i,k,t} \omega_{i,k,t}) \\ &= \underbrace{\sum_k \bar{\omega}_{i,k} \Delta LS_{i,k,t}}_{\text{within effect}} + \underbrace{\sum_k (L\bar{S}_{i,k} - L\bar{S}_i) \Delta \omega_{i,k,t}}_{\text{between effect}}\end{aligned}$$

where  $LS_{i,k,t}$  is the labor share in country  $i$  and sector  $k$  in year  $t$ ,  $\omega_{i,k,t}$  is sector  $k$ 's share in country  $i$ 's gross value added in year  $t$ ,  $\Delta x$  is the p.p. change in  $x$  over 1977-2015 and  $\bar{x}$  is its average.

Results are presented in Table 1a for the largest four European economies and Table 1b for the US (detailed results are presented in Tables A.5 to A.7). As expected, the total economy labor share declined in both the EU and US since 1977 – by 4.01% and 2.10%, respectively. The decline in the EU, however, is entirely explained by the rise of real estate (-3.68p.p total contribution). In fact, the business sector labor share excluding real estate exhibits a 0.37p.p *increase*, driven by small and offsetting contributions across sectors. By contrast, only a small portion of the US labor share decline is explained by real estate (1.29p.p.) so that, excluding real estate, the US business sector labor share still declines by 2.86p.p primarily due to a large decline in the manufacturing labor share.<sup>28</sup>

## 6. Conclusions and Implications

Our results challenge the common wisdom of a global decline in the non-housing labor share, and cast doubt on most common explanations for these trends: technological changes – including declining capital prices, automation, import competition and intangibles – which, at least as emphasized so far, have similar effects across countries and industries.

Determining why the labor share declined in US manufacturing, but not elsewhere is an important area of future research. Perhaps declining competition has led to rising profits in selected US

<sup>28</sup>As a further robustness test, Appendix Figure A.5 confirms that EU manufacturing labor shares remain stable when using firm-level data of non-financial corporations. The divergence between the US and EU appears in firm-level data and is not due to self-employment adjustments.

industries, as emphasized by Gutiérrez and Philippon (2018). Or perhaps the mechanisms emphasized so far had different outcomes across regions and industries. We explore this in future work Gutiérrez et al. (2019).

**Table 1** – Sector contributions to the change in the labor share, 1977-2015

**(a) EU4 (France, Germany, Italy, UK)**

Sector	$\Delta LS$ , p.p.	$LS_{2015}$ , %	$\Delta \omega$ , p.p.	$\omega_{2015}$ , in %	within effect, p.p.	between effect, p.p.	total contrib., p.p.
Total	-4.01	65.73	-	-	0.25	-4.26	-
Real Estate	-2.39	5.61	5.68	12.09	-0.22	-3.46	<b>-3.68</b>
Business sector	<b>0.37</b>	70.75	-6.44	67.34	0.53	-0.45	0.08
Manuf.	-1.84	68.18	-12.03	17.06	-0.28	-0.31	-0.59
Business services	-0.08	70.09	8.72	44.89	0.20	-0.02	0.18
Other business activities	11.90	84.35	-3.13	5.39	0.61	-0.11	0.49
Other non-business sectors	-2.69	84.60	0.76	20.58	-0.05	-0.35	-0.40

**(b) United States**

Sector	$\Delta LS$ , p.p.	$LS_{2015}$ , %	$\Delta \omega$ , p.p.	$\omega_{2015}$ , in %	within effect, p.p.	between effect, p.p.	total contrib., p.p.
Total	-2.10	58.09	-	-	-1.49	-0.61	-
Real Estate	0.54	6.02	2.53	12.13	0.06	-1.35	-1.29
Business sector	<b>-2.86</b>	59.90	-2.29	65.62	-2.01	0.06	-1.96
Manuf.	<b>-20.82</b>	47.14	-10.07	12.20	-2.84	-0.58	-3.43
Business services	4.35	62.87	8.63	47.47	1.31	0.70	2.01
Other business activities	-7.54	62.34	-0.85	5.96	-0.48	-0.06	-0.54
Other non-business sectors	5.36	81.14	-0.24	22.26	0.47	0.68	1.15

Source: author's calculations using EU KLEMS.

Note: The aggregate is the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates.

## References

- Acemoglu, D. and Restrepo, P. (2018). The race between man and machine: Implications of technology for growth, factor shares, and employment. *American Economic Review*, 108(6):1488–1542.
- Askenazy, P. and Palier, B. (2018). France: rising precariousness supported by the welfare State. Working Paper 1801, CEPREMAP.
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., and Reenen, J. V. (2017a). Concentrating on the fall of the labor share. *American Economic Review*, 107(5):180–185.
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., and Van Reenen, J. (2017b). The fall of the labor share and the rise of superstar firms. Working Paper 23396, National Bureau of Economic Research.
- Autor, D. and Salomons, A. (2018). Is automation labor-displacing? Productivity growth, employment, and the labor share. *Brookings Papers on Economic Activity*, 49(1 (Spring)):1–87.
- Blanchard, O. (1998). *Revisiting European Unemployment: Unemployment, Capital Accumulation and Factor Prices*. Economic and Social Research Institute (ESRI).
- Cette, G., Koehl, L., and Philippon, T. (2019). Labor shares. Technical report.
- Elsby, M., Hobijn, B., and Sahin, A. (2013). The decline of the US labor share. *Brookings Papers on Economic Activity*, 44(2 (Fall)):1–63.
- Gollin, D. (2002). Getting income shares right. *Journal of Political Economy*, 110(2):458–474.
- Gutiérrez, G., Martínez, J., and Piton, S. (2019). The collapse of the manufacturing labor share: why is the US exceptional?
- Gutiérrez, G. and Philippon, T. (2018). How EU markets became more competitive than US markets: A study of institutional drift. Working Paper 24700, National Bureau of Economic Research.
- Hall, R. and Jorgenson, D. (1967). Tax policy and investment behavior. *American Economic Review*, 57(3):391–414. Reprinted in Bobbs-Merrill Reprint Series in Economics , Econ-130. Investment 2, ch. 1, pp 1-26.
- IMF (2017). Understanding the downward trend in labor income shares. In Dao, M. C., Das, M., Koczan, Z., and Lian, W., editors, *World Economic Outlook*. IMF.
- ISTAT (2012). The household sector in Italy: an analysis for producer and consumer units. Technical report, United Nations Conference of European Statisticians. Group of Experts on National Accounts.
- Karabarbounis, L. and Neiman, B. (2014). The global decline of the labor share. *The Quarterly Journal of Economics*, 129(1):61–103.
- Knoll, K. (2017). *Our Home in Days Gone By: Housing Markets in Advanced Economies in Historical Perspective*. PhD thesis, University of Bonn.



- Koh, D., Santaeuàlia-Llopis, R., and Zheng, Y. (2015). Labor share decline and intellectual property products capital. Technical Report ECO2015/05, European University Institute.
- Lequiller, F. and Blades, D. (2014). *Understanding National Accounts*.
- Martinez, J. (2018). Automation, growth and factor shares. Technical report.
- Melitz, M. J. and Polanec, S. (2015). Dynamic Olley-Pakes productivity decomposition with entry and exit. *RAND Journal of Economics*, 46(2):362–375.
- Moulton, B. R. (2014). The Implementation of System of National Accounts 2008 in the US National Income and Product Account. Technical report, Eurostat.
- OECD (2018). Decoupling of wages from productivity: What implications for public policies? In *OECD Economic Outlook*, volume 2018. OECD.
- ONS (2017). National accounts articles: Improving the household, private non-financial corporations and non-profits institutions serving households sectors' non-financial accounts. Technical report, UK Office for National Statistics.
- Piketty, T. and Zucman, G. (2014). Capital is back: Wealth-income ratios in rich countries 1700-2010. *The Quarterly Journal of Economics*, 129(3):1255.
- Pionnier, P.-A. and Guidetti, E. (2015). Comparing profit shares in value-added in four OECD countries: Towards more harmonised national accounts. OECD Statistics Working Papers 2015/3, OECD Publishing.
- Reshef, A. and Santoni, G. (2019). Are your labor shares set in Beijing? The view through the lens of global value chains.
- Rognlie, M. (2015). Deciphering the fall and rise in the net capital share: Accumulation or scarcity? *Brookings Papers on Economic Activity*, 46(1 (Spring)):1–69.
- Rognlie, M. (2018). Comment on “Accounting for factorless income”. In *NBER Macroeconomics Annual 2018, volume 33*, NBER Chapters. National Bureau of Economic Research, Inc.
- Smith, M., Yagan, D., Zidar, O. M., and Zwick, E. (2019). Capitalists in the twenty-first century. Working Paper 25442, National Bureau of Economic Research.
- United Nations (2008). *System of National Accounts 2008*.

## Appendix for “Revisiting the Global Decline of the (Non-Housing) Labor Share”

### A. Data

We use two National account databases to measure labor shares: sector and industry accounts. Both sets of accounts rely on the same accounting identities defined in the 2008 System of National Accounts (SNA, [United Nations, 2008](#)). Data coverage for both sources is summarized in Tables A.3 and A.4. To compare our results with prior literature, we also gather labor share series from [Karabarbounis and Neiman \(2014\)](#) and [Piketty and Zucman \(2014\)](#).

#### A.1. Sector Data

Data for sector accounts are easily downloadable from the OECD's website – particularly SNA Table 14A. Sector accounts divide the economy into five institutional sectors: households (*HH*), nonprofit institutions serving households (*NPISH*), general government (*G*), financial corporations (*FC*), and non-financial corporations (*NFC*). GDP can thus be decomposed as follows:

$$GDP = Y^{NFC} + Y^{FC} + Y^{HH} + Y^{NPISH} + Y^G + \text{Net Taxes on products}$$

with  $Y^x$  the nominal gross value added (GVA) of sector  $x$ . GVA for sector  $x$  can be further decomposed into

$$Y^x = W^x L^x + GOS^x + MI^x + \text{Net Taxes on production}^x$$

with  $W^x L^x$  the compensation of employees,  $GOS^x$  the gross operating surplus, and  $MI^x$  mixed income of unincorporated enterprises (containing an element of remuneration for work that cannot be separated from the return to the owner as entrepreneur).

**Total economy labor shares.** The total economy labor share is defined as the ratio of total employee compensations to GDP. We account for the income of the self-employed by applying the corporate labor share to the noncorporate sector.<sup>29</sup> [Karabarbounis and Neiman \(2014\)](#) series for the total economy do not account for self-employment, so we use [Piketty and Zucman \(2014\)](#) to extend our series and get more historical data.

<sup>29</sup>To do this, we split mixed income using the corporate wage share, so that total labor compensation in the noncorporate sector is the estimated "labor compensation" part of mixed income plus observed employee compensations. More specifically, the labor share for the total economy is:  $(WL + MI[WL/(Y - MI)]) / Y$ . [Piketty and Zucman \(2014\)](#) simply apply the corporate wage share to the noncorporate GVA, without using the information on mixed income nor employee compensations in this sector.

**Corporate sector labor shares.** The labor share for the corporate sector is defined as the ratio of employee compensations to GVA in the corresponding sector. We use OECD data and Karabarbounis and Neiman (2014) to extend our series back in time. Most of our results use the raw corporate sector labor shares. However, Figure 3 of the paper corrects for housing services and labor compensation of the self-employed. See the main text for additional details.

## A.2. Industry Data

Industry accounts divide activity according to an industrial classification. As for sectors, industry-level GVA can be decomposed into compensation of employees, gross operating surplus, mixed income, and net taxes on production. In the US, industry-level GVA also include net taxes on products.<sup>30</sup>

Our primary dataset is the 2018 vintage of EU KLEMS, which covers all European countries as well as the United States. Data is split into 33 industries, which follow the ISIC rev. 4 classification. Whenever a longer history is available in previous vintages, we use them to extend our data as far back as possible. To do so, we face two challenges. First, as discussed by Autor and Salomons (2018), revisions to the industry definitions in KLEMS (and underlying raw data) were implemented in the 2016 release. To ensure consistency over time, we construct an industrial classification with 26 industries, shown in Table A.1, that ensures correspondence across vintages. The second challenge is that data in recent vintages are not comparable due to changes in national accounting manuals (ESA 1995 vs. ESA 2010, see EU KLEMS methodological note for more details). We thus cannot apply 2012 labor share levels to the 2018 series. We extend each industry series by applying the absolute change in the labor share of the previous vintage to the last observation in the 2018 vintage. We also extend series of GVA by applying the previous vintage growth rates to the 2018 vintage level in 1995.

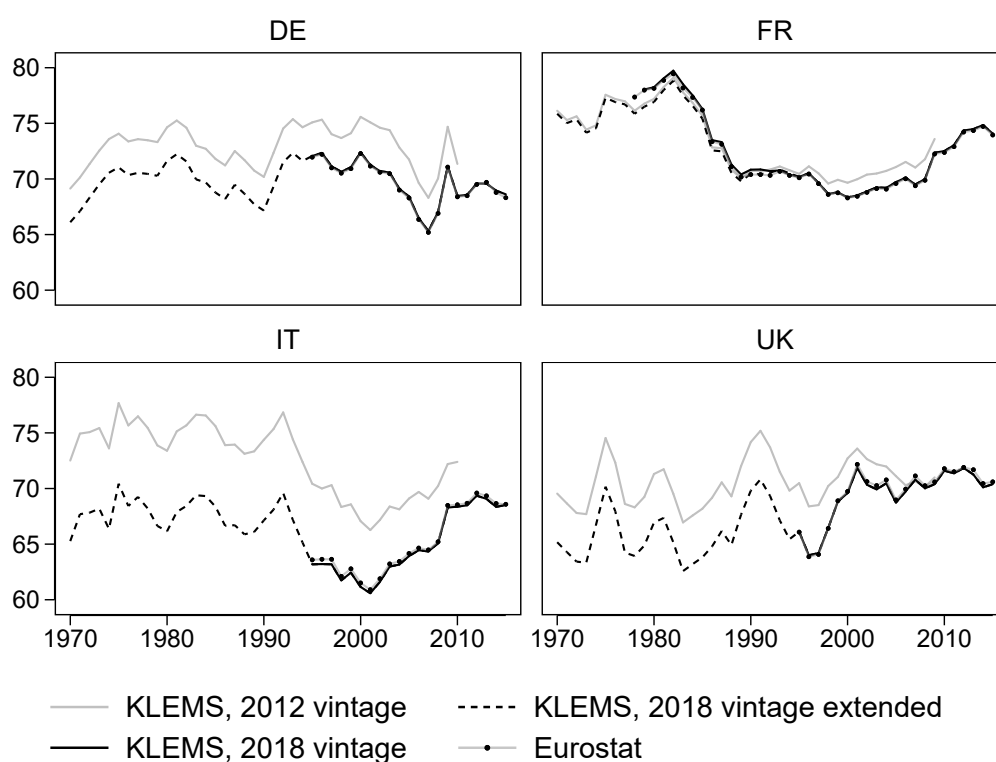
Figure A.1 compares labor shares for the business sector of selected countries from various sources<sup>31</sup>: from KLEMS 2012 vintage, KLEMS 2018 vintage and from Eurostat. It also exhibits our final extended series. KLEMS 2018 vintage uses Eurostat raw data, so both measures coincide exactly when they overlap (as expected). Labor shares in the 2012 vintage are systematically larger than in the most recent vintages, but they exhibit similar trends when they overlap. Concatenating the two series would then automatically result in a large drop in the labor share, but concatenating the trends – as we do – appears reasonable.

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<sup>30</sup>For consistency, all labor shares series are presented at basic prices (i.e. including only net taxes on production and not on products) for Europe and market prices (i.e. including both net taxes on production and not on products) for the US. As a result, the levels of the US and EU labor shares are not comparable: the US labor share is lower because the GVA includes more taxes. Figure A.8 in Appendix shows that the different treatment of taxes do not affect the dynamics of labor shares, but only levels.

<sup>31</sup>Labor share adjusted for self-employed using data on hours worked.

**Figure A.1** – Gross domestic labor share in different KLEMS vintages and comparison with Eurostat, business sector, 1970-2015, in %



Source: authors' calculation using EU KLEMS and Eurostat.

Note: Share of total labor compensations in GVA. Series are adjusted for self-employed using data on hours worked.

Finally, we use Eurostat, world KLEMS and OECD STAN to build series for non European countries (see Table A.4). Our dataset covers up to 39 countries from up to 1961-2017.

### **A.3. Firm-level Data**

For some of our robustness tests, we complement KLEMS with firm-level data from the ECB's CompNet. CompNet's data is sourced from Central Banks and National Institutes, and consolidated into a common industry hierarchy (NACE). We use the 4th vintage of CompNet, which covers 18 European countries from 2001 to 2012. We focus on manufacturing firms with more than 20 employees, since they provide the best coverage over time and across countries. The labor share is defined as total employee compensations to nominal GVA.

### **A.4. Real Estate Data**

Last, we gather data on rental income, housing prices and housing structures from the OECD. We use these data to estimate the contribution of housing to NFC value added. The following fields are used in our main results:

- Actual and imputed rents on housing (P31CP041 and P31CP042 from SNA table 5, respectively);
- Gross operating surplus for the housing sector (field NFB2GP from SNA Table 14A);
- Current cost value of housing structures, by sector (field N1111 from SNA table 9B).

We complement these data with a few additional fields used for robustness tests, described in Appendix C:

- Current cost value of land, by sector (field N211 from SNA table 9B);
- 3-month and 10 year interest rates (fields IR3TIB01 and IRLTLT01 from table KEI);
- Nominal housing price index (field HPI from table HOUSE PRICES).

**Table A.1** – Industrial classification and correspondence table with various KLEMS vintages

Sector code in 2018 or 2012 vintages	Sector code in 2009 vintage	Sector description	Included in the business sector?
A	AtB	Agriculture, forestry and fishing	
B	C	Mining and quarrying	✓
10-12	15t16	Food products, beverages and tobacco	✓
13-15	17t19	Textiles, wearing apparel, leather and related products	✓
16-18	20 + 21t22	Wood and paper products; printing and reproduction of recorded media	✓
19-23	23t25 + 26	Chemical, rubber, plastics, fuel and other non-metallic products	✓
24-25	27t28	Basic metals and fabricated metal products	✓
26-27	30t33	Electrical and optical equipment	✓
28	29	Machinery and equipment n.e.c.	✓
29-30	34t35	Transport equipment	✓
31-33	36t37	Other manufacturing; repair of machinery and equipment	✓
D-E	E	Electricity, gas and water supply	✓
F	F	Construction	✓
G	G	Wholesale and retail trade; repair of motor vehicles	✓
I	H	Accommodation and food service activities	✓
49-52	60t63	Transport and storage	✓
53 + 61	64	Post and telecommunications	✓
K	J	Financial and insurance activities	✓
L	70	Real estate activities	
M-N + 58-60 + 62-63	71t74	Other business activities	✓
O	L	Public administration and defence; compulsory social security	
P	M	Education	
Q	N	Health and social work	
T	P	Activities of households as employers	
U	Q	Activities of extraterritorial organizations and bodies	

**Table A.2** – Produced non-financial fixed assets classification

SNA (2008) asset code	KLEMS code	Asset description
N111	Rstruc	Dwellings
N112	Ocon	Other buildings and structures
N1131	TraEq	Transport equipment
N11321	IT	Computer hardware
N11322	CT	Telecommunications equipment
N11O	Omach	Other machinery and equipment and weapons systems
N115	Cult	Cultivated biological resources
N1171	RD	Research and development
N1173	Soft_DB	Computer software and databases
N117 - N1171 - N1173	OIPP	Other intellectual property products

**Table A.3** – Coverage of final dataset, European countries and United States

Country group	Country	Country code	Adjusted business sector	Unadjusted corp. sector	Adjusted corp. sector
US	United States	US	1977-2015	1970-2016	1970-2016
EU4	Germany	DE	1970-2015	1980-2017	1995-2015
EU4	France	FR	1970-2015	1950-2017	1978-2016
EU4	Italy	IT	1970-2015	1980-2017	1995-2016
EU4	United Kingdom	UK	1970-2015	1987-2017	1995-2015
EU14	Austria	AT	1970-2015	1995-2017	1995-2016
EU14	Belgium	BE	1970-2015	1985-2017	1995-2016
EU14	Denmark	DK	1970-2015	1981-2017	1995-2016
EU14	Greece	EL	1970-2015	1995-2016	1995-2016
EU14	Spain	ES	1970-2015	1995-2017	
EU14	Finland	FI	1970-2015	1975-2017	1995-2016
EU14	Luxembourg	LU	1970-2015	1995-2016	1995-2016
EU14	Netherlands	NL	1970-2015	1980-2017	1995-2016
EU14	Portugal	PT	1970-2015	1995-2017	1995-2016
EU14	Sweden	SE	1970-2015	1980-2017	1995-2016
EU27	Bulgaria	BG	2000-2015	2005-2010	
EU27	Cyprus	CY	1995-2015	1995-2007	
EU27	Czech Republic	CZ	1995-2015	1993-2017	1995-2016
EU27	Estonia	EE	1995-2015	1994-2017	1995-2016
EU27	Croatia	HR	2008-2015	1997-2007	
EU27	Hungary	HU	2010-2015	1995-2017	1995-2016
EU27	Ireland	IE	1970-2015	1995-2017	
EU27	Lithuania	LT	1995-2015	1995-2017	1995-2016
EU27	Latvia	LV	1995-2015	1994-2017	1995-2015
EU27	Poland	PL	1995-2015	1995-2016	1995-2015
EU27	Romania	RO	1995-2015	1989-2009	
EU27	Slovenia	SI	1995-2015	1995-2017	1995-2016
EU27	Slovakia	SK	1995-2015	1995-2017	1995-2016

Note: Series for the adjusted business sector use data from KLEMS. Series for the unadjusted corporate sector use data from Karabarbounis and Neiman (2014) and OECD. Series for the adjusted corporate sector use data from the OECD.



**Table A.4** – Coverage of final dataset, additional countries

Country group	Country	Country code	Adjusted business sector	Unadjusted corp. sector	Adjusted corp. sector
global	Australia	AU	1970-2007		
global	Canada	CA	1961-2014		
global	Costa Rica	CR	1991-2016		
global	Iceland	IS	1997-2016		
global	Japan	JP	2007-2014		
global	Korea	KR	1980-2015	2010-2016	2010-2016
global	Malta	MT	1995-2017	2000-2007	
global	Norway	NO	1970-2015	1978-2017	2012-2015
global	New Zealand	NZ	2009-2015	1998-2016	
global	Turkey	TR	2009-2016	2009-2015	
global	Taiwan	TW	1980-2009		

Note: Series for the adjusted business sector use data from KLEMS and STAN. Series for the unadjusted corporate sector use data from Karabarbounis and Neiman (2014) and OECD. Series for the adjusted corporate sector use data from the OECD.

## B. Additional Details and Results

We first present a set of additional results:

- Figure A.2 plots historical labor share series for EU4 countries as well as the United States since 1950.
- Figure A.3 contrasts estimated trends using the harmonized series against those of Karabarbounis and Neiman (2014), for countries and years available in both datasets. The harmonized series significantly reduces the fall in the labor share on average.
- Figure A.4 presents estimated trends using the harmonized series for two sub-periods: 1970-2015 and post-2000. About half of the countries present in the dataset have increasing trends since 2000, when the labor share declined most in the US.
- Tables A.5 to A.7 detail the shift-share analysis presented in section 5.
- Figure A.5 contrasts KLEMS and CompNET based labor share estimates in manufacturing industries, to show that they behave remarkably similar. CompNET series are based on firm-level data of corporations, hence do not require a self-employment adjustment.

We then present some robustness checks:

- Figure A.6 shows that EU labor shares are stable so long as real estate is excluded, irrespective of which other industries are excluded.
- Figure A.7 contrasts net and gross labor share measures using both data on the consumption of fixed capital and KLEMS depreciation estimates. Given the rise in depreciation, net labor shares exhibit slightly more positive trends than gross shares.
- Figure A.8 shows that labor shares measures with GVA at basic and market prices behave similarly.

Next, we discuss the inclusion of dwellings in the corporate sector and the composition of the real estate sector in industry accounts:

- Figure A.9 and A.10 document the important share of ownership of dwellings in European corporate sectors.
- Figure A.11 to A.13 provide additional details on the ownership of dwellings for France, the US and the UK.
- Figure A.14 shows the contribution of real estate to value added, which increased much faster in Europe than the US.

Last, we discuss further the treatment of self-employment:

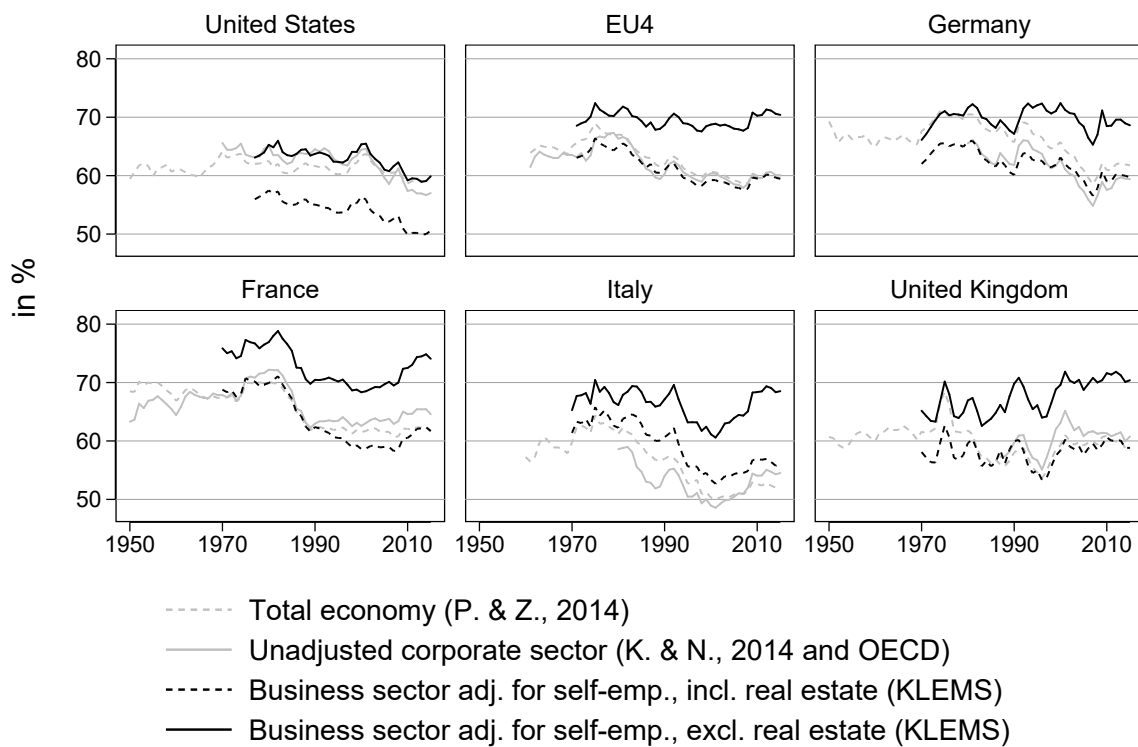
- Figure A.15 and Figure A.16 contrast the two main approaches for estimating wages of the self-employed: estimating the compensations of self-employed using (i) mixed income or (ii) the number of hours worked, respectively for the total economy and the

business/corporate sector. The gap between the two is stable in the US, but increases in Europe over time, in line with an increasing share of self-employed not accounted for in the measure of mixed income.

- Figure A.17 contrasts alternate self-employment adjustments for France. See main body for details.
- Figure A.18 shows the prevalence of self-employment in Italy, in particular in the corporate sector.

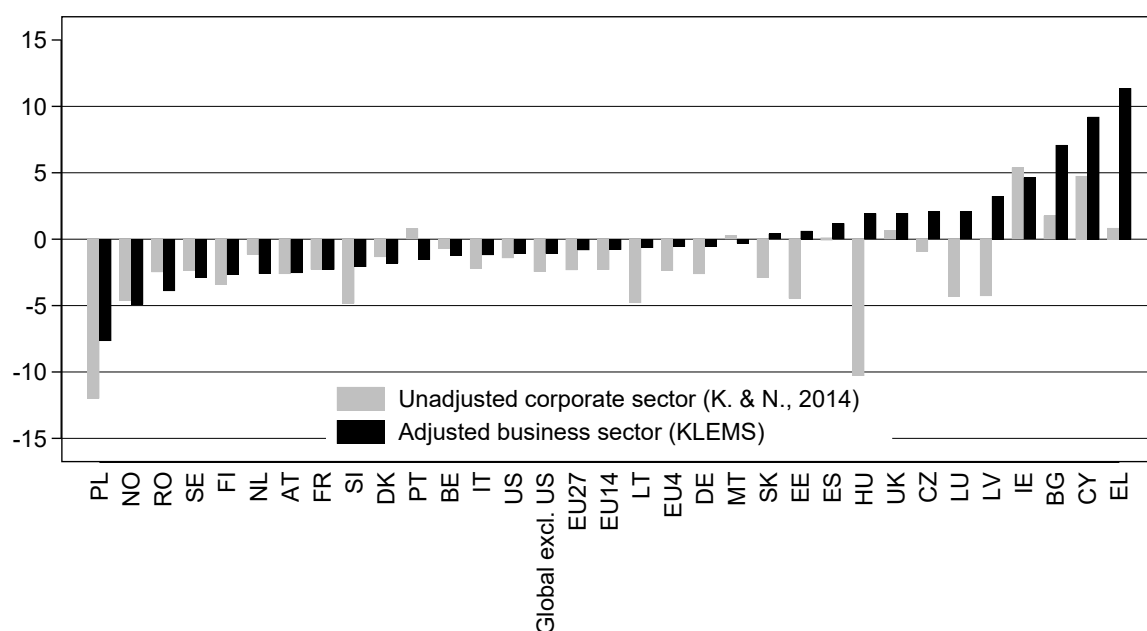
## B.1. Additional Results

**Figure A.2** – Historical gross domestic labor share, Europe and United States, 1950-2015



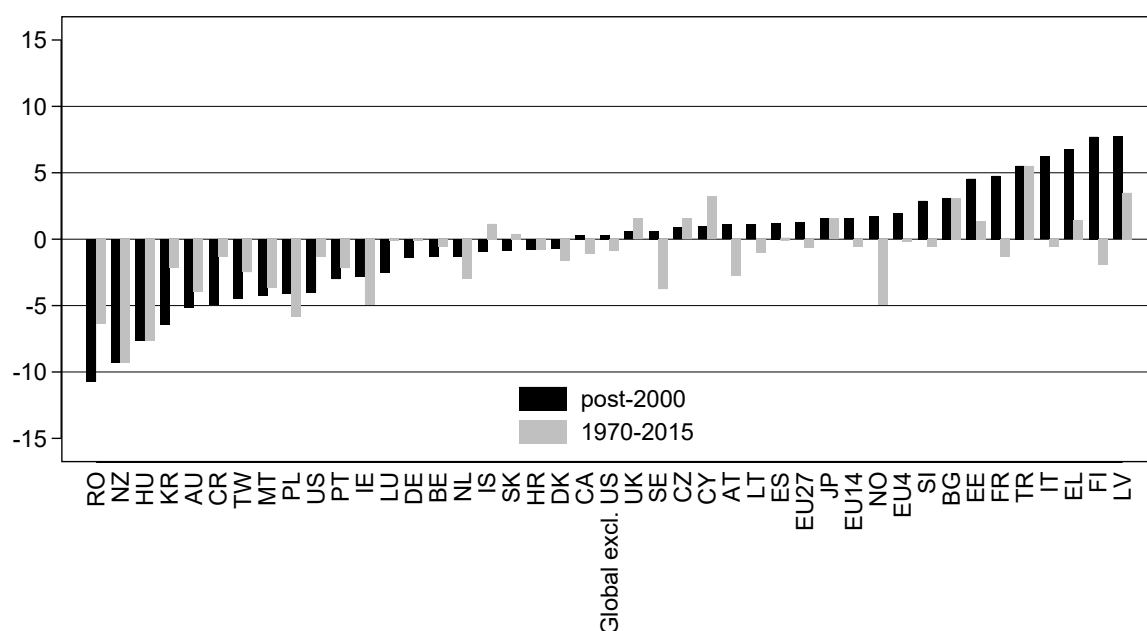
Source: authors' calculations using EU KLEMS, OECD, [Piketty and Zucman \(2014\)](#) and [Karabarbounis and Neiman \(2014\)](#). EU4 plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates and the effects have been normalized to equal the average labor share in 1995.

**Figure A.3** – Labor share trends, in percentage points per 10 years, comparison with Karabarbounis and Neiman (2014)



Source: authors' calculations using EU KLEMS and Karabarbounis and Neiman (2014). The figure shows estimated trends in the labor share for all countries and years available in both datasets. Trend coefficients are reported in units per 10 years (i.e. a value of -5 means a 5 percentage point decline every 10 years). EU4 includes France, Italy, Germany and the UK. EU14 includes EU4 as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. EU27 includes all EU countries except Malta.

**Figure A.4** – Adjusted labor share for the business sector, trends in percentage points per 10 years, 1970-2015 and 2000-2015



Source: authors' calculations using EU KLEMS data for the business sector. The figure shows estimated trends in the labor share for all countries and years available in the dataset. Trend coefficients are reported in units per 10 years (i.e. a value of -5 means a 5 percentage point decline every 10 years). EU4 includes France, Italy, Germany and the UK. EU14 includes EU4 as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. EU27 includes all EU countries except Malta.

**Table A.5** – Sector contributions to the change in the labor share, 1977-2015, EU4

Sector	$\Delta LS$ , p.p.	$LS_{2015}$ , %	$\Delta \omega$ , p.p.	$\omega_{2015}$ , in %	within effect, p.p.	between effect, p.p.	total contrib., p.p.
Total	-4.01	65.73	-	-	0.25	-4.26	-
Real Estate	-2.39	5.61	5.68	12.09	-0.22	-3.46	-3.68
Business sector	0.37	70.75	-6.44	67.34	0.53	-0.45	0.08
Manuf.	-1.84	68.18	-12.03	17.06	-0.28	-0.31	-0.59
Food products, beverages, tobacco	4.87	71.21	-1.23	1.79	0.12	-0.01	0.10
Textiles, wearing apparel, leather products	-2.76	75.88	-1.46	0.46	-0.03	-0.14	-0.17
Wood, paper products; reprod. of recorded media	3.58	76.63	-0.96	0.84	0.05	-0.07	-0.02
Chemical, rubber, plastics, fuel products	-2.79	59.28	-2.37	3.35	-0.13	0.17	0.04
Basic metals and metal products	-3.32	74.85	-1.67	2.16	-0.10	-0.15	-0.25
Electrical and optical equipment	8.31	68.18	-2.02	1.92	0.24	0.07	0.32
Machinery and equipment n.e.c.	-0.52	74.34	-1.16	2.23	-0.01	-0.08	-0.09
Transport equipment	-11.89	57.40	-0.31	2.93	-0.37	0.01	-0.35
Other manuf.	-2.42	80.62	-0.86	1.39	-0.04	-0.12	-0.17
Business services	-0.08	70.09	8.72	44.89	0.20	-0.02	0.18
Transport and storage	-20.07	63.94	0.08	4.18	-0.83	-	-0.83
Post and telecommunications	-7.46	54.71	-0.61	1.74	-0.15	0.06	-0.10
Electricity, gas and water supply	-6.45	38.89	-0.15	2.74	-0.18	0.04	-0.14
Wholesale and retail trade; repair of motor vehicles	0.37	78.42	-1.07	10.24	0.04	-0.11	-0.07
Accommodation and food service activities	-16.69	86.03	0.80	2.36	-0.33	0.21	-0.11
Financial and insurance activities	1.74	64.39	0.68	4.96	0.08	-0.03	0.05
Other business activities	12.49	70.83	8.27	15.29	1.39	-0.26	1.13
Arts, entertainment, recreation and other services	5.93	79.59	0.72	3.39	0.18	0.06	0.24
Other business activities	11.90	84.35	-3.13	5.39	0.61	-0.11	0.49
Mining and quarrying	17.43	63.32	-1.21	0.29	0.16	0.16	0.31
Construction	7.44	85.56	-1.92	5.10	0.45	-0.27	0.18
Other non-business sectors	-2.69	84.60	0.76	20.58	-0.05	-0.35	-0.40
Agriculture, forestry, fishing	-15.75	101.16	-2.04	1.10	-0.33	-0.84	-1.18
Public administration and defence	-0.92	77.35	-0.90	6.31	-0.06	-0.09	-0.15
Education	9.40	93.75	0.33	4.89	0.44	0.07	0.51
Health and social work	-1.83	80.82	3.25	7.87	-0.11	0.45	0.34
Activities of households as employers	3.22	115.57	0.13	0.41	0.01	0.06	0.07

Source: author's calculations using EU KLEMS. Note: EU4 includes France, Italy, Germany and the United Kingdom.

**Table A.6** – Sector contributions to the change in the labor share, 1977-2015, United States

Sector	$\Delta LS$ , p.p.	$LS_{2015}$ , %	$\Delta \omega$ , p.p.	$\omega_{2015}$ , in %	within effect, p.p.	between effect, p.p.	total contrib., p.p.
Total	-2.10	58.09	-	-	-1.49	-0.61	-
Real Estate	0.54	6.02	2.53	12.13	0.06	-1.35	-1.29
Business sector	-2.86	59.90	-2.29	65.62	-2.01	0.06	-1.96
Manuf.	-20.82	47.14	-10.07	12.20	-2.84	-0.58	-3.43
Food products, beverages, tobacco	-15.13	40.86	-0.80	1.45	-0.28	0.09	-0.19
Textiles, wearing apparel, leather products	-	79.74	-1.24	0.16	-	-0.26	-0.26
Wood, paper products; reprod. of recorded media	-8.83	61.67	-1.20	0.72	-0.12	-0.08	-0.20
Chemical, rubber, plastics, fuel products	-24.77	29.29	-0.65	3.70	-1.00	0.11	-0.88
Basic metals and metal products	-12.32	63.77	-2.23	1.15	-0.28	-0.24	-0.52
Electrical and optical equipment	-24.96	51.54	-0.55	1.88	-0.54	-0.03	-0.56
Machinery and equipment n.e.c.	-8.11	61.92	-1.42	0.86	-0.13	-0.10	-0.22
Transport equipment	-17.55	50.12	-1.46	1.65	-0.42	-	-0.41
Other manuf.	-10.00	70.03	-0.52	0.62	-0.09	-0.08	-0.17
Business services	4.35	62.87	8.63	47.47	1.31	0.70	2.01
Transport and storage	-8.50	62.53	-0.62	3.05	-0.29	-0.05	-0.33
Post and telecommunications	6.01	110.55	-0.35	0.30	0.03	-0.17	-0.14
Electricity, gas and water supply	4.47	31.95	-0.63	1.85	0.10	0.19	0.28
Wholesale and retail trade; repair of motor vehicles	-4.53	52.43	-2.61	12.08	-0.61	0.12	-0.49
Accommodation and food service activities	3.08	65.93	0.64	2.95	0.08	0.03	0.11
Financial and insurance activities	3.38	58.07	2.82	7.27	0.20	-0.08	0.12
Other business activities	10.47	71.16	9.04	16.67	1.27	0.61	1.89
Arts, entertainment, recreation and other services	16.88	80.32	0.33	3.30	0.53	0.04	0.57
Other business activities	-7.54	62.34	-0.85	5.96	-0.48	-0.06	-0.54
Mining and quarrying	-9.25	28.43	-0.27	1.84	-0.18	0.07	-0.11
Construction	-6.84	77.53	-0.58	4.11	-0.30	-0.13	-0.43
Other non-business sectors	5.36	81.14	-0.24	22.26	0.47	0.68	1.15
Agriculture, forestry, fishing	13.33	50.65	-1.42	0.98	0.23	0.21	0.44
Public administration and defence	-0.51	78.76	-2.35	12.84	-0.07	-0.47	-0.54
Education	1.92	94.87	0.38	1.14	0.02	0.13	0.15
Health and social work	5.16	87.31	3.15	7.30	0.30	0.81	1.10
Activities of households as employers	-	-	-	-	-	-	-

Source: author's calculations using EU KLEMS.

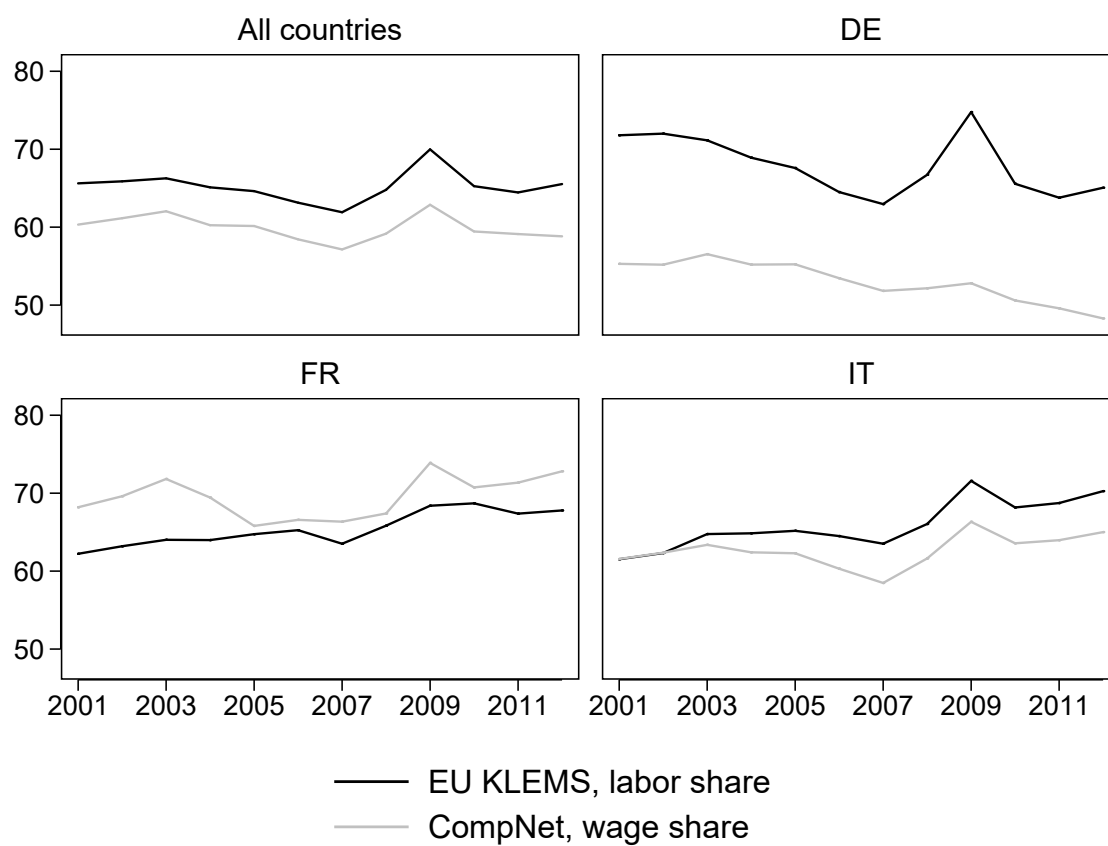


**Table A.7** – Adjustment contributions to the change in the labor share, US and EU4

	Germany	France	Italy	United Kingdom	United States
Total eco. Labor share	-3.34	-6.59	-3.55	4.77	-2.59
<i>Contribution of:</i>					
Real estate activities	-3.59	-3.57	-6.39	-3.21	-1.65
Non-business activities	-2.03	-0.42	-0.42	2.63	1.91
Business activities	2.29	-2.61	3.25	5.35	-2.86
of which, wage share	0.14	1.46	-2.38	-3	-4.25
of which, adj. for self-emp.	2.15	-4.07	5.64	8.34	1.39

Source: author's calculations using EU KLEMS. Data cover the period 1970-2015 except for the US where data starts in 1977.

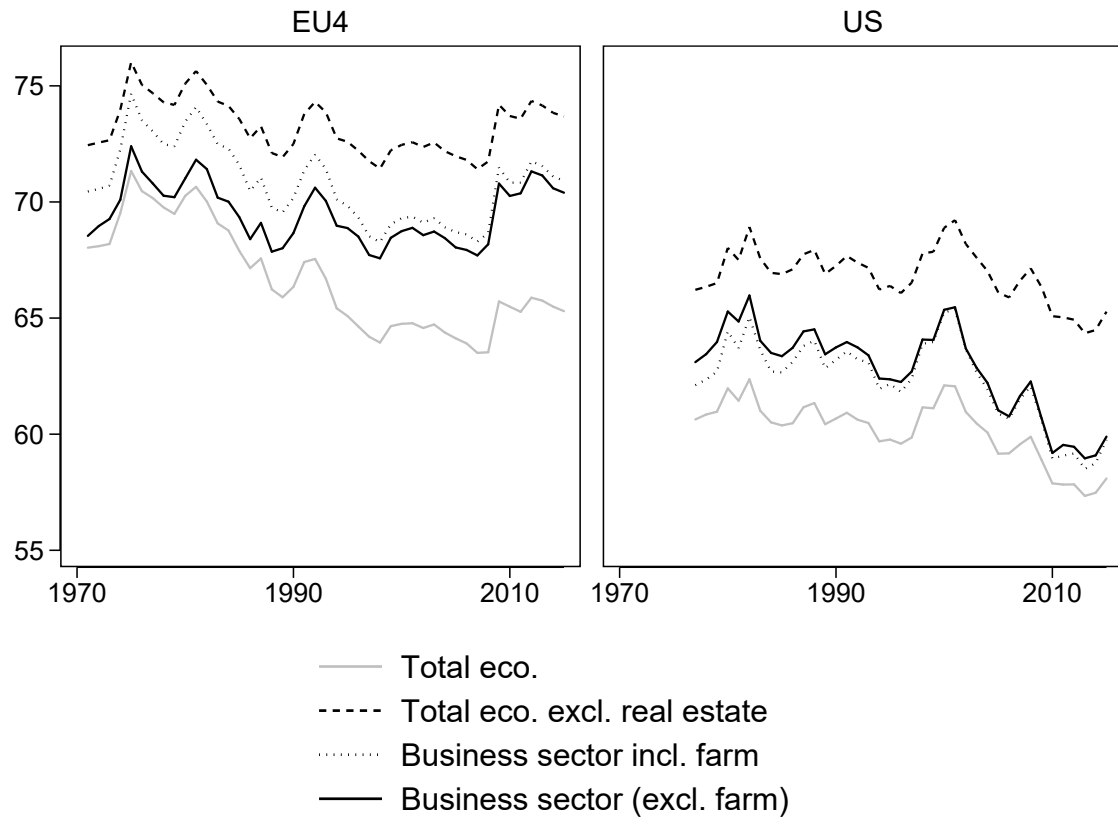
**Figure A.5** – Labor share, comparison EU KLEMS and CompNet, manufacturing sector, 2001-2012, in %



Source: authors' calculations using EU KLEMS and CompNet. The figures shows the average wage share over sub-sectors of the manufacturing sector where the value is reported in both datasets. Averages are weighted by the share in GVA of the sub-sector in EU KLEMS.

## B.2. Robustness Checks

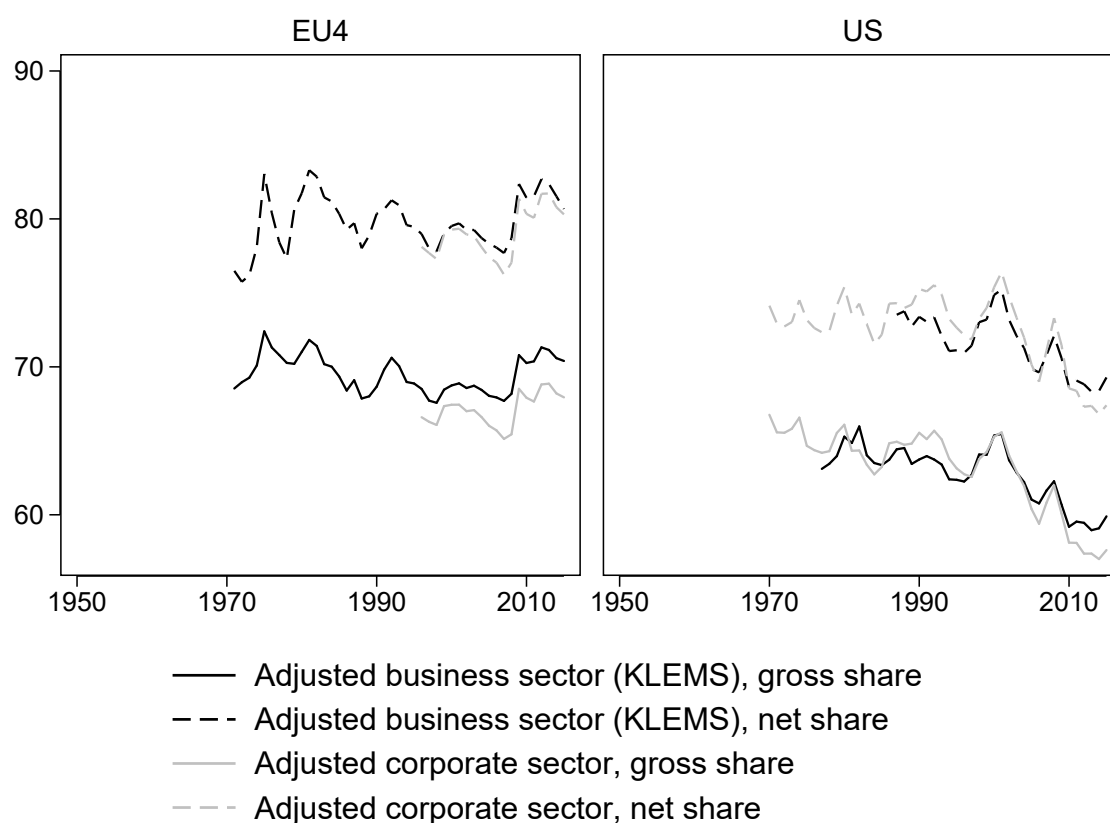
**Figure A.6** – Gross domestic labor share, by sector, EU4 and United States, 1970-2015, in %



Source: authors' calculation using EU KLEMS.

Note: Share of total labor compensations in GVA. Series are adjusted for self-employed (see Appendix section A for a description of the adjustment). EU4 includes France, Italy, Germany and the UK and plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average labor share in 1995.

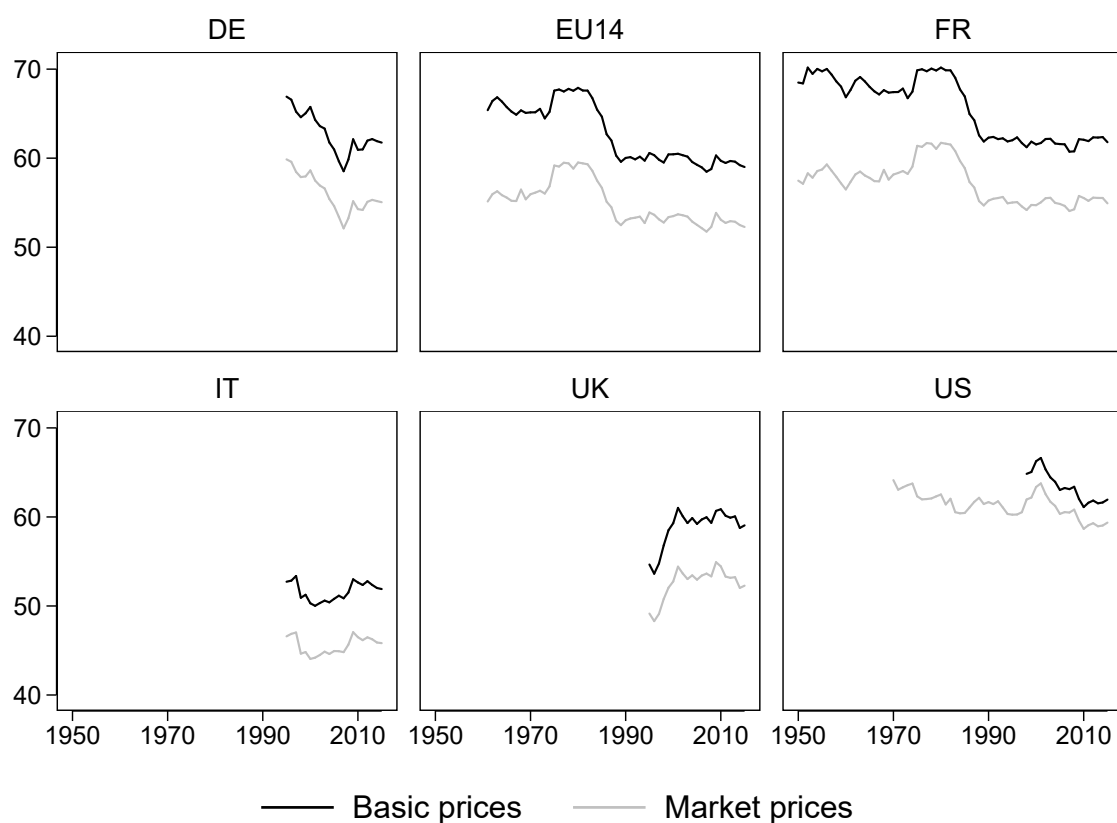
**Figure A.7** – Gross and net domestic labor share, EU4 and United States, 1950-2015, in %



Source: authors' calculation using EU KLEMS and OECD.

Note: Share of total labor compensations in GVA. Series are adjusted for self-employed (see Appendix section A for a description of the adjustment). Corporate sector net shares are measured using information on the consumption of fixed capital. Business sector net shares are measured using KLEMS estimates of capital depreciation at the industry-asset level. EU4 includes France, Italy, Germany and the UK and plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average labor share in 1995.

**Figure A.8** – Domestic gross labor share at market and basic prices, total economy, Europe and United States, 1950-2015, in %

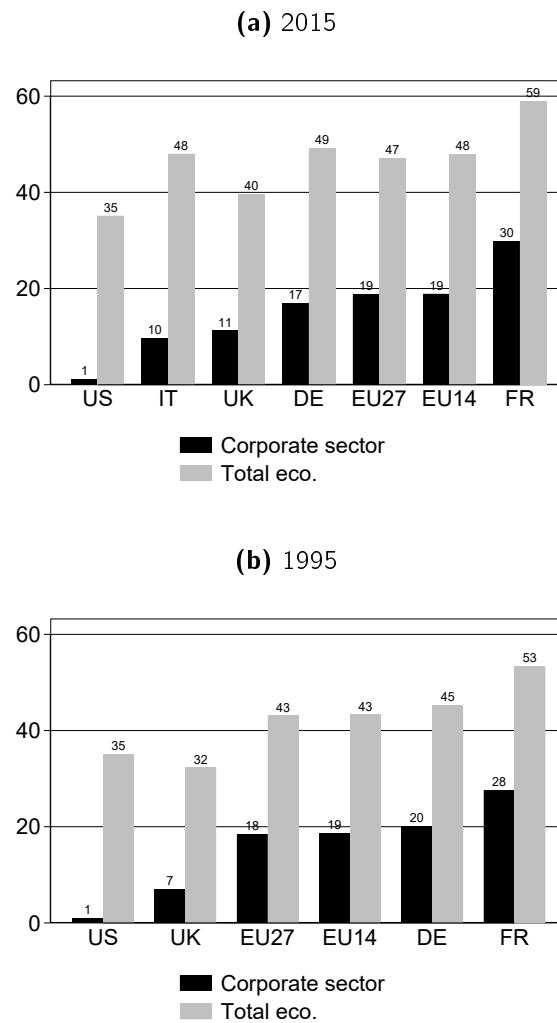


Source: authors' calculation using OECD.

Note: Share of total labor compensations in GVA. Series are adjusted for self-employed (see Appendix section A for a description of the adjustment). EU14 includes France, Italy, Germany, the UK as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. It plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average labor share in 1995.

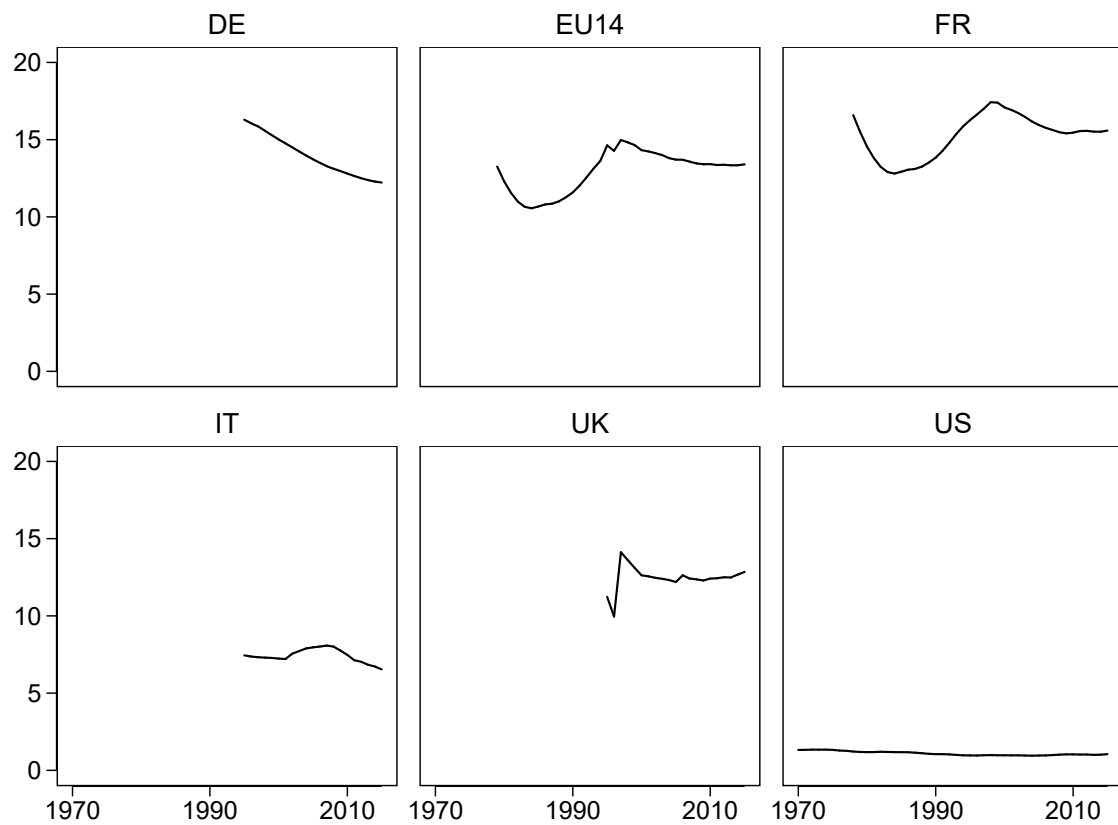
### B.3. The Treatment of Residential Real Estate

**Figure A.9** – Share of dwellings in the total stock of non-fin. produced fixed assets, by sector and country, in %



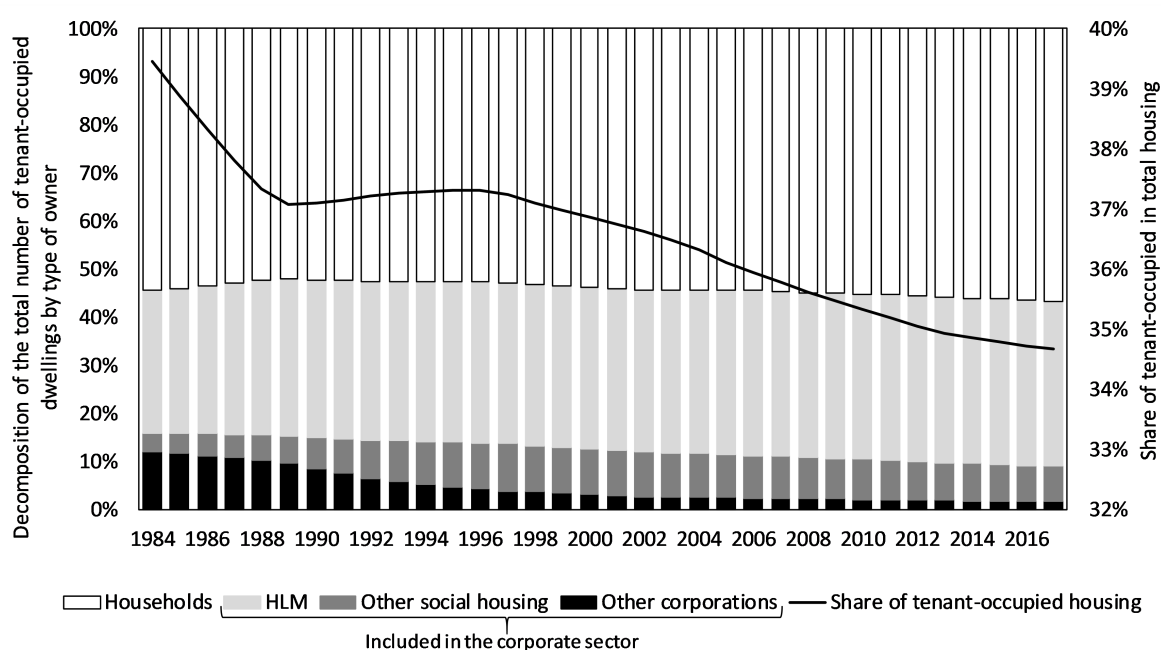
Source: authors' calculations using OECD. See Table A.2 for a description of non-financial produced fixed assets. EU14 includes France, Italy, Germany, the UK as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. EU27 includes all EU countries except Malta.

**Figure A.10** – Share of the corporate sector in the total stock of dwellings, by country, 1970-2015, in %



Source: authors' calculations using OECD. See Table A.2 for a description of non-financial produced fixed assets. EU14 includes France, Italy, Germany, the UK as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. It plots the year fixed effects from a regression of shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average share in 1995.

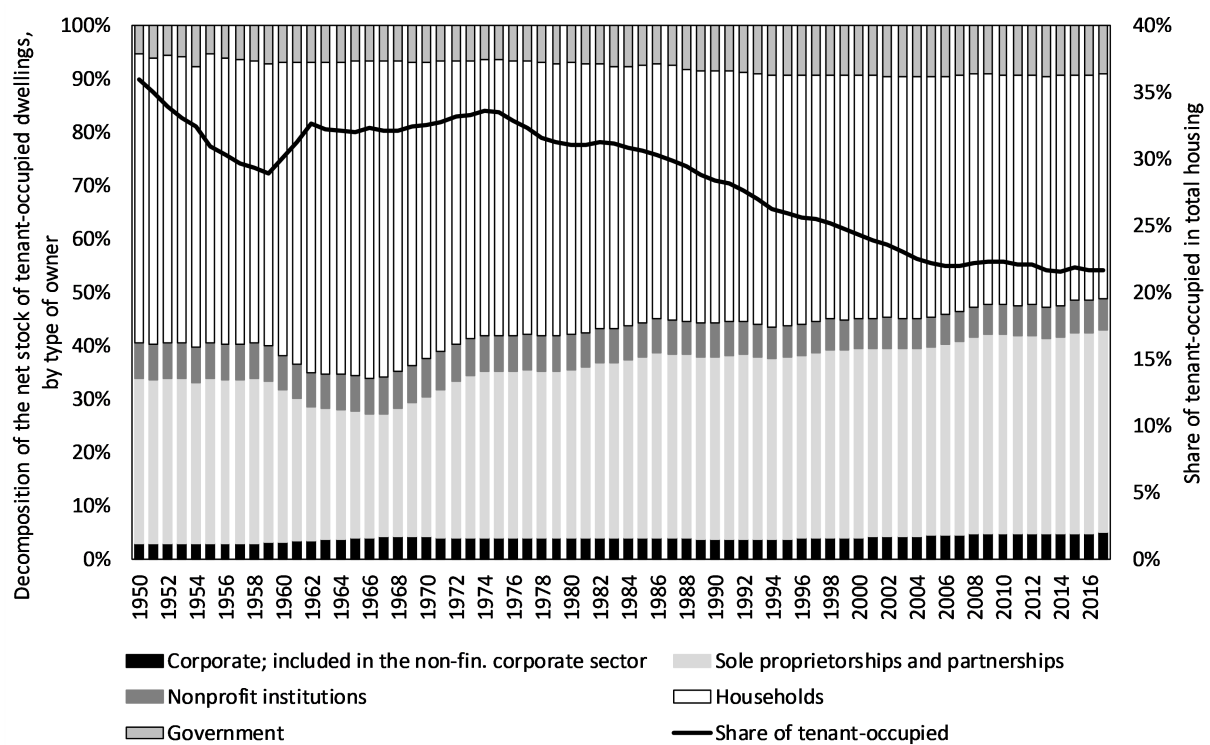
**Figure A.11** – Housing stock, by type of owner, France, 1984-2017, in %



Source: authors' calculations using *Compte satellite du logement*, 2018 Edition. See INSEE methodological note for Eurostat entitled "ESA 2010 Gross National Income Inventory" and last accessed [here](#) in Feb. 2019, on p.142, for a more detailed discussion.

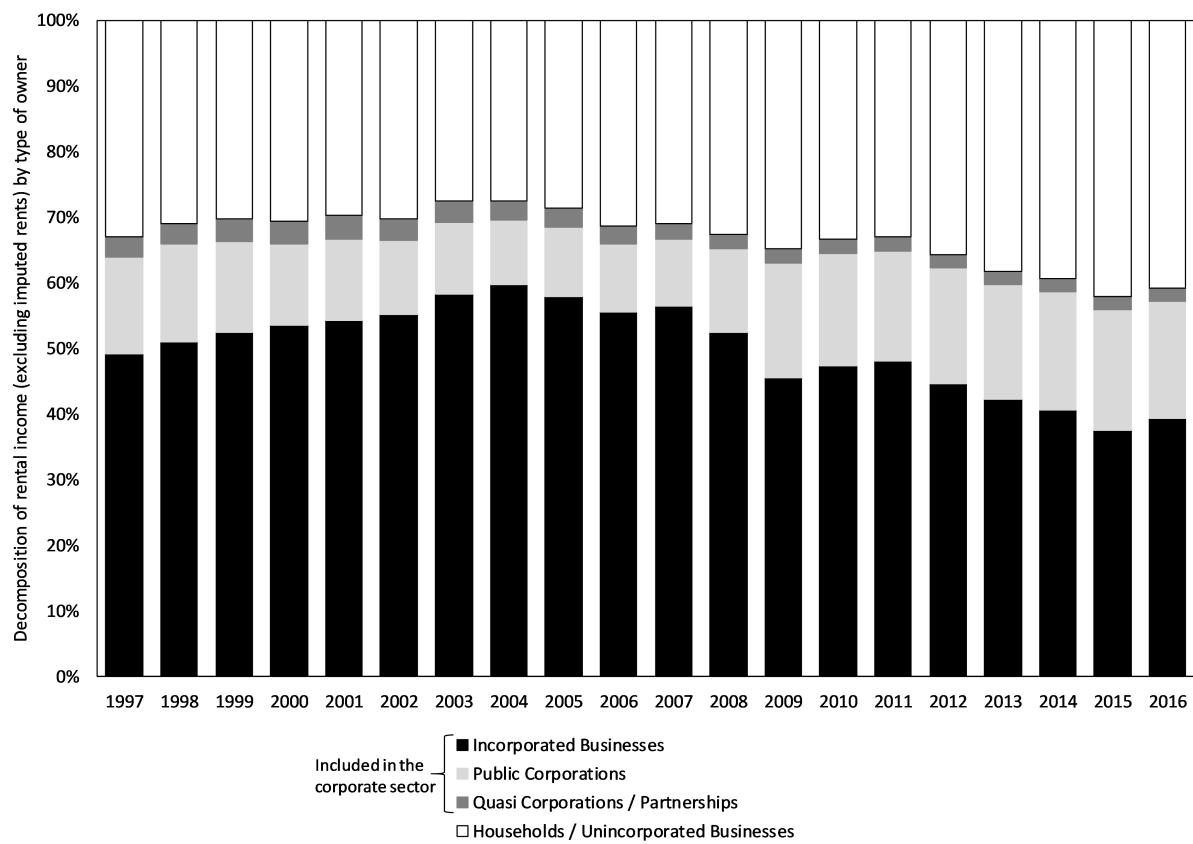


**Figure A.12** – Current-cost net housing stock, by type of owner, United-States, 1950-2017, in %



Source: authors' calculations using BEA.

**Figure A.13** – Percentage of rental income by institutional sector, UK, 1997-2016, in %



Source: *UK National Accounts, The Blue Book: 2018*, ONS.

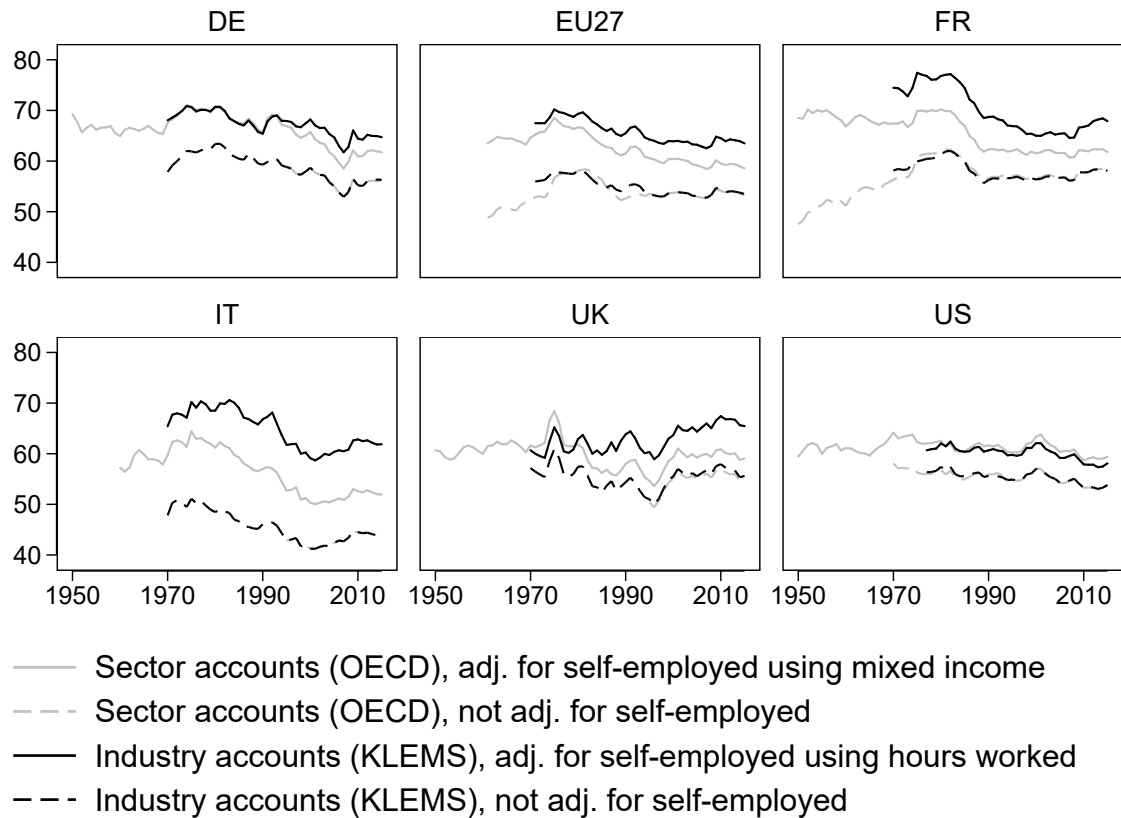
**Figure A.14** – Share of the real estate sector in total GVA, Europe and United States, 1970-2015, in %



Source: authors' calculations using EU KLEMS. Real estate activities is sector L in ISIC rev. 4. EU14 includes France, Italy, Germany, the UK as well as Austria, Belgium, Denmark, Greece, Spain, Finland, Luxembourg, the Netherlands, Portugal and Sweden. EU27 includes all EU countries except Malta. Series for Europe plot the year fixed effects from a regression of shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average share in 1995.

## B.4. The Treatment of Self-Employment

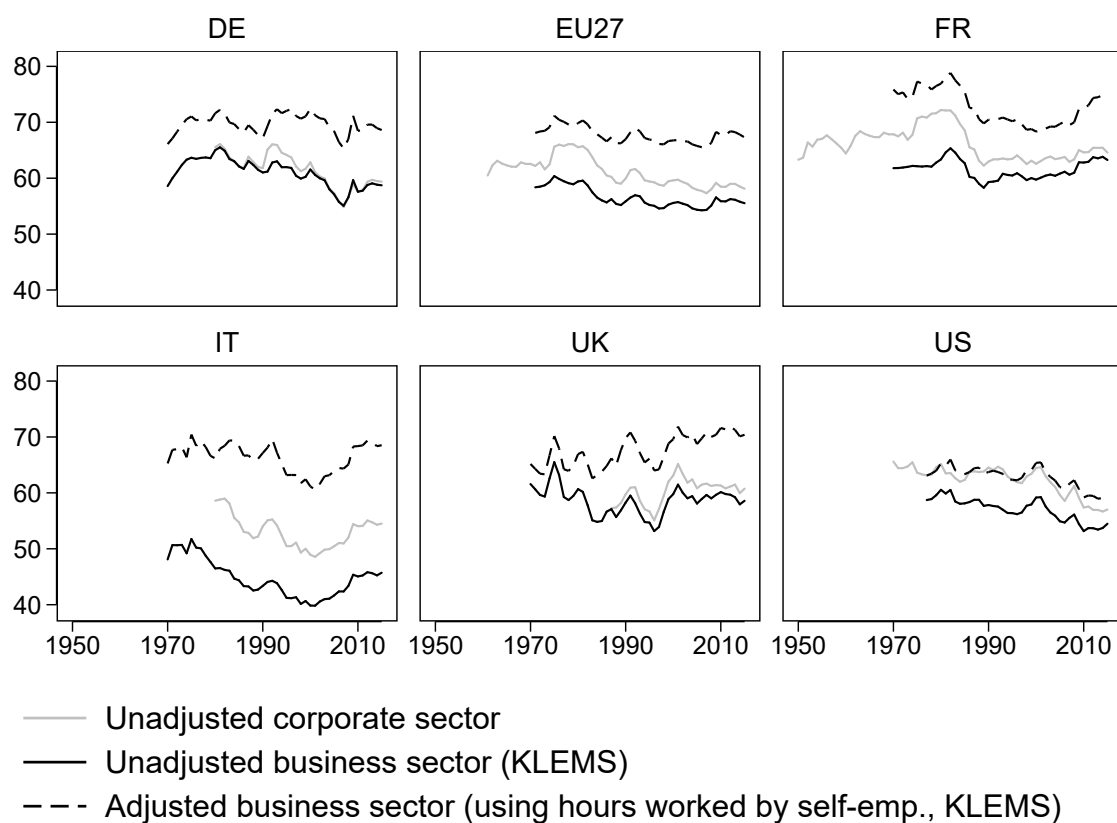
**Figure A.15** – Domestic gross labor share adj. or not for self-employed, total economy, Europe and United States, 1950-2015, in %



Source: authors' calculation using OECD, [Piketty and Zucman \(2014\)](#) and EU KLEMS.

Note: EU27 includes all EU countries except Malta. It plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average labor share in 1995.

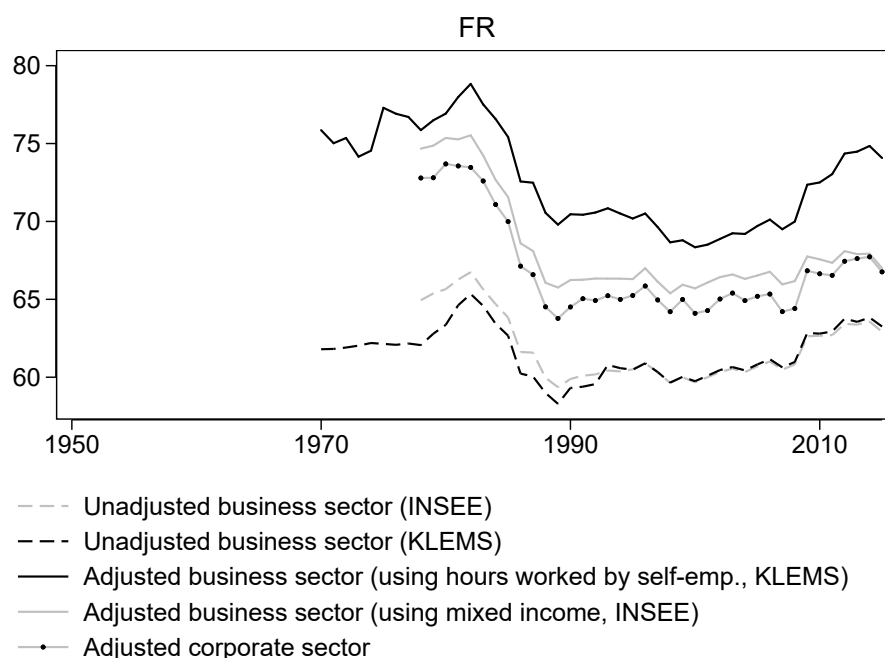
**Figure A.16** – Domestic gross labor share adj. or not for self-employed, corporate and business sectors, Europe and United States, 1950-2015, in %



Source: authors' calculation using OECD and EU KLEMS.

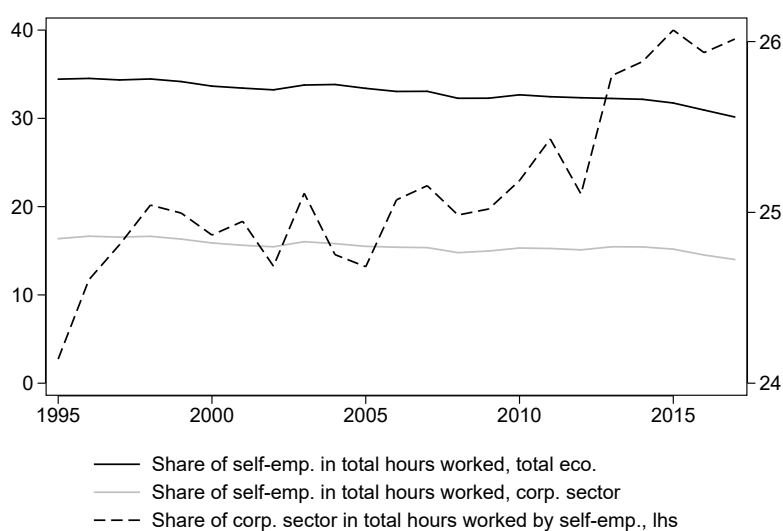
Note: EU27 includes all EU countries except Malta. It plots the year fixed effects from a regression of labor shares that also includes country fixed effects, to account for entry and exit during the sample. The regressions are weighted by GDP measured in US dollars at market exchange rates. The effects have been normalized to equal to the average labor share in 1995.

**Figure A.17** – Gross labor share for France with alternate self-employment adjustments, in %



Source: authors' calculations using OECD, KLEMS, and INSEE. All series are adjusted for real estate (see main text for more details); they are adjusted for self-employment only when specified.

**Figure A.18** – Share of self-employed in total hours worked, by sector, Italy, 1995-2017, in %



Source: authors' calculations using ISTAT.

### C. Estimating the Housing Share of Corporate Value Added

In this Appendix we describe four different methods to measure returns to housing  $R^H$  so as to get housing value added in the corporate sector:  $Y^{H,C} = R^H \times ResK^C$ , with  $ResK^C$  residential capital in the housing sector.

National Accounts report housing income in three different ways:

- $Y^{RE}$ : real estate value added from industry accounts (including all activities related to both residential and non residential real estate);
- $Rents$ : total housing rents paid by households in their final expenditure accounts;
- $GOS^{HH}$ : gross operating surplus of households and NPISH in sector accounts, composed only of rental income of tenant-occupied dwellings owned by households and imputed rents on owner-occupied dwellings.

Figure A.19 contrasts the three measure for France. As shown, all three series differ in levels. Household value added includes ( $GOS^{HH}$ ) only rents on dwellings owned by the household sector, while  $Rents$  cover all dwellings. Real estate value added ( $Y^{RE}$ ) combines commercial and residential real estate. Value added and rents also differ because the former excludes expenditures on maintenance and repairs, as well as FISIM (i.e. associated financial services) – while rents include the former and sometimes the latter. Yet, all measures evolve close to each other.

In the case of France, it is worth mentioning that the  $Rents$  series increase faster than rents paid to households ( $GOS^{HH}$ ), meaning that there is an increasing share of rental income outside of the households sector. And since the corporate sector owns 80% of dwellings outside the household sector, this suggests that our housing bias in the corporate sector has been increasing over time.

These definitions, combined with economic theory, provide at least four ways of estimating  $R^H$ .

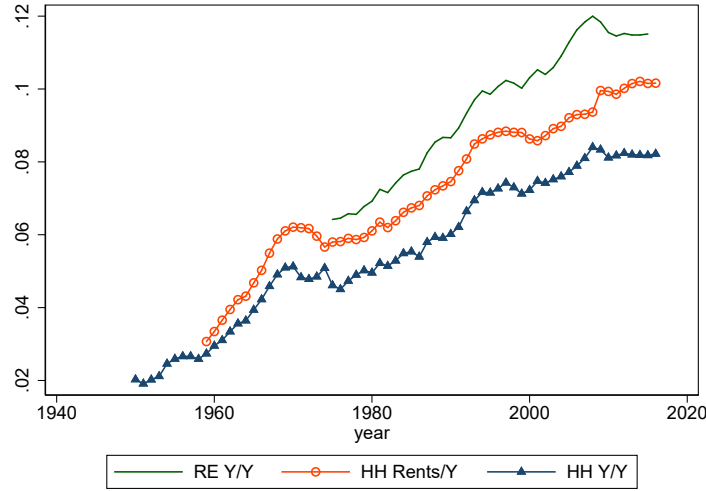
**1. Using the return from housing in the HH sector (HH  $Y/Kstruc$ ).** We can get  $R^H$  using the ratio of housing value added to residential structures in the household sector,  $R^H = \frac{GOS^{HH}}{ResK^{HH}}$ . Assuming that housing assets in the corporate sector attain the same return as in the household sector, we can estimate:

$$\hat{Y}^{H,C} = \frac{Y^{HH}}{ResK^{HH}} \times ResK^C$$

**2. Allocating rental expenditures across sectors – our main approach (Rents ex HH/ $Kstruc$ ).**

Unfortunately, returns to dwellings in the overall economy may differ substantially from returns in the corporate sector (e.g., if corporate sector dwellings are rent-controlled). Our second – and preferred method described in the body – aims at addressing this concern. We isolate value added outside the household sector by taking the difference between total rents paid by households

**Figure A.19** – Real estate and housing share of value added in France, 1950-2017, in %



Source: Real estate value added from EU KLEMS. Rents from SNA Table 5 (expenditures); and housing value added from SNA Table 14A (GOS of household and NPISH sector). SNA data sourced via the OECD.

(*Rents*) and value added in the household sector (rental income of dwellings owned by households,  $GOS^{HH}$ ), and allocate the corresponding income across sectors. In other words:

$$\hat{Y}^{H,C} = \frac{Rents - GOS^{HH}}{ResK - ResK^{HH}} \times ResK^C$$

Corporations own more than 90% of dwellings outside the household sector, so this method is likely to closely capture housing income in the corporate sector.

**3. Estimating user-costs following Hall and Jorgenson (1967) (User-cost  $R^H$ ).** Alternatively, we can impose more structure on the problem, and estimate  $R^H$  following the now standard formula of Hall and Jorgenson (1967):

$$R^{HJ} = r_f + \delta^H - g_{p^H}^e \quad (5)$$

where  $r_f$  denotes the risk-free rate,  $g_{p^H}^e$  the expected growth in the price of housing and  $\delta^H$  the depreciation of housing. We set  $r_f$  equal to the 10-year centered moving average of the country-specific risk-free rate.<sup>32</sup> We set  $\delta^H = 0.0114$ , which is the assumed depreciation rate of housing structures in EU KLEMS. Last, we estimate  $g_{p^H}^e$  as the 10-year centered moving average

<sup>32</sup>Using a moving average accounts for the fact that housing assets are often purchased through long maturity mortgages, hence the appropriate rate would be a rolling average of spot rates. The moving average also tracks the actual cost of debt of non-financial corporations far more closely than the spot rate.



of housing price changes, as measured by the OECD's house price indices. Importantly,  $K^H$  under Hall and Jorgenson (1967) should include land as well as structures. The data includes the value of residential and non residential structures, as well as (total) land. We assume the value of land splits between residential and non residential assets according to the share of residential and non residential structures.

**4. Using rent-to-price indices (Rent-to-Price\*Ktot)** Last, note that  $R^H$  under Hall and Jorgenson (1967) is the rental rate for a unit of capital. This is precisely what rent-to-price ratios aim to measure, so we can let  $R^H$  equal the rent-to-price ratio. Unfortunately, long time series are not widely available for all countries. We obtain the ratio for France from Knoll (2017), Figure B.10.

### C.1. Drill-down: France

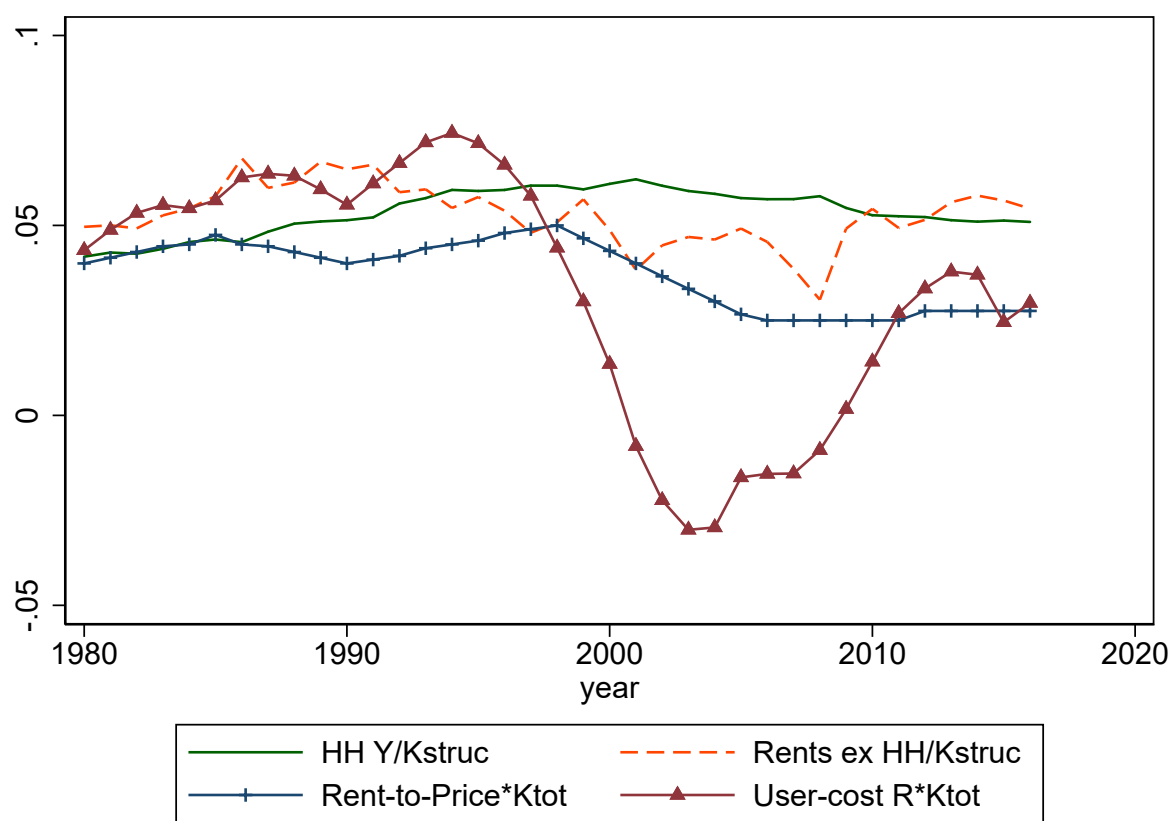
Let us compare the estimates across all methods. We focus on France, because it is the country with the best data availability; but also report labor share results for selected countries below.

**Rates of return.** Figure A.20 contrasts our four estimates of  $R^H$ . Note that returns based on residential structures (first two) are not necessarily comparable to returns based on total house prices (last two). Estimates of returns on housing structures behave similarly over time. They are largely stable, whether based on household value added or rents. This is consistent with Figure A.21, which shows similar patterns in rental price inflation of social and private housing. By contrast, estimates based on house prices fall over time – likely due to the rise in land values.

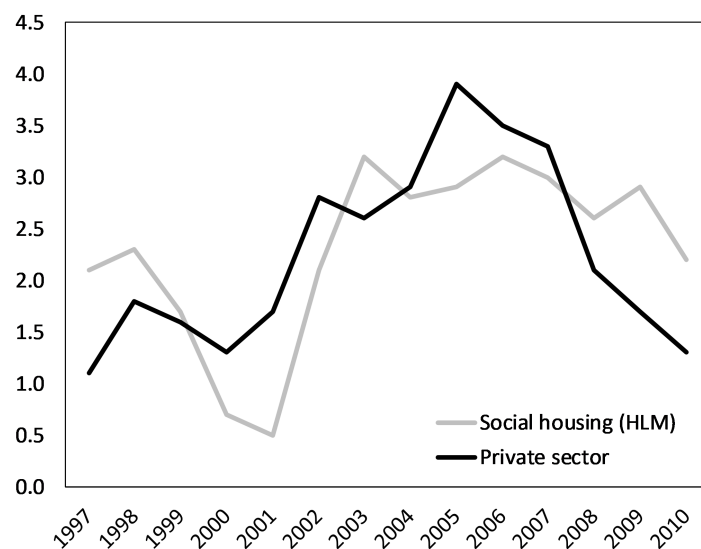
The user-cost implied estimate (which follows Hall and Jorgenson, 1967) is far more volatile than all other estimates. This appears to be due to deviation between expected and actual price gains, as shown in Figure A.22. The left plot shows the realized home price change against the expected home price changes implied by rent-to-price indices, interest rates and depreciation (using equation 5 above). The expected series is more stable and lags realized changes slightly, consistent with agents updating their expectations over time. The right plot shows the residuals, which are noisy and centered around zero. Thus, user-cost estimates of required returns appear to be a noisy proxy of rental-price based estimates. We exclude the former in the remainder of this section, but include them in cross-country comparisons because a long history of rent-price indices is not readily available for most countries.

**Housing share of corporate gross value added.** Applying the required returns to the appropriate capital stock, we obtain estimates of housing value added in the corporate sector. Figure A.23 plots the results, as a share of total corporate value added. The share of housing in corporate value added increases from about 1.5% to 3.5% for all three methods.

**Figure A.20** – Four estimates of  $R$  for France

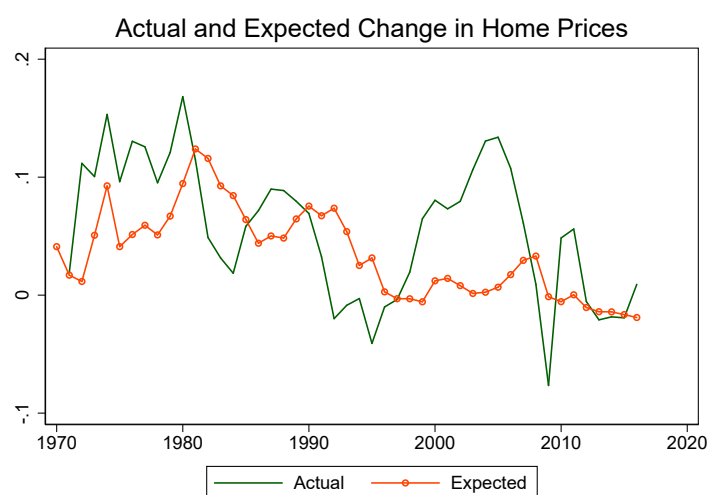


**Figure A.21** – Rental price inflation in France



Source: authors' calculations using *Compte satellite du logement*, 2018 Edition. See INSEE methodological note for Eurostat entitled "ESA 2010 Gross National Income Inventory" and last accessed [here](#) in Feb. 2019, on p.142, for a more detailed discussion.

**Figure A.22** – Explaining the difference between user-cost and rent-price indices for France

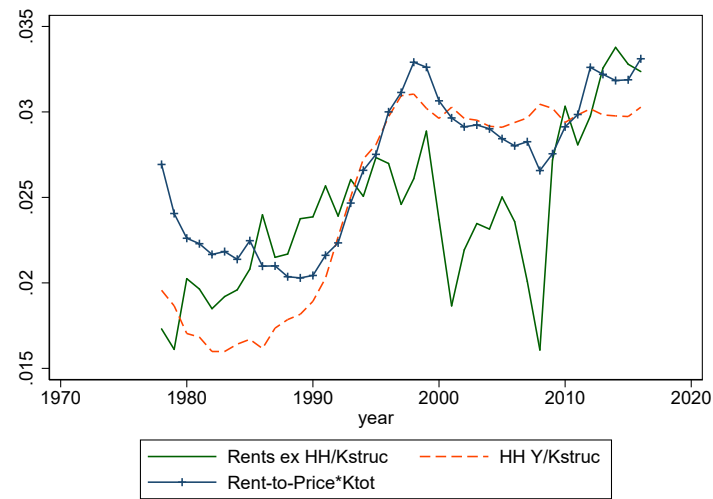


**Labor shares.** Since housing has virtually no labor income, the rise in housing value added biases down the trend in the French corporate labor share. Figure A.24 plots the change in raw (CB) and adjusted corporate labor shares, from 1979 to 2015, following each method. We include the KLEMS business sector series (NFME, non-farm market economy excluding real estate) for comparison. As shown, the corrected corporate series fall by 1 to 2 p.p less than the raw corporate series. This explains about half of the difference between the KLEMS NFME and the raw corporate series – the rest is likely explained by differences in industry mix and, potentially, differences in the estimates of imputed wages. Regardless, the adjusted series ends only slightly below the average labor share from 1950 to 1970 – before the cyclical rise and fall emphasized by Blanchard (1998).

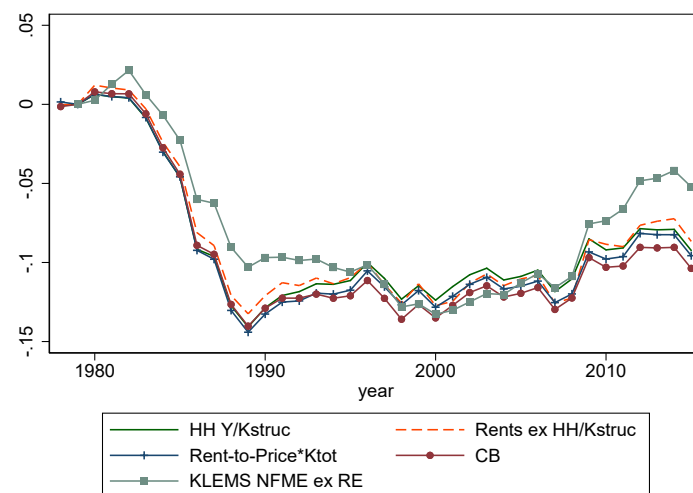
## C.2. All countries.

Figure A.25 shows the share of dwellings owned by the corporate sector among the countries for which data are available. Figure A.26 shows the raw and corrected labor shares for the EU15 and the top 3 countries by corporate share of dwellings: Sweden, Denmark and Netherlands. As shown, the corrected series are much closer and behave similar to the KLEMS series. They are always higher than the corporate labor share. Figure A.27 plots the same data in changes since 1995. Again, the adjusted series behave closer to the KLEMS NFME series than the raw corporate series.

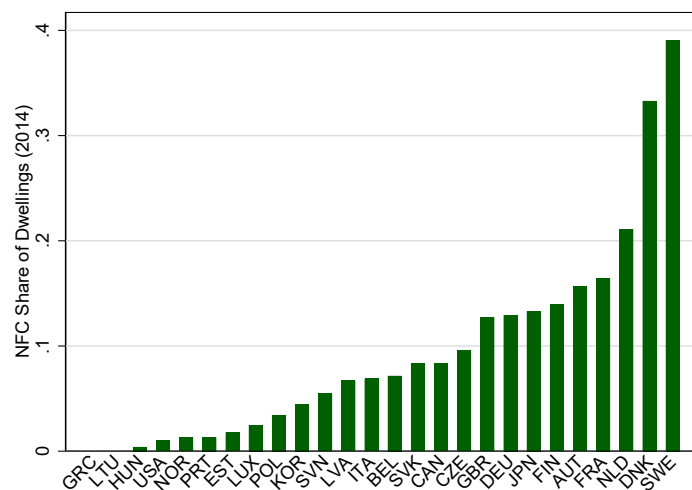
**Figure A.23** – Housing share of corporate gross value added for France



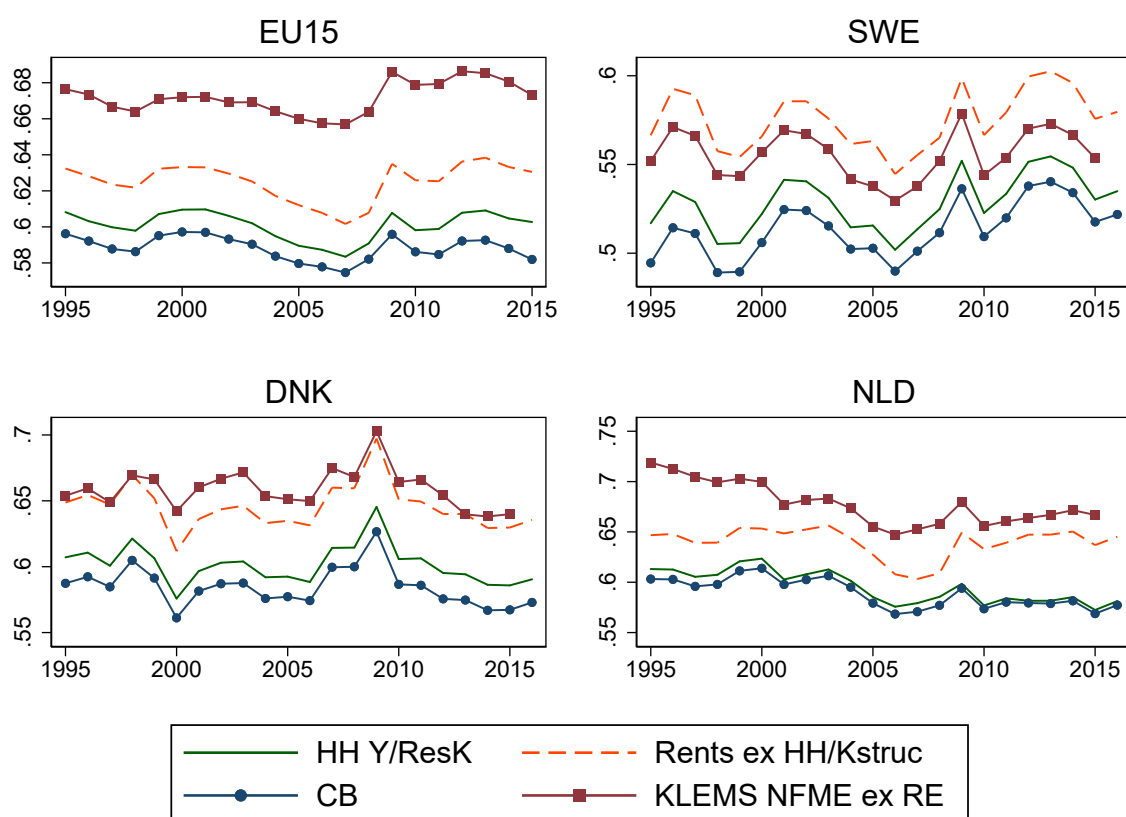
**Figure A.24** – Raw and corrected labor shares for France (change from 1979)



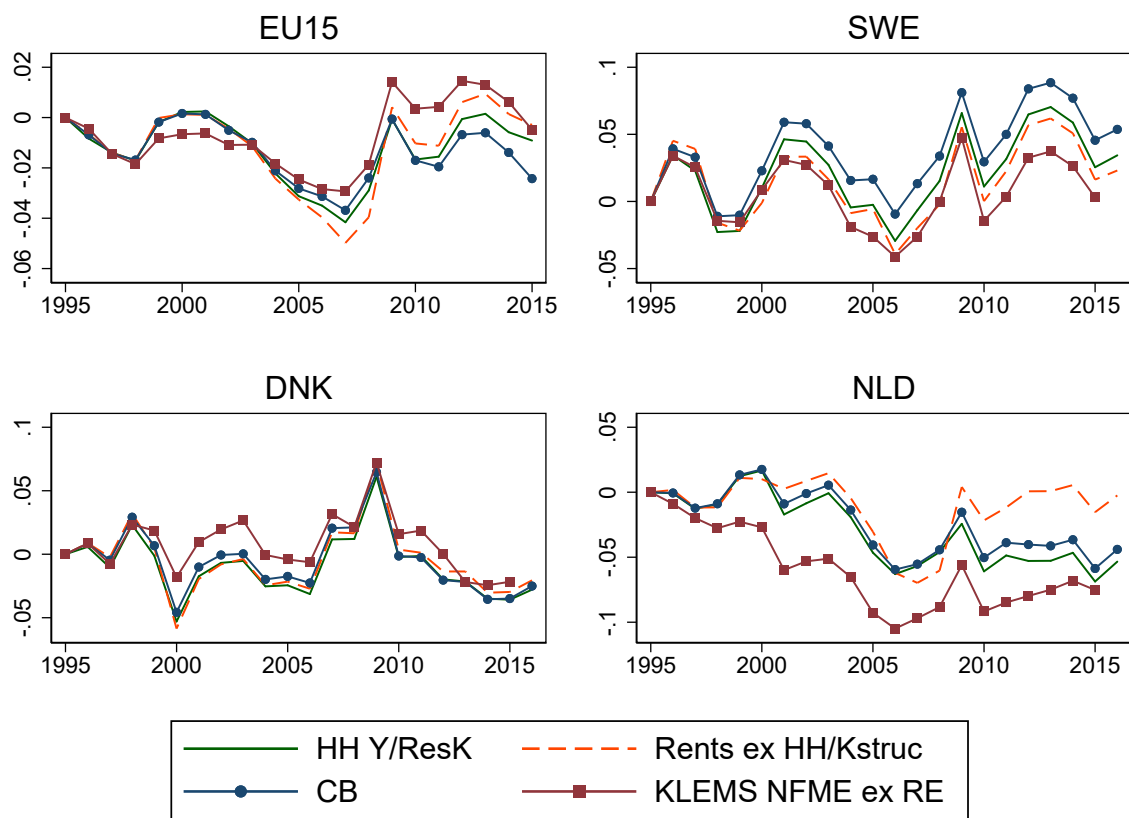
**Figure A.25** – Corporate share of dwellings, by country, 2015



**Figure A.26** – Raw and corrected labor shares



**Figure A.27** – Change in raw and corrected labor shares since 1995



## D. Composition of Real Estate Sector

Last, this appendix provides additional details on the composition of the Real Estate sector. In particular, this sector is composed of three NACE groups:

- Buying and selling own real estate (Group 68.1);
- Renting (to third parties) and operating own or leased residential and non-residential real estate, including both furnished and unfurnished property; the development of building projects for own operation is also included (Group 68.2);
- Appraising real estate; providing real estate agency services as an intermediary; managing property as an agent (Group 68.3).

Table A.8 provides a breakdown of the composition of real estate activity by country and activity. It shows that nearly 75% of real estate value added is composed of actual and imputed rents. Importantly, real estate activities do not include facilities management (which are part of administrative and support services), development of building projects for later sale (which are part of construction), nor short-stay letting of accommodation (which are part of accommodation and food services). Real estate also excludes rental and leasing services of non-real estate assets, which are part of the business services sector.

Table A.8 also shows that the vast majority of real estate activity is concentrated in residential property. In particular, column 5 shows that imputed rents on owner-occupied properties account for over 60% of real estate value added in most countries. And column 6 shows that actual rents on tenant-occupied properties are approximately 30% of imputed rents on owner-occupied properties. Combined, actual and imputed rents on residential property account for the vast majority of real estate activity. The remaining activity includes property rental for businesses and fee- or contract-based activities. The former are again mainly driven by real estate prices, while the latter may actually be affected by technological change.<sup>33</sup>

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<sup>33</sup>Ideally, we would keep all non-housing activities, but this is not feasible due to data limitations.



**Table A.8** – Decomposition of the real estate (RE) share of gross value added (GVA), average 2005-2015, in %

Country	Composition of RE activities			Housing share of RE	
	Renting and operating of RE	Activities on a fee or contract basis	Buying and selling of own RE	Imputed rents on own-occ. properties	Ratio of actual to imputed rents in housing
	(% of RE sector GVA)				
AT	78	18	4	55	33
DE	82	13	5	37	80
ES	89	13	-2	73	17
FR	70	21	8	62	30
IT	75	11	14	66	15
NL	73	16	11	23	54
FI	-	-	-	63	34
UK	63	35	1	73	35
SE	91	8	0	42	63
CA	-	-	-	66	34
US	-	-	-	59	32

Notes: Table shows the average values from 2005 to 2015, when available. Columns 2-4 show the composition of real estate activities in European economies from Eurostat. Columns 5-6 show the housing share of real estate GVA and the ratio of household expenditures on actual and imputed rents for housing (from SNA Tables 5 and 6A sourced from the OECD).