# The labour market, income per capita and welfare in Europe: An overview of the last two decades

Using PWT10 and EU-SILC, we analyse the relationship between income per capita, wage inequality and welfare for 30 European countries over the period 2004-2019. We found that there is a great divergence between European countries in terms of labour productivity, although this variable is strongly (positively) related to the average salary of the different European economies. Spain has experienced one of the largest increases in wage inequality in the last two decades, and the functioning of the labour market is not the only factor that explains this evolution in the short term. The countries with the highest income per capita have increased their well-being the most, while in Spain this variable has barely changed. Gains in the mean wage have been offset by rising wage inequality. In addition to being far from the labour productivity figures of our more developed neighbours, we have a convergence problem in wage inequality.

Utilizando las bases de datos PWT10 y EU-SILC, analizamos la relación entre la renta per cápita, la desigualdad salarial y el bienestar para 30 países europeos durante el periodo 2004-2019. Encontramos que existe una gran divergencia entre los países europeos en términos de productividad laboral, aunque esta variable está fuertemente relacionada (positivamente) con el salario medio de las diferentes economías europeas. España ha experimentado uno de los mayores incrementos de la desigualdad salarial en las dos últimas décadas; y el funcionamiento del mercado laboral no es el único factor que explica esta evolución en el corto plazo. Los países con mayor renta per cápita son los que más han aumentado su bienestar, mientras que en España esta variable apenas ha variado. Las ganancias del salario medio se han visto compensadas por el aumento de la desigualdad salarial. Además de estar lejos de las cifras de productividad laboral de nuestros vecinos más desarrollados, tenemos un problema de convergencia en la desigualdad salarial.

PWT10 eta EU-SILC datu-baseak erabiliz, 2004-2019 aldian, Europako 30 herrialdetako per capita errentaren, soldata-desberdintasunaren eta ongizatearen arteko erlazioa aztertzen dugu. Lan-produktibitateari dagokionez, Europako herrialdeen artean dibergentzia handia dagoela ikusi dugu, baina aldagai hori oso lotuta dago (modu positiboan) Europako ekonomien batez besteko soldatarekin. Espainiak soldata-desberdintasunaren igoerarik handienetako bat izan du azken bi hamarkadetan, eta lan-merkatuaren funtzionamendua ez da bilakaera hori epe laburrean azaltzen duen faktore bakarra. Biztanle bakoitzeko errenta handiena duten herrialdeak ongizatea gehien handitu dutenak dira; Espainian, berriz, aldagai hori ia ez da aldatu. Batez besteko soldataren irabaziak soldata-desberdintasuna handitzeak konpentsatu ditu. Gure auzokide garatuenen lan-produktibitatearen zifretatik urrun egoteaz gain, soldata-desberdintasuna bateratzeari lotuta arazo bat dugu.

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## 1. INTRODUCTION

The last decade has given rise to an intense debate as to whether the productivity gains observed in the most developed countries are improving wages or, on the contrary, only increasing corporate profits. The basic question is whether the growth in per capita income, i.e., economic growth, is leading to greater welfare for citizens in these countries or whether, on the contrary, it is only improving the position of a very limited part of society, those who already have more economic resources (Jones and Klenow, 2016). It is argued that countries have continued to grow in terms of na-

tional output, while economic inequality has increased and, as a result, individual well-being has declined (Ayala and Cantó, 2018). In this paper we tentatively explore this issue for European countries as a whole. We study how productivity, average wages, wage inequality and welfare have evolved over the last two decades. We will see that there is no single trend, and that the above statements, far from being applicable in a generalised way to all European countries, must only be made within the framework of each country's particular experience. The desire to simplify economic reality, and thus provide a single explanation, does not allow a glimpse of the true variety of behaviour and developments across European economies.

For our analysis we use two main databases. First, the Penn World Table (PWT, version 10.0) (Feenstra, *et al.*, 2015), a set of national-accounts data developed to measure real GDP across countries and over time. From this database we obtain macroeconomic variables at the country level such as real GDP per capita and total factor productivity (TFP) since the PWT10 allows for comparisons of relative GDP per capita, the productive capacity of economies and their productivity level. Second, the European Union Statistics on Income and Living conditions (EU-SILC), a database with microeconomic information from which we obtain wages at the personal level. Taking advantage of this information, we sample active workers –employees and self-employed– who declare to be working at least part time at the time, and who have a greater than zero salary during the reference year. Because the PWT10 covers 188 countries and goes from 1950 to 2019, our work is limited by the available data in EU-SILC. As a result, this paper considers the economic evolution of 30 European countries over the period 2004-2019.

Our study begins with a decomposition of GDP per capita into its two main components: the (apparent) productivity of the labour factor and the employment rate in terms of the country's total population. In this way, we can observe for the set of countries and time periods considered the two sides of per capita income: the brain (productivity) and the muscle (employment). What has driven the increase in per capita income, an improvement in efficiency or an increase in the number of workers employed? After comparing the two variables, productivity is related to the observed average wage by country and year. In principle, it is expected that there is a close relationship between the two magnitudes and that an improvement in productivity has been reflected in higher average wages in all European countries analysed. To see whether our results are robust to the type of productivity used, we will also consider the TFP.

That said, the analysis would be incomplete if we do not take into account the distributional dimension of wages, since a high average wage does not guarantee that welfare is widespread. To do so, we measure wage inequality by country and year using the Gini index. It has been repeatedly observed that the most developed countries are precisely those with the lowest inequality values. However, it is worth asking whether this trend has continued over the last few decades and, therefore, whether countries with higher average wages have lower levels of wage inequality.

Then, we apply the Social Welfare Function (SWF) proposed in Sen (1974). This function assumes that the marginal utility of the society, is inversely related to its positioning in the income distribution. This implies that, when the transfers of income between the population group with highest levels of income towards the population group with the lowest levels, there is a general increase in the levels of social welfare of the society. In this perspective, the Sen's vision of the SWF applied to wages will consider not only the average wage of the society but also the Gini coefficient in the wage distribution. In this manner, we relate the two variables previously calculated, namely, the mean wage which –at least in theory– is tightly linked to productivity, and wage inequality. Once welfare is estimated across countries and over time, the question is straightforward, have income per capita and welfare go hand in hand?

In what follows we try to summarize our main findings. When real GDP per capita is decomposed, the main difference across European countries is explained by labour productivity disparities. Indeed, Europe is far from converging in productivity. Another interesting result related to productivity is that there is not a trade-off between labour productivity and employment: those countries with a higher productivity show a significant larger rate of employment. In fact, when we look at the relationship in 2004 and 2019, we observe that the increase in productivity happened between both years has been made at the cost of a lower rate of employment only in Southern European countries. If we compare Spain with other European countries, it is observed that productivity and employment are too closely linked to the business cycle and that from 2007 to 2013 productivity has increased significantly due to the reduction in employment. Nonetheless, and despite that the average wage in Spain is quite procyclical, it does not follow as close as it would be desirable the evolution of labour productivity. Thus, the gap between both variables has been amplified since 2010: productivity has slightly increased, while the mean wage has been stagnated.

Wage inequality has evolved over time very differently across European areas (Northern, Central, Southern, Northeast, Southeast and islands) with Spain being the country, among those most developed, where the Gini index has increased the most. In addition, this evolution of wage inequality in Spain has been quite peculiar, it increased 4 Gini points in only one year (2007-2008), kept stable until 2013 and increased again (3 Gini points) since then. This evolution highlights the substantial problem of inequality due to the unbalanced behaviour of the labour market in Spain, although it does not explain all as we will show (Ayala and Cantó, 2022).

Finally, welfare has increased across the continent, except in Southern Europe, where it has remained stable. In fact, Spain is one of the European countries where welfare has changed the least. The increase of productivity observed in Spain has been reflected in its average wage, but because wage inequality in Spain has increased so much, welfare has remained basically the same. In addition, the high dependence of wages and inequality on the business cycle means that welfare is also highly cyclical, which increases economic uncertainty and vulnerability.<sup>1</sup> With respect to GDP per capita, welfare evolves with a lag of two or three years.

The paper is organized as follows. In the next section we explain the main datasets used, the considered set of European countries and the period of analysis. Next, we decompose income per capita into labour productivity and employment rate. Then, in Section 4, we show the relationship between productivity and average wages across Europe. Section 5 comments on the wage inequality levels observed in Europe and Section 6 presents the results for welfare and its connections with income per capita. Finally, Section 7 concludes.

#### 2. DATABASES, COUNTRIES AND YEARS

The first database we use is the Penn World Table (PWT), version 10.0 (Feenstra et al., 2015). For over four decades, the PWT10 -a set of national-accounts data- has been a standard source of data on real GDP across countries. Making use of prices collected across countries in benchmark years by the International Comparisons Program (ICP), and using these prices to construct purchasing-power-parity (PPP) exchange rates, PWT10 converts gross domestic product (GDP) at national prices to a common currency -US dollars- making them comparable across countries.<sup>2</sup> Successive updates have added countries (currently 188), years (1950-2019), and data on capital, productivity and population. One of the most important changes introduced in the latest generation of PWT10 is the distinction between real GDP for measuring the standard of living across countries or for measuring productive capacity. Feenstra et al. (2009) have argued that real GDP in previous versions of PWT10, or its components such as consumption or domestic absorption, was intended to measure the standard of living across countries. Therefore, we use this series to make comparisons between countries and over time, and to relate its value with welfare. In addition, we use data on TFP across countries from PWT10. The intention is to substitute labour productivity for TFP to see if some of our results are robust when we change the type of productivity considered.

The second database we use is the European Union Statistics on Income and Living conditions (EU-SILC). Since 2004, this database encompasses homogeneous surveys on living conditions implemented by the national institutes of statistics under the coordination of Eurostat. Collected data contains information on a wide range of socioeconomic items, including occupation, industry and salary at the personal level. Taking advantage of this information, we sample active workers –employees and self-em-

<sup>&</sup>lt;sup>1</sup> For the relationship between the business cycle and poverty in Spain see Ayala *et al.* (2017).

<sup>&</sup>lt;sup>2</sup> Previous versions of PWT were described extensively by their originators (Summers and Heston 1988, 1991; Heston and Summers 1996). From version 8 onward, development has moved to the University of California, Davis and the University of Groningen, while retaining the PWT initials and with continued input from Alan Heston at the University of Pennsylvania.

ployed– who declare to be working at least part time at the time, and who have a greater than zero salary during the reference year. This excludes unemployed and retired workers, and people under the legal working age of 16. We follow Palomino *et al.* (2020a, b) for our salary variable: for each individual we have aggregated yearly cash, in-kind gross employee income and gross self-employed income. Employee income is defined as 'the total remuneration payable by an employer to an employee in return for work done by the latter during the income reference period', while self-employed income is 'the gross income received during the reference year as a result of their current or former involvement in self-employed work'.

Clearly, wages (the information we use from EU-SILC) are more limited in time and territories than real GDP per capita and TFP from PWT10 as the latter covers 188 countries and runs from 1950 to 2019. For this reason, we finally work with 30 European countries over the period 2004-2019 as documented in Appendix A (see Table A1). Although we will comment on European countries as a whole in some detail, on many occasions we will focus on comparing the Spanish case with other neighbouring countries.

## 3. DECOMPOSITION OF GDP PER CAPITA: PRODUCTIVITY AND EMPLOYMENT

Our first step to explore the relationship between income per capita and welfare across Europe is to analyse in detail the evolution of real GDP per capita  $(rGDP_{pc})$  in Europe. For this task, we decompose  $rGDP_{pc}$  into two main components, namely labour productivity (*lProd*) and the rate of employment (*Empl*) in terms of total population. In this manner, we are able to study the evolution of labour productivity and, more importantly, to see which element, the 'brain' (productivity) or the 'muscle' (rate of employment) is more important in explaining per capita income.

The decomposition that we study is the following:

$$rGDP_{pc} = \frac{rGDP}{Population} = \frac{rGDP}{Employment} + \frac{Employment}{Population} = lProd + Empl.$$
(1)

Equation (1) highlights that there are two main factors explaining per capita income, one is (apparent) labour productivity and the other is the unemployment rate.<sup>3</sup> Of course, an increase in the second variable is important for the economy of any country, as it generates new jobs, but it is even more important that labour productivity increases over time, as this is the only way to achieve sustained improvements in workers' wages. Figure 1 shows the decomposition of the  $rGDP_{pc}$  for each of the European countries in the sample in the initial (2004) and final

<sup>&</sup>lt;sup>3</sup> This decomposition can be extended by also considering the active population and the working-age population (see for example, Andrés and Doménech, 2020).

(2019) periods. Ireland and Luxembourg have been excluded from this graph as they are clearly two outliers: in the case of Ireland, we find very high productivity –the European average for the whole period excluding Ireland is 79.383, while for Ireland it is 157.206–, while the employment rate in Luxembourg is very high –the European average for the whole period excluding Luxembourg is 0.46, while for Luxembourg it is  $0.70-.^4$ 

## Figure 1. PRODUCTIVITY AND EMPLOYMENT RATE IN EUROPE IN 2004 (LEFT) AND 2019 (RIGHT)



Source: Own elaboration based on PWT10 y EU-SILC databases.

The first thing that can be seen in Figure 1 is that there is a positive correlation between the two variables in both 2004 and 2019. Therefore, as country's income per capita is higher, both variables are higher. In short, economic growth allows us to increase labour productivity and the employment rate, although this increase is not symmetrical. In this respect, it is important to realise that the main difference between the European economies is in productivity and not employment rates. To give an idea, the variance of labour productivity in Europe is 7.10 in 2004 and 4.78 in 2019, while the variance of the employment rate is 0.002 in both 2004 and 2019.

<sup>&</sup>lt;sup>4</sup> The interested reader is referred to Figure B1 (Appendix B) for a graph showing the productivity and employment rate for Ireland and Luxembourg for all years of the sample.

That is, the variable that defines the large divergence between European countries is workers' productivity. With such a productivity gap between European countries, convergence in terms of real per capita income is almost impossible. On the other hand, although of lesser importance, it is worth noting that the variance of productivity has decreased significantly between 2004 and 2019 because the countries of Southeast Europe have experienced a clear improvement in productivity (remember that these economies come from a communist production model that is not at all inclined to seek productivity improvements).





Source: Own elaboration based on PWT10 y EU-SILC databases.

To explore in more detail the relationship between productivity and employment rate, we plot in Figure 2 both variables by territorial areas of Europe in 2004 and 2019. These areas are Northern Europe (DK, FI, NO, NL, SE), Central Europe (AT, BE, CH, DE and FR), Southern Europe (EL, ES, IT, PT), North Eastern Europe (EE, LT, LV, PL), South Eastern Europe (BG, CZ, HU, Ro, SI, SK) and Islands (CY, IS, MT, UK). As in the previous graph we have excluded Ireland and Luxembourg. As before, a positive relationship between productivity and the employment rate is observed in all geographical areas of Europe except in the South, where the relationship is negative. It would seem that in this region of Europe there is a trade-off between labour productivity and the employment rate. To check whether this is true, in Figure 3 we plot the evolution of both variables in Southern Europe for the whole period (the rest of the geographical areas are presented in Figure C1 in Appendix C).

## Figure 3. PRODUCTIVITY AND EMPLOYMENT RATE DEVELOPMENTS IN SOUTHERN EUROPE (GREECE, SPAIN, ITALY AND PORTUGAL)



Source: Own elaboration based on PWT10 y EU-SILC databases.

Figure 3 clearly shows that during the economic crisis from 2007 to 2013, the increase in labour productivity has taken a heavy toll, with a drastic decline in the employment rate in both Spain and Portugal. Worse still has been the case in Greece, where not only has the employment rate fallen over the same period, but labour productivity has also fallen. Although the change in Italy resembles the Greek case, the decline in both macroeconomic variables has been small and does not constitute a drama even close to that of Greece. Returning to the cases of Spain and Portugal, it can be observed that after 2013 there has been a positive evolution of both variables, although growth has been uneven, the employment rate has grown much more than productivity. On the other hand, it is worth noting that while Spain has higher levels of labour productivity, Portugal has higher employment

rates. To summarise, in Spain productivity between 2004-2007 is 83,300, in 2013 it rises to 91,200, reaching the figure of 94,000 in 2019. On the other hand, the employment rate in 2007 is 0.45, in 2013 0.37 and, finally, in 2019 it is 0.42.

To conclude this section, we will compare Spain's performance over the years with countries with a higher per capita income and located in a different geographical area. To do so, we chose France, the Netherlands and the United Kingdom. In Figure 4 we see that the big difference between Spain and these three countries is in how the employment rate has changed. In all the countries, we can see how productivity has increased. But only in Spain has this increase led to a decrease in employment over the period 2007-2013. In France, employment hardly changes at all, while in the Netherlands and the UK the employment rate increases significantly. Spain has not yet been able to recover its pre-crisis employment rate and, what is worse, it continues to behave as an economy that is too volatile, too dependent on the economic cycle.

#### Figure 4. PRODUCTIVITY AND RATE OF EMPLOYMENT IN FRANCE, NETHERLANDS, SPAIN AND THE UK



Source: Own elaboration based on PWT10 y EU-SILC databases.

#### 4. PRODUCTIVITY AND AVERAGE WAGE

Having estimated the importance of productivity in explaining real GDP per capita in Europe and its evolution over time, we study average wages across Europe.

The economic literature has typically highlighted the close connection between labour productivity and wages. Consequently, we attempt to test whether the two variables are so closely related.

First, we plot in Figure 5 the relationship between labour productivity and average wages for the sample countries for the years 2007 and 2018. The reason why we take these years instead of 2004 and 2019 is because there are countries for which there is no wage information for these years –in Bulgaria, Switzerland, Latvia, Lithuania, Malta and Romania the data start in 2007 and in Ireland, Iceland, Italy and the United Kingdom the data end in 2018 (see Table A1 in Appendix A)– and we prefer to compare all countries in the same year.

## Figure 5. PRODUCTIVITY AND AVERAGE WAGES IN EUROPE IN 2007 AND 2018



Source: Own elaboration based on PWT10 y EU-SILC databases.

Figure 5 shows that there is a positive and significant correlation between productivity and average wage. Thus, the coefficient of determination of the linear regression between both variables ( $\mathbb{R}^2$ ) is 0.82 in 2007 and 0.83 in 2018. Everything points to the fact that the close relationship between labour productivity and average wages, as suggested by the literature, is true. Although, as we shall see below, there are some relevant nuances to this observation. Secondly, as with the relationship between productivity and the employment rate, the variance of labour productivity is clearly greater than that of average wages (5.63 versus 3.15 in both years, excluding Ireland). Finally, the order of countries hardly changes between the two years considered, i.e., there is little mobility in terms of the two variables considered between European countries.

We have seen how higher labour productivity is accompanied by higher average wages, but when we look at the details, we see that the experience of the countries in the sample is very different. To see this, we present in the following graph the time evolution of both variables for France, the Netherlands, Spain and the United Kingdom. In order to avoid the use of two different scales and, in addition, to be able to appreciate changes over time, we represent them in percentage rate of change.

## *Figure 6.* **PRODUCTIVITY AND AVERAGE WAGE IN FRANCE, THE NETHERLANDS, SPAIN AND THE UNITED KINGDOM**



Source: Own elaboration based on PWT10 y EU-SILC databases.

Figure 6 shows that changes in average wages and productivity are not as similar as might be expected, not only in Spain, but also in the Netherlands and the United Kingdom. In the case of France, average wages have experienced positive rates of change above productivity throughout the period under consideration. Moreover, it can be observed that the percentage changes in average wages in Spain are completely conditioned by the evolution of the economic cycle. In fact, the strong growth experienced in average wages before 2007 has collapsed with the advent of the Great Recession to become negative for several years of the sample. In contrast, in the Netherlands since 2007 average wages have never experienced negative rates of change, i.e., average wages have never stopped growing, albeit at lower rates during the financial crisis, while in the United Kingdom average wages have had positive rates of change since 2010 (in Spain this has been the case since 2016).

To conclude this analysis focusing on average wages, we study the joint evolution of productivity and average wages in levels for the case of Spain (Figure 7). Given the information available in the EU-SILC, the data on wages start in 2006. The scales of the graph are different –on the left is the scale of labour productivity and on the right the scale of average wages– so that the comparison of differences cannot be made, but the joint evolution of both variables can be compared. We can see that since 2009, productivity has not stopped increasing while the average wage has remained more or less stable. This shows once again that changes in average wages in Spain do not follow as closely as desirable the evolution of labour productivity.



### Figure 7. PRODUCTIVITY AND AVERAGE WAGE DEVELOPMENTS IN SPAIN

Source: Own elaboration based on PWT10 y EU-SILC databases.

One might think that the type of productivity taken is decisive in arriving at the above conclusions. However, as shown in figure D1 in appendix D, when we substitute labour productivity for TFP, we find that the percentage rates of change in France, the Netherlands, Spain and the UK are similar. That is, our results are robust to the type of productivity employed.

#### 5. WAGE INEQUALITY IN EUROPE

In order to estimate welfare in Europe over the period 2004-2019 in the next section, once we have estimated the average wage for the different European countries, we now need to calculate the wage dispersion within these countries. It will be of no use for an economy to have a high average wage if wage inequality is high.

For this goal, among all the possible inequality indices that fulfil the basic principles found in the literature on inequality (progressive transfers, symmetry, scale invariance and replication of the population) we adopt the Gini coefficient:

$$G(w) = \frac{1}{2n^{2}\mu} \sum_{i=1}^{n} \sum_{j=1}^{n} |w_{i} - w_{j}|, \qquad (2)$$

where *w* represents the wage distribution,  $w_i$  is the salary of individual *i*, and  $\mu$  is the mean wage of the economy. We use this inequality index for two reasons. First, the Gini coefficient is the most popular inequality index, widely used in the empirical literature. Second, using this inequality index together with the average wage will allow us to apply the Social Welfare Function (SWF) proposed in Sen (1974) (see next section). Note that the Gini index is not additively decomposable into a between-group component and a within-group component, but in our case, this is not important since we do not perform this type of decomposition.

When we compare the evolution of wage inequality over the period 2004-2019 by geographical areas in Europe, we find very different profiles (Figure 8). Within Northern European countries, wage inequality has hardly changed, except in the Netherlands and Denmark where it has increased. In Central Europe, there are economies where wage inequality has increased (France, Austria and Belgium) and others where the opposite has happened (Germany, Luxembourg and Switzerland). Developments have been equally heterogeneous in Southern Europe. While inequality has decreased in Greece and Portugal, it has increased in Spain and Italy. The evolution of wage inequality in Eastern Europe has been more homogeneous. Except in Bulgaria, and slightly in Lithuania, inequality has decreased. Almost the opposite seems to be the case in the islands. With the exception of Iceland, wage inequality has increased in all other island countries. There is thus a high heterogeneity of trends in Europe.



Source: Own elaboration based on PWT10 y EU-SILC databases.

Having said all this, we find an important fact when we compare Spain with other developed countries in our environment. In France, the Netherlands and the United Kingdom, wage inequality has also increased, but it is in Spain where this variable has increased the most. Figure 9 shows that the French economy has the lowest and most stable Gini of the four countries considered, while the United

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Kingdom has the highest inequality index. The Netherlands performs similarly to France, although it has slightly higher levels of inequality. On the other hand, Spain, which was the economy with the lowest Gini index in 2006 (0.337), with the advent of the Great Recession, had an index equal to 0.384 in 2008, surpassing the Netherlands. Wage dispersion remained stable until 2013 (recession period) and since then has risen significantly to 0.411 in 2019.

# *Figure 9.* WAGE INEQUALITY IN FRANCE, NETHERLANDS, SPAIN AND THE UK (GINI INDEX)



Source: Own elaboration based on PWT10 y EU-SILC databases.

On numerous occasions the labour market has been accused of being the main culprit behind the increase in economic inequality in Spain. This is why we would like to see (albeit superficially) whether there is a clear relationship between the employment rate and wage inequality. This relationship is shown in Figure 10 and, contrary to our expectations, we see that labour market functioning and wage inequality do not go hand in hand. The excessive increase in wage inequality in Spain over the period 2006-2019 is mainly due to two periods. In the first, between 2007 and 2008 (bursting of the real estate bubble), wage inequality increases by no less than 4 Gini points –with only a slight reduction in the employment rate– which is an astonishing increase insofar as the Gini index, by weighting average wages more than extreme wages, is a very inertial measure whose variations over time are smooth.

In the second, between 2013 and 2015 (the period in which the Spanish economy bottomed out in terms of GDP per capita), wage inequality increased by 3 Gini points, while the employment rate increased. Between the two periods (2008-2013), the Gini index hardly changes while the employment rate falls sharply. From 2015 onwards, wage inequality decreases until 2019, after which it increases again. The aforementioned decline occurs while the employment rate rises. In short, the evolution of the employment rate does not determine the evolution of wage inequality per se. The functioning of the labour market in Spain is not a sufficient factor to explain short-term changes in wage inequality.

## Figure 10. EMPLOYMENT RATE AND WAGE INEQUALITY IN SPAIN (GINI INDEX)



Source: Own elaboration based on PWT10 y EU-SILC databases.

### 6. WELFARE AND INCOME PER CAPITA

Once we have estimated the average wage and wage inequality across European countries, we put together both variables to measure social welfare based on salaries (not incomes).<sup>5</sup>

Since its origins in Bergson (1938), the Social Welfare Function (SWF) is mainly used to analyse the impact of an event (growth, business cycle, tax-benefit system, etc.) within a society in terms of the dilemma between efficiency and equity (Mukhopadhaya, 2003). The shortest expression of the SWF with the simplest approxi-

<sup>&</sup>lt;sup>5</sup> For an analysis of income and well-being around the world see Deaton (2008).

mation possible can be defined as W = W (*S*, *I*), where *W* is the level of social welfare, *S* is a representation of the total income of the society –which seeks to capture the aspect of efficiency of the economy–, and *I* represents the level of inequality observed in the society. In principle, it must be true that  $\partial W/\partial S > 0$  and  $\partial W/\partial \theta < 0$ , i.e., the SWF must be increasing respect to the income profile of the society and decreasing respective to the levels of inequality. In addition, it is commonly assumed that the SWF is concave to reflect the preference for the equity necessary in the analysis. As Mukhopadhaya (2003) explains, the preference for the equity is given when a transfer of income from the richer person to the poorer person increases the level of social welfare. Of course, the SWF also has to be governed by the Paretian Principle, i.e., if there is an increase in the wage of one person, keeping the wages of all other workers constant, the level of welfare must increase.

Under an axiomatic approach, after assuming that the marginal utility of income is decreasing, Sen (1974) proposes the following SWF:

$$W = \mu (1 - G), \tag{3}$$

where  $\mu$  is the mean income (in our case, the average wage) of the society, and *G* is the Gini coefficient of the income (wage) distribution.<sup>6</sup>

As in previous sections, we first compare the evolution of the variable under analysis (well-being) by geographical area of Europe. The general trend –although it is not monotonous– is an increase in welfare throughout the period of time considered. Only the countries of Southern Europe (except Portugal), Cyprus and the United Kingdom do not seem to experience relevant changes in their well-being. Well-being improvements in Northern and Central European countries, plus Iceland, are quite significant, while well-being in Eastern Europe improves more smoothly. It seems, therefore, that the countries with a higher per capita income are precisely those that have seen their welfare increase the most.

Let us see what has happened in Spain in the light of more developed countries such as France, the Netherlands and the United Kingdom. Figure 12 represents the evolution of well-being for this group of advanced countries and the diagnosis is clear. While well-being has increased almost monotonically in France and the Netherlands over the entire analysis period and in the UK from 2009 onwards, well-being in Spain has remained roughly constant. In other words, Spain not only has the lowest level of well-being of the four countries in the group, it is also the only country that has not improved its well-being for practically the last 15 years.

<sup>&</sup>lt;sup>6</sup> Rodríguez and Salas (2014a, b) show that for a set of income (wage) distributions that are symmetric under the same transformation, the SWF proposed by Sen (1974) agrees with the majority voting result.





Source: Own elaboration based on PWT10 y EU-SILC databases.



Figure 12. WELFARE IN IN FRANCE, NETHERLANDS, SPAIN

Source: Own elaboration based on PWT10 y EU-SILC databases.

Given this behaviour of well-being in our economy, it is interesting to look at the joint evolution of income per capita, the average salary and well-being. In this way, we can close the circle started at the beginning of our analysis and better understand what has happened in recent years in our economy. As shown in Figure 13, we see how the real GDPpc has increased since approximately 2013 -remember that from this year on the employment rate also increased, while the average wage has increased from 2015, although in a softer way than income per capita. Given that well-being has barely changed throughout the period analysed, it is clear that the gains in average wages have been offset by the excessive increase in wage inequality. Salary gains that have increased less than would be expected based on the performance of GDP in recent years, seconded by a disproportionate increase in salary inequality, have led to a stagnation of well-being in Spain. This evolution, however, has not been the one experienced by the most advanced economies on the European continent. Thus, for example, a country like the Netherlands has had a significant growth in its well-being as a result of a significant growth in the average wage and a small worsening of wage inequality. It is observed, therefore, that our convergence problem is not only given by productivity and average wages, but also by our level of wage inequality.





Source: Own elaboration based on PWT10 y EU-SILC databases.

#### 7. CONCLUDING REMARKS

Using the Penn World Table (version 10.0), a set of national-accounts data developed to measure real GDP across countries and over time, and the European Union Statistics on Income and Living conditions, a database with information on wages at the personal level, we have analysed the links between income per capita, wage inequality and welfare for 30 European countries over the period 2004-2019.

Our first result is that far from being employment, the variable that defines the true divergence between European countries is the productivity of workers. In the Spanish case, moreover, a significant trade-off is observed between labour productivity and the employment rate during the worst years of the Great Recession, from 2007 to 2013.

When we look at the average salary, we find that there is a strong positive correlation between this variable and the productivity of the labour factor, with the completion coefficient between both variables being greater than 0.8 at all times. Regarding Spain, it can be seen how the changes experienced by the average salary are conditioned by the economic cycle. Indeed, strong growth prior to 2007 has turned negative during the Great Recession. It can be seen, therefore, that the evolution of the average salary in Spain does not follow the evolution of productivity as closely as would be desirable.

Our country, which was the economy with the lowest salary inequality in 2006, has become the country with the greatest increase in inequality during the last dec-

ade and a half. In addition, when it is compared with the employment rate, it is observed that the evolution of the latter does not determine the increase in wage inequality. That is, the functioning of the Spanish labour market is not enough to explain short-term variations in wage inequality.

On the other hand, the countries with a higher income per capita have been the ones that have seen their welfare increase the most. In Spain, by contrast, well-being has remained practically unchanged over the last 15 years. The gains in the average wage (lower than expected given the evolution of GDP per capita) have been offset by the increase in wage inequality. Given that this evolution has not been the one followed by the most advanced economies in our environment, it is clear that our convergence problem is not only our lower labour productivity (and, therefore, the average wage), it is also the excessive level of wage inequality.

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Table A1.	COU	NTRIES AND YEARS	OF ANALYSIS	
Acr	onym	Country name	PWT10	EU-SILC
	AT	Austria	2004-2019	2004-2019
	BE	Belgium	2004-2019	2004-2019
	BG	Bulgaria	2004-2019	2007-2019
	СН	Switzerland	2004-2019	2007-2019
	CY	Cyprus	2004-2019	2005-2019
	CZ	Czech Republic	2004-2019	2005-2019
	DE	Germany	2004-2019	2005-2019
	DK	Denmark	2004-2019	2004-2019
	EE	Estonia	2004-2019	2004-2019
	EL	Greece	2004-2019	2004-2019
	ES	Spain	2004-2019	2004-2019
	FR	France	2004-2019	2004-2019
	FI	Finland	2004-2019	2004-2019
	HU	Hungary	2004-2019	2005-2019
	IE	Ireland	2004-2019	2004-2018
	IS	Iceland	2004-2019	2004-2018
	IT	Italy	2004-2019	2004-2018
	LT	Lithuania	2004-2019	2007-2019
	LU	Luxembourg	2004-2019	2004-2019
	LV	Latvia	2004-2019	2007-2019
	MT	Malta	2004-2019	2007-2019

## Appendix A

THE LABOUR MARKET, INCOME PER CAPITA AND WELFARE IN EUROPE: AN OVERVIEW OF THE LAST TWO DECADES

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Acronym	Country name	PWT10	EU-SILC
NL	Netherlands	2004-2019	2005-2019
NO	Norway	2004-2019	2004-2019
PL	Poland	2004-2019	2005-2019
PT	Portugal	2004-2019	2004-2019
RO	Romania	2004-2019	2007-2019
SE	Sweden	2004-2019	2004-2019
SI	Slovenia	2004-2019	2005-2019
SK	Slovakia	2004-2019	2005-2018
UK	United Kingdom	2004-2019	2005-2018

Source: Own elaboration based on PWT10 y EU-SILC databases.

## Appendix B

## *Figure B1.* **PRODUCTIVITY AND RATE OF EMPLOYMENT IN IRELAND AND LUXEMBOURG**



Source: Own elaboration based on PWT10 y EU-SILC databases.

## Figure C1. PRODUCTIVITY AND EMPLOYMENT RATE DEVELOPMENTS BY GEOGRAPHICAL AREA IN EUROPE (2004-2019)



Source: Own elaboration based on PWT10 y EU-SILC databases.



## Figure D1. TFP AND AVERAGE WAGES IN FRANCE, THE NETHERLANDS, SPAIN AND THE UNITED KINGDOM



(Percentage change rates)

Source: Own elaboration based on PWT10 y EU-SILC databases.