Inequality and growth in a developing economy:

Evidence from regional data (Spain, 1860-1930)

Abstract: This paper measures inequality at the provincial level in Spain for different benchmark years between 1860 and 1930. It then empirically assesses the relationship between economic growth and inequality. The results confirm that, although growing incomes did not directly contribute to reducing inequality, at least during the early stages of modern economic growth, other processes associated with economic growth such as the rural exodus to urban and industrial centres, the demographic transition and the spread of literacy, among others, notably improved the situation of the bottom part of the population.

1. Introduction

The relationship between inequality and economic development has been widely approached in the social sciences. A large bulk of the literature addresses Kuznets' (1955) hypothesis that inequality grows during the first stages of modern economic growth to decline afterwards as the economy develops further. This issue is nonetheless far from being settled. While some cross-country studies focusing on the second half of the 20th century seem to confirm the empirical regularity of the Kuznets curve, others do not find enough support for the inverted U curve (Barro 2000, 2008; Deininger and Squire 1998; Gallup 2012)1. Long-term longitudinal studies focusing on particular countries have also analysed this issue. In the case of Britain, inequality seems to have increased in the first half of the 19th century during the early stages of industrialisation and started falling from then on (Williamson 1985; Lindert and Williamson 1985; Lindert 2000a; Allen 2009). A similar trend is found for the US, with a substantial rise in inequality between 1800 and 1860 (Lindert and Williamson 2016). In other Western countries such as France, Germany and Sweden, inequality also followed a U-inverted pattern (Morrison 2000), while in the case of Italy no evidence is found of an increase in inequality in the early stages of development (Rossi *et al* 2001). Likewise, although the Kuznets curve often shows up in long-term country studies, a new wave of increasing inequality has been detected for recent decades (Lindert 2000b)2.

One of the main problems regarding these issues is measurement. The quality of the sources employed in the construction of inequality measures is hotly debated (see e.g., Deininger and Squire 1998; Gallup 2012). Moreover, while research estimating the evolution of contemporary inequality is relatively abundant, the number of studies dealing with historical inequality from a quantitative point of view is still scarce3. Some

attempts have nonetheless been made to correct this situation. Two studies led the way by measuring the distance between unskilled wages and farm rents per acre, on the one hand, and the income earnings of the average citizen, on the other, for different countries during the late 19th and early 20th century (O'Rourke *et al* 1996; Williamson 1997).

More recently, Milanovic *et al* (2011) have examined this issue even further back relying on social tables from different pre-industrial societies such as the Roman Empire, Byzantium, England in 1688, Moghul India in 1750 or China in 1880, only to mention some examples[4]. Alternatively, recent research has studied the evolution of top income shares for a growing sample of countries (Piketty and Saez 2006; Atkinson *et al* 2011; Alvaredo *et al* 2013)[5]. Yet, the fact that the top income database is mostly restricted to the 20th century does not allow capturing the potential upsurge of inequality during the early stages of development[6].

The lack of information regarding inequality in 19th and early 20th century Spain has similarly long troubled historians and impeded to follow its evolution, as well as a proper assessment of the relationship between this variable and economic development. The unequal distribution of land ownership has been usually considered one of the main causes of the poor performance of Spanish agriculture and the lack of a more rapid industrialisation (Nadal 1975; Tortella 2000)[7]. However, as Tortella (2000, 56) has pointed out, these arguments have not been able to be tested empirically due to the lack of information.

Recent work has begun to fill in this gap by constructing long-term series of inequality at the national level. Prados de la Escosura (2008) has calculated a set of inequality measures for the period going from 1850 to 2000[8]. His research shows that inequality increased between the mid-19th c. and the First World War and decreased

afterwards. Although this downward trend was interrupted during the autarkic decades that followed the Civil War (1940s-1950s), the decrease in inequality continued up to the 1980s, when inequality increased again, especially since the beginning of the 1990s[9]. Important as it is, country-level inequality hides wide differences at more disaggregated levels, an issue that has been hardly explored. Given the sharp regional differences that characterized the Spanish economy, a more spatially disaggregated measure of inequality would drastically improve our understanding of the patterns behind the evolution of income distribution.

In order to expand our knowledge about these issues, this paper analyses the Spanish experience between 1860 and 1930. Our work provides two main contributions. Firstly, building on earlier work by Williamson (1997), it constructs a measure of inequality for each one of the Spain's provinces between 1860 and 1930: an indirect index of inequality defined as the ratio between nominal income per worker and the nominal unskilled wage or Williamson Index (WI). Our dataset presents a series of advantages. Most of the international studies employ country-level information, so internal differences at lower levels of aggregation is overlooked. Besides, by focusing on just one country, we avoid the problems that different legal and political regimes impose in cross-country comparisons. In addition, our analysis, unlike other empirical exercises within this literature, is conducted for a historical period that corresponds with the early stages of modern economic growth as stated by Kuznets. This is particularly relevant because cross-country studies have mainly focused, due to data scarcity, on the last decades of the 20th century or on the period after WWII. Likewise, distributional policies where almost non-existent during this period, thus enhancing the role of economic forces in explaining the trends in inequality. Lastly, by employing underlying data coming from the same statistical agencies, our study also avoids problems of

comparability between different economies, especially acute when comparing data originated in developed and developing countries (Atkinson and Brandolini 2001; Banerjee and Duflo 2003, 281), or the troublesome conversions of incomes across countries using the purchasing parity power.

Secondly, a model assessing the different causes behind the evolution of inequality is developed and empirically tested. The results confirm the presence of the Kuznets' curve. However, although growing incomes did not directly contribute to reducing inequality, at least during the early stages of modern economic growth, other processes associated with economic growth considerably improved the situation of the bottom part of the population. In this sense, the population shift from rural areas to urban and industrial centres, the demographic transition and the spread of literacy, among others, all partly counterbalanced the initial negative impact of economic growth and helped building a more equal society.

The paper is structured as follows. Section 2 offers a brief description of the economic context of the Spanish economy in the period under study. In section 3, the new regional measure of inequality is presented and a first approach to the relationship between this indicator and early economic growth in Spain is conducted. While the next section develops the methodology employed to explore the determinants of inequality, section 5 presents the results of the empirical analysis. After conducting some robustness tests in section 6, the conclusion summarises our contribution.

2. The early stages of economic growth in Spain, 1860-1930

Economic growth in Spain progressed at a slow pace during the early stages of development. It was only after WWI when GDP growth rates showed a substantial increase (table 1). Structural change in the Spanish economy was also rather limited.

The gradual diffusion of industrialization across Europe in the 19th c. allowed the countries which joined this process to enter the path of what Simon Kuznets defined as 'modern economic growth' (Kuznets 1971). Spain, a middle-sized country lying in the geographical periphery of Europe, strived from the early decades of the 19th c. to foster its industrial sector but these initial attempts mostly failed (Nadal 1975). In 1860, the workforce employed in the agrarian sector still accounted for two-thirds of the total active population. By 1910, this share had hardly changed. The reallocation of resources from agriculture to other economic sectors then accelerated and a substantial reduction in the share of the agrarian population took place in the interwar years, reaching 45.5 per cent of the total population in 1930 (Nicolau 2005).

[TABLE 1]

Economic historians have argued that one of the main reasons that explains why the Spanish economy experienced difficulties to converge with the core European countries was the limited industrialization of the country. During the 19th c. and up to the Civil War (1936-39), Spain indeed lagged behind the major European economic powers and, generally speaking, the Spanish economy had not witnessed the profound transformations that industrialization implies. In parallel to these developments, the demographic transition was delayed relative to the core European countries (Livi-Bacci 1988), thus limiting potential improvements in living standards and health (Pérez Moreda *et al* 2016). The picture was not much better in terms of the educational levels attained by the population. Although literacy levels increased from 26 to 71 per cent of the adult population between 1860 and 1930 (Núñez 1992), this figure was still below

the levels registered in countries like France or England sixty years before (75 and 80 per cent respectively in 1870).

This general description of the Spanish economy as a whole hides nonetheless widely diverse regional experiences. Firstly, three regions escaped from this general view of economic backwardness: Catalonia, the Basque Country and Madrid. In the first two cases, a considerable degree of industrial development was achieved, even for European standards (Carreras 1990). Structural change advanced rapidly in these regions which developed a modern manufacturing sector (table 2). In Catalonia, Barcelona witnessed a remarkable increase in the active population enrolled in industrial activities between 1860 and 1930 (being close to a 60% of the total active population in 1930). Similarly, in the Basque provinces of Guipúzcoa and Vizcaya, industrial active population doubled and tripled, respectively, almost reaching a 40% of the total active population. Likewise, the growth of Madrid, the capital city, brought about the expansion of the manufacturing, construction and service sectors. As a result, by 1930, while their population only represented 11.8%, 5.9% and 3.8%, the contribution of Catalonia, Madrid and the Basque Country to Spanish industrial output was 34.6%, 9.3% and 9.2%, respectively.

[TABLE 2]

In this context, the divergent paths followed by the Spanish regional economies and their timing to join 'modern economic growth' led initially to an upswing in regional inequality during the second half of the 19th c. However, as industrialization spread into an increasing number of provinces in the first decades of the 20th c., a process of inter-regional convergence began. A similar trend is observed in terms of

labour productivity: an increase in regional disparities in the second half of the 19th century and convergence from then on, only interrupted during the aftermath of the First World War. These trends have been linked to structural change and the integration of the Spanish commodity markets due to the removal of institutional barriers and improvements in transport infrastructures, particularly the completion of the railway network (Herranz 2007).

The integration of the Spanish labour market also took place in a context characterised by low rates of interregional migration during the 19th century and the early decades of the 20th century. In the decades between 1877 and 1920 the percentage of permanent internal migrations was low and stable, around 2-3 per cent of the total population (Silvestre 2005). These figures increased in the 1920s reaching rates that almost doubled those of the previous decades (4.3%). Even in this context of low internal mobility, Rosés and Sánchez-Alonso (2004) show that real wages in Spain's regions converged throughout the second half of the 19th century and the first decade of the 20th century. While this trend was interrupted in the years following the First World War, it resumed in the 1920s.

In a mainly agrarian country, the situation of the agricultural sector also greatly differed between regions. The existence of market incentives, together with the social and environmental conditions that characterised the different rural societies influenced the crop-mix and agricultural productivity. While the Southern half of the country and the Castilian plateau, based on a traditional dry-farming cereal agriculture, expanded arable land without appreciably increasing yields, other regions were able to raise productivity through the employment of more intensive techniques and a more diversified agriculture (Simpson 1995a; Gallego 2001)[10]. Such differences were also present in the distribution of land. On the one hand, while large states relying on cheap

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labour were the norm in Southern Spain, small family farms predominated in Northern Spain and some areas of the Mediterranean coast. On the other hand, although the liberal state promoted the privatisation of the commons throughout the 19th century, the outcome of the process was geographically diverse (GEHR 1994).

In a similar vein, important regional differences in educational levels were also present (Núñez 1992). Not only the transition to universal literacy was delayed relative to other European countries, but also the spread of literacy was geographically uneven. A dual structure was configured during the period under study with the Northern provinces reaching higher rates of literacy than those in the South of the country. There were however some exceptions to this general pattern. The Galician provinces in the North, for instance, did perform badly, while the Mediterranean coast was not as backward as the South.

Lastly, it should be noted that the early stages of modern economic growth in Spain coincided with political transformations that are likely to have an influence on the levels of inequality. Liberal reforms were implemented during a period plagued with social instability and political conflict11. This period was followed by the Bourbon Restoration (1874-1923). A parliamentary monarchy was established and under this system, two dynastic political parties, the liberals and the conservatives, alternated in power. However, it appears that, despite the establishment of universal male suffrage in 1890 and its potential effect on the expansion of political participation, the ruling elites managed to keep a good amount of political power during this period (Moreno-Luzón 2007; Curto-Grau *et al* 2012). The Restoration ended in 1923 when it was replaced by a military dictatorship led by Primo de Rivera (1923-1930). Interestingly, the Second Republic (1931-1936), which also brought about the extension of suffrage to women, attempted to undermine the power of the elites, especially of the large landowners, was

followed by a coup d'etat organised by the same threatened elites, which triggered the Civil War and eventually overthrew the democratic government.

3. Measuring inequality

The analysis of income distribution usually relies on the information provided by household surveys. In particular, most recent studies are interested in the evolution of disposable income, thus considering household incomes once taxes and government transfers have been paid and received respectively. The data contained in household surveys usually serves as the basis for the computation of Gini coefficients[12]. Unfortunately, such information is all too often not available for historical periods: household surveys only began to be published after World War II and they were produced mostly in rich countries and not on a regular basis. Therefore, the limited time coverage of the household surveys implies that studies focusing on distant periods have to rely on alternative measures. Historical indicators of inequality are normally constructed using sources which usually offer scattered and more fragmentary data.

Building on earlier work by Williamson (1997; 2002), an indicator of inequality is developed here. The Williamson Index (WI) is an indirect index of inequality defined as the ratio between nominal income per worker (y) and the nominal unskilled wage (w_{unsk})[13]:

$$Williamson\ Index = \frac{y}{w_{unsk}} \qquad [1]$$

By dividing the returns to all factors of production per worker by the returns to unskilled labour, the WI compares the bottom of the distribution to the average income[14]. Examining the Spanish economy as a whole, Prados de la Escosura (2008,

299) has shown that, before 1950, the evolution of the Gini and the Williamson indexes was closely correlated[15]. In particular, the decomposition of the Gini coefficient reveals that inequality in Spain was driven by the gap between the average returns of proprietors and workers, thus justifying the comparison between average income and unskilled wages as the basis for developing these indexes[16]. Likewise, income taxes and social transfers were negligible during the period under study, which also supports the adequacy of these indicators (Prados de la Escosura 2008, 291).

As captured by the Williamson Index, inequality would increase over time if average income per worker increases more than the unskilled (agrarian) wage. Alternatively, if the improvement in unskilled wages exceeds that of the average income per worker, income distribution would become less unequal. Given that we adopt a regional approach, it is worth mentioning that spatial inequality contributes to personal inequality (Kanbur *et al* 2005). In the case of Spain, as mentioned in the previous section, nominal regional income per worker differentials increased in the second half of the 19th century and decreased afterwards, except in the aftermath of the First World War. In this regard, industrialising regions recorded higher rates of economic growth, GDP per capita and productivity. Thus, the level of inequality and its changes over time would depend on to what extent economic progress in each Spanish province translated into higher unskilled wages relative to the evolution of the average income per worker[17].

The Williamson Index has been computed for the Spanish provinces during the period of analysis (see the Statistical Appendix for methodology and sources). At the Spanish level, as previously mentioned, this indicator steadily increased between the 1850s and the end of First World War when it markedly declined up to the 1930s (Prados de la Escosura 2008, 293). This evidence thus displays a U-inverted shape which is consistent with the Kuznets hypothesis. However, compared to the evolution of

Spain as a whole, a much more complex picture appears when the regionally disaggregated information is considered. Firstly, Figure 1 portrays the regional picture and its evolution over time. Yet, extracting general patterns from the observation of the maps is not straightforward. While inequality declined in some provinces, it increased in others. The values of the Williamson Index by year and province can be consulted in table A1 in the appendix.

[FIGURE 1]

Secondly, Figure 2 plots each province's inequality index against their level of real income per capita in 1860, 1900 and 1930. In order to provide a representation of the relationship between economic growth and inequality over time, a quadratic function is fitted to the observations for each period. According to this graph, richer provinces show higher levels of inequality, at least during the first stages of economic growth. Consistent with the Kuznets' hypothesis, the Williamson index seems to have increased as incomes grew, a relationship which weakened over time as the Spanish economy developed[18]. Next sections explore this regional variation to fully assess the distinctive impact of growing incomes and economic development on inequality levels. In order to do so, other potential factors influencing these processes are also taken into account.

[FIGURE 2]

4. The determinants of inequality: empirical strategy

As explained in the introduction, since the pioneering article by Kuznets (1955), the relationship between economic growth and inequality has received considerable attention (Lindert and Williamson 1985; Deininger and Squire 1998; Li *et al* 1998; Barro 2000, 2008; Lindert 2000b; Morrison 2000; Allen 2009; Milanovic *et al* 2011; Gallup 2012)[19]. While some of these studies defend that inequality grows during the early stages of modern economic growth to drop afterwards as the economy develops further, others claim that this connection is far from clear. In this section, we test the Kuznets' hypothesis and examine the potential determinants of inequality using the indicator developed above. Relying on a panel data set at the Spanish provincial level at 1860, 1900, 1910, 1920 and 1930, we estimate the following model:

$$Y_{it} = \beta_1 GDPpc_{it} + \beta_2 GDPpc(squared)_{it} + \beta_3 IND_{it} + \beta_4 URB_{it} + \beta_4 POPDENS_{it} +$$
$$+ \beta_5 FERT_{it} + \beta_6 LIT_{it} + \beta_7 COMM_{it} + a_t + u_{it} \qquad [2]$$

While Y_{it} denotes the level of inequality in province *i* at time *t*, $GDPpc_{it}$ and its square attempt to capture the inverted U-relationship between real income per capita and inequality. The other terms refer to a set of variables that account for other potential determinants of inequality as suggested by the literature and explained below. In addition, a_t introduces fixed time effects[20].

Firstly, Kuznets (1955) itself theorises that, during the early stages of development, inequality is driven up by the shift of the population from agriculture to the urban and industrial sectors where incomes and inequality tend to be higher, so the fraction of the working force employed in the industrial sector (IND_{it}) is included in the model. Likewise, increasing market opportunities, which can be accounted for not only by income per capita but also by urbanisation (URB_{it}) and population density

(*POPDENSit*), may promote inequality due to larger potential gains and risks. However, by providing working opportunities, both the industrial and the urban sector may exert a beneficial influence on wages, potentially decreasing inequality levels[21]. In the case of Spain, several works have shown the relevance of agglomeration economies in explaining both the large increase in the spatial concentration of manufacturing before the Civil War (Tirado *et al* 2002; Rosés 2003; Martinez-Galarraga 2012) and the long-term evolution of population (Ayuda *et al* 2010; Beltrán Tapia *et al* 2018).

Apart from these structural changes, demographic pressures may have also played a role in this process because population growth, by expanding the labour force supply, tends to prevent wages from rising (Lindert and Williamson 1985, 354-355). Similarly, demographic growth in rural areas may entail an increase in land prices and in the number of landless peasants (Morrison 2000, 253). In this sense, during the early stages of economic development, household behaviour underwent fundamental transformations such as the increase in female labour force participation, which led to a decline in fertility rates and the onset of demographic transition, thus potentially alleviating demographic pressures (Galor 2011, 123-124). The shift from 'quantity to quality' in the patterns of fecundity resulted in increasing levels of human capital which may also have affected inequality levels (Becker *et al* 2010). In the case of Spain, it has been argued that the increase in children's literacy at the beginning of the twentieth century is related to the decline in fertility thus offering evidence in favour of the existence of a quantity-quality trade off (Basso 2012).

Plus, in an era where primary education was the main source of human capital differences (Núñez 2005, 140), the spread of schooling and literacy reduced the high concentration of human capital in the top part of the distribution and, therefore, may have levelled off the playing field (Morrison 2000, 252; Galor 2005, 212-214)[22].

According to Rajan and Zingales (2006), elites tried to block the diffusion of education so as to prevent both large-scale reforms and a reduction of the rents accruing to the already educated. However, Galor (2011) suggests that, as the industrialization process advanced, physical capital accumulation was replaced by human capital accumulation as the prime engine of economic growth. In that context, while landowners would favour policies aimed at depriving the masses from education in order to reduce the mobility of rural workers and keep rural wages low, capitalists or industrialists benefited from human capital accumulation and thus had incentives to support education policies. In a recent study, Beltrán-Tapia and Martinez-Galarraga (2018) show, using information from districts (*partidos judiciales*) in 1860 that there is a negative relationship between the fraction of farm labourers and male literacy rates. Further, they argue that as well as supply factors, demand effects also played a significant role in explaining the negative impact of inequality on education.[23] Therefore, proxies capturing fertility ($FERT_{it}$) and educational levels (LIT_{it}) are included in the analysis.

The period under analysis also coincides with a massive privatisation of common lands in Spain (Iriarte 2002; Beltrán Tapia 2016). By providing pasture, wood, and fuel, among other products, including the possibility of temporary cropping, the commons constituted an important source of complementary income. The disrupting impact of the British enclosures on the living standards of the bottom part of the rural population has been repeatedly stressed (Humphries 1990; Allen 1992; Neeson 1993), although these claims have been contested (Shaw-Taylor 2001; Clark and Clark 2001). Spanish historiography has also argued that the loss of these collective resources negatively affected rural households but the lack of information on inequality has prevented drawing stronger conclusions (Tortella 2000; Jiménez Blanco 2002; Beltrán Tapia

2016). Interestingly, although enclosure was highly intense in some regions, other areas were able to preserve large tracts of the commons (GEHR 1994). This heterogeneity therefore allows for empirically testing the effect of the persistence of common lands ($COMM_{it}$) on inequality.

Lastly, a set of time dummies (a_t) accounts for other changes, apart from the economic transformations already considered, which may have affected the Spanish economy, such as the establishment of universal male suffrage in 1890. Recent literature on institutions has stressed that the transition from an oligarchy run by the elites to a more democratic political system involved wide-ranging effects on the economies undergoing those institutional changes (Acemoglu and Robinson 2000; Engerman and Sokoloff 2002; Lindert 2003). The Spanish literature argues, however, that, despite legal changes, economic and political elites were able to keep the political system under their control through different mechanisms such as widespread vote buying, coercion and mass fraud, among other practices, at least until well into the 20th century (Moreno-Luzón 2007; Curto-Grau *et al* 2012). Trade unions, nonetheless, began to exert an important influence on the labour markets during this period (Prados de la Escosura 2008, 303). Given the difficulty of constructing indicators that may capture regional differences in the quality of institutions, the potential impact of these political developments on inequality will therefore be assessed by the time dummies.

[TABLE 3]

5. The determinants of inequality: results

Table 4 reports the results of estimating equation (2) using different methods. Column (1) presents the baseline specification using OLS. Columns (2) and (3) add the set of

controls and the time dummies explained above, respectively[24]. In order to further capture the peculiarities of each province, column (4) employs a fixed-effects specification. The within-province variation of some of the explanatory variables is however small, so this specification cannot fully account for their impact on inequality. Despite the inclusion of different factors potentially explaining inequality trends, a potential bias coming from unobserved heterogeneity and simultaneity is worrisome. An instrumental variable approach is therefore conducted using the lagged values of the explanatory variables as instruments, thus allowing us to alleviate endogeneity issues[25]. Columns (4) to (6) repeat the previous exercise but employing now the IV specification[26]. Admittedly, by following this approach, we lose one time-period and our sample is reduced to years 1900, 1910, 1920 and 1930. However, due to the lack of a different instrument, this is the best available strategy to test the robustness of our results. Moreover, despite the increase in standard errors resulting from both implementing the instrumental variable approach itself and the loss of observations, the IV estimates hardly change and remain statistically significant[27].

The reported results strongly confirm the presence of the Kuznets curve in the early stages of modern economic growth in Spain[28]. Inequality tended to rise as the economy grew but this relationship gradually became weaker and eventually reversed. According to the estimates in column (5), the inflexion point is reached at an income per capita around 1,272 pesetas, when the WI tended to decline thereafter. It is worth noting that the average real GDP per capita went from 359 pesetas in 1860 to 487 and 672 pesetas in 1900 and 1930, respectively. Interestingly, in spite of focusing on a period which only captures the initial stages of modern economic growth, this exercise is able to identify the changing trend in the relationship between income and inequality. Using a long-term longitudinal data at the country level from 1850 to 2000, Prados de la

Escosura (2008, 300) also detects the presence of a Kuznets curve in Spain. In that case, the Williamson Index suggests that the upswing of inequality ends after World War I.

[TABLE 4]

It should be stressed that the relationship between income and inequality does not disappear when other potential determinants of inequality are included in the model, in spite of being highly correlated with economic development. This means that, apart from the economic, social and political transformations which usually accompany this process, and that also involve distributional consequences, income still exerts an independent effect. Given that the coefficient actually almost doubles in size when these variables are introduced, it can be inferred that these other factors were partly offsetting the effect of economic growth on inequality[29]. The positive dimension of this relationship is likely to be due to the expanding opportunities and risks brought about by increasing incomes. Milanovic *et al* (2011) indeed stress that economic growth expands the maximum feasible inequality. Explaining the negative dimension attached to the coefficient on GDP squared is more challenging. Bourguignon (2005, 1739-1740) argues that, in developing economies, markets function very imperfectly, especially credit markets, resulting in 'unbalanced' growth. As the economy develops and markets become better integrated, the impact of growth upon social structures becomes less disrupting and may facilitate that larger parts of the population benefit from expanding opportunities (Dercon 2009).

Regarding structural change, although the shift from agriculture to industry has often been linked to increasing inequality following Kuznets' seminal contribution (1955), our results show that other processes correlated with the emergence of an

industrial sector, such as urbanisation or increasing population density, may explain that trend[30]. Analysing the British case, Lindert and Williamson (1985, 367) were indeed very cautious about the supposed effect of the Industrial Revolution on inequality levels. Industrialisation, on the contrary, at least in the Spanish case, appears to have reduced inequality by opening up new job opportunities for the lower classes, not only consequently raising their salaries but also increasing their room to manoeuvre in their relationships with the well-off (Gallego 2007). The availability of industrial jobs meant, for instance, that peasants could threaten to 'exit' if their landlords did not provide better wages or rents. Likewise, industrialization may have reduced underemployment in rural areas (Morrison 2000, 255).

Alternatively, demographic pressures, as shown by the coefficients on population density and fertility, together with expanding economic opportunities, do explain rising inequality trends. In this sense, Kuznets' intuition (1955, 18) that higher birth rates would be unfavourable to the relative economic position of lower-income groups is strongly validated by the data. Also, by affecting the distribution of population and the labour force supply, migration processes are likely to have had opposite effects: releasing demographic pressures in sending areas but exacerbating them in receiving regions (O'Rourke and Williamson 1999; Betrán and Pons 2011)[31]. Migrations also have an impact on the age structure of the population. Emigration is highly selective and the group of population that migrates usually consists of young adult males. International emigration of workers increases the dependence ratio in the regions of origin regardless of the destination of these migrants. This effect can be even stronger if migration takes place within the domestic market. In this case the host regions also receive people of working age, thus reducing their dependency ratio (Williamson 2001).

There is indeed evidence that internal and international migration gradually increased during the period under analysis (Sanchéz Alonso 2000; Silvestre 2005; 2007).

On the other hand, and as expected, increasing educational levels also help reducing inequality (Barro 2000, 21)[32]. The diffusion of literacy seems to have facilitated reducing the concentration of human capital in narrow segments of the population (Morrison 2000). Although its effect disappears when time dummies are added, this may be due to the association between the spread of political voice, state intervention and the provision of schooling, what would imply multicollinearity problems. In this sense, Lindert (2003) finds an important link between the expansion of voting rights and increasing schooling enrolment rates. There is indeed evidence that the implementation of a public schooling system largely explains most of the growth in literacy levels in Spain between 1860 and 1930[33].

Likewise, the stock of common lands shows a negative and statistically significant influence on inequality. The commons seem to have been a crucial asset for the rural population. Not only did these collective resources complement households' incomes by supplying a variety of goods and services, but also their existence influenced the standards of living of the rural working classes by increasing their bargaining power in the labour market (Jiménez Blanco 2002; Gallego 2007)[34]. Those regions where large tracts of common lands survived actually enjoyed higher levels of life expectancy and heights. The link between the commons and inequality is consistent with anecdotal evidence and the historiography on the driving forces behind the privatisation of these resources, which stresses how powerful elites promoted this process and became the main beneficiaries from it, especially after 1860 (Jiménez Blanco 2002)[35]. A similar story appears evident from the English Parliamentary enclosures where a vast

redistribution of agricultural income from the rural poor to the landowners occurred (Humphries 1990; Allen 1992).

Lastly, it should be stressed that the time dummies show that, holding everything else fixed, inequality decreased under the period of analysis. Although this timing coincides with the modernisation of the economy and the increasing importance of dynamic urban centers, their effect is already accounted for by the control variables. The independent effect of the time dummies may therefore be linked to other factors. On the one hand, the literature has pointed to the effects derived from the transition from an oligarchy run by the elites to a more democratic political system (Acemoglu and Robinson 2000; Engerman and Sokoloff 2002; Lindert 2003). The importance of enfranchisement and electoral dynamics within semi-democratic political systems has actually been stressed for the Spanish case during the monarchic 'Restoration' (1874-1923), in which the two dominant parties alternated in office (Curto-Grau *et al* 2012). Although economic and political elites firmly controlled the Spanish political system by widespread vote buying, coercion and mass fraud, together with promises of individual favours and pork barrel politics, the ability to do so weakened over time as elected candidates from third parties began to gradually gain importance in the political arena from the end of the 19th century onwards. In this sense, not only the establishment of universal male suffrage in 1890 may have opened new paths for mass political participation, but also may have partially corrected some of the malfunctions of the system[36]. Likewise, the political reforms that a wider political representation usually involves, such as social reforms, increased taxation or the extension of education, are likely to need time to begin making an impact (Lindert 2003, 342). Inequality also seems to have been considerably reduced during the 1910s and 1920s coinciding with the disruptive effects of the WWI and the increasing role of trade unions in fostering

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relative wages (Prados de la Escosura 2008, 303). Other processes, such as the trade policy or the effect of technological innovation, nonetheless may have also contributed to explaining these trends. Further research is needed to be able to disentangle between these competing explanations[37].

6. Robustness tests

The results reported above might be influenced by the way the measure of inequality is constructed. On the one hand, the Williamson Index (WI) compares income per worker (y) with the unskilled wage (w_{unsk}). However, it can be argued that, as an economy develops, the share of unskilled workers will drop. If that was the case, comparisons over time could become inconsistent. In order to overcome this potential problem, economic historians have also relied on an inequality measure similar to the Williamson Index which is based not only on the returns of unskilled workers but on the average returns to all labour (*avg w*). The denominator of the equation thus includes both the returns of unskilled and skilled workers. This inequality measure can be expressed as:

$$WI(average\_wage) = \frac{y}{avg\ w}$$ [3]

Prados de la Escosura (2008, 293) computed Williamson Indexes both using the unskilled wage and the average wage for Spain as a whole. His results show that both indicators followed a similar trend from the mid-19th century up to the 1950s. This evidence confirms the expected result given that, during the early stages of development, skilled labour represented a small proportion of the total labour force in Spain (Prados de la Escosura 2008, 292)[38].

Yet, as explained in section 2, structural change in Spain proceeded at different speed across provinces and, consequently, both indicators may differ for different areas in Spain. In particular, if an increase in the share of skilled labour accompanied structural change, this indicator would show disparities both across provinces and compared with the Williamson Index. We have thus computed the Williamson Index using both unskilled and skilled wages (see Appendix for details) and compared this measure with the original version of the Williamson Index. As expected, both indicators are highly correlated (r=0.81). Reassuringly, estimating equation (2) using this alternative indicator hardly change the results reported above (see table A2 in the Appendix).

On the other hand, we are aware of the potential endogeneity arisen from the fact that one of our independent variables, income per capita, is also employed when computing the Williamson Index. This issue may affect the reliability of the estimated coefficients. Relying on other studies that proxy economic development using urbanisation ratios (Acemoglu *et al* 2005, 552), we have also re-estimated our model employing urbanisation rates as a proxy for income per capita. The results of this analysis, reported in table A3 in the Appendix, do not qualitatively change the interpretation here, thus mitigating this concern.

Likewise, the effect on inequality of the variables we have analysed throughout the paper might be capturing the influence of other economic and social processes we have not yet accounted for. Although we have mitigated this concern by implementing different models (Fixed Effects and Instrumental Variables), we now further address this issue by repeating our main specification but adding other variables that may affect inequality. Firstly, in order to account for the effect of international trade, we test whether our results are robust to the inclusion of two new variables (distance to Madrid

or Barcelona and a dummy variable for being a coastal province) and the corresponding interactions with time dummies. The intuition behind is that if the evolution of international trade had an effect on inequality, this impact would be larger in areas close to international markets (coastal areas and provinces closer to the main Spanish cities: Madrid or Barcelona). The results of this exercise, as reported in table A4 in the Appendix, do not alter the image portrayed in the previous section.

Similarly, migratory flows might be filtering how inequality evolves in response to changes in the variables under study. However, controlling for migration does not alter the results (table A5)[39]. In addition, given that our results might depend on how regional GDPs have been adjusted to account for differences in costs of living between provinces, we have carried out an additional robustness test using wheat prices as controls[40]. As shown in table A6, our results remain virtually identical.

Lastly, given that the literature on Spain tends to stress the differences between Northern and Southern Spain in terms of the importance of landless labourers and the number of days worked (Simpson 1995a), we have further tested the robustness of our results by allowing the possibility that these two macro-regions followed different paths. In order to do so, we have included a time dummy for the Southern provinces, so the analysis can then focus on the variation within these macro-regions. In order to account for a distinct evolution over time, we have also interacted this variable with time dummies. As reported in table A7 in the Appendix, results are hardly altered.

7. Conclusion

In a period where other potential indicators are lacking, the Williamson Index developed here enhances our knowledge about the evolution of Spanish inequality at the provincial level during the early stages of modern economic growth. Importantly, this

study shows that country-level inequality hides important differences at more disaggregated regional levels. The analysis also contributes to the debate on the causes behind inequality. While growing incomes appear to have fostered inequality (although at a decreasing rate), other processes associated with economic development, such as the rural exodus to urban and industrial centers, the demographic transition, the spread of literacy or the effect of extending political participation helped improving the relative standards of living of the lower classes. Therefore, the potential of economic growth to improve the lot of the bottom part of the population becomes conditional on its ability to expand the opportunities available to increasingly wider segments of the population.

Statistical Appendix

GDP and wages

Nominal GDP at factor costs for Spanish provinces (NUTS3). In order to express it in per capita terms, *total population by province* has been compiled from the respective Censuses of Population (1860, 1900, 1910, 1920 and 1930).

Nominal unskilled wages correspond to agricultural wages by province. By construction, the Williamson Index heavily relies on wages and thus we attempt to capture the unskilled provincial wages in each benchmark year by considering as much information as possible. For that reason we often compute averages of agricultural wages for different years when available. This way of proceeding allows correcting volatile values in some provinces in a particular year. Agricultural nominal wages are drawn from two sources. For 1860, data come from Sánchez-Alonso (1995, 302-303). Wages are referred to the years 1849-1856, and are collected from the information

provided by Moral Ruiz (1979) and García Sanz (1980). For 1900-1930, the source used

is Bringas (2000, 178-183) who offers data of average agrarian daily male wages

(*Jornales medios diarios masculinos en pesetas*). These refer to cash wages paid to

adult male labourers in the production of cereals between spring and fall (Bringas 2000,

91). For 1900, we take the simple average of the three closest years with information

available (1890, 1897 and 1910). The lacking data in 1890 is filled using the wages of

the neighbouring provinces (Vizcaya); for the Canary Islands we take the wages of

1897. For 1910, we consider the wages available for that year. The closest information

to that year is that of 1914 being the wages virtually the same. For 1920 and 1930, we

use the simple average of the years 1919-1921 and 1929-1931, respectively. The

missing values for wages in some provinces are obtained computing them as the simple

average of the neighbouring provinces. Given that there were no barriers to prevent

agricultural labourers to shift to other occupations within the same province (Silvestre

2005; 2007; Beltrán Tapia and Miguel Salanova 2017), unskilled wages in different

sectors tended to converge.

Nominal skilled wages refer to manufacturing wages. We are interested in obtaining a

wage which represents the average manufacturing wage. Thus we average the wages

earned by skilled and unskilled manufacturing workers. Manufacturing wages for 1860

are given by Madrazo (1984, 208). Figures for ten professional categories involved in

the building of roads are offered[41]. The average manufacturing wage for 1860 comes

from a simple average of two categories established according to level of skill and

provincial coverage[42]: skilled workers (bricklayers or *albañiles*) and unskilled workers

(*peón mayor*). Indeed, the geographical coverage of bricklayers is high but we do not

have information for their wages in six provinces. In order to fill this gap, we use data

for the most similar professional category for which the source offers information, that

is, masons. The wages of bricklayers in these six provinces are calculated from the wages of masons, and their deviation from the average wages for masons in Spain, weighted by the industrial population of each province according to the Population Census of 1860. In addition, given that no wages are provided for Navarre, they must be estimated. It would be reasonable to think that there might be a wage gradient depending on geographical proximity. Indeed, for the rest of the years available, it is confirmed that the manufacturing wage in Navarre is close to the average wage of the neighbouring provinces. Therefore, the manufacturing wage in Navarre in 1860 is calculated as being the average wage in the neighbouring provinces[43]. Manufacturing wages in 1900 come from Sánchez-Alonso (1995). Regarding these data, which originally come from IGE (1903), Simpson (1995b, 190, 199) defines them as semi-skilled workers and he points out two provinces with excessively high wages: Pontevedra and Toledo. The values have therefore been corrected by re-calculating in both cases their wages as the average of the industrial wage in the neighbouring provinces. Finally, manufacturing wages in 1914, 1920 and 1930 come from Ministerio de Trabajo (1927, 1931) (*Estadísticas de los Salarios y Jornadas de Trabajo*). These publications provide data for nominal wage per hour and the number of workers in each occupation according to different categories: we compute the provincial wages as the weighted average for skilled male workers and unskilled labourers. For 1930, the number of workers is assumed to be the same as in 1925. Finally, manufacturing wages for the Canary Islands are not available and have thus to be estimated. For 1914, it is assumed that the manufacturing wage in the Canary Islands was similar to that of the lowest one among the Spanish provinces (0.28 ptas per hour). For the next years, the increase in the manufacturing wage is assumed to be similar to that of the Spanish economy as a whole. While this decision may lead to an overestimation of the

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manufacturing wages in the Canary Islands in 1920 and 1930, its effect on the final average wage is actually small. If we assume an evolution in the manufacturing wages of the Canary Islands similar to that of the less dynamic province, results are virtually the same.

Employment and hours worked

Total male active population by province has been compiled from the respective Censuses of Population (1860, 1900, 1910, 1920 and 1930). Due to the lack of consistency regarding the registration of female agrarian population in the period analysed (Erdozáin and Mikelarena, 1999; Nicolau, 2005), we have only considered the male agrarian population in the calculation of the total active population, a usual procedure both in the Spanish as well as the international historical literature (Van Zanden 1991; O'Brien and Prados de la Escosura 1992; Prados de la Escosura 2008). However, the first Census of Population in this study does not disaggregate agrarian population between male and female actives. The male agrarian workers in 1860 are thus obtained by applying the percentage of the total male agrarian population over total active male population in each province in the closest Census, that of 1877, offered by Erdozáin and Mikelarena (1999). As a robustness test four our results, we have also computed total agrarian population including both males and females, and, considering only agrarian males, adding a fixed proportion of one third for female agrarian workforce (Prados de la Escosura 2008, 322; Prados de la Escosura and Rosés 2009, 1074)[44].

For the *number of days* worked throughout the year, we consider, following Prados de la Escosura (2008, 322), that each full-time worker was employed 270 days per annum. To obtain the daily *hours worked*, we take a value of ten hours per day for the

manufacturing sector. In the case of the agrarian sector, the same amount of hours is considered. As Prados de la Escosura (2008, 322) states, "[f]or mid-nineteenth-century agriculture, Caballero (1864) pointed to 10 hours per day while a similar average figure, 9.7 hours, was found in the mid-1950s".

Regression variables

Real GDP has been obtained from the five-sector disaggregation of provincial GDP and the deflators at the national level for those sectors provided in Prados de la Escosura (2003). Urbanisation rates (*urbanisation*), measured as the percentage of population living in municipalities bigger than 5.000 inhabitants, are taken from Reher (1994) and Tafunell (2005). The variable *industrialisation* is computed as the ratio between the industry GVA and the nominal GDP. In addition, the underlying geographical data for the calculation of the *population density* (population by square km) in each province are compiled from the Censuses of Population and INE. *Fertility rates* come from Livi-Bacci (1988). Given the lack of data for 1860, the figures of 1887 are considered instead, thus assuming that fertility rates hardly changed between these two years. The information about *literacy*, calculated as the percentage of the total population over 10 years who was able to read and write, is offered by Núñez (1992). Lastly, the stock of common lands is measured as a fraction over the total provincial area using data from GEHR (1994), Artiaga and Balboa (1992) and Gallego (2007). Unfortunately, there is no information for the three provinces in the Basque Country. Given that no data exist for 1910 and 1920, linear interpolation has been employed instead.

[TABLE A1]

[TABLE A2]

[TABLE A3]

[TABLE A4]

[TABLE A5]

[TABLE A6]

[TABLE A7]

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[1] Other authors argue that this relationship weakens over time (Li *et al* 1998).

[2] Inequality between regions over the long run has been explored for a number of developed countries. In this instance, the seminal paper of Williamson (1965) identified a Kuznets-type U inverted relationship between national economic development and the evolution of regional inequalities.

[3] For some examples on the evolution of contemporary inequality see Deininger and Squire (1998), Chen and Ravallion (2001) and Milanovic (2002). Baumol *et al* (1994) and Pritchett (1997) approach historical inequality from a more qualitative perspective.

[4] Soltow and Van Zanden (1998) have also traced inequality levels in the Netherlands back to the 16th century. Alfani (2015) has recently analysed northern Italy during the Modern Period. From a different perspective, Hoffman *et al* (2002) compare the evolution of the living standards of different social groups in England, France and Holland from the 16th century onwards.

[5] Interestingly, this work is based on the pioneering study by Kuznets (1953) who first combined data on income tax records and national accounts to estimate top income shares.

[6] The information is usually restricted to the post-WWI period, when income tax was introduced in most countries. Yet, there is data available for some countries that goes back to the 19th century. Relying on fiscal sources presents some problems like tax evasion.

[7] In Southern Spain, large states relying on cheap labour had no incentives to modernise and, since the non-agricultural sector was not dynamic enough, this kept waged labour in the agricultural sector. In some areas of Northern Spain, on the contrary, the small size of the farms and the lack of capital prevented the adoption of new methods and techniques (Clar and Pinilla 2009, 313). It is argued that both social structures reduced mass consumption, reducing thus the incentives to modernise. A broader access to land is also likely to have directly benefited standards of living (Pérez Picazo 2010, 48). Inequality may have also affected well-being through the political process and the willingness to provide public goods and Spanish restricted franchise and political practices assured that economic inequality implied political inequality (Prados de la Escosura 2008, 290).

[8] Álvarez del Nogal and Prados de la Escosura (2013) have extended it backwards from 1850 to 1280. These authors present alternative measures of inequality including the land rent-wage rate ratio and the nominal output per capita to nominal wage rates (Williamson Index).

[9] Using individual tax statistics, Alvaredo and Saez (2009) have presented top income shares for Spain between 1933 and 2005 (in this case, for the 0.01 top percent).

10 Even though the expansion of cultivated land was also widely practised in the Ebro valley and the Mediterranean strip running from Castellón to Murcia, these regions were able to complement this strategy by extending irrigation systems and applying increasing doses of chemical fertilisers. The productive orientation of dry Spain was not exclusively based on cereal crops, but also on stockbreeding, vineyards and olive groves. However, all of these crops were produced on un-irrigated land cultivated through extensive systems (Gallego 2001, 46).

11 The liberal agenda was mostly enacted during the "Revolución Liberal" (1836-1840), the "Bienio Progresista" (1854-1856) and the "Sexenio Revolucionario" (1868-1974).

12 It is also usual to find in the literature several entropy indices such as the Theil (Theil 1967; Milanovic 2011).

13 The components are normalised by the number of hours worked. See the statistical appendix for details.

14 This indicator exploits the right-skewness of the income distribution, which implies that the mean is higher than the median. An alternative way of calculating inequality indexes is the wage-rental ratio, an indicator which has also been widely used. See Williamson (1997) for an example.

15 In addition, Milanovic *et al* (2007, 23) argue that the y/w ratio is highly correlated with the Gini indexes and therefore it is a good proxy for inequality in the nineteenth and twentieth centuries.

16 Between-group inequality dominated over within-group mainly up to the First World War, which remained stable during this period.

17 It could be argued that, in more industrialized provinces unskilled urban wages may be lower than unskilled agrarian wages, thus representing the bottom part of the distribution. The data available does not seem to confirm this view. In 1910, in Barcelona, one of the most industrialized provinces, the average agrarian wage was 0.28 pts/hour. This wage was lower than that perceived by unskilled industrial workers (0.36 pts/hour) and skilled industrial workers (0.54 pts/hour). At the other end, in Badajoz, while unskilled agrarian wages reached 0.18 pts/hour, unskilled and skilled industrial wages where higher: 0.20 and 0.35 pts/hour, respectively. Ministerio de Trabajo, Comercio e Industria (1927).

18 This pattern is similar to that found for the evolution of regional income inequality in Spain, which goes in line with the so-called Williamson-hypothesis. Inspired by the contribution of Kuznets' (1955) on the dynamics of economic inequality, Williamson (1965) suggested that along the process of economic development regional inequality also exhibited an inverted U-shaped pattern. In the early stages of modern economic growth, industrial activity concentrated in specific locations, raising regional income inequality. Specialization and divergence in economic structures would then explain the rise in inequality in the early stages of modern economic growth. Yet, these disparities will eventually decrease: regional economic convergence begins as soon as industrialization spreads."

19 Recent research by Bourguignon and Morrison (2002), Van Zanden *et al* (2011) and Milanovic (2011) has focused on estimating long-run trends in global inequality. See also Bourguignon (2005, 1732-1742) and Kanbur (2000) for a detailed review of the literature on the Kuznets curve and the determinants of inequality.

20 The selection of variables is a critical issue in this kind of exercises. On the one hand, the more regressors are included, the lower would be the potential problem of omitted variables (although this can be partially solved using an IV approach as explained below). On the other hand, a large number of variables could imply that some of them may be statistically correlated therefore capturing similar effects.

21 In the Spanish case, urbanisation and industrialisation do not always come together. The importance of agro-towns, especially in Southern Spain, advises to include both variables in the model. It should be noted that these variables also capture the effect of changes in international trade. Although declining transport costs were supplemented with tariff reductions from 1869, Spain returned to strict protectionist policies from 1892 onwards (O'Rourke and Williamson 1999; Tena 1999).

22 Notwithstanding, Rosés (1998) argues that informal education at the workplace and on-the-job training were key in the Catalan industrialization during the 19th century.

23 Interestingly, these authors find that the timing of the different stages in the Reconquest did have a persistent impact on the land ownership structure, at least in Castile.

24 Estimating a Random Effects model does not alter the results reported above.

25 This is a usual procedure in the literature. See, for instance, Wolf (2007) and Klein and Crafts (2012).

26 All instrumental variables are statistically significant in the first stage regressions. The endogenous regressors pass the Angrist-Pischke tests of underidentification and weak identification.

27 The Hausman test cannot actually reject at the 5 per cent significance level that there is no systematic differences in the OLS and IV estimates (p-value=0.0965).

28 All reported results do not change when alternative definitions of the agrarian active population are used. See Appendix I for details. The results are available from the authors upon request.

29 Studying Brazil, Ferreira and Paes de Barros (1998) find that the fact that inequality did not increase between 1976 and 1996 was not because economic growth did not have an impact on income distribution,

but because there were other socio-demographic forces, such as a decline in fertility and average family size, as well as an expansion of education, obscuring that relationship.

30 Interestingly, there is evidence in support of the existence of an 'agglomeration effect' linking the spatial density of economic activity and interregional differences in the productivity of industrial labour in Spain for the period 1860 to 1999. In line with Ciccone and Hall (1996) and Ciccone (2002), the estimated elasticity of employment density with respect to labour productivity, as the agglomeration effect has been defined, played a key role during the early stages of industrialisation.

31 In addition, Betrán and Pons (2011) analyse the effect of the grain invasion from the New World in the late 19th century, adopting a regional approach. They conclude that lower wheat prices initially had a negative impact on agricultural wages. However, after the establishment of the 1891 tariff, agricultural wages increased. This impact would be nonetheless more noticeable in the cereal regions mainly located in Castile. Interestingly, they found that wheat prices had a larger effect on agricultural wages than migrations (both internal and external).

32 Its loss of significance in column (5) when the IV approach is conducted is likely to be due, as explained above, to the increase in standards errors resulting from both implementing the IV approach itself and the loss of observations caused by the use of lagged values of the regressors and instruments (its p-value is only 0.130). Also, Barro's specification does not include fertility rates, which, being correlated with literacy levels, may explain why that variable is not statistically significant here (or, alternatively, why it is significant in his model).

33 Another potential complementary explanation may be that the effect of education on inequality is not contemporaneous but lagged. See Núñez (2003; 2005) for an analysis of the regional patterns in the transition to universal literacy in Spain.

34 According to Gallego (2007, 165), the level to which privileged groups subordinated peasant exploitations to their own interests depended on the array of possibilities that peasant families could lean on, which apart from access to the commons, include access to other resources such as land or credit, or to alternative sources of income such as urban wages or remittances. The greater labour market dependence caused by the disappearance of collective user-rights left peasants in a more vulnerable position, since they were doomed to a compulsory submission to work conditions that benefited their employers (López Estudillo 1992, 93).

35 The widespread social unrest and resistance that privatisation generated, especially among the least favoured groups, speaks clearly about its negative impact on living standards (Cobo *et al* 1992; De la Torre and Lana 2000).

36 Although elections became increasingly competitive, this process was nonetheless limited (Curto-Grau *et al* 2012, 778-779). Members of Parliament from third parties only accounted for about 20 percent of the chamber by the early 1920s. However, weakened by an increasingly challenging environment, this political system actually collapsed in 1923 and a military dictatorship was established which lasted until 1930. Despite all its shortcomings, historiography has considered that the political regime in place between 1874 and 1923, based on the peaceful (but corrupted) alternation in power of the two dynastic parties, succeeded in achieving institutional stability, especially after the previous turbulent decades, thus contributing to fostering economic growth. See Moreno-Luzón (2007) for a detailed synthesis of the functioning of this political regime and the interpretations of the historiography.

37 The loss of one time period when employing the IV approach also prevents us from drawing a stronger assessment of what happened between 1860 and 1900.

38 This is consistent with the fact that around 96 per cent of the total years of schooling of the labour force corresponded to primary education (Núñez 2005, 140).

39 Migration rates include both internal and international migration and are measured as net migration flows (Mikelarena 1993). Admittedly, the data is far from perfect and some interpolation was required because the original source does not include information on all the periods analysed here.

40 Data come from Sánchez-Albornoz (1975), GEHR (1980) and Revista del Ministerio de Agricultura (1919-1933).

41 Here we use construction wages to proxy industrial wages. To check whether this is a reasonable assumption we take the data available in the closest years (1914-1925), offered by the Ministerio de Trabajo (1927, 1931). The data show that construction wages on those years were similar to the average industrial wage.

42 Here we aim to obtain the highest degree of homogeneity with the wages available for 1900 and 1910-30. Given that no data on active population in each occupation is available, the average cannot be weighted and a simple average is used.

43 As a test for this result, we use wages in 1897, the closest available date. In that year, the industrial wage in Navarre was 3% higher than the Spanish average weighted by the industrial population. If this percentage

is applied to the Spanish value for 1860, the figure obtained almost coincides with the one previously calculated.

44 In this sense, "since female EAP figures for agriculture are inconsistent across censuses, women in agriculture were assumed to allocate their time in a way that made female labor a fixed fraction of male labor in the agricultural sector" (Prados de la Escosura and Rosés 2009, 1074).