Did Spanish Labour Markets Fail?
Urban-Rural Wage Gaps in Spain, 1850-1930

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1. Introduction

Over the 19th century, improvements in transport and communications and the progressive elimination of institutional barriers to commerce induced an impressive increase in trade and factor mobility. The opening of economic relations affected both home and international markets. In international markets, an increase in international commerce and an extraordinary factor mobility phenomenon took place across Atlantic economies (Harley 1980; O'Rourke and Williamson 1999). The great flows of trade, capital, and migration were linked and induced factor price and GDP per capita convergence across countries (O'Rourke, Taylor and Williamson 1996).

No less spectacular, and equally important, it was the sharp increase in commodity and factor movements within national boundaries. Price gaps among regions in many countries declined as transport and information costs fell and institutional barriers to home trade were eliminated. Associated to this process of commodity market integration, many countries also experienced notable progresses in the integration of their factor markets. The changes in home capital markets were striking: the processes of national monetary integration, spectacular developments in banking, and the new telegraph networks allowed capitals to flow rapidly and abundantly from one region to another (Cameron 1967). Equally impressive was the transformation of labour markets. Thus, regionally or locally segmented labour markets become increasingly integrated at the national or even international level (Hatton and Williamson 1993, 1998). As a consequence, regional and urban-rural wage gaps declined elsewhere. Millions of Europeans, even more than those who crossed the Atlantic, migrated from lower wages regions to others where wages were higher and job opportunities better (Baines 1994; Hatton and Williamson 1998) and abandoned agriculture to work into industry and services. Above all, the reallocation of production factors induced huge structural change, increases in efficiency and, hence, economic growth.

The performance of the Spanish economy during this period of progressive integration of home and international markets was nothing short of remarkable (Prados de la Escosura 2003). Determining the source of this poor development ranks among the key issues for economic historians interested in Spanish economic history. An obvious candidate to explain Spain's economic backwardness is the process of market integration at international and national levels. Particularly, economic historians have debated on the issue of the consequences for Spanish

economic growth of international trade openness and tariffs (Tena 1999; Tena and Tirado 1996), the inability to attract foreign capital due to unorthodox macroeconomic policies (Martín Aceña 1994), and international migrations (Sánchez-Alonso 1995, 2000a, 2000b). In the case of the integration of national commodity markets, recent research has tended to downplay the amount of social savings associated to the development of the national railway networks and, implicitly, the increase in efficiency that can be associated to the creation of the national market (Barquín 1997). Despite these new estimations, academics continue to agree that this integration of the commodity market was beneficial for economic development of Spain. By contrast, the consequences for Spanish economic development of the integration and functioning of capital markets have received much less attention from economic historians. To our knowledge, no study has examined the impact of the integration of capital markets on economic growth. Thus, the only study on capital home market integration (Castañeda and Tafunell 1993) suggests that the integration of the markets seems to have been accomplished by the latter half of the 19th century but does not consider the consequences for Spanish growth of that process. In any case, in absence of detailed research, it seems little reasonable to attribute to home capital markets a major contribution to slow growth. In a sharp contrast, the performance of labour markets has been commonly censored. Specifically, the literature commonly condemn the operation of labour markets leaving behind the implicit, or even explicit, impression that in absence of considerable reallocation of labour from agriculture to industry and services Spaniards lost opportunities for structural change and higher growth. Surprisingly, the issue of labour market integration between rural and urban markets is little empirically explored with the exception of Simpson (1995b). Instead, there is more research done on the determinants of internal migration and the low numbers of internal migrants (see, for example, Mikelarena 1993, Silvestre 2001).

This paper is the second step of a large research project on the changes in factor prices in Spain. Therefore, their results are not definitive and must be read with caution. In this paper we examine how far one can go explaining the performance of rural and urban labour markets from 1850 to 1930 using provincial and regional employment and wage data for agrarian, unskilled urban and industrial workers. Rather than focusing in internal migrations, we analyse urban-rural wage gaps and the sources of labour shifts from agriculture to other sectors. By examining these variables, it seems that Spanish labour markets worked better than previously thought. An intense process of urban-rural labour markets integration took place over the 2nd half of the 19th century without large migrations and little structural change. World War I interrupted abruptly this process but it

reappeared powerfully over 1920s. However, the new process of market integration had a different character since this time it was accompanied by large home migrations and a noteworthy reallocation of labour from agriculture to industry and services.[1]

The paper is organized as follows. Section 2 reviews the literature and the evidence on structural change, urbanization and migrations in Spain from 1850 to 1930. The following section 3 presents the evidence in urban-rural wage gaps. Section 4 analyses the changes in these gaps employing a simple supply and demand framework. Section 5 considers relative factor price equalization across Spanish regions; that is, the convergence of urban-rural wage gaps. Section 6 summarizes and concludes.

2. Structural change in Spain

Spanish economic history has been traditionally focused on the reasons of economic backwardness in the "long" 19th century. The general view found in the Spanish literature is that the process of development should be characterized by fundamental changes in the structure of production and employment. In this view, the basic assumption is that structural change generates a positive contribution to aggregated productivity growth just by factors of production (mainly labour) moving from low productivity sectors (agriculture) to high productivity sectors (industry and services[2]. Therefore, among a wide variety of factors of retardation (poor natural endowments, institutions, human capital scarcity, and so on) there is a wide consensus that the extremely slow structural change and reallocation of factors between sectors was one of the main reasons for the poor performance of the Spanish economy.[3]

In a pioneering work, Sánchez-Albornoz (1968) described the 19th century Spanish economy as a dual economy with a large traditional sector and an emerging modern sector. Agriculture was characterized by low productivity, low saving rates and considerable underemployment. The

[1] It should be underlined that these results are in line with previous research done on labour markets integration within occupations (Rosés and Sánchez-Alonso 2002).

[2] This appears to have been the case indeed for the Spanish economic growth in the long run as shown in Prados de la Escosura (2003: chap.6).

[3] More specifically, the majority of Spanish economic historians have in mind (most of the times implicitly) a version of the Lewis' dual sector model of development.

modern sector, though small, was assumed to be technologically advanced and with higher levels of productivity. The persistently high share of active population employed in agriculture is therefore seen as a major obstacle to economic growth in the long run. Following the same line of reasoning, Tortella (1992, 1994) stressed the crucial role of the agricultural revolution (the lack of it in the Spanish case) for the industrialization process. Thus, in his view, Spanish agriculture failed almost completely in promoting economic growth since it was disappointing as a market for industrial products,[4] as a supplier of capital for modernization, as an export-led sector and, above all, as a supplier of cheap and abundant labour to be employed in the industry.[5]

However, a completely different view emerges when the 20th century is considered. Literature has stressed that from World War I onwards (with a major break during the Civil War and the 1940s) the transfer of human resources out of agriculture contributed greatly to economic modernization by providing urban activities with cheap and abundant labour and by rising agricultural productivity.[6] Nevertheless, even in the years of fast economic growth during the 1960s, the low rate of employment growth in the urban sector was balanced with a massive emigration of rural labour to Europe (Serrano Sanz and Sabaté 2002, Ródenas 1994).

In spite of a wide variety of historical explanations, little empirical research has been done on the reasons why Spanish agriculture did not release labour at a faster rate. Tortella (1992) hypothesized that there were two main sets of reasons for the tardiness of labour in leaving agriculture: demography and policy. On the one hand, the slow population growth of the 19th century due to high death rates and relatively low birth rates did not drive out peasants from the countryside (Pérez Moreda 1987). On the other hand, the highly protective tariffs, which helped to maintain traditional agriculture (namely cereals), retarded structural change within the agricultural sector and in the Spanish economy as a whole.[7] However, the same Tortella (1992,

[4] A view shared with Nadal (1975).

[5] Note the close parallelism between this argument and those employed to explain the industrialization retardation in France (Sicsic 1992). Thus, like for France, the argument in the literature is that industrialization was choked off by the inability of agriculture to release labour.

[6] See, among others, Maluquer de Motes (1987), García Delgado and García Grande (1999), Tortella (1994), and Barciela (1997).

[7] In the same line of reasoning, Prados de la Escosura (1988: 102) pointed out that policies for the protection of cereals resulted in a misallocation of resources and that protection maintained artificially the area under

1994) argued that an external shock -the "agricultural depression"- during the last quarter of the 19th century pushed the peasants and farmers out of the countryside although agrarian population emigrated overseas because "they were not mainly attracted by domestic cities and industry" (Tortella 1992: 17).[8] Nadal (1975) also shared this multi-causal interpretation of the slow structural change. While stressing the conservative nature of the Spanish peasant, he also pointed out the low demand of labour from the urban sector as major causes of weak structural change. Similarly, Sánchez-Albornoz (1968: 18) did not only maintain that textile industry was unable to attract labour from the countryside but also that the majority of Spanish farmers never had in mind leaving agriculture to work into factories.[9] In a sharp contrast, Prados de la Escosura (1988, 1997) put forward a labour demand-based interpretation arguing that modest rates of industrialization generated a limited expansion of labour demand in the modern sectors and hence, a large share of workforce remained in agriculture.

More firmly based on empirical research is the research done by Simpson (1995b) who analysed urban-rural wage gaps in the period 1860-1930 and found that they widened from 1860 to 1896 whereas declined slowly after 1914.[10] Simpson attributed the widening wage gap in the first period to a series of barriers to off-farm migration: the success of smaller peasants in retaining their properties during the land sales of the 19th century, the widespread use of partible inheritance, the availability of village lands for communal use, and finally, the large areas of land leased to farmers (though often with short-term contracts) that allowed small farmers and labourers a greater access to land.

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cultivation and, consequently, the *status quo*. By contrast, Simpson (1997) and Sánchez-Alonso (2000) argued that tariffs were not sufficient in themselves to explain either the poor performance of Spanish agriculture or the emigration of labour out of agriculture.

[8] The same view was shared by Maluquer de Motes (1987).

[9] Comín (2002: 302) shared the same eclectic view for the interwar period than Tortella, Nadal and Sánchez-Albornoz.

[10] However, Simpson misinterpreted 1896 wage data considering that it corresponded to unskilled urban labour while it appears clear from the source that data refers to industrial (semi-skilled) urban workers.

TABLE 1

The share (%) of primary sector into total employment, 1860-1930

A. Male Employment							
	1860	**1877**	**1887**	**1900**	**1910**	**1920**	**1930**
Spain (48)	74.57	71.97	72.13	73.48	73.21	62.03	51.35
Andalusia (8)	70.38	69.11	70.17	73.51	71.92	64.51	59.97
Ebro Valley (7)	78.75	75.86	78.62	76.98	78.11	70.09	58.68
Mediterranean (8)	67.41	63.46	62.82	66.52	65.34	50.45	39.77
North (8)	82.94	79.06	77.67	75.36	76.46	61.32	49.33
Northern Castile (9)	78.82	79.49	79.09	82.06	81.71	74.72	60.27
Southern Castile (8)	71.40	70.94	72.33	72.78	74.14	63.51	50.20
B. Total employment							
	1860	**1877**	**1887**	**1900**	**1910**	**1920**	**1930**
Spain (48)	67.23	70.35	69.36	71.33	69.76	58.79	46.42
Andalusia (8)	64.08	65.09	65.10	69.93	68.82	61.30	57.00
Ebro Valley (7)	72.41	75.33	73.62	72.64	73.68	65.90	54.83
Mediterranean (8)	59.44	59.86	58.62	61.51	59.95	43.82	33.89
North (8)	75.08	81.38	80.30	79.06	76.81	63.70	43.52
Northern Castile (9)	71.65	75.91	74.72	80.31	78.19	71.53	56.87
Southern Castile (8)	63.86	65.74	66.53	67.37	68.81	61.39	45.79

Notes and sources: The number of provinces within each region is in parenthesis. We divided Spain in six macro-regions by similarity of characteristics (the so-called homogeneity principle). This kind of division is adequate for analysis based on the Heckscher-Ohlin framework (Kim 1995). Each macro-region comprises a minimum of 7 provinces and a maximum of 9 provinces. Andalusia includes observations for the following provinces: Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga and Sevilla. Ebro Valley includes Álava, Huesca, Lérida, Logroño, Navarra, Teruel, and Zaragoza. Mediterranean region comprises the provinces of Alicante, Baleares, Barcelona, Castellón, Gerona, Murcia, Tarragona, and Valencia. North includes Coruña, Guipúzcoa, Lugo, Orense, Oviedo, Pontevedra, Santander and Vizcaya. Northern Castile comprises the provinces of Ávila, Burgos, León, Palencia, Salamanca, Segovia, Soria, Zamora and Valladolid. Finally, Southern Castile includes Albacete, Badajoz, Cáceres, Ciudad Real, Cuenca, Guadalajara, Madrid and Toledo. Therefore, we exclude from our calculations the Canary Islands, Ceuta, Melilla and the Spanish colonies. In total employment, we exclude female agricultural labour due to inconsistencies in censuses data over time.[11] The sources are the population censuses for the respective years.

In table 1, we explore the share of primary sector into total employment from 1860 to 1930 according to data collected into Spanish population census. According to the two measures considered, male and total employment, the share of agrarian workforce was rather stable from 1860 to 1910. Even, in several regions like Andalusia, Northern and Southern Castile this share

[11] We are aware that this exclusion can bias the data since female employment in agriculture varied regionally depending on the type of agriculture (more or less labour intensive). However, Pérez Moreda (1987) points out that statistics for the active agrarian population included a group of landowners who were not really part of the labour force and whose incorporation may partially compensate for the exclusion of female labour.

grew significantly during the period. More prominently, the share of labour employed in the primary sector was comparatively larger exceeding in regions like Northern Castile the 75 per cent of total employment by 1910. Nevertheless, the situation changed dramatically from 1910 to 1930 given that the share of agrarian workforce decreased by about twenty points. Particularly, in regions like Mediterranean, North and Southern Castile workforce employed in primary activities was below the 50 per cent of the total workforce by 1930. These three regions concentrated the most industrialized and developed provinces in Spain, namely Barcelona, Biscay and Madrid. In consequence, at first sight, population census data confirm the view shared by many economic historians: structural change was slow from mid-19th century to 1910 and relatively fast in the 1910s and the 1920s.

TABLE 2

Urbanization rates (%), 1860-1930

A. Cities more than 10000 pop.					
	1860	**1887**	**1910**	**1920**	**1930**
Spain (48)	20.25	26.33	31.14	34.18	38.03
Andalusia (8)	37.57	41.47	45.62	48.84	52.21
Ebro Valley (7)	9.73	11.73	14.08	17.16	19.79
Mediterranean (8)	31.96	42.53	48.19	50.00	53.97
North (8)	7.69	10.32	15.41	18.53	20.84
Northern Castile (9)	6.27	9.27	8.99	9.79	13.33
Southern Castile (8)	17.85	25.88	33.95	37.95	42.25
B. Cities more than 25000 pop.					
	1860	**1887**	**1910**	**1920**	**1930**
Spain (48)	11.05	15.46	18.64	22.44	26.00
Andalusia (8)	17.97	19.67	21.75	24.88	26.19
Ebro Valley (7)	3.79	8.27	9.49	14.12	16.47
Mediterranean (8)	19.59	27.04	33.42	37.18	42.40
North (8)	3.06	6.41	10.36	14.44	16.72
Northern Castile (9)	3.31	4.40	5.60	6.04	8.34
Southern Castile (8)	12.44	17.59	18.64	23.85	28.89

Notes and sources: The source of urban population data is Luna (1988) whereas total population data is draw directly from population censuses for the respective years.

A different view on the Spanish structural change emerges when one considers the evolution of urbanization (see table 2) since the growth of urbanization rates was impressive in the second half of the 19th century. In forty years, from 1860 and 1900, the share of population living in cities of 25000 or more habitants increased by about 70 per cent (from 11.05 per cent to 18.64 per cent). If we consider the entire period (1860-1930), urbanization rates more than doubled. Therefore, during the 1910s and 1920s, Spanish urban population continued growing but the contrast with

the rest of the country lessened as total population rose in response to demographic transition. Indeed, this trend conflicts directly with those views summarized above on the low levels of mobility of the Spanish population and the census data on the occupational structure of Spanish workforce.[12]

It is important to note that the growth of urbanization rates was not due to higher rates of natural increase of the urban population but to migrations from countryside to the cities. According to Reher (1990) rates of natural increase in Spanish urban areas were low and showed no signs of improvement over the period 1860-1920. More prominently, the lowest levels were achieved in the 1920s in a period of extraordinary growth in urbanization rates.[13] The lower urban rates of natural increase were consequence of the persistence of higher mortality rates in the cities, the so called "urban penalty". Eventually urban mortality became lower than in rural areas, though this threshold would not be definitively crossed after the Civil War.[14] Therefore, towns were growing faster than rural areas largely because of net migration.

Migration evidence also shows a relatively vigorous Spanish economy since internal migrations grew steadily since the late 19th century. Scholars have found that many workers migrated during the period, though less than in other European countries, that most moves where short distance and temporary, that once patterns of migration were established they often persisted, and that regional differences in migration patterns were relatively important. The total impact of migration in the 1930s was lower than in the 1960s although the stock of permanent migrants reached almost one million people (4.3 per cent of total Spanish population).[15] But not all migrations were permanent since a large part of internal migrations were temporary and short-distance given

[12] Several years ago, Pérez Moreda (1987) pointed out that employment data do not seem to fit with the data on development, though slow and localized of industry, mining, communication and transport which should have generated a shift in labour demand towards the secondary sector.

[13] Both Pérez Moreda (1987) and Reher (1990) consider population in the provincial capitals as urban population assuming that overall they appear to yield a relative representative sample of urban population in Spain.

[14] Reher (2001) estimates that, around 1930, living in a town meant a decrease in life expectancy of 6 years for men and 2.5 years for women.

[15] Silvestre (2003) offers an estimation of home migrations computed using census data on residents from other provinces and surviving data.

the seasonality of labour demand both in agriculture and in the cities, particularly for unskilled labour. Simpson (2000) argued that seasonal demand for labour in agriculture made a high percentage of the labour force jointly employed in agriculture and manufacturing, but these short term migration came to an end in the early 1920s as a consequence of harvest mechanization[16]. More recently Silvestre (2003) has re-examined critically the evidence arguing that this kind of migrations did not decrease during the first third of the 20th century. Though permanent and temporary migrants have some differences in their preferred destinations, the main areas of attraction for internal migrants remained quite stable along this period and were already defined as early as 1877: Madrid, Barcelona and Biscay. More prominently, Madrid and Barcelona received more than 70 per cent of total immigrants in the period 1887-1930.

To sum up, Spanish historiography has traditionally considered that weak structural change (measured by the reallocation of labour from agriculture to industry and services) was one of the main reasons of the slow growth of the Spanish economy. The persistently high share of labour employed in agriculture up to 1914 is commonly presented as the empirical evidence for the extremely slow structural change. However, either data on urbanization rates in Spain over the period 1860-1920 or research done on internal migrations present a less immobile picture of the Spanish economy.

3. Evidence on urban-rural wage gaps

Another procedure widely employed to analyze the relation between traditional and modern sectors is the study of wage gaps between urban and rural workers. Nevertheless, there are not many studies on labour market and wage gaps for Spain. A major step was the research done by Simpson (1995b) analysing urban-rural wage gaps for the period 1860-1930. According to his data, urban-rural wage gap widened from 1860 to 1896 whereas declined slowly after 1914. The widening wage gap in the first period appears to have been caused by urban wages growing faster than rural wages while the trend is reversed between 1914 and 1930. But Simpson's research was focused on explaining trends in rural out-migration rather than on wage gaps determinants. He concludes that wages were not the decisive factor in determining internal migration, but rather the

[16] There is not any study for the Spanish case similar to the one for France by Magnac and Postal-Vinay (1997) on wage competition between agriculture and industry.

prospects of employment in high wage areas or lack of employment in the countryside. More recently, Silvestre (2003) reached the same conclusion for the period 1914-1931. According to him the narrowing in the urban-rural wage gaps can be explained by the migration from the countryside to the urban centres and by an increase in agricultural wages.

We begin our analysis of the issue of wage gaps in Spain with the simplest and most commonly used measure of urban-rural wages gaps; namely, the ratio between urban and rural wages. Traditionally, literature has interpreted the evolution of wage gaps in the following way. If urbanisation and industrialisation were blocked by labour scarcity consequence of the absence of migrations from countryside to cities, wage gaps should have been large and rising. Instead, if industrialisation was too slow to attract large number of migrants from the countryside, the wage gap should be small and stable. Finally, if markets worked quite well and become increasingly integrated wage gaps should have been declining.[17] The ratio between urban, unskilled and industrial, and agrarian wages is defined for each region as the unweighted average of ratios between those wages in the provinces making up the region. The resulting nominal regional, and Spanish, wage ratios are displayed in the following table 3 (panels A and B).

[17] However, readers should note that this interpretation is not necessarily correct according our theoretical framework.

TABLE 3
Nominal and Real Urban / Rural Wage ratios

A. Nominal unskilled urban / agrarian labourer					
	1860	1914	1920	1925	1930
Spain (48)	1.55	1.15	0.92	1.07	0.96
Andalucia (8)	1.36	1.31	0.80	1.23	0.85
Ebro Valley (7)	1.53	0.96	0.80	0.92	0.82
Mediterranean (8)	1.46	1.26	0.95	0.86	0.80
North (8)	1.80	1.06	0.93	1.00	1.00
Northern Castile (9)	1.74	1.11	1.02	1.35	1.26
Southern Castile (8)	1.38	1.21	0.97	1.00	1.00
B. Nominal wage gap industrial urban / agrarian labourer					
	1860	1914	1920	1925	1930
Spain (48)	3.13	1.77	1.34	1.56	1.53
Andalucia (8)	3.19	2.08	1.11	1.80	1.42
Ebro Valley (7)	2.96	1.52	1.07	1.28	1.22
Mediterranean (8)	2.81	1.82	1.36	1.23	1.30
North (8)	2.94	1.62	1.45	1.51	1.55
Northern Castile (9)	3.59	1.79	1.60	2.00	2.02
Southern Castile (8)	3.22	1.76	1.39	1.48	1.59
C. Spanish Real Urban / Rural wage ratios					
	1860	1914	1920	1925	1930
Unskilled / rural	1.39	0.98	0.78	0.92	0.81
Industrial /rural	2.80	1.51	1.14	1.35	1.29

Notes and Sources: The ratios had been computed under the assumption that urban workers worked 300 days per year while rural workers only 250 days per year. Given that urban and rural cost-of-living deflators at provincial level are not already available, we used the following procedure to compute urban-rural living-cost ratios at national level. We regress provincial cost-of-living series for each year on urban population ratios (population in cities of 5000 habitants or more). More specifically, we estimate WLS regressions with weights given by the population in each province). Then with the constant and the coefficients obtained, we compute urban/rural cost-of-living ratios for Spain by multiplying these coefficients by mean urban population ratios. The sources are described in Rosés and Sánchez-Alonso (2004), appendix.

A sharp picture appears from this table: nominal wage gaps were relatively larger in 1860, decreased sharply in 1914 and 1920, and remained quite stable during the 1920s (with the exception of industrial/rural wage gaps that grew significantly). It is also noticeable that these trends were replicated in each region; that is, urban-rural wage ratios evolved simultaneously in all Spain. Note that these results enter directly into conflict with the traditional interpretation of

changes in wage gaps that associated them with migrations and structural change. More prominently, trends in wage gaps do not either appears compatible with employment or migration figures. In particular, from 1860 and 1910 wage gaps decreased significantly but workforce employed in agriculture remained rather stable and internal migration were relatively of little importance. Instead, from 1910 to 1930, the share of agrarian employment fell sharply and many rural workers migrated from countryside entering urban unskilled jobs with stable or growing wage gaps.

To gain insight into the timing of the movement of the urban/rural gap, we compute the real ratios of unskilled and industry wages to farm wages for Spain in the same period[18]. The results (panel C, table 3) are also striking confirming the trend observed in nominal urban-rural wage gaps. In other words, considering cost-of-living adjustments between city and countryside does not modify the general picture of a narrowing gap in the initial period. However, these adjustments also indicate that within regions or provinces permanent movements of labour from the countryside to the cities from 1914 onwards increased very little the real salary of migrants. Indeed, this is consistent with the higher rates of temporary work in Spain found by Silvestre (2003).

In comparison with urban-rural wage gaps in other countries, Spanish wage gaps were small.[19] In England, gaps were about 70 percent for nominal wages and 45 percent for gaps adjusted by cost-of-living and rural poor relief. In the United States, the wage gap in the 1890s and in the 1920s diminishes from 50 to 10 or 15 percent. Real French wage gaps evolved differently since they were nil in 1852 but widened up to 26 percent in 1892 and levelled off thereafter.[20]

Another simple way of gauging the relative performance of urban and rural wages is to compute elasticities between nominal wages across sectors. These elasticities are estimated according to the following equation:

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[18] We use a new data set on provincial real wages with cost-of –living deflators (including housing costs for the first time) computed following the PPP procedure. See Sánchez-Alonso and Rosés (2002).

[19] In this paragraph, we refer to unskilled urban and farm wages.

[20] See for England, Williamson (1990); for the United States, Alston and Hatton (1991); for France, Sicsic (1992).

(1) $$Log(WA_{it}) = \sum_{t=1}^{4} b_i DTI_t Log(WB_{it}) + \sum_{j=1}^{N} d_i DPJ_i + \sum_{t=1}^{4} c_t DTI_t$$

where the *DTJ* are provincial dummies, the *DTI* are the time dummies (1860, 1914, 1920, 1925, 1930), and the WA_{it} and WB_{it} are the nominal wages in province i, year t.

TABLE 4
Elasticities between Nominal Wages

	1861	**1914**	**1920**	**1925**	**1930**
Agrarian wages on unskilled urban wages	1.05	.33	.60	.74	.65
	(.09)	(.07)	(.09)	(.12)	(.11)
Agrarian wages on industrial wages	.78	.52	.65	.79	.91
	(.07)	(.08)	(.11)	(.15)	(.14)
Unskilled wages on industrial wages	.36	.93	.94	.92	1.07
	(.04)	(.06)	(.04)	(.05)	(.05)

Notes and sources: See text. Figures in parenthesis are the standard errors. For sources see table 3.

Table 4 displays these elasticities without regional and provincial dummies. Indeed, local labour markets seem integrated in the sense that elasticities of agrarian wages to urban wages (unskilled and industrial) are large and significant. Including the regional and provincial dummies does not change the picture that increases our previous evidence on the good functioning of the local markets.[21] However, it should be also be noted the large variation of elasticities during the period from mid-19th century to 1930. Specifically, elasticities between agrarian and urban wages decreased from 1861 to 1914 but increased thereafter. Instead, elasticities between unskilled urban and industrial workers were growing continuously during the period.

4. Supply and Demand shifts as a source of relative wage variation

To understand the evolution of wage gaps across urban and rural workers, it seems that the traditional interpretation based solely on the supply shifts is incomplete. For this reason, we employ the familiar production side of the standard 2x2 Heckscher-Ohlin trade theory.[22] This framework suggests an exercise for examining the evolution of wage gaps: a straightforward supply and demand structure following the basic Katz and Murphy (1992) modelling.

[21] These estimations are not presented in table 4 but are available from the authors under request.

[22] This model is consistent with the requirement of the CES production function.

Before proceeding further, it seems necessary to underline that our framework departs largely from the two leading theories of dual labour markets commonly employed by economic historians in this kind of exercises. The dualistic models had its source in Arthur Lewis' (1954) original labour surplus model. This model of economic dualism is based on the assumption that labour remains underemployed in the traditional sector. The underemployed would survive through family sharing. Family members who earn an income above the subsistence level may be willing to share, by altruism or tradition, this extra income with less well-off family members already underemployed. As a result, owners of capital into the modern sector had to pay a wage that insured a spread between sectors marginal products. Thus, wages in both agriculture and industry remain constant rather than increasing in response to the greater demand for labour, while labour remain underemployed in agriculture. Lewis particularly stressed this last point, since it meant that earnings of owners of capital would not be reduced by rising wages, and he believed that these earnings were the main source of savings that would finance further investment and drive economic growth. However, Lewis's model was optimistic regarding to the rates of migration from countryside since it was based on the assumption that that the rate of absorption in city employment would be fast. A different view emerged in the 1960s when urban unemployment became more and more pronounced in LDC cities. Thus, the Harris-Todaro model (1970) stressed that urban labour market distortion could account for both the rising unemployment and the increasing wage gaps. By focusing on expected rather than current wage gap, the Harris-Todaro model incorporated the fact that the wage rate in the industrial sector is pegged at artificially high levels by unionism or minimum wage legislation. Basically, in the Harris-Todaro framework migration is driven by expected wages and wages are sticky in city labour markets while flexible in the countryside. In sum, both Lewis (1954) model of unlimited supplies of labour and Harris and Todaro (1970) two-sector analysis are based on the basic principle that relative wages between sectors are not responding completely to relative changes in supply and demand. Instead, our basic modelling starts out from the belief that wages are fully flexible in response to supply and demand shifts.

Our basic modelling proceeds as follows. We begin with a version of the familiar 2x2 Heckscher-Ohlin framework. Consider a region with two sectors (industry or modern sector and agriculture or traditional sector) and two factors of production (skilled and unskilled labour). On average, industry workers are more skilled than agriculture workers although both sectors employed

unskilled and skilled labour.[23] However, for simplicity, we treat employment in the different sectors as distinct labour inputs.[24] Doing so, in our framework we only consider relative wage changes with reference to the average employed worker in each industry. It should be noted, however, that this occupational measure is the only measure consistently available over a long time period. To the extent that these different employment groups are imperfect substitutes in production, we can consider changes in relative wages as being generated by shifts in relative supplies and shifts in factor demand schedules.[25] According to the familiar production side of the model, we can conventionally assume that each sector is competitive so that revenue (Y) equals costs (C):

(2)
$$p_i Y_i = C_i$$
$$p_j Y_j = C_j$$

where *pi* and *pj* are prices in each sector (respectively, industry and agriculture).

If there is no technical progress or price change, the *relative* wages between industry (w_i) and agriculture (w_j) are constant and depend, solely, in relative prices and productivity. But suppose agriculture releases workers, perhaps due to falling prices from increased international trade competition or technical change. This creates a flow of potential workers willing to work at industry and so potentially drive down wages. Relative wages therefore depend on whether technical progress and output prices are changing by more in one sector *relative* to another. It is these *differences across* sectors ("sector bias") that potentially cause wage adjustments. Put it in another way, the finding is that demand forces (trade and technological change) can induce changes in wage gaps across sectors. Therefore, if the workers are mobile across sectors (that is,

[23] A requirement of 2x2 Heckscher-Ohlin model is incomplete specialization.

[24] To simplify our further discussion we refer continuously to two-sector although in our calculations we consider up to three different sectors (agriculture, industry and services). We also restrict our services employment to commerce, transport and personal services and, hence, we exclude from calculations army, public servants, clergy, and liberal professions. Finally, to avoid problems with female employment underreporting and wage discrimination, we confine our analysis to male wages and employment.

[25] In the equilibrium conditions of the Heckscher-Ohlin framework the supplies must equal to total employment. Then, we consider through calculations employment as equal to labour supply. For this reason, we do not adjust our calculation for part-time work or hours-of-work.

if there is rural migration to urban centres), each sector faces a flat relative labour supply curve.[26] Put formally, changes in (log) relative wages can be written:

$$\Delta \ln (w_i / w_j) = \frac{1}{V_i - V_j} \left(\Delta \ln (p^i / p^j) + \Delta \ln (TFP^i / TFP^j) \right) \quad (3)$$

where V*i* and V*j* are the shares of labour in the total value added in each sector and *TFP* is total factor productivity. This equation (3), which is standard in the trade literature, serves to explain two different types adjustment in *relative* wages. First, it shows Stolper-Samuelson type effects of changes in *relative* prices (*pi/pj*) on *relative* wages (*wi/wj*). The effect depends on the sector bias of changes in prices. Given the zero profit conditions (that is, costs must be equal to revenues) of the Heckscher-Ohlin framework, if prices fall in any sector then, that sector is now unprofitable and *relative* wages must adjust to restore zero-profit equilibrium (that is, the decrease in revenues). Hence, if prices fall in industry *relative* wages (w_i/w_j) must fall because if not, this would render sector unprofitable. Similarly, if prices fall in agriculture *relative* wages (w_i/w_j) must rise. Second, equation (3) also shows that the effect of technology depends on sector bias of changes in TFP. The mechanism also works via the zero profit conditions following the same intuition as changes in prices. Technical progress reduces a sector's costs and so makes it relatively profitable. Hence, technical progress in industry makes that sector more profitable and hence *relative* wages (w_i/w_j) must rise whereas technical progress in agriculture sector means that *relative* wages (w_i/w_j) must fall.

What might happen with labour supply changes? With many sectors the extra workers can potentially be absorbed by a rise in output in the expanding sector. Given the flat shape curve in the 2x2 Heckscher-Ohlin model, this absorption is done entirely by changes in output mixes with no change in relative wages; this is the so-called Rybczynski effect (Rybczynski, 1955). However, there are at least three possible situations in which relative wages can be modified by supply changes. Any of these situations was likely to be the case given the conditions of the Spanish economy from mid-19th century to 1930. First, if there are more traded goods than factors then labour supply matters for relative wages since relative wages are not completely

[26] Note that this model also holds if the two sectors contain heterogeneous labour. Particularly, on the case of industry and agriculture employing simultaneously skilled and unskilled workers. See Haskel (2001) for the formal development of the argument.

determined by zero profit conditions (that is, revenues can exceed costs). Second, if the economy shifts due to labour supply (for example, producing new goods), a new set of zero-profit conditions appears in (2) and hence a new flat segment of the national relative demand curve. Third, if factors are immobile across sectors then each sector matters as a local labour market, in which case relative supply and demand will determine relative wages.

Therefore, it not seems reasonable to ignore the importance of supply shifts in relative wages. For this reason, we will implement our basic analysis based on the HO framework considering that the absorption of supply shifts is not done entirely by changes in output mixes. According to the equilibrium conditions of our framework and under the assumption that the aggregate production function is concave, relative changes in factor supplies (net of relative demand shifts) and relative changes in wages must negatively co-vary.[27] In other words, any increase in the *relative* supply of any type of labour, when the demand is constant, must lead to a reduction in its *relative* wages. For example, a relative increase in the amount of labour employed in agriculture should necessarily produce, if labour demand is held constant, a relative decrease in wages of agricultural workers. In this case, wage changes are generated by relative supply changes arising from changing demography and migration rates. Therefore, it is relatively simple to examine whether data are consistent with stable factor demand since one can examine for fixed factor demand between two years by evaluating whether:

$$(7) \qquad (W_t - W_{t-1})\,(X_t - X_{t-1}) \leq 0$$

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[27] This affirmation can be justified as follows. Following the basic Katz and Murphy (1992) modelling, our basic framework involves an aggregate production function consisting of N types of labour inputs. Then, we assume that the related factor demands can be written as:

$$(4) \qquad X_t = D(W_t, Z_t),$$

where: $X_t = N \times 1$ vector inputs employed in the market in year t; $W_t = N \times 1$ vector of market prices for these inputs in year t and $Z_t = M \times 1$ vector of demand shift variables in year t. This Z_t reproduces the consequences of technology, product demand, and other inputs different from labour (like capital and intermediate inputs) on demands for labour inputs. Under the assumptions of perfect markets and concavity, the (K x K) matrix of cross-price effects on factor demands, D_w, is negative semidifinite. Thus, equation (4) can be differenced:

$$(5) \qquad dXt = D_w dW_t + D_z dZ_t$$

The negative semidifiniteness of D_w implies that

$$(6) \qquad dW'_t(dX_t - D_z dZ_t) = dW'_t D_w dW_t \leq 0$$

where the variation in relative wages between year *t* and *t-1* (W_t - W_t-1) are multiplied by the relative variation in employment (X_t - X_{t-1}). When this inequality is satisfied supply shifts could potentially explain all variation in relative wages. Instead, when the inequality is not satisfied, changes in relative wages are not only due to supply shifts; that is, demand shifts also play a role in deciding relative wages changes. In other words, when the sign of product is negative supply forces could explain variations in relative wages whilst when a positive sign is found we could argue that labour shift play a major role in that changes.

To implement our basic analysis based on equation 7, we should combine a relative wage with a relative supply measure.[28] Our relative wage measure is actual wages W_t deflated by a wage index *N'* W_t where *N* is the vector of average employment shares over the entire sample for the different labour inputs. Our supply measure is actual supplies X_t (employment) deflated by the total supply (employment) of labour in the economy with its different components measured in efficiency units.[29] Then, we proceed with equation 7 and compute the products of changes in relative wages with changes in relative factor supplies between time periods.[30] We not only estimate these products not only for the whole Spain but also for each of the macro-regions already defined and employed previously in our analysis.

[28] The formal justification of these measures is furnished in Katz and Murphy (1992), p. 48.

[29] In equilibrium, efficiency units can be computed as the vector of average relative wages over the entire sample.

[30] One source of concern on our methodology is that, given the absence of data, we consider only three industries (agriculture, industry and services) and do not take into account demographic groups and employment categories as is typical in this kind of exercises. See, for example, Katz and Murphy (1992) and Hanson and Slaughter (2002). Indeed, this can lead to bias in our results but against the hypothesis of the importance of supply shifts. Given that the period studied, 1860-1930, corresponded with the demographic and literacy transitions in Spain one can expect that our measure of labour quantity understate the 'true' increase of the relative supply of labour in Spain.

TABLE 5

Supply and demand shifts as source of relative wage changes, 1860-1930

Period	Region	Wage Changes (W_t - W_{t-1})	Supply Changes (X_t - X_{t-1})	Product of wages and supply changes (W_t - W_{t-1}) (X_t - X_{t-1})
(a) 1860-1910	Spain (48)	-0.3292	0.0468	-0.0154
	Andalusia (8)	-0.2134	0.0539	-0.0115
	Ebro Valley (7)	-0.5312	-0.0080	0.0043
	Mediterranean (8)	-0.0901	0.0452	-0.0041
	North (8)	-0.6183	-0.0761	0.0471
	Northern Castile (9)	-0.9184	0.1809	-0.1661
	Southern Castile (8)	-0.1536	0.2371	-0.0364
(b) 1910-1920	Spain (48)	-0.2829	-0.2213	0.0626
	Andalusia (8)	-0.6970	-0.1353	0.0943
	Ebro Valley (7)	-0.3996	-0.0553	0.0221
	Mediterranean (8)	-0.1544	-0.2196	0.0339
	North (8)	-0.0812	-0.3597	0.0292
	Northern Castile (9)	-0.1739	-0.2055	0.0357
	Southern Castile (8)	-0.2040	-0.2945	0.0601
(c) 1920-1930	Spain (48)	0.0465	-0.1215	-0.0056
	Andalusia (8)	0.2316	0.0072	0.0017
	Ebro Valley (7)	-0.0083	-0.0305	0.0003
	Mediterranean (8)	-0.0918	-0.1587	0.0146
	North (8)	0.0550	-0.0951	-0.0052
	Northern Castile (9)	0.2531	-0.2848	-0.0721
	Southern Castile (8)	0.0499	-0.2181	-0.0109
(d) 1860-1930	Spain (48)	-0.5656	-0.2960	0.1675
	Andalusia (8)	-0.6788	-0.0742	0.0503
	Ebro Valley (7)	-0.9391	-0.0938	0.0881
	Mediterranean (8)	-0.3363	-0.3331	0.1120
	North (8)	-0.6445	-0.5310	0.3422
	Northern Castile (9)	-0.8393	-0.3095	0.2597
	Southern Castile (8)	-0.3077	-0.2755	0.0848

Notes and sources: see text.

The results presented in table 5 seem to be reasonably coherent with a stable demand structure for the early period (1860-1910). An exception to this general rule is the North region, which experienced a quick industrialization process during this early period. Instead, in regions like Andalusia, the Ebro Valley (with a value close to zero), Mediterranean and Northern and Southern Castile, supply shifts seem the most defining force.

In a sharp contrast, all calculations involving the intermediate period (1910-1920) are positive and thereby refuse an interpretation solely based on stable demand structure. During this period, Spanish economy experienced the shock of the globalisation backlash and the alteration of its international comparative advantage as a consequence of neutrality during World War I.

Elsewhere (Rosés and Sánchez-Alonso 2004) we have shown that during this period the process of convergence across provinces and within occupations was abruptly interrupted.

The later period (1920-1930) can also be characterized as a period of stable demand, with the exception of Mediterranean and Andalusia regions where changing demand played a role in deciding relative wage changes. In the first case, industrial growth and diversification in Catalonia, and to some extent in Valencia (Palafox 1987), promoted a growing demand for industrial workers during the 1920s while in Andalusia major changes took place with the mechanization of agriculture (Simpson 1995a).

Finally, in the calculations for the overall period (1860-1930) stable demand hypothesis is rejected. This later result points in the direction that demand shifts occurring in the intermediate period were so strong that influenced the overall trend of wages for the whole period 1860-1930. Therefore, labour demand was the determinant factor in the evolution of urban-rural wage gaps in the long run.

5. Testing for urban-rural wage gap convergence across Spanish regions

We will explore now the integration of rural and urban labour markets across Spain as a result of commodity markets integration. To do so, we will employ growth analysis methodology. Namely, we will consider the issues of "σ-convergence" and "β-convergence" in urban/rural wage ratios. The first is "σ-convergence" that refers to a downward time-trend in the cross-section dispersion of wage gap, and the second is "β-convergence" that refers to an inclination for initially low-wage gap regions (provinces) to experience faster wage gap growth than high-wage regions (provinces). In this framework, as urban-rural market integration progresses, σ-convergence and β-convergence takes place simultaneously.

To motivate this exercise, we can employ the Stolper-Samuelson theorem, a core result of the Heckscher-Ohlin framework. Under the same condition than in the 2x2 model (two goods, two regions, two factors), if the relative price of agrarian goods fall, resources shift out of unskilled-intensive agriculture to skilled-intensive industry; the demand for unskilled labour (agrarian labour) falls and that for skilled labour (industry labour) rises. Likewise, if the relative price of

industrial commodities rises, skilled wages will rise and unskilled wages will fall. The implication of the theorem is that commodity price convergence can induce factor price (urban-rural wage gap) convergence across regions.

To measure σ-convergence, we will employ the unweighted coefficient of variation. The coefficient of variation in year *t* is the standard deviation of wage gaps of the sample considered divided by the mean values of the sample. If the coefficient of variation decreases over time, we can identify σ-convergence. Table 6 presents calculations for two different wage gaps and up to five benchmarks.

TABLE 6

Coefficients of Variation in Nominal Urban / Rural wage ratios across Spanish Regions

A. Unskilled urban / agrarian labourer					
	1861	**1914**	**1920**	**1925**	**1930**
Spain (48)	0.209	0.189	0.282	0.337	0.337
Andalucia (8)	0.130	0.156	0.375	0.232	0.186
Ebro Valley (7)	0.242	0.117	0.274	0.219	0.248
Mediterranean (8)	0.167	0.160	0.284	0.274	0.192
North (8)	0.166	0.158	0.167	0.106	0.094
Northern Castile (9)	0.220	0.188	0.296	0.407	0.424
Southern Castile (8)	0.146	0.193	0.266	0.356	0.320
B. Industrial urban / agrarian labourer					
	1861	**1914**	**1920**	**1925**	**1930**
Spain (48)	0.200	0.166	0.292	0.330	0.324
Andalucia (8)	0.126	0.191	0.340	0.285	0.148
Ebro Valley (7)	0.199	0.128	0.205	0.269	0.199
Mediterranean (8)	0.252	0.130	0.263	0.275	0.228
North (8)	0.149	0.114	0.160	0.130	0.121
Northern Castile (9)	0.124	0.100	0.333	0.347	0.426
Southern Castile (8)	0.273	0.147	0.230	0.285	0.211

Notes and sources: Rosés and Sánchez-Alonso (2004).

There is evidence of two different regimes for wage ratios. In the case of unskilled urban / agrarian, the summary statistic falls from about 0.21 to 0.19 from 1861 to 1914 and from 1914 to 1930, the coefficient of variation grows to about 0.34. Similarly, the coefficient of variation of industrial urban / agrarian drops from about 0.20 to 0.17 from 1861 to 1914 whereas, from 1914 to 1930, the coefficient of variation increases to about 0.33. In other words, World War I disrupted the process of provincial wage convergence within and across occupations.

Finally, we consider the issue of "β-convergence" in nominal urban / rural wage ratios. To do so, we will estimate the rate at which regions where the wage gap is the lowest grew faster than the regions where the wage gap is the highest. There are also two basic types of β convergence: *unconditional* and *conditional*. Convergence is conditional if the growth rate of the gap is negatively related to the initial level of wage gaps after holding fixed some other variables, like the starting levels of human and physical capital. By contrast, the *unconditional* convergence does not require holding constant any variable. The basic form of the equation of *unconditional* convergence is:

$$\frac{1}{T}\ln\left(\frac{W_{i,\,final}}{W_{i,initial}}\right)=\alpha+\Theta\ln\left(W_{i,initial}\right)+\varepsilon_i\,, \tag{8}$$

Where *T* is the number of years considered, and W is the wage gap on the designated year for the province *i*. This equation can be estimated by ordinary least squares (OLS). Following Barro and Sala-i-Martín (1995), it is easy to derive from this estimation the yearly convergence rate β. This can be computed as: - (1/*T*) ln(Θ*T* + 1), where Θ is the regression coefficient computed on $\ln(W_{i,\,initial})$. In that regression, a negative coefficient on initial levels is taken to indicate convergence[31]. There are two basic measurement problems to be addressed. The first is if our variable of interest, the $\ln(W_{i,\,initial})$, remains statistically significant and of the theoretically predicted sign when we introduce a conditioning set of variables in the regression (Levine and Renelt 1992), that is, when one estimates a *conditional* convergence regression. In other words, we should allow for heterogeneity across provinces and, hence, we drop from our regression the assumption that all provinces have the same parameters. This implies that provinces differed in their steady-state positions and that wage gaps grow faster the further away they are from their own steady-state value (Barro and Sala-i-Martin 1995). To do so, we introduce in our convergence regressions the initial levels of human and physical capital as the basic test for the presence of different steady states. Algebraically, the new equation of *conditional* convergence is:

$$\frac{1}{T}\ln\left(\frac{W_{i,\,final}}{W_{i,initial}}\right)=\alpha+\Theta\ln\left(W_{i,initial}\right)+\Phi\ln\left(H_{i,initial}\right)+\Lambda\ln\left(K_{i,initial}\right)+\varepsilon_i\,, \tag{9}$$

[31] However, these tests turn out to be affected by measurement problems (Quah 1993; Levine and Renelt 1992).

Where H is the literacy rate as a proxy for human capital and K is the urbanization rate as a proxy for physical capital on the designated year for the province *i*.[32] We will also estimate this equation by OLS. If our coefficient on $\ln(W_{i,\ initial})$ computed by equation 9 differs significantly from coefficient computed with equation 8 this implies that wage gaps are not converging towards a national steady-state value but, instead, we have different steady states according to provincial human and physical capital endowments. The contrary result would indicate the existence of *unconditional* national convergence independent from the provincial initial human and physical capital endowments.

We can also carry out our test on *conditional* β convergence a step further. Thus, we will consider that wages are converging towards different steady states decided by both human and physical capital endowments and the geography. In other words, following Barro and Sala-i-Martin (1995), we estimate the equation 8 (*conditional* convergence) including regional dummies by Seemingly Unrelated Regression (SUR).[33] This procedure allows for region effects that are correlated over time. When the coefficients computed including regional dummies are similar to the previous *unconditional* and *conditional* convergence regressions coefficients one may suggest that the speed at which averages for the six regions are converging is not substantially different from the speed at which averages for the provinces within each of the regions converge towards the national steady state.

Our results, presented in table 7, indicate the existence of strong β-convergence; that is, urban/rural wage ratios were growing faster in provinces were these ratios were lower whereas the contrary holds for provinces were these ratios were higher.

[32] We define literacy rates as the rate of literacy population per hundred inhabitants and the urbanization rate as the rate of population in cities of 25000 habitants or more per hundred inhabitants. The sources of literacy and urbanization rates are, respectively, Nuñez (1992) and Luna (1988).

[33] The regions are the same of table 1.

TABLE 7

β-Convergence Regressions: Agrarian-Unskilled labourers wage gap

Period	Information description	(1) Unconditional OLS	(2) Conditional OLS	(3) Conditional SUR
(a) 1860-1914	$Ln(W_{initial})$	-0.0225	-0.0212	-0.0153
	Stand. Error	(0.0022)	(0.0022)	(0.0019)
	R-squared	0.68	0.72	0.74
	F-stat.	99.98	40.88	29.97
	Implied-β	*n.d.*	*n.d.*	*-0.0324*
(b) 1914-1920	$Ln(W_{initial})$	-0.1054	-0.0788	-0.0124
	Stand. Error	(0.0392)	(0.0423)	(0.0201)
	R-squared	0.12	0.13	0.18
	F-stat.	7.23	3.32	1.14
	Implied-β	*-0.1668*	*-0.1067*	*-0.0132*
(c) 1920-1930	$Ln(W_{initial})$	-0.0806	-0.0845	-0.0470
	Stand. Error	(0.0135)	(0.0123)	(0.0102)
	R-squared	0.42	0.48	0.51
	F-stat.	35.53	15.50	7.97
	Implied-β	*-0.1640*	*-0.1864*	*-0.0635*
(d) 1860-1930	$Ln(W_{initial})$	-0.0064	-0.0087	-0.0030
	Stand. Error	(0.0025)	(0.0024)	(0.0016)
	R-squared	0.11	0.28	0.32
	F-stat.	6.61	7.02	2.08
	Implied-β	*-0.0066*	*-0.0091*	*-0.0030*

Notes and sources: All estimations include 48 observations. OLS: Ordinary Least Squares. SUR: seemingly Unrelated Regressions. Unconditional estimation is computed with the equation 7. Conditional (OLS) estimation is computed with the equation 8 and, then, includes human and physical capital variables. Conditional (SUR) estimation includes previous conditional variables plus regional dummies (regions description in notes to table 1). Standard errors are shown in brackets. Implied-β is the convergence rate computed with the coefficient on $Ln(W_{initial})$ as described in the text. The estimated coefficients for constants, regional dummies and conditional variables are not reported.

TABLE 8

β-Convergence Regressions: Agrarian-Industry workers wage gap

Period	Information description	(1) Unconditional OLS	(2) Conditional OLS	(3) Conditional SUR
(a) 1860-1914	$Ln(W_{initial})$	-0.0168	-0.0164	-0.0124
	Stand. Error	(0.0016)	(0.0015)	(0.0016)
	R-squared	0.71	0.75	0.77
	F-stat.	116.21	47.96	37.25
	Implied-β	*-0.0440*	*-0.0401*	*-0.0205*
(b) 1914-1920	$Ln(W_{initial})$	-0.1516	-0.1209	-0.0259
	Stand. Error	(0.0476)	(0.0516)	(0.0337)
	R-squared	0.16	0.17	0.22
	F-stat.	10.13	4.22	1.73
	Implied-β	*-0.4006*	*-0.2154*	*-0.0281*
(c) 1920-1930	$Ln(W_{initial})$	-0.0697	-0.0732	-0.0369
	Stand. Error	(0.0123)	(0.0126)	(0.0094)
	R-squared	0.40	0.40	0.43
	F-stat.	31.74	11.42	5.09
	Implied-β	*-0.1194*	*-0.1317*	*-0.0460*
(d) 1860-1930	$Ln(W_{initial})$	-0.0089	-0.0095	-0.0044
	Stand. Error	(0.0020)	(0.0018)	(0.0013)
	R-squared	0.30	0.39	0.43
	F-stat.	20.90	11.08	4.93
	Implied-β	*-0.0093*	*-0.0100*	*-0.0045*

Notes and sources: see table 7

Table 8 confirms again the existence of strong β-convergence. As in the case of agrarian-unskilled labourers wage gap, when industrial urban/rural wage ratios are considered wage gaps were growing faster in provinces were these ratios were lower. The contrary holds for provinces were these skilled urban/rural wage ratios were higher. Indeed, this result indicates the existence of strong forces for integration of rural and urban labour markets in Spain.

6. Conclusions

One of the enduring features of Spanish economic backwardness in the long run is the persistently high share of labour force employed in agriculture. Spanish historians have long debated the reasons why labour did not leave agriculture at a faster rate. In this context, it is commonly argued that the source of declining urban-rural wage gaps was a better functioning of labour markets and/or supply shifts when this is not necessarily true. Particularly, the widening or enlarging of urban-rural wage gaps may be due to market integration forces or/and supply/demand shifts.

Since this paper is a preliminary version we will just summarize our basic findings:

1. During the period 1860-1930 urban /rural wage gaps, both nominal and real, decreased in Spain particularly in the case of unskilled urban/agrarian wage gaps.
2. While wage rates present a sharp decrease between 1860 and 1920, they remained stable in the 1920s (with the exception of industrial/rural wage gaps that grew significantly).
3. Trends in wage gaps documented in this paper do not appear compatible with employment or migration figures. From 1860 to 1914 urban/rural wage gaps fall but labour employed in agriculture remained rather stable and internal migrations were relatively of little importance. Instead, from 1910 to 1930 stable or growing wage gaps coincided with increasing migration and a significant fall of employment in agriculture.
4. Labour demand seems to have been the determinant factor in the evolution of urban-rural wage gaps in the long run, particularly for the periods 1910-1920.
5. We also document strong "β convergence" in urban/rural wage ratios across Spanish regions. Initially low-wage gap regions experienced faster wage gaps growth than high-wage gap regions.
6. As a general conclusion, though provisional, our results seems to indicate that Spanish labour market worked better than previously thought. The traditional (and pessimistic) supply-side interpretation of structural change in Spain can be modified employing an explicit supply-demand model.

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