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Regional wage convergence in Spain 1850–1930[☆]

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Abstract

This paper presents a new regional database on real wages for Spain from 1850 to 1930. This evidence is used to analyze the evolution of wages across regions and occupations. Substantial wage convergence occurred from 1850 to 1914, despite low rates of internal migration. World War I and the subsequent globalization backlash were associated with a spectacular increase in wage differentials. However, real wage convergence across Spanish provinces resumed during the 1920s, this time accompanied by high rates of internal migration.

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1. Introduction

Regional market integration was an important feature of economic development in many European and American countries during the 19th century. The re-allocation of productive factors across regions produced structural change, increases in efficiency, and higher rates of economic growth.

In the case of Spain, national commodity and capital markets emerged in the 19th century, but much less is known about this process for labor markets. We present new evidence on real wages in Spain from 1850 to 1930. Unlike prior studies, we include housing costs in our analysis and our cost of living deflators are constructed using Purchasing Power Parity (PPP) methods. We focus on two key questions. First, did real wages converge within and across occupations in Spain? Second, what role, if any, did migration play in the process of wage convergence?

We show that substantial wage convergence across regions took place prior to World War I, despite low rates of internal migration. The process of wage convergence was interrupted by World War I, which produced a sharp increase in regional wage differentials. These increases proved to be temporary, however; wage convergence re-emerged in the 1920s, this time accompanied by internal migration and substantial re-allocation of labor from agriculture to industry. Despite these patterns, regional disparities remained important within Spain on the eve of the worldwide Great Depression.

2. A new database on Spanish real wages

We present a new database on real wages in Spain. This database incorporates benchmark series on real average daily wage rates for the most important male occupations—unskilled workers in agriculture, urban unskilled workers, and urban industrial (semi-skilled) workers—from approximately 1850 to 1930 for 48 Spanish provinces (the Canary Islands are excluded). The benchmark years are 1854, 1887, 1910, 1914, 1920, 1925, and 1930 for unskilled workers in agriculture; 1860, 1914, 1920, 1925, and 1930 for urban unskilled; and 1860, 1896, 1914, 1920, 1925, and 1930 for industry urban workers.

In their original form, our data pertain to nominal daily wages and are drawn from a variety of sources that vary in coverage, reliability, and detail.¹ In particular, the sources provide little or no information on worker heterogeneity, working conditions, or firm-level characteristics that may have influenced wages, and which may have varied across Spanish provinces (Reis, 2002; Rosés, 1998; Simpson, 2000). These defects aside, the new data are superior to those previously available in that

¹ Specifically, sources are: Madrazo (1984) for 1860 data on unskilled urban and industry urban workers wages; Bringas Gutiérrez (2000) for 1854, 1874, and 1910 data on agrarian workers wages; Sánchez-Alonso (1995) for data on 1896 industry urban workers wages; and Ministerio de Trabajo (1931).

they refer to occupations found throughout the country and which occupied a large share of Spanish male wage earners.

We also estimate new cost-of-living deflators for each province. Our cost of living indices include urban and rural prices, and cover food, dwelling rents, fuel, light and clothing. To estimate the provincial prices of food, fuel, light and clothing, we rely heavily in the data collected by government officials in the different provinces. These have been used previously by Spanish historians.² However, a major advantage of our deflators is that dwelling rents are incorporated. In particular, we use a new dataset on housing prices from the property provincial bureaus yearbooks (Ministerio de Gracia y Justicia, several years). This dataset includes the prices and quantities of houses sold during the year, the prices and quantities of houses transferred by heritage, and the prices and quantities of houses that were settled in mortgage. An average of these three prices during 2 or 3 years, depending on data availability, has been employed in the calculations. Average prices per house were transformed in prices per square meter with data on average size of houses by province from 1874 statistics (*Anuario Estadístico* 1874). Average prices per square meter were used to estimate rent levels using interest and depreciation rates.³

We use a common market basket to construct our provincial real wage series.⁴ This basket is an equally weighted average of all provincial baskets for the early 20th century.⁵ The entire database is presented in Appendix A.

Table 1 presents real wage indices by occupation and region, setting base period values (for example, 1850) equal to 100. Clearly, real wages were higher in 1930 than in the middle of the 19th century. Growth differed across time periods, regions, and occupations, but was especially rapid for agrarian workers, resulting in a sharp decline in the rural–urban wage gap.

We consider two measures of wage convergence. The first is “ σ -convergence,” or wage dispersion, which we measure by the coefficient of variation (CV). Declines in the CV are an indicator of such convergence.

Table 2 documents real wage dispersion between 1854 and 1930. At the beginning of the period, wage dispersion was lower among unskilled urban workers than in the

² Among others, Ballesteros (1997), Reher and Ballesteros (1993), and Sánchez-Albornoz (1975).

³ This estimation is derived from the following identity $Rent_{it} = (Price_{it}) \times (i + \delta)$, where i is the interest rate and δ the depreciation rate. We assume a depreciation rate of the 2 percent per year. Interest rates were obtained from Tortella (1974) and Martín Aceña (1989).

⁴ The common basket was constructed from information reported in Instituto de Reformas Sociales (1905–1910); US Bureau of Foreign Commerce, Labor in Europe. Reports from the Consuls of the United States in the Several Countries of Europe (Washington 1885); Ballesteros (1997), Domínguez Martín (1997), Fernández de Pinedo (1992), García Sanz (1979–1980), Martínez Carrión (1997), Martínez Vara (1997), Pérez Castroviejo (1992), Ponsot (1986), and Serrano (1999).

⁵ We follow the Cobb–Douglas PPP indices methodology suggested by Williamson (1995). The resulting PPP basket is composed by: food (72.1 per cent), housing rent (10.2 per cent), clothing (9.6 per cent) and other items (8.1 per cent). More specifically, food is composed by bread (18.6 per cent), olive oil (4.1 per cent), chick-peas (5.1 per cent), wine (10.4 per cent), beef (13.5 per cent), rice (5.1 per cent), potatoes (5.1 per cent), eggs (1 per cent), sugar (0.5 per cent), cod (5.1 per cent), and milk (3.6 per cent). We also tested alternative methods of weighting provincial baskets without obtaining significantly different results.

Table 1
The evolution of wages, mid-19th century to 1930

	1854	1914	1920	1925	1930
<i>(A) Agrarian laborers</i>					
Spain (48)	100.00	200.48	285.76	296.58	318.95
Andalucía (8)	100.00	156.28	271.31	218.88	290.15
Ebro Valley (7)	100.00	192.50	339.18	274.48	307.55
Mediterranean (8)	100.00	189.23	282.27	354.99	328.93
North (8)	100.00	289.46	358.61	452.35	431.10
Northern Castile (9)	100.00	225.29	247.03	231.85	253.63
Southern Castile (8)	100.00	170.17	221.19	268.06	276.09
	1860	1914	1920	1925	1930
<i>(B) Unskilled urban laborers</i>					
Spain (48)	100.00	152.58	165.30	201.58	187.80
Andalucía (8)	100.00	150.80	145.22	191.61	178.57
Ebro Valley (7)	100.00	126.53	143.60	160.37	149.60
Mediterranean (8)	100.00	157.88	185.46	202.70	184.33
North (8)	100.00	159.48	175.77	248.85	230.68
Northern Castile (9)	100.00	135.43	137.04	170.52	172.34
Southern Castile (8)	100.00	170.17	172.41	225.57	212.46
	1860	1914	1920	1925	1930
<i>(C) Industry urban workers</i>					
Spain (48)	100.00	118.33	121.16	148.44	149.39
Andalucía (8)	100.00	101.34	85.83	123.99	130.23
Ebro Valley (7)	100.00	106.33	103.63	114.61	122.32
Mediterranean (8)	100.00	127.48	143.27	155.72	156.24
North (8)	100.00	144.17	164.61	216.68	204.66
Northern Castile (9)	100.00	109.48	104.85	126.46	132.45
Southern Castile (8)	100.00	117.48	118.47	147.73	146.05

Notes and sources. The number of provinces within each region is in (). We divided Spain in six macro-regions. Each macro-region comprises a minimum of seven provinces and a maximum of nine provinces. Andalusia includes observations for the following provinces: Almería, Cádiz, Córdoba, Granada, Huelva, Jaén, Málaga, and Seville. The Ebro Valley includes Alava, Huesca, Lérida, Logroño, Navarra, Teruel, and Zaragoza. The Mediterranean region comprises the provinces of Alicante, Balearic Islands, Barcelona, Castellón, Gerona, Murcia, Tarragona, and Valencia. The North includes Coruña, Guipuzcoa, Lugo, Orense, Oviedo, Pontevedra, Santander, and Biscay. Northern Castile comprises the provinces of Avila, Burgos, León, Palencia, Salamanca, Segovia, Soria, Zamora, and Valladolid. Southern Castile includes Albacete, Badajoz, Cáceres, Ciudad Real, Cuenca, Guadalajara, Madrid, and Toledo. The indices are Divisia indices with weights given by the labor force numbers according to the Spanish population censuses. See Section 2 for sources and Appendix A.

other two occupations. By 1914, differences in wage dispersion between occupations were much smaller but increased again during the 1920s. Table 2 suggests the presence of three different regimes for the three occupations. For agrarian laborers, the coefficient of variation fell from 0.25 to 0.18 from 1854 to 1914; from 1914 to 1920, the coefficient of variation increased to 0.36; and in the 1920s it fell again to 0.31. Movements of the coefficient of variation for unskilled urban workers evolved differently but also suggest three regimes: no convergence before 1914, divergence during

Table 2
 σ -Convergence in real wages across Spanish regions

	1854	1874	1910	1914	1920	1925	1930
<i>(A) Agrarian laborers</i>							
Spain (48)	0.247	0.209	0.168	0.177	0.365	0.7348	0.316
Andalucia (8)	0.147	0.118	0.091	0.124	0.245	0.244	0.149
Ebro Valley (7)	0.173	0.135	0.123	0.142	0.435	0.224	0.378
Mediterranean (8)	0.234	0.268	0.238	0.199	0.224	0.301	0.237
North (8)	0.228	0.202	0.144	0.121	0.223	0.263	0.220
Northern Castile (9)	0.228	0.072	0.095	0.096	0.272	0.245	0.332
Southern Castile (8)	0.277	0.263	0.141	0.110	0.240	0.269	0.212
	1860			1914	1920	1925	1930
<i>(B) Unskilled urban laborers</i>							
Spain (48)	0.146			0.159	0.220	0.188	0.181
Andalucia (8)	0.062			0.131	0.135	0.089	0.139
Ebro Valley (7)	0.137			0.114	0.171	0.107	0.092
Mediterranean (8)	0.097			0.078	0.167	0.110	0.161
North (8)	0.230			0.164	0.217	0.193	0.220
Northern Castile (9)	0.094			0.178	0.205	0.172	0.122
Southern Castile (8)	0.173			0.101	0.107	0.174	0.128
	1860	1896	1914	1920	1925	1930	
<i>(C) Urban industrial workers</i>							
Spain (48)	0.213		0.211	0.138	0.200	0.190	0.155
Andalucia (8)	0.161		0.091	0.092	0.129	0.112	0.113
Ebro Valley (7)	0.071		0.139	0.095	0.104	0.163	0.119
Mediterranean (8)	0.109		0.215	0.126	0.110	0.089	0.101
North (8)	0.183		0.326	0.155	0.235	0.215	0.175
Northern Castile (9)	0.173		0.224	0.084	0.172	0.110	0.088
Southern Castile (8)	0.259		0.235	0.078	0.122	0.111	0.114

Notes and sources. We used as measure of σ -convergence the unweighted coefficient of variation. See Section 2 for sources, Appendix A for the data, and Table 1 for regions definition.

the intermediate period (1914–1920), and the coefficients show an incomplete slow return to previous World War I levels during the 1920s.⁶

It is important to compare our coefficients of variation in real wages with similar studies for other countries. In 1860 Spanish coefficients ranged from a maximum of 0.25 in agrarian laborers to a minimum of 0.15 in urban unskilled workers. The urban unskilled workers coefficients were comparatively lower (in the range of English coefficients) while the agrarian and industry workers coefficients were in the range or slightly larger than similar coefficients for Prussia, Sweden, France, and the United States (Söderberg, 1985). By 1914, in European terms, Spanish variation coefficients in real wages were even more similar. They ranged from 0.18 in agrarian laborers to 0.14 in industry urban workers while in early 20th century Europe they ranged from a minimum of 0.15 for farm labor in England in Wales to 0.20 for unskilled labor in

⁶ However, only two regions (Andalusia and Northern Castile) drove this divergence whereas the rest of the country experienced σ -convergence.

Sweden (Boyer and Hatton, 1994). From the evidence presented here the Spanish experience seems therefore very much like other European countries in spite of very different aggregate economic performance.⁷

Our second measure of convergence is β -convergence—that is, whether high (low)-wage regions grew more slowly (quickly) than low (high)-wage regions. The specification of the equation for *unconditional* β -convergence is:

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

where T is the number of years considered and W is the real wage on the designated year for the province i . This equation can be estimated by ordinary least squares (OLS). Following Barro and Sala-i-Martin (1995), it is straightforward to derive the yearly convergence rate from the above regression: $\beta = -(1/T) \ln(\Theta T + 1)$.

There are two estimation issues to be addressed. First, we allow for heterogeneity across provinces and, hence, we drop from our regression the assumption that all provinces have the same parameters (Barro and Sala-i-Martin, 1995; Levin and Renelt, 1992). 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:

$$\frac{1}{T} \ln \left(\frac{W_{i,\text{final}}}{W_{i,\text{initial}}} \right) = \alpha + \Theta \ln (W_{i,\text{initial}}) + \Phi \ln (H_{i,\text{initial}}) + \lambda \ln (K_{i,\text{initial}}) + \varepsilon_i, \quad (2)$$

where H , the literacy rate, is as a proxy for human capital and K , the percent urban, is a proxy for physical capital. We estimate this equation by OLS. We also estimate Eq. (2) including regional dummies. 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 macro-regions considered 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.

A second issue involves errors in variables. The convergence rate β is computed using data from two time periods. If the wage data are measured with error, and this error is more severe for earlier than for later periods, our estimates will be biased. To correct for this, we experiment with alternative reliability levels from a minimum of 50 per cent to a maximum of 99 per cent (that is, the measurement error is between 1 and 50 per cent).⁸

⁷ In India, coefficients of variation in real wages were higher than in Spain ranging from a minimum of about 0.20 to a maximum of about 0.37 (Collins, 1999).

⁸ In unreported results, we also tried addressing measurement error with instrumental variables (IV). The instruments comprised lags of the original values of $\ln(W_{i,\text{initial}})$. Lag values are reasonable candidates as instruments because the correlation of the residuals in the wage growth regressions is never substantial. However, this technique did not prove especially useful since the coefficient estimates were close in magnitude to their OLS counterparts while standard errors increased.

Tables 3–5 present the estimations for unskilled agrarian laborers, unskilled urban laborers, and urban industrial laborers. These calculations suggest the existence of three convergence regimes: two periods of convergence (from mid-19th century to 1914, and in the 1920s) and one period of no convergence or even divergence (1914–1920).⁹ The estimated coefficients of $\ln(W_{i,initial})$ are uniformly negative and significant (as the model of convergence predicts) in the periods from mid-19th century to 1914 and in the 1920s whereas the coefficients are not significant in the intermediate period (from 1914 to 1920). The joint estimates for the whole period indicate, however, that the long-run tendency towards wage convergence was larger than the divergence shock of the period 1914–1920.

Considering Table 3 in more detail, the results shown in column 1 (unconditional convergence) and column 2 (conditional convergence) differ but both show convergence. If we hold human and physical capital constant, convergence rates increased by 7 percent in the 1920s and by about 40 percent in the estimation for the entire period (1854–1930).¹⁰ This may suggest that there were several steady states in Spain according to human and physical capital endowments. However, contrary to theoretical predictions, in the initial period (1854–1914) when one holds human and physical capital constant, convergence rates decreased by about 16 percent, possibly because of counterbalancing movements of capital.

The third column presents the estimated speed of convergence when the six regional dummies are incorporated. This estimate reflects within-region β convergence, whereas that of the first two columns reflects a combination on within- and between-region convergence.¹¹ In the period 1854–1914, the estimated β coefficient is essentially the same than in column 2, which imply that the within- and between-region rates of β convergence are similar. Perhaps the most interesting results appear in the period 1920–1930, which imply that the regional dummies (not reported in the table) have substantial explanatory power. Thus, when we introduce regional dummies in conditional β convergence regressions the implied β rates increase substantially (from 6.7 percent per year in the unconditional estimation to 13.8 percent per year in the conditional estimation with regional dummies).

The results of column 4 show that correcting for measurement error will increase the estimated rates of convergence. For example, for the period 1860–1914 the implied β -convergence rate corrected by assuming a 15 per cent of error in the initial values is a 46 per cent faster than those computed assuming no measurement error.

Turning to Table 4, the differences in convergence rates between columns 1 (unconditional) and 2 (conditional) are not statistically significant. Results in column 4 re-affirm the robustness of our convergence findings. As in Table 3, regional dummies seem to have substantial explanatory power in the third period (1920–1930) and also raise the estimated convergence rates. It is also interesting to note the combina-

⁹ Barro and Sala-i-Martin (1995) also found divergence during the periods of foreign shocks (like the two World Wars) and striking convergence in the subsequent periods of reconstruction after the shocks.

¹⁰ However, this difference is within the standard of error of β coefficients, which is not statistically significant.

¹¹ See, Barro and Sala-i-Martin (1991, pp. 116–117).

Table 3
 β -Convergence regressions: agrarian laborers

Period	Information description	(1) Unconditional OLS	(2) Conditional OLS	(3) Conditional-Regions OLS	(4) Conditional EIV
(a) 1854–1914	$\ln(W_{\text{initial}})$	-0.0152	-0.0145	-0.0146	-0.0179
	Standard error	(0.0016)	(0.0017)	(0.0043)	(0.0017)
	R-Squared	0.65	0.65	0.40	0.78
	F-Stat.	87.54	30.22	4.95	44.91
	Implied- β	0.0405	0.0340	0.0348	n.d.
(b) 1914–1920	$\ln(W_{\text{initial}})$	-0.0309	-0.0107	0.0106	-0.0127
	Standard error	(0.0442)	(0.0435)	(0.0552)	(0.0517)
	R-Squared	-0.01	0.13	0.17	0.13
	F-Stat.	0.49	2.27	2.22	2.29
	Implied- β	0.0342	0.0111	0.0170	0.0132
(c) 1920–1930	$\ln(W_{\text{initial}})$	-0.0489	-0.0511	-0.0749	-0.0609
	Standard error	(0.0123)	(0.0127)	(0.0149)	(0.0146)
	R-Squared	0.24	0.25	0.45	0.34
	F-Stat.	15.71	6.09	3.97	6.56
	Implied- β	0.0671	0.0715	0.1382	0.0939
(d) 1854–1930	$\ln(W_{\text{initial}})$	-0.0070	-0.0086	-0.0088	-0.0103
	Standard error	(0.0024)	(0.0024)	(0.0025)	(0.0028)
	R-Squared	0.14	0.23	0.48	0.32
	F-Stat.	8.56	5.67	4.53	6.03
	Implied- β	0.0100	0.0139	0.0145	0.0201

Notes and sources. All estimations include 48 observations. OLS, ordinary least squares; EIV, errors in variables regression. Unconditional estimation is computed with the Eq. (1). Conditional (OLS) estimation is computed with the Eq. (2) and, then, includes human and physical capital variables. Literacy rates are the rate of literate population per hundred inhabitants. Nuñez (1992), while the urbanization rate is the rate of population in cities of 25,000 habitants or more per hundred inhabitants Luna (1988). Urbanization rates are a good proxy for capital stock given that residential capital constitutes the majority of the stock of capital in Spain (Prados de la Escosura and Rosés, 2002). Conditional-Regional (OLS) estimation includes previous conditional variables plus regional dummies (regions description in notes to Table 1). Conditional (EIV) estimation includes only human and physical capital variables but not regional dummies. We assume a reliability of the $\ln(W_{\text{initial}})$ values of the 85 per cent. Standard errors are shown in brackets. Implied- β is the convergence rate computed with the coefficient on $\ln(W_{\text{initial}})$ as described in the text. The estimated coefficients for constants, regional dummies and conditional variables are not reported. See Section 2 and Appendix A for sources and the description of the variables.

tion for this occupation of no σ -convergence (Table 2) and some β -convergence (Table 4) in the early period (1860–1914). This could be explained by the existence of a stable steady state in urban unskilled wages so that wages grow faster the further away they are from its steady-state value.

The main findings of Table 5 are the same as of Table 4. The estimated convergence rates from column 1 and 2 differ little in all periods and the convergence rate in column 4 is appreciably faster, reiterating the goodness of results from the other columns.

Table 6 examines β -convergence in urban/rural wage ratios. We find evidence of convergence. As in the previous tables, the results in Table 6 indicate the presence of three wage regimes. The regional dummies, which are not reported, have substantial

Table 4
 β -Convergence regressions: urban unskilled laborers

Period	Information description	(1) Unconditional OLS	(2) Condi- tional OLS	(3) Conditional- Regions OLS	(4) Condi- tional EIV
(a) 1860–1914	$\ln(W_{\text{initial}})$	–0.0122	–0.0128	–0.0133	–0.0152
	Standard error	(0.0032)	(0.0032)	(0.0031)	(0.0037)
	R-Squared	0.22	0.27	0.46	0.36
	F-Stat.	14.23	6.75	4.16	7.24
	Implied- β	0.0179	0.0196	0.0234	0.0287
(b) 1914–1920	$\ln(W_{\text{initial}})$	–0.0098	–0.0046	–0.0340	–0.0055
	Standard error	(0.0219)	(0.0229)	(0.0269)	(0.0272)
	R-Squared	–0.02	–0.05	0.22	0.02
	F-Stat.	0.02	0.24	1.41	0.24
	Implied- β	0.0101	0.0047	0.0380	0.0056
(c) 1920–1930	$\ln(W_{\text{initial}})$	–0.0530	–0.0547	–0.0605	–0.0651
	Standard error	(0.0095)	(0.0098)	(0.0115)	(0.0109)
	R-Squared	0.39	0.39	0.58	0.51
	F-Stat.	30.95	11.18	6.96	12.95
	Implied- β	0.0755	0.0792	0.0930	0.1053
(d) 1860–1930	$\ln(W_{\text{initial}})$	–0.0093	–0.0096	–0.0090	–0.0113
	Standard error	(0.0028)	(0.0030)	(0.0028)	(0.0034)
	R-Squared	0.17	0.14	0.42	0.23
	F-Stat.	10.87	3.59	3.57	3.76
	Implied- β	0.0150	0.0159	0.0093	0.0224

Notes and sources. See Appendix A and Table 3.

explanatory power. In all periods, the estimated β coefficient increases substantially when one introduces regional dummies. For example, in the joint estimate for the whole period (1860–1930), β -coefficients more than doubled.

Our regressions imply that unconditional real wage convergence was somewhat faster in the Spanish case than in other countries for which similar studies have been undertaken. Most β -estimates for recent times (Barro and Sala-i-Martin, 1995; Blanchard and Katz, 1992) and for countries with highly integrated home markets cluster around a central value of 2 per cent per year, smaller in magnitude than our estimates for Spain. Spanish convergence rates are also larger than those obtained by Williamson (1996) for Atlantic economies real wages during the first wave of “globalization” (1.2 per cent per year from 1870 to 1890 and 0.8 per cent per year from 1890 to 1913). For the period 1874 to 1905, real wage convergence within India occurred at rates from 1.2 to 2.4 per cent per year, again a slower pace of convergence than within Spain (Collins, 1999).

3. What role did migration play in this process of wage convergence?

Labor migration from low-wage areas (or occupations) to high-wage areas (or occupations) is one of the standard explanations of wage conver-

Table 5
 β -Convergence regressions: urban industrial workers

Period	Information Description	(1) Unconditional OLS	(2) Conditional OLS	(3) Conditional-Regions OLS	(4) Conditional EIV
(a) 1860–1914	$\ln(W_{initial})$	-0.0121	-0.0125	-0.0102	-0.0148
	Standard error	(0.0020)	(0.0021)	(0.0022)	(0.0023)
	R-Squared	0.40	0.41	0.62	0.53
	F-Stat.	33.61	12.15	7.81	14.24
	Implied- β	0.0177	0.0187	0.0148	0.0268
(b) 1914–1920	$\ln(W_{initial})$	-0.0079	-0.0062	-0.0121	-0.0073
	Standard error	(0.0246)	(0.0246)	(0.0269)	(0.0291)
	R-Squared	0.00	0.07	0.44	0.07
	F-Stat.	0.10	1.20	3.89	0.31
	Implied- β	0.0081	0.0063	0.0125	0.0075
(c) 1920–1930	$\ln(W_{initial})$	-0.0445	-0.0436	-0.0453	-0.0520
	Standard error	(0.0085)	(0.0088)	(0.0098)	(0.0100)
	R-Squared	0.35	0.35	0.62	0.45
	F-Stat.	27.32	9.47	7.97	10.58
	Implied- β	0.0589	0.0573	0.0603	0.0734
(d) 1860–1930	$\ln(W_{initial})$	-0.0084	-0.0086	-0.0058	-0.0102
	Standard error	(0.0018)	(0.0018)	(0.0017)	(0.0021)
	R-Squared	0.29	0.29	0.69	0.39
	F-Stat.	20.86	7.50	8.67	8.23
	Implied- β	0.0127	0.0132	0.0074	0.0179

Notes and sources. See Appendix A and Table 3.

gence.¹² The evidence presented in Table 7 suggests, however, that migration might have been of little importance up to the early 20th century, which was the typical pattern common to Latin countries in Southern Europe (Hatton and Williamson, 1994; Sánchez-Alonso, 2000).

Three broad periods can be distinguished in the evolution of Spanish migration. From 1877 to 1887, internal migration seems to have been larger than international migration (although detailed statistics on foreign migrations are not actually available). Between 1887 and 1910, internal migration increased very slowly. Instead, international migration peaked in the first decade of the 20th century, surpassing internal migration in total. All in all, internal and international migration involved more than one million people between 1901 and 1910. During the third period, the 1910s and the 1920s, migration to foreign countries decreased significantly, as a consequence of the disruption of the international labor markets (O'Rourke and Williamson, 1999), while internal labor movements increased to previously unheard of levels, especially in the 1920s.

¹² Labor demand and supply forces must also be taken into account in order to explain the convergence or divergence of wage rates; see Boyer and Hatton (1997).

Table 6
 β -Convergence regressions: agrarian urban wage gap

Period	Information description	Unconditional OLS		Conditional OLS		Conditional-Regions OLS	
		(1) Unskilled-Agrarian	(2) Industry-Agrarian	(3) Unskilled-Agrarian	(4) Industry-Agrarian	(5) Unskilled-Agrarian	(6) Industry-Agrarian
(a) 1860–1914	$\ln(W_{initial})$	−0.0225	−0.0168	−0.0212	−0.0164	−0.0203	−0.0183
	Standard error	(0.0022)	(0.0016)	(0.0022)	(0.0015)	(0.0023)	(0.0020)
	R-Squared	0.68	0.71	0.72	0.75	0.78	0.81
	F-Stat.	99.98	116.21	40.88	47.96	17.24	21.78
	Implied- β	<i>n.d.</i>	0.0440	<i>n.d.</i>	0.0401	<i>n.d.</i>	0.0662
(b) 1914–1920	$\ln(W_{initial})$	−0.1054	−0.1516	−0.0788	−0.1209	−0.0944	−0.1500
	Standard error	(0.0392)	(0.0476)	(0.0423)	(0.0516)	(0.0461)	(0.0540)
	R-Squared	0.12	0.16	0.13	0.17	0.29	0.44
	F-Stat.	7.23	10.13	3.32	4.22	2.03	3.77
	Implied- β	0.1668	0.1584	0.1067	0.1251	0.1392	0.1570
(c) 1920–1930	$\ln(W_{initial})$	−0.0806	−0.0697	−0.0845	−0.0732	−0.0908	−0.0875
	Standard error	(0.0135)	(0.0123)	(0.0123)	(0.0126)	(0.0133)	(0.0139)
	R-Squared	0.42	0.40	0.48	0.40	0.62	0.57
	F-Stat.	35.53	31.74	15.50	11.42	7.94	6.38
	Implied- β	0.1640	0.1194	0.1864	0.1317	0.2386	0.2079
(d) 1860–1930	$\ln(W_{initial})$	−0.0064	−0.0089	−0.0087	−0.0095	−0.0098	−0.0147
	Standard error	(0.0025)	(0.0020)	(0.0024)	(0.0018)	(0.0026)	(0.0019)
	R-Squared	0.11	0.30	0.28	0.39	0.41	0.51
	F-Stat.	6.61	20.90	7.02	11.08	3.32	5.11
	Implied- β	0.0066	0.0093	0.0091	0.0100	0.0165	0.0232

Note and sources. See Appendix A and Table 3.

Table 7
Total net migrations in Spain, 1877–1930 (000)

	Home migration	Share of total population %	Foreign migration	Share of total population %	Total	Share of total population %
1877–1887	369.4	2.2	n.a.	n.a.	n.a.	n.a.
1888–1900	428.3	2.0	177.6	0.8	605.9	2.8
1901–1910	565.8	2.9	578.1	3.0	1143.9	5.9
1911–1920	583.1	2.8	50.1	0.2	633.2	3.0
1921–1930	968.6	4.3	89.9	0.4	1058.5	4.7

Sources and notes. Home and foreign migration data are drawn, respectively, from Silvestre (2003) and Sánchez-Alonso (1995), Appendix A. Home migration was computed using census data on residents from other provinces and surviving data. Net migration was calculated employing statistics on departures and returns of migrants and surviving data. Net foreign migration data are less reliable than home migration data because of serious underestimation in the return flow. The percent of total population was calculated using mean population. Numbers are subject to rounding errors.

There are two major interpretations of the causes of low internal migration prior to the 1920s. Some economic historians have blamed the low dynamism of the Spanish agriculture as the main source of the large share of labor in that sector (Nadal, 1975; Tortella, 1987). In turn, others have insisted that the main reason for the low levels of internal migration was the lack of pull from cities and industry (Fraile, 1991; Sánchez-Albornoz, 1968 and, particularly, Prados de la Escosura, 1988). The issue of labor market integration between rural and urban markets has not been empirically examined with the exception of Simpson (1995) and Silvestre (2003). However, Simpson’s research focused on trends in rural out-migration rather than on wage gaps determinants. The recent and most comprehensive research by Silvestre (2003) shows that the narrowing in the urban/rural wage gap during the period 1914–1931 can be explained by the migration from the countryside to the urban centers and by an increase in agricultural wages.

We explore the impact of migration on Spanish wage convergence by including the contemporaneous net migration rate as an explanatory variable in our convergence regressions (Barro and Sala-i-Martin, 1995). If migration is an important source of wage convergence the convergence coefficient β should become smaller when migration is held constant.

Table 8 compares our convergence coefficient β with and without the migration variable. We report the estimated speed of convergence, and its standard error, for the whole period and all three occupations and two wage gaps.¹³

¹³ In unreported regressions, we also estimate the speed of convergence including net migration rates for the three subperiods (1860–1914; 1914–1920; and 1920–1930) separately without obtaining significantly different results from those presented in Table 8. More specifically, the speed of convergence including net migration rates was different than those computed without migration rates only for the period 1920–1930 (though in the case of urban workers it was bigger, not smaller, as one may expect) and only in regressions without regional dummies. Similarly, in the case of the urban–rural wage gaps, coefficients were smaller only for the 1920s and in regressions without regional dummies.

Table 8
Migration and convergence rates

	Information description	Unconditional OLS		Conditional OLS		Conditional-Regional OLS	
		(1) Migration excluded	(2) Migration Included	(3) Migration excluded	(4) Migration Included	(5) Migration excluded	(6) Migration Included
Agrarian labor	Implied- β	0.0100	0.0104	0.0139	0.0139	0.0145	0.0151
	Standard error	(0.0034)	(0.0035)	(0.0039)	(0.0039)	(0.0041)	(0.0042)
	Migration		0.0892		0.1141		0.0815
	Standard error		(0.1518)		(0.1595)		(0.1057)
Unskilled urban	Implied- β	0.0150	0.0148	0.0159	0.0134	0.0142	0.0136
	Standard error	(0.0045)	(0.0042)	(0.0050)	(0.0043)	(0.0044)	(0.0040)
	Migration		0.2457		0.2870		0.2482
	Standard error		(0.1070)		(0.1228)		(0.1269)
Industry urban	Implied- β	0.0127	0.0124	0.0132	0.0117	0.0074	0.0071
	Standard error	(0.0027)	(0.0027)	(0.0028)	(0.0026)	(0.0022)	(0.0020)
	Migration		0.2149		0.2858		0.2287
	Standard error		(0.1191)		(0.1332)		(0.1186)
Unskilled-agrarian	Implied- β	0.0066	0.0063	0.0091	0.0089	0.0165	0.0142
	Standard error	(0.0026)	(0.0026)	(0.0025)	(0.0024)	(0.0044)	(0.0041)
	Migration		0.1005		0.0852		0.0755
	Standard error		(0.1347)		(0.1357)		(0.1475)
Industry-agrarian	Implied- β	0.0093	0.0092	0.0100	0.0100	0.0232	0.0234
	Standard error	(0.0020)	(0.0020)	(0.0019)	(0.0019)	(0.0038)	(0.0041)
	Migration		0.0181		0.0090		0.0097
	Standard error		(0.1353)		(0.1391)		(0.1561)

Note and sources. Net migration rates are from Mikelarena (1993). We reported implied- β convergence rate, which is computed with the coefficient on $\ln(W_{\text{net}})$ as described in the text, and migration rates coefficients (multiplied per 1000). Regressions period are 1854–1930 for agrarian laborers and 1860–1930 for urban workers. The “migration excluded” β convergence rates are the same than in Tables 3–6. The “migration included” regressions incorporate as explanatory variable the average yearly migration rate for the period 1878–1930. Standard errors are shown in brackets. The estimated coefficients for constants, regional dummies, and conditional variables are not reported. The adjusted R -squared and F -tests (not reported) are practically identical to those obtained in Tables 3–6. See notes to Table 3 for further details.

Table 8 suggests that the net migration rates were a factor determining the rate of wage convergence across Spanish regions in the case of urban workers. Holding the net migration rate and the rest of human and physical capital variables constant, the value of β decreased for unskilled and industry urban workers by about the 15 per cent.¹⁴ In the urban market, provinces receiving migrants had a slower growth of the urban wages than provinces sending migrants. However, the majority of this effect is eliminated when we include regional dummy variables. It is also interesting to note that net migrations do not seem to affect the convergence rate of β agrarian laborers and of urban–rural wage gaps. Overall, these results appear to provide little support for the hypothesis that wage convergence in Spain was mainly consequence of migration.

An alternative way to investigate the impact of migration is to analyze the response of regions to labor-demand shocks. Although we cannot conduct an analysis similar to Blanchard and Katz (1992) we can speculate how Spanish labor markets responded to the major demand-shock that Spanish economy experienced during World War I.

There is a widespread consensus among Spanish historians (García Delgado, 1986) that economic disruption associated with World War I fell unevenly across regions in Spain. Spanish neutrality facilitated a sharp and unexpected increase in exports and a decrease in imports. The balance of payments experienced notable surpluses in contrast to its traditional deficit and Spain reduced greatly her international indebtedness (Sudrià, 1990). The export boom benefited certain products (such as textiles, machinery, and chemical products) that were traditionally sold in the highly protected home markets. Similarly, the disruption of the maritime transportation by the war accelerated the process of import substitution in the industrial sector benefiting largely the local producers. Instead, traditional Spanish exports (such as citric or minerals) decreased sharply because of the war disruption. In consequence, some industries benefited from high prices and extraordinary profits but others were in crisis. International migrations were also affected because the Atlantic flow stagnated and emigration re-directed mainly toward European countries, particularly to France. The new migrants had very different regional origins (namely the Mediterranean region and the Ebro Valley) than those in traditional transatlantic migration (Sánchez-Alonso, 1995). The war shock was not translated into higher GDP growth but into higher inflation rates. Thus Spanish GDP growth was even slower than during the preceding and subsequent periods (Prados de la Escosura, 2003).

Fig. 1 presents evidence on the increased dispersion of prices within major sectors as a consequence of the World War I. The dispersion of agrarian prices rose from 1906 to 1910, decreased up to 1913 and rose again from 1914, remaining at high levels up to 1929. The dispersion of industrial prices was even more sizable since initial dispersion was low.

Comparing our estimations of wage convergence (Tables 2–6) with data on price dispersion (Fig. 1), one can observe some parallels that suggest that wage dispersion

¹⁴ This difference is not statistically significant.

was related to price dispersion. In particular, the increase of price dispersion affecting agriculture, industry, and services during the World War I corresponded with a similar increase in wage dispersion in all three occupations. Similarly, the decrease of price dispersion in industry during the post-war period corresponded to a decrease in unskilled and skilled industry workers wage dispersion. Further, the absence of decreasing wage dispersion in agrarian wages during the 1920s corresponds quite well with the higher levels of dispersion of agrarian prices.

Keeping these patterns in mind, we can speculate on how Spanish labor markets responded to this external demand shock. During the 1920s, β -convergence was rapid and was accompanied by re-allocation of labor from low-wage regions and industries to high-wage regions and industries. Moreover, there was also rapid re-allocation of labor across sectors. The share of male labor employed in agriculture decreased from 62 percent to 53 percent between 1920 and 1930. However, real wages did not decrease fast enough in those regions in crisis to avoid out-migration.

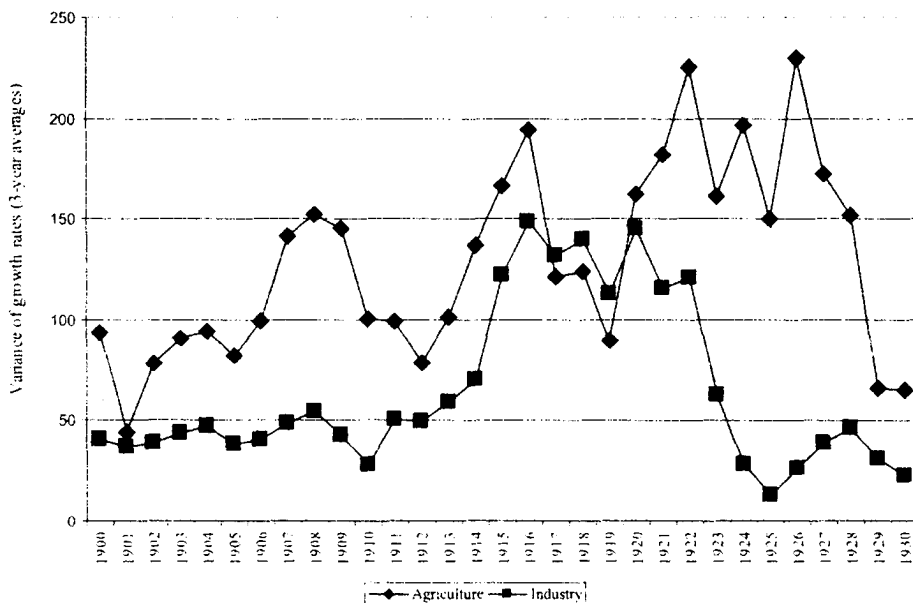


Fig. 1. The dispersion of prices, 1900–1930. *Notes and sources.* The dispersion of prices is measured as the variance of the log growth rate (3-year centered averages) of the corresponding group (agriculture and industry). The agriculture series are the value added deflators (Implicit GDP deflators) of grains, vegetables, potatoes, oil, wine, raw wool, raw silk, meat, eggs, fertilizers, forestry products, and fishing. The industry series are the value added deflators (Implicit GDP deflators) of the following sectors: Food, beverages, and tobacco; textile; clothing and shoemaking; timber, cork, and furniture; stone, clay, glass, and cement; metal, basic; metal, transformation, and machinery; transportation material; other manufacturing; extractive industries; utilities; construction and public works. The source of all series is Prados de la Escosura (2003).

In sum, our wage regressions suggest migration was a minor player in explaining wage convergence in the long run. However, Spanish labor was not reluctant to migrate; quite the contrary, it did migrate in response to large labor-demand shocks. When these migrations took place, industrial structures changed dramatically and wage convergence was rapid.

4. Conclusion

This paper presents new data on real wages in Spain from the middle of the 19th century until 1930. We use these data to study convergence across regions, but the data are a separate contribution in their own right that we hope will be valuable to other scholars.

Over the long run, real wages did converge within Spain but there were three distinct periods separated by the World War I. Although labor clearly migrated within and from Spain, and migration clearly responded to large, external shocks (like World War I), on the whole internal migration seems to have played a minor role as a causal factor suggesting that other forces, such as factor price equalization due to internal trade, were involved.

Appendix A

Agrarian wages (Barcelona 1914 = 100)

	1854	1874	1910	1914	1920	1925	1930
Alava	35.59	64.88	98.57	96.08	78.14	69.85	84.26
Albacete	38.75	82.98	79.97	70.70	105.69	109.87	95.28
Alicante	37.16	63.12	69.18	65.94	92.20	117.59	113.56
Almeria	40.64	71.11	72.28	66.52	70.29	121.73	121.81
Avila	39.32	53.17	83.95	71.01	40.92	58.21	102.05
Badajoz	36.14	61.13	72.82	66.71	77.07	100.21	120.42
Baleares	44.44	39.32	83.39	79.05	97.41	92.48	112.01
Barcelona	61.49	96.11	100.15	100.00	157.73	156.83	162.75
Burgos	33.66	58.71	92.55	78.74	68.26	86.04	98.30
Cáceres	28.19	50.71	57.74	53.57	63.59	118.08	70.53
Cádiz	48.53	56.26	70.48	65.09	79.56	101.56	122.00
Castellón	36.00	58.13	66.27	61.77	145.71	225.06	183.14
Ciudad Real	58.45	46.17	60.55	56.14	44.64	50.70	102.19
Córdoba	36.09	61.08	73.29	67.00	123.63	58.01	118.18
Coruña (La)	28.81	48.61	80.41	74.46	96.63	127.33	129.80
Cuenca	43.05	42.52	68.98	61.84	76.43	85.61	88.39
Gerona	35.99	75.31	107.30	100.22	120.99	174.60	148.49
Granada	50.93	47.05	61.57	48.41	95.73	94.28	100.27
Guadalajara	38.86	47.63	62.95	56.32	74.68	127.11	78.93

Appendix A (continued)

	1854	1874	1910	1914	1920	1925	1930
Guipuzcoa	30.01	59.04	63.61	62.05	64.31	82.34	74.61
Huelva	43.07	60.68	79.58	72.57	120.83	75.63	109.05
Huesca	39.90	75.77	98.26	92.92	105.35	112.53	107.58
Jaén	32.92	54.88	66.11	61.81	154.52	76.18	114.52
León	21.93	60.54	80.19	67.35	106.14	80.17	85.67
Lérida	42.38	67.70	98.77	91.74	141.57	132.88	226.61
Logroño	30.63	66.33	72.52	63.27	121.43	96.35	101.49
Lugo	18.17	40.33	81.94	80.83	109.57	105.66	117.88
Madrid	23.61	38.64	50.81	51.67	94.47	88.48	61.32
Málaga	42.93	56.56	68.48	62.69	115.62	93.33	105.48
Murcia	31.10	60.36	66.22	63.40	101.69	109.02	104.51
Navarra	42.77	64.93	91.25	81.81	159.50	144.49	133.36
Orense	29.52	68.74	92.81	84.34	92.61	139.57	128.71
Oviedo	35.75	56.17	99.64	93.20	132.38	183.48	153.55
Palencia	39.11	60.25	70.95	59.57	67.38	95.25	100.22
Pontevedra	21.34	37.64	70.20	71.28	73.73	89.90	86.74
Salamanca	21.08	59.07	77.21	68.06	94.19	39.56	47.54
Santander	28.69	60.84	76.29	73.74	101.51	117.48	107.60
Segovia	35.63	57.90	73.51	61.66	76.43	69.80	34.33
Sevilla	37.56	61.59	80.98	75.01	113.18	122.56	158.04
Soria	28.80	58.62	70.92	59.41	79.83	88.31	109.37
Tarragona	44.22	59.44	79.25	74.31	128.86	172.59	166.20
Teruel	43.93	58.47	76.61	73.13	96.37	101.85	97.64
Toledo	34.64	54.80	68.16	61.27	87.16	71.14	83.97
Valencia	35.46	87.05	51.92	71.29	87.04	121.74	101.06
Valladolid	27.31	50.85	70.11	61.34	78.59	73.66	78.96
Vizcaya	37.92	61.74	77.67	81.05	86.50	142.54	111.98
Zamora	38.72	49.93	76.27	64.36	50.76	58.76	61.21
Zaragoza	53.45	86.99	86.02	82.08	256.99	124.03	136.96

Sources: See text, Section 2.

Unskilled urban wages (Barcelona 1914 = 100)

	1861	1914	1920	1925	1930
Alava	73.52	74.73	74.12	91.04	85.92
Albacete	52.03	68.73	73.98	83.81	79.05
Alicante	51.73	91.18	110.07	114.74	96.82
Almeria	51.99	68.98	87.48	108.45	74.70
Avila	52.13	69.04	65.17	113.18	77.78
Badajoz	57.09	57.65	64.68	69.28	88.15
Baleares	50.68	90.76	101.02	106.18	88.86
Barcelona	68.09	100.00	116.54	130.59	126.58

Appendix A (*continued*)

	1861	1914	1920	1925	1930
Burgos	53.96	71.89	75.21	92.55	90.22
Cáceres	42.82	69.44	64.91	88.50	85.71
Cádiz	59.76	95.62	92.82	110.92	105.43
Castellón	52.50	93.08	85.85	108.53	90.81
Ciudad Real	55.24	72.78	66.41	81.79	76.59
Córdoba	50.88	78.17	78.81	95.44	97.44
Coruña (La)	44.64	95.56	102.00	135.22	117.48
Cuenca	53.18	61.46	59.44	65.00	68.75
Gerona	55.98	92.94	90.68	100.65	124.38
Granada	53.05	78.19	77.62	94.28	90.99
Guadalajara	53.23	72.15	78.50	91.49	70.16
Guipuzcoa	56.73	69.71	69.17	81.89	75.34
Huelva	53.22	93.13	70.49	99.16	101.06
Huesca	61.72	75.28	77.21	98.27	103.45
Jaén	51.20	66.77	58.59	110.50	82.22
León	46.19	71.68	94.56	103.92	106.30
Lérida	60.09	95.13	93.17	111.96	105.75
Logroño	51.28	66.43	81.76	80.19	87.54
Lugo	37.97	71.85	65.28	101.74	95.35
Madrid	31.08	80.37	81.15	113.49	100.69
Málaga	56.52	86.04	77.30	122.71	114.86
Murcia	56.28	78.32	77.41	96.66	81.29
Navarra		74.70	71.30	95.94	95.64
Orense	40.35	99.96	90.98	121.08	114.13
Oviedo	49.53	84.09	113.26	156.03	156.86
Palencia	54.44	87.21	67.38	75.56	93.54
Pontevedra	38.89	63.76	61.87	101.39	91.07
Salamanca	51.25	87.34	87.62	95.10	88.74
Santander	60.54	82.29	92.62	121.28	114.12
Segovia	60.62	53.29	57.96	67.49	78.54
Sevilla	58.09	88.90	84.94	107.03	107.12
Soria	43.76	59.80	57.66	83.30	83.52
Tarragona	57.05	101.15	125.28	124.17	108.58
Teruel	52.49	74.85	104.63	91.40	86.57
Toledo	50.51	68.84	69.41	85.37	79.64
Valencia	56.02	87.55	118.47	125.68	101.31
Valladolid	49.78	55.66	52.39	73.05	89.05
Vizcaya	69.13	70.32	81.69	122.69	113.89
Zamora	52.39	77.87	63.78	82.26	69.83
Zaragoza	56.29	77.72	108.08	105.11	86.64

Sources. See text, Section 2.

Industry urban wages (Barcelona 1914 = 100)

	1861	1896–1897	1914	1920	1925	1930
Alava	74.96	68.33	72.81	69.17	90.06	80.58
Albacete	78.64	55.93	71.48	76.72	93.12	102.10
Alicante	62.13	46.48	94.98	103.40	107.53	106.44
Almería	75.10	61.88	80.48	68.73	83.78	94.74
Avila	83.99	40.21	79.17	72.75	88.53	83.60
Badajoz	61.48	56.75	67.26	61.00	83.14	95.50
Baleares	67.02	46.19	85.88	94.28	102.75	99.89
Barcelona	76.94	77.97	100.00	111.43	120.54	120.13
Burgos	73.98	48.80	74.55	65.87	78.79	88.69
Cáceres	61.37	46.24	62.96	55.64	74.59	78.85
Cádiz	96.72	71.11	97.50	91.79	112.04	114.80
Castellón	72.92	59.40	78.07	84.71	103.86	100.90
Ciudad Real	70.76	38.46	67.93	62.39	71.08	77.07
Córdoba	59.07	61.13	81.07	77.76	107.58	111.53
Coruña (La)	58.94	52.40	96.52	104.98	138.39	117.48
Cuenca	87.19	60.84	58.79	65.33	81.38	74.35
Gerona	63.56	79.31	101.93	91.25	100.12	111.35
Granada	100.21	61.35	88.81	73.92	105.92	108.94
Guadalajara	85.86	70.60	67.00	68.03	82.63	93.55
Guipuzcoa	52.55	50.09	59.58	61.72	73.49	74.66
Huelva	95.97	77.39	75.26	67.88	96.36	109.48
Huesca	82.29	67.42	84.31	78.79	91.10	96.35
Jaén	80.54	62.19	80.12	62.09	88.61	85.64
León	55.07	61.97	84.55	98.06	107.88	108.94
Lérida	67.53	61.65	89.19	84.70	112.54	108.10
Logroño	77.19	62.44	70.53	74.24	71.87	88.02
Lugo	44.74	47.60	83.82	65.28	97.83	100.24
Madrid	49.57	44.20	76.55	80.42	99.80	84.79
Málaga	92.76	61.87	95.60	76.78	110.61	114.25
Murcia	86.23	55.53	69.62	85.26	94.97	94.55
Navarra		68.38	81.15	74.15	83.15	104.17
Orense	46.03	47.23	93.71	84.66	130.82	122.80
Oviedo	70.96	62.86	92.79	122.41	153.49	142.60
Palencia	84.11	63.86	74.49	75.87	90.87	93.54
Pontevedra	41.49	106.74	73.92	75.46	104.88	106.82
Salamanca	57.79	73.70	84.70	77.57	92.31	82.83
Santander	53.13	76.41	79.80	99.20	130.69	116.66
Segovia	92.37	82.79	65.72	64.40	74.34	85.87
Sevilla	85.75	65.87	87.04	64.86	114.84	124.09
Soria	64.18	50.06	76.11	54.21	83.79	91.77
Tarragona	70.55	72.45	96.33	101.34	115.22	124.09
Teruel	74.44	48.04	77.84	76.00	73.12	79.99

Appendix A (continued)

	1861	1896–1897	1914	1920	1925	1930
Toledo	56.13	77.20	67.07	71.02	86.42	90.26
Valencia	69.53	56.20	87.55	111.70	120.51	121.11
Valladolid	69.70	60.76	74.21	64.04	83.07	92.12
Vizcaya	61.45	56.53	72.74	88.90	121.21	118.80
Zamora	71.03	75.13	68.60	69.85	86.33	97.34
Zaragoza	81.41	77.42	90.67	93.77	99.83	99.43

Sources. See text, Section 2.

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