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LABOUR MARKET IN THE CATALAN COTTON TEXTILE SECTOR: EMPLOYMENT AND FERTILITY (1850-1913)

ABSTRACT:

This paper deals whit the dynamics of the Catalan textile labour market (the Spanish region that concentrated most of the industrial and factory activity during the 19 Century) and offers hypotheses and results on the impact it had on living standards and fertility levels. We observe the formation of an uneven labour market in which male supply for labour (excluding women and children) grew much faster than the demand. We stress the fact that labour supply is very dependant on institutional factors liked to the transmition of household property between generations. Instead the slow path of growth of adult males demand for labour is witnessing the limits of this industry to expand and to compete in international markets. The strategy of working class families to adapt to scarce opportunities of employment we document here is the diminution of legitimate fertility levels. Fertility control is the direct instrument we think workers have to control their number in a situation that was likely to create labour surpluses in the short and mid run.

Key words: labour market, female employment, children employment, fertility.

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LABOUR MARKET IN THE CATALAN COTTON TEXTILE SECTOR: EMPLOYMENT AND FERTILITY (1850-1913): FIRST RESULTS.

1. The textiles Catalan industrialization patterns: a singular case.

Between 1830 and 1860 Catalan cotton textiles experienced an industrial spurt[1]. In the Spanish context it was the first sector of the economy showing economic growth and dynamism. In the same years technological change was intensive and by 1860 most of the spinning was already mechanical (see table 1). The efficiency of the cotton sector grew at the same path as technological change if measured according to the total productivity factors[2]. All together economic growth and technological change gave rise to a new factory system in which firms were vertically integrated leaving aside the previous handicraft workshops of the manual weavers.

According to James Thomson, at the eve of the 19th century Barcelona's cotton calico printing factories represented one of the most remarkable textile industrial concentration of Europe[3]. Nonetheless, according to all the authors, this initial advantage soon run against its main obstacle: the absence in Catalonia of one of the main inputs to power 19th century mechanical mills, coal. The first coal powered mill was funded in 1832 and the steam engine was spread in the

[1] See J.Nadal (1975): El fracaso de la revolucion industrial en Espana, Barcelona; A.Carreras (1990): Industrialización española: estudios de historia cuantitativa, Madrid; J. Maluquer de Motes (1994): "El indice de producción industrial de Cataluna. Una nueva estimacion (1817-1935)", Revista de Historia Industrial, 5; J.R. Roses (2004): "Industrialización regional sin crecimiento nacional: la industrialización catalana y el crecimiento de la economia española (1830-1861), Revista de Historia Industrial, 25
[2] J.R. Roses (1998): The early phase of Catalan industrailisation, 1830-1861, Unpublished PHD dissertation, European University Institute, Florence .
[3] See J.K.J. Thomson (1989): "The Catalan Calico-Printing Industry Compared Internationally", Societat ´Catalana d'Economia, Anuari 7.

region after this date. But the price of coal at the port of Barcelona was five fold the price at the port of Liverpool[4]. The high production costs because of the lack of a natural endowments made necessary tariff protection during all the 19th century. Therefore after the emancipation of the colonies of the Spanish Empire the single markets available for Catalan industries were the Spanish Iberian markets and the insular colonies.

In terms of the quality of natural endowments and production factors Catalan industries did not have comparative advantage to compete in foreign markets in at least two important respects. The first is the aforementioned lack of coal. The second is the poor investments in human capital of the region. The rate of literacy (both genders) was 24 in 1860, 32 in 1877, 40 in 1887 and 48 in 1900, and the gender literacy gap was enormous[5]. Trade and engineers schools developed latter[6]. The role of the learning by doing inside the factory by means of the system of industrial apprenticeship has been emphasised by several authors[7]. Nonetheless the extremely low levels of literacy till 1900 reveal one of the handicaps of 19th century Catalan economy.

Despite of all of these disadvantages, Catalan industries grew because they were competitive in the closed and protected Spanish market. The quota of Catalan textiles in the Spanish domestic market was enormous and by 1900 this quota attained 91 per cent in the case of cotton textiles, 63.3 in the case of woollen textiles, 55.3 in the case of silk textiles, and 43.8 in the case of linen textiles[8]. The success of Catalonia inside Spain can be explained in terms of the social capital inherited by this region since the early Modern Ages[9]. Since the 17th century Catalonia developed a mercantilised structure and since the 18th

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[4] This price differential was due to taxes (bad quality Spanish coal was protected) and transport costs. The Spanish railway network was inefficient to connect dynamic areas and the coal from England arrived by sea ship, whilst Catalonia had very few things to sell to England. See Nadal (1975)

[5] C.E. Nunez (1992): La fuente de la riqueza. Educación y desarrollo económico en la Espana contemporanea, Madrid.

[6] The first promotions of the Engineers School were from the 1880s. See R. Garrabou (1982): Enginyers industrials, modernitzacio economica I burgesia a Catalunya (1850-inicis del segle XX), Barcelona.

[7] See E. Camps (1995): La formación del mercado de trabajo industrial en la Cataluña del siglo XIX, Madrid. See Ibid Roses (1998). Jeffrey G. Williamson has also emphasised the nature of apprenticeship during the 19th century for the British case, J.G. Williamson (1985): Did British Capitalism Breed Inequality?, Allen and Unwin, 1985; J.G.Williamson (1990): Coping with city growth during the Industrial Revolution, Camboridge, CUP.

[8] See J. Nadal in Nadal, J., A. Carreras, C. Sudria (1987): La economía española en el siglo XX. Una perspectiva historica, Barcelona.

[9] Since the 15th century by means of a popular revolt the servile feudal payments were suppressed and a social strata of prosperous peasants constituted of sharecroppers family tenants was formed.

century capitalised agriculture[10]. Time before the liberal revolution the sharecroppers achieved the quasi private property of the land by means of contracts like “enfiteusi” and “rabassa morta”. During the 18th century economic specialisation took place in Catalonia and urban growth and agrarian specialisation in export agricultural products in the littoral lead to increased production of mass consumption woollen textiles. What is more important to stress is that before the liberal revolution, after the 1770s, we can consider that the region was already economically integrated and real wages converged between the west cereal and the littoral export based agrarian areas and also between the agrarian activity and the industrial activities in calico cotton textiles factories[11]. Therefore we can say that quite autonomously from the path of institutional change in the Spanish context, as soon as in the 18th century Catalan economic agents were maximizing profits on the bases of the regional market infrastructure and were able to build a balanced regional economy. This particular singularity of the region inside Spain and the possibility of developing distinctive economic strategies are the main reasons for the success of Catalonia in the Spanish market.

The aforementioned singularity of Catalonia makes it difficult to compare its industrial experience with that of other countries or regions of the world. The economic spurt in the decades 1830-1860 was so sharp that some economic historians have assessed that Catalans followed the English model, but the Spanish poor market circumstances and the price of the imported coal led to the failure of the Spanish (Catalan) industrial revolution.[12] According to the figures we present in this paper by 1875 employment in the cotton textiles (spinning, weaving, finishing and mixtures all together) represented 51,700 workers. At the same date Lancashire employed 70.000 workers just in the process of spinning cotton[13] . By 1849 England had installed 249,627 mechanical looms, whist the

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[10] See P.Vilar (1966): Catalogne dans l’Espagne Moderne, Paris; J. Torras-Elias (1984): « Especializacion agricola e industria rural en Cataluña en el siglo XVIII », Revista de Historia Economica, 3. J. Maluquer de Motes (1985): “La revolución industrial en Cataluña” in N. Sanchez Albornoz (ed) La modernizacion economica de España, Madrid.

[11] See N. Mora-Sitja (2006): Labour Supply and wage Differentials in an Industrialising Economy: Catalonia in the long Nineteenth Century, PHD dissertation, Oxford.

[12] See J. Nadal Ibid. (1975); Maluquer de Motes, ibid (1985). To go in depth into the English model see J.G.Williamson (1987) « Debating the British Industrial Revolution », Explorations in Economic History, July, pp. 269-92.

[13] Data from Lancashire quoted by A. Garcia I Balaña (2004): La fabricació de la fàbrica. Treball i política a la Catalunya cotonera (1784-1874), Barcelona

number of mechanical looms in Catalonia was 5,580 in 1850 and 29,000 in 1870 (see table 1)[14] . England could experience such a big transformation because of its high levels competitiveness, the scale of the institutional change of that country, and the higher intensity of work on the side of workers[15]. All of these facts meant that England could have a big quota of the textiles world's market whilst the lack of comparative advantage for coal powered technologies limited the demand of Catalan manufactures to the poor Spanish agrarian markets.
If we move from the paradigm of free trade, England, to countries that adopted protectionist trade policies like the New England in the USA or Japan, the experience also diverges. The silk industry of Japan is radically different from the Catalan cotton textiles industry because of the nature of its labour force and its high levels of literacy.[16] The woollen and cotton industries of Massachusetts also differ in nature because in this case labour was an extremely scarce production factor and this fact fostered the quick development of highly mechanised technologies[17]. According to J.K.J. Thomson the French region of Alsace is the most similar region of Europe with respect to Catalonia, in terms of machinery installed and the transfers and adoption of British technology[18]. And in fact 19th century Catalan social structure has lots of similarities with several French regions like Alsace. But the economy of Alsace owed coal and the Catalan not.

All in all we can confirm the singularity of the Catalan experience. In this last case the effective size of the Spanish market limited the availability of economies of scale of the industry and also the possibility to increase more its levels of employment. As we shall see, and in sharp contrast with the 18th Century economy when Catalonia was open to the world, this last fact had several externalities in terms of social costs of adjustment.

In this paper we shall resent evidence on the nature of the 19th Century labour market to stress the labour adjustment policies adopted to confront the social externalities that Catalan industrialisation involved. We shall sustain that

[14] Quoted in J.K.J. Thomson (2003). "Transferencia tecnológica en la industria algodonera catalana: de las indianas a la selfactina", Revista de Historia Industrial, 24
[15] See Ibid Williamson, 1985, 1990; Voth (2000).
[16] See the special number of the Economic History Review (1991) on Japan.
[17] See for the tariff policies L. Bertola, J. G. Williamson (2003): "Globalization in Latin America before 1940", NBER Working Paper, n. 9687. This paper proves that during the 19th century the USA had the highest trade tariffs in the world.
[18] See Ibid Thomson (2003).

the capacity of employment to grow was limited by the nature of the Catalan economy. The experience of retails in the wage tariffs[19] and unemployment during the first downswing of the business cycle (years 1860s) led to the strategy to control fertility (and therefore also the labor supply) by industrious labour economic agents. The radicalisation of the labour movement towards anarchism brought with it the spread of Neo Malthusian fertility control practices[20]. This fact (the slower path of growth of labour supply) and the prevailing implicit contracts in the labour market involved that the 1880s crisis had less severe impact on living standards[21] than those it would have otherwise.

2. THE EVOLUTION OF EMPLOYMENT IN THE COTTON TEXTILES.

In figure 1 we present the series of employment, including men, women and children. Since the series begins as early as 1830, factory, workshop and subcontracted labour are included[22] . In figure 1 we can observe the role of technological change in total employment. The first period to pay attention to is 1830-1860 of transition from manual technologies to mechanized ones (see table 2). All the spinning process was mechanised and after 1850 the self-acting mule was introduced, and mechanical looms partially replaced manual looms. The dramatic fall of the number of employed between 1855 and 1865 can partially be understood in terms of the labour savings caused by the technological advances typical of the industrial revolution.

But a part from the effects of technological change on employment we must bear in mind that in Catalonia the 1860s were years of industrial crisis. The first fact leading to this industrial crisis was the North American civil war (1860-66) that caused the "cotton famine" or temporary absence of raw cotton to import. The adjustment to this crisis and

[19] See ibid. Garcia-Balaña (2004)

[20] For evidence on Neo Malthusian Catalan fertilty patterns see E. Masjuan (2000): La ecología humana en el anarquismo iberico. Urbanismo "organico" o ecologico, neomaltusianismo y naturismo social, Barcelona.

[21] See J. Domenech (2005): "Labour Market Adjustment to Economic Downtowns in the Catalan Textile Industry, 1880-1910. Did Employers Breach Implicit Contracts? "Working Papers in Economic History, n.88/05, LSE. See also E. Camps I Cura (2004): "Wage Structures and Family Economies in the Catalan Textiles Industries in an Age of Nascent Capitalism", Continuity and Change, 19:2.

[22] The preliminar version of this series was presented at Barnusell, G, E.Camps, A. Garcia, L. Muñoz, J.R. Rosés (1994): "Ocupacion, productividad y salarios: una reflexion para el caso catalan", Simposio de Analsis Economico, UAB.<

the financial crisis that follow it (with the bankruptcy of Barcelona's Bank) involved the restructuration of the sector by means of new technological change, the formation of vertically integrated firms[23], and savings in labour employment. The organisational and technological change just mentioned involved in itself the redundancy and obsolesce of the independent manual weavers workshops working on an the bases of horizontal integration. Among all, this was the most important labour saving[24], and not only affected the number of workers but also their location. The new goals of industrial investment implied several times the delocalization of industry in order to benefit from some of the available comparative advantages to make use of the imported coal or hydraulic power[25]. Together with the delocalization of industry inside the region, these decades experienced important internal migratory movements from urban or semi-rural nuclei by then in crisis to the expanding industrial towns. These migration movements affected manual weavers and their families but also other manual workers including all stages of the production process and craftsmen in all the urban occupations[26]. When they migrated the household heads were young (between 25 and 35 years old) but in a 66 per cent of the cases they were married and migrating in family and travelling and settling with small inactive children[27]. In the Catalan case these migration movements were caused by push rather by pull factors[28].

Nevertheless, industrial restructuration and technological change in the 1860s were followed by a sustained growth in employment from 1869 to 1913, which confirms the increasing power of the cotton textile sector with the use of capital-intensive techniques. The observed trend of stagnation of employment of the adult male worker (the effective breadwinner according to wage levels)[29] shows the features of a urban industrial sector with very inelastic labour demands[30] . This fact is important for an industrial region like Catalonia where the absence of natural resources such as coal or iron prevented further

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[23] See Ibid Rosés.

[24] See the changes in employment and its location between 1850 and 1861 in Camps (1990). In the English case this structural change and the disamenities it caused have suggested much of the perceptions of the pessimist school on the outcomes of the industrial revolution. See E.P. Thompson (1963): The Making of the English Working Class, London; Gray, R. (1996): The factory question and industrial England, 1830-1860, Cambridge.

[25] See Camps, 1985, 1990, 1995.

[26] See ibid Camps :(1995)

[27] See for the British case Williamson, J. G (1990): Coping with city growth, Oxford. In the English case the migrants were younger and single and represented a direct input of human capital to industrialising towns.

[28] The same can be observed during the 18th century. See Mora-Sitja :(2006)

[29] Camps (1995).

[30] As opposed to the British case. See ibid Williamson (1990). See also on the topic Voth (2000)

industrial diversification. The single strategy that the Catalans could follow to maintain a path of economic growth was the specialization in the manufacture of other consumption goods like paper, food industry, and others[31] .

By 1913 the cotton industry represented 34.6 per cent of the regional added value, the woollen textiles 19.9 per cent and other industries 45.5 per cent. In the pattern of Catalan specialisation of this last period the most important among the other industries were food and metal industries and chemicals. In all of these industries the market quota achieved by Catalans in Spain by 1900 was remarkable according to the estimations of Jordi Nadal[32]

But as we will see, and before economic diversification could take place, during the decades of the 1860s and 1870s the textiles continued to cause important labour surpluses (see table 4)[33]. The final destination of most of internal migrants, Barcelona, shows the occupations that were really expanding during the second half of the 19th century: construction of houses[34], construction of the railway network, construction of roads, and construction in agrarian public works. I think that employment in construction was the factor that gave more elasticity to the Catalan urban labour demand providing employment to unskilled workers.

[31] See Maluquer de Motes, J. (2004) : « Introducció » in M. Llonch (ed.) El treball textil a la Catalunya contemporania, Lleida.

[32] See Ibid Nadal (1987)

[33] The behaviour of employment in the woollen sector is different in a process in which all woollen production of the region was concentrated in two industrial towns: Sabadell and Terrassa. In Sabadell employment in the woollen sector increased from 2,328 people in 1849 to 3,295 people in 1858 whilst employment in cotton decreased from 2.066 to 700 in the same dates. Nonetheless this are just two local cases. See ibid Camps (1995)

[34] The size of Barcelona increased form 111,410 inhabitants in 1787, to 183, 787 in 1857, to 533,000 inhabitants in 1900. In this last period this town absorbed the municipalities of its conurbation. By 1900, the percentage of urban population of Catalonia was high, 40.4%. See Camps (1995). In this last date Barcelona's inhabitants represented 27% of the Catalan population.

3. ECONOMICALLY ACTIVE POPULATION TRENDS OR HOW TO ADAPT TO TECHNOLOGICAL CHANGE.

In order to calculate the tensions in the matching of supply and demand for labor in the cotton textile sector in this part we use the methodology proposed by Jeffrey G. Williamson to measure the same in the British case, in spite of the fact that the scope and dimensions of the analysis used here are much more limited[35]. Indeed our background of knowledge of demographic and economic activity trends in 19th century Catalonia makes the construction of a series of economically active population in the cotton sector more difficult. The census data offer results on employment and not on economic activity. Therefore, labour surpluses or unemployment are not accounted for in the census data. Finally in the Spanish context the census data under register female and children's levels of participation in the workforce.

As a first exercise to calculate male economic activity trends in the cotton sector, several transition matrices showing the probability of changing occupation during the worker's lifetimes and between generations are presented in Tables 2 and 3. The information they include refers to men at the age after first marriage, the vital event at which occupation begins to be regularly registered. The main limitations to use these transition matrices lie in the fact that satisfactory vectors of activity by date are not available at present. On the other hand these matrices only represent the conversion coefficients in industrial towns. Therefore these coefficients are only representative of the transformations of the Catalan population in middle sized industrial urban centres and not of the total population.

Despite all of these problems, the aforementioned transition matrices provide several clues, which help us to understand the trend in adult male economic activity in the cotton textiles. Simplifying a lot the data exposed in tables 2 and 3 and extrapolating the data, it may be concluded that male textiles' workers activity grew as much as their natural growth plus around 40 per cent of the natural growth of all remaining sectors of activity. However, during worker's lifetimes few marked trends concerning change of economic activity are observed in table 3[36] and, to a large extent, the standard pattern

[35] See ibid Williamson (1990).

[36] This is in line with all results of occupational mobility. See nonetheless the higher occupational mobility of migrants in I.Maas, M.H.D. van Leeuwen (2004): "Occupational Careers of the Total Male

was to remain within the same occupational sector after attaining a certain level of seniority (normally after marriage, by which time the formal apprenticeship within the factory was completed).

Population shifts between occupational sectors existed, but only with a time lag-effect, i.e., they occurred in the next generation. In the case of Catalonia the propensity of creating an abundant pool of industrial journeymen was caused by the inheritance system which preserves most of the family wealth for the first born[37]. The portions of wealth received by second and third born were insufficient to allow that their respective families had access to a new properties, or property owned business[38]. This is also particular to the Catalan case, since the Napoleonic Wars in continental Europe implied that many countries adopted the system of divisible inheritance. This fact implies that the propensity of the Catalan institutional family system to create new waged workers is very high in comparative terms.[39]

In order to reconstruct the male textile activity series it has been supposed that in the peak year of spread of manual weaving, 1855, the Catalan economy enjoyed full employment. The baseline for measuring the initial economic activity is employment in the years 1856-60, for which only male employment has been taken into account. The criteria to evaluate textile economic activity are the following:

1. As mentioned above, it has been supposed that all the offspring of textile factory workers (textile factory workers represent 20% of the employment in urban and semi-rural areas excluding Barcelona) and 40% of the offspring of all remaining occupational sectors (80% of Catalan employment excluding Barcelona) became textile factory workers around the age of marriage. The resulting propensity to create new wage workers is very high, 0.52 (or 52 per cent) and was fostered by the Catalan inheritance family system. I have excluded Barcelona since most cotton industrial workers were formed in medium-sized industrial towns or manufacturing villages. This flow of workers that finally migrated to Barcelona

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Labour Force during Industrialisation: The Example of Nineteenth-Century Sweden" in Mitch, D., J. Brown, Marco H.D. van Leeuwen, Origins of the Modern Carrer, Hants. Our results are limited by the nature of the sources and methodology (individual computerised nominal record linkage) that only refer to stable population

[37] See Barrera Gonzalez, A. (1986): Casa, herencia y familia en la Cataluña rural, Madrid.

[38] See ibid Camps (1995)

[39] On the other hand this propensity is constant during the 19th century and as we already stated implied that 40 per cent of the natural growth of all sectors of activity were producing new waged factory workers.

was formed according to the patterns of job transmission in medium-sized industrial towns[40].

2. The demographic dataset employed is the one published by Anna Cabre (1999) and is reproduced in table 5.
3. Nonetheless, as mentioned above, children's employment was not registered till the moment of marriage. In other words, in order to calculate effective growth of textile adult potential workers, the proportion of population reaching the age of marriage must be measured.

To calculate the effective active population of adult male, the replacement rates up to the age of 30 as observed by Anna Cabre (1999) have been employed (see table 5). These data represent the number of people reaching the age of 30 years (with contemporary mortality tables) able to replace each person of the same age from the previous generation. Cabre's data also give us the chance to compare patterns of cohort replacement for men as well as for women (Net Reproduction Rates) and show that the gendered results and conclusions are similar in the period under study (see table 5). The age of 30 puts as a little after the age of first marriage which can be set at between 25 and 27 for men and 23-25 for women. If the replacement rate is less than 1 this means that mortality is to high or fertility too low for every person aged 30 to be able to produce another person replacing him or her. Notice in table 5 that the mortality conditions improved in this period despite life expectancies being as low as 27,7 years (both genders) in1860, and 37.1 in 1900. Therefore the age of 30 places us around the average age of survival during the period. On the other hand fertility continuously diminished and the total offspring size (legitimate children) went from 4 in the birth cohort of 1860 to 2 in the birth cohort of 1906 despite the aforementioned adverse mortality circumstances.

On the bases of the data detailed in points 1, 2, and 3 the rate of growth of the textile adult economically active population is presented (see table 6). To reconstruct the annual rates of growth of the labour supply the Net Replacement Rate up to the age of 30 for each date (date=cohort date+30) has been applied to the proletarianization propensity (0.52), and the net immigration trend (immigrants from the rest of Spain) of the Catalan Population also according to A. Cabré.

[40] See the English model in Ibid Williamson (1990).

The series of employment and economic activity in the cotton textiles are presented in Table 4 and figure 1. These are explicit in showing the effects of the 1860s industrial crisis on the contraction of employment. The textile sector was generating surpluses equivalent to 40% of its male active population between 1860-1870. But as we can see in Table 4 and Figure 1 the implications of male redundancy on trade unionism and political discontent had as result a new employment pattern on the side of the firm which consisted in increasingly employing more docile workers such as women and children, in spite of the unemployment of the male adult workers. Not only were women and children more docile: they were relatively cheaper. In this stage of mechanization dealing with many productive tasks also meant to have a lot of dexterity and other abilities such as more discipline and liability were more typical of women than of men. After 1900 a new steady state is attained in which male full employment is reached again with a frictional rate of redundancy of around 5%. The effects of technological change and the industrial crisis of the 1860s on the contraction of the labour demand, and the high rate of proletarianization arising form the Catalan institutional family context, both of them explain the causes of the high rates of male redundancy in the years 1857-77 and of a process of adjustment that replaced men by women and children. After 1890 the new trend of male employment to increase can be properly explained by the new strategy of the employers to deal with workers discontent: this was the ruralization of textile activity and the move towards the industrial rivers that could make use of the cheap energy of the water. In these "Colonias Industriales" the impact of urban trade unions was nearly inexistent, and they made extensive use of male, female and children's work.

As for the redundant workers of the years 1855-1875 the most plausible alternative may have been overseas emigration and existing literature have already documented this population flow as early as in the mid of the 19th century[41]. These data are explicit in showing that the industrial crisis of the 1860s had important repercussions and social externalities. The strategy adopted during these years based on workers' layoffs had as result an important emigration flow from Catalonia (to

other parts of Spain or to Latin America[42]), even before the overseas transports revolution fostered the first globalization era[43]. This emigration flow has not been measured yet but the data on overall Catalan population growth are explicit in what concerns its existence. In the decades 1887-57 Catalan population grew at an annual rate of 0,88, and in the period 1857-77 the rate is 0,26, and 1877-1900 0,47. The contraction of the rate of population growth to one fourth of the pre-exiting level in the decades 1857-77 is a clear sign that important emigration flows from Catalonia took place in these years.[44]

The reasons behind the decrease of the rate of growth of economically active population are some of the factors that suggest how families adjust to the situation of unemployment. If the Catalan family institutional (and customary) framework was causing a constant and permanent propensity of increase of the labour force, the single measure that could be adopted by industrious people to improve the economic condition of their children was the reduction of the size of the offspring (see table 5). We are implying here that among other factors fertility control was fostered by the aforementioned adverse economic conjuncture.

In other words, demographic factors came to control the rate of growth of the labour supply, thus preventing the emergence of an economy suffering from a long-term structural labour surplus. One conclusion rising from this fact is that industrial wage-earners had adaptive expectations and strategies, and in order to prevent their children from the experience of poverty and layoffs they diminished their number. Or in other words the 1860s experience had as a result a change in the preferences of couples in what concerns their fertility patterns. The diminishing rates of demographic growth witnessed by the Catalan population and the new trend of employment growth after 1870 led to a new steady state that made possible the improvement of living standards after 1900 and the beginnings of the 20th century.

[42] See on the topic Yañez, C. (1988): "Cataluña: un caso de emigración temprana" in Sanchez Albornoz, N. (ed.) Españoles hacia America. La emigración en masa, 1880-1930, Madrid. Yañez documents the overseas nework migration patterns from the Catalan litoral that begin during the first half of the century.
[43] See O'Rourke and Williamson (1990).
[44] See the Spanish Population Census returns.

4. CONCLUSION.

In the last pages we have presented the underlying labour market forces that were under operation in 19th century Catalonia. When summarizing the existing literature we have stressed the fact that in Catalonia the common wisdom is that during the 19th century this region was following the English model of industrial growth. To conclude from this paper we can state that several factors avoid to present the Catalan industrial spurt as a failed initiative that followed the rules of the English model.

A first fact we want to stress is that after 1800 English textile industry grew on the bases of high levels of labour productivity and free trade policies. In Catalonia instead the transition to the factory system was done in spite of the fact that region did not have comparative advantage in mechanical production: during the 19th century a lack of natural endowments (coal) and very poor achievements in the field of health (life expectancies) and education (literacy) all seem to prove that Catalan population did not receive any positive feedback from economic growth and factory industrialization.

The scale of the production and number of mechanical machines installed in Catalonia witness a reality that was qualitatively different from the British just because of the enormous quantitative gaps observed between both regions in terms of the number of machines and industrial workers employed. Moreover: according to our estimations during the 19th century employment did not increase and the balance was the formation of a labour surpluses. On the one hand, the impact of mechanization had as a result the formation of labour savings. But more importantly the institutional family formation background was based on indivisible inheritance and it was causing a very quick process of proletarianization. In Europe this is a very singular case since in the parts of its geography where the Napoleonic wars took place the result was the adoption and assimilation of the Napoleonic code. Therefore when we look at the reasons why factory labour supply was growing we realize that the case under analysis is uncommon in Western Europe.

Last but not least, during the 19th century Catalan towns and cities had lower input of migrants than British cities and towns. The latter received migrants from Ireland and all the countryside. Or to put it in other words, while the British model meant that industrial towns and cities were pulling immigrants from manufacturing rural areas and

agrarian activities, the meanings of migration we are able to identify in the Catalan case are mainly caused by push factors. The latter were originated by the delocalization process that mechanization and the transition to the factory system involved at the regional level. This is a last fact that places the Catalan case far away from the English model, both in terms of scale factors and also in terms of scope factors. In spite of the fact that Catalonia was the first region in Spain experiencing an industrial spurt, in the Catalan case we miss a larger process of creative destruction and structural change that was visible in Britain and England and was absent in Spain and Catalonia.

TABLE 1

MACHINERY IN THE CATALAN COTTON TEXTILES SECTOR, 1830-1860

(in absolute numbers)

	1835	1841	1850	1861
Spinning:				
Manual spindles	691,949	315,162	183,778	7,366
Mechanical spindles	27,220	346,681	622,858	763,051
Total	719,169	661,843	806,636	770,417
Weaving:				
Manual looms	?	24,880	24,008	12,026
Mechanical looms	?	231	5,580	9,695
Total	?	25,111	29,588	21,721

Source: Nadal (1975)

TABLE 2. OCUPATIONAL MOBILITY DURING WORKER'S LIFETIMES.

Terrassa, 1845-1885.

	(1)		(2)		(3)		(4)		(5)		(6)		Total	
	N.	%	N.	%	N	%	N	%	N	%	N	%	N	%
(*)														
(1)	297	77	15	18	26	13	13	11	13	19	22	21	386	40
(2)	18	5	40	49	14	7	1	1	6	9	3	3	82	8
(3)	25	6	10	12	147	74	9	7	3	4	11	10	205	21
(4)	11	3	1	1	4	2	91	75	0	0	4	4	111	11
(5)	14	4	10	12	3	1	4	3	40	61	6	6	77	8
(6)	20	5	6	7	5	2	4	3	4	6	58	56	97	10
Total	385	100	82	100	199	100	122	100	66	100	104	100	958	100

(*) Sector of employment after 10 or 15 years.

(1) Textile workers.

(2) Entrepreneurs and owners.

(3) Agrarian workers.

(4) Craft workers.

(5) Trade and liberal professions.

(6) Construction, transport and services.

Source: Municipal censuses of Terrassa. Elaborated at Camps (1990, 1995)

TABLE 3. INTER-GENERATIONAL CHANGES IN THE OCCUPATION. TERRASSA AND INGUALADA 1830-1885.

	(1)		(2)		(3)		(4)		(5)		(6)		TOTAL	
(*)	N	%	N	%	N	%	N	%	N	%	N	%	N	%
(1)	407	79	65	42	252	41	87	35	43	43	65	36	919	40
(2)	20	4	64	41	19	3	9	3	8	8	6	3	126	8
(3)	15	3	7	4	237	39	7	3	4	4	15	8	285	21
(4)	31	6	2	1	33	5	115	46	4	4	13	7	198	11
(5)	23	4	7	4	21	3	27	11	34	34	9	5	121	8
(6)	20	4	9	6	50	8	6	2	7	7	72	40	164	10
TO	516	100	154	100	612	100	251	100	100	100	180	100	1813	100
%	40		8		21		13		7		11		100	

(*) Occupation of the son.

(1) Textile workers.

(2) Entrepreneurs and owners.

(3) Agrarian workers.

(4) Craft workers.

(5) Trade and Liberal Professions.

(6) Construction, transport and services.

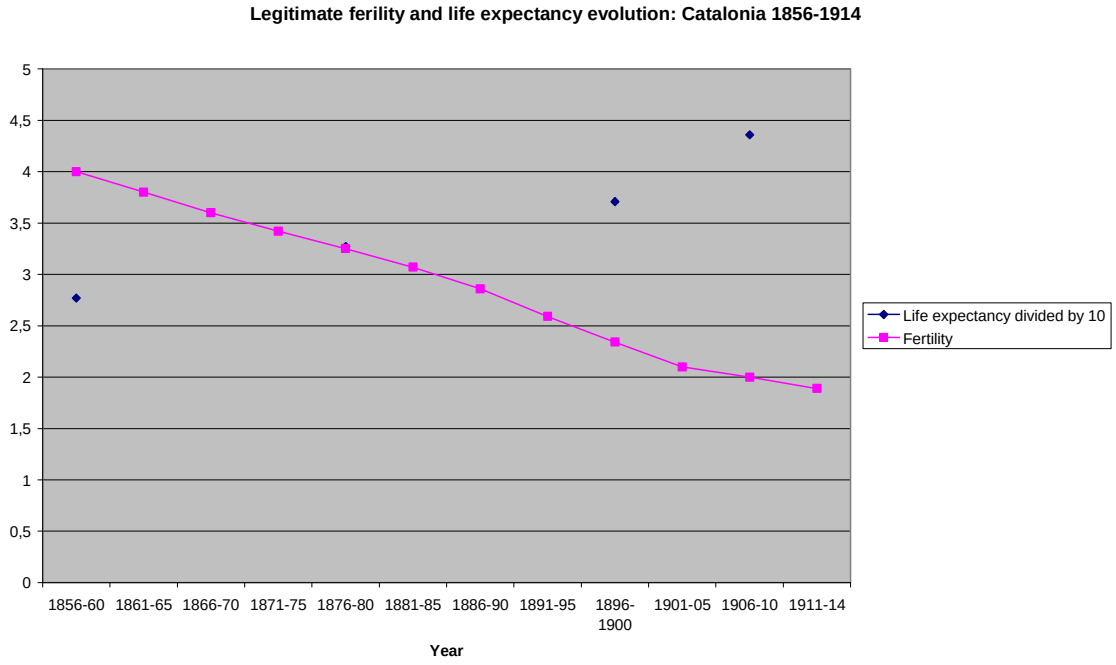
Source: Camps (1990, 1995).

TABLE 4. SUPPLY AND DEMAND FOR LABOUR IN THE COTTON TEXTILE SECTOR (1856-1905).

YEAR	EMPLOYMENT: MEN	EMPLOYMENT: WOMEN	EMPLOYMENT: CHILDREN	TOTAL	MALE LABOR SUPPLY WITHOUT MIGRATION	MALE LABOR SUPPLY WITH MIGRATION
1856-60	41,066	17,176	8,309	58,325	41,066	41,066
1861-65	25,300	10,350	3,067	38,717	41,959	41,959
1866-70	25,090	10,714	3,258	38,507	42,779	42,779
1871-75	29,094	13,089	4,103	46,286	43,639	43,639
1876-80	32,653	14,535	4,530	51,700	44,530	47,883
1881-85	39,666	17,538	5,444	57,748	45,427	48,869
1886-90	39,200	17,341	5,384	61,925	46,262	49,869
1891-95	35,920	16,556	5,257	57,733	47,055	50,660
1896-1900	43,579	19,204	5,949	68,732	47,805	53,825
1901-05	49,206	21,204	6,484	76,894	48,512	57,014

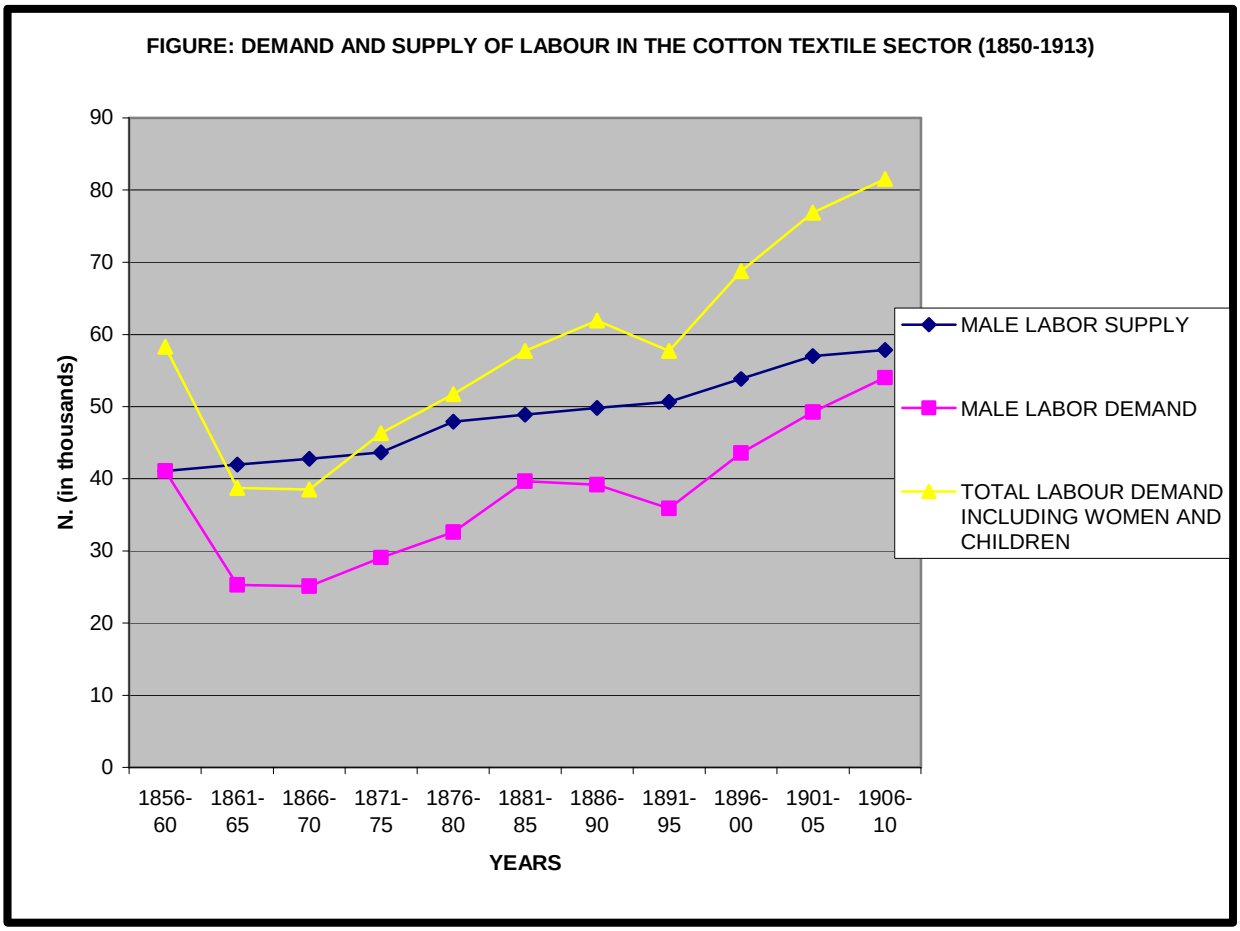
Source: Dta on employment are calculated according the methodology suggested by Barnusell, Camps, García-Balañà, Rosés (1994). For results on labour supply see the manuscript, part 3.

Figure 1.



Source: Anna Cabré, La reproducció de les generacions Catalanes, Barcelona, pp. 39 and 67.

FIGURE 2. SUPPLY AND DEMAND FOR LABOR IN THE CATALAN COTTON TEXTILES SECTOR.



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