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**EL TRABAJO DE MENORES EN LA MINERÍA ESPAÑOLA: 1860-1940****Miguel Á. Pérez de Perceval<sup>#</sup>, Ángel Pascual Martínez Soto<sup>•</sup> y Andrés Sánchez Picón<sup>\*</sup>**

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**RESUMEN**

Este texto analiza el empleo de menores en la minería española en su momento de mayor apogeo (época dorada). La fuente principal es la Estadística Minera oficial, que muestra que la mano de obra infantil se utilizó ampliamente en la geografía peninsular: una media del 14-17% del total de empleados de 1860 a 1920. Desde esta fecha, desciende de manera continuada y se sitúa en 1930 por debajo del 9%. Los cambios no son consecuencia directa de la legislación, cada vez más restrictiva desde 1900, sino que influyen elementos ligados a la organización de laboreo del trabajo minero. Además, hay un importante sesgo territorial, que hace que los distritos del sureste (especialmente las provincias de Murcia y Almería) tengan unos porcentajes muy elevados (30% de menores de media en la segunda mitad del s. XIX). En el texto se profundiza en los factores que determinan esta diferente distribución. Para ello se estudian tanto las peculiaridades del trabajo de menores como los factores que hay detrás del uso de esta mano de obra. Además, se ha utilizado la contabilidad de algunas minas de estas dos provincias para estudiar la evolución de los salarios infantiles, lo que proporciona mayor información para comprender los modelos de organización minera. Por último, se presenta un estudio de la época (década de 1870) que mide en esta zona la contribución a la economía familiar de los niños mineros, muy en consonancia con lo estudiado para los distritos industriales ingleses y americanos del s. XIX.

**Palabras clave:** Trabajo infantil, minería española, legislación laboral, salarios mineros.

**ABSTRACT**

This paper analyses the employment of children in the Spanish mining sector at the highest point of its history (golden age). The main source used is Spain's official Mining Statistics that show that child labour was widely used throughout the Spanish peninsula: an average of 14-17% of total workers between 1860 and 1920. Subsequently, the incidence of child labour reduced steadily and by 1930 had fallen to below 9%. The changes were not a direct result of the legislation that had become increasingly restrictive since 1900, but were brought about by factors related to the organisation of the different activities involved in mining. Furthermore, there was a significant territorial bias whereby south-eastern areas (particularly the provinces of Murcia and Almeria) were characterised by very high levels of child labour (an average of 30% in the second half of the nineteenth century). The paper examines the factors that determine this different distribution, analysing both the specific aspects of child labour and the reasons for using this type of workforce. In addition, the accounts of some of the mines in these two provinces have been used in order to study the evolution of child wages which provides further information to help us understand the mining organisation models. Finally, a case study from the 1870s is presented which measures the contribution that the mining children made to the family economy, with results remarkably similar to those of studies of English and American industrial districts in the nineteenth century.

**Keywords:** Spanish mining; labour legislation; mining wages.

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# **CHILD AND YOUTH LABOUR IN THE SPANISH**

## **MINING SECTOR: 1860-1940**<sup>°</sup>

### **An overview**

Although child labour did not arise with the nineteenth century industrialisation process, when we think of this concept in European economic and social history we recall images of children employed in British mines or textile factories in the early days of the Industrial Revolution. As Arenas points out (2003: 29-32), Hammond and Hammond (1930), pioneers in British social history of the first third of the twentieth century, had already identified child labour as the most characteristic feature of the Industrial Revolution.

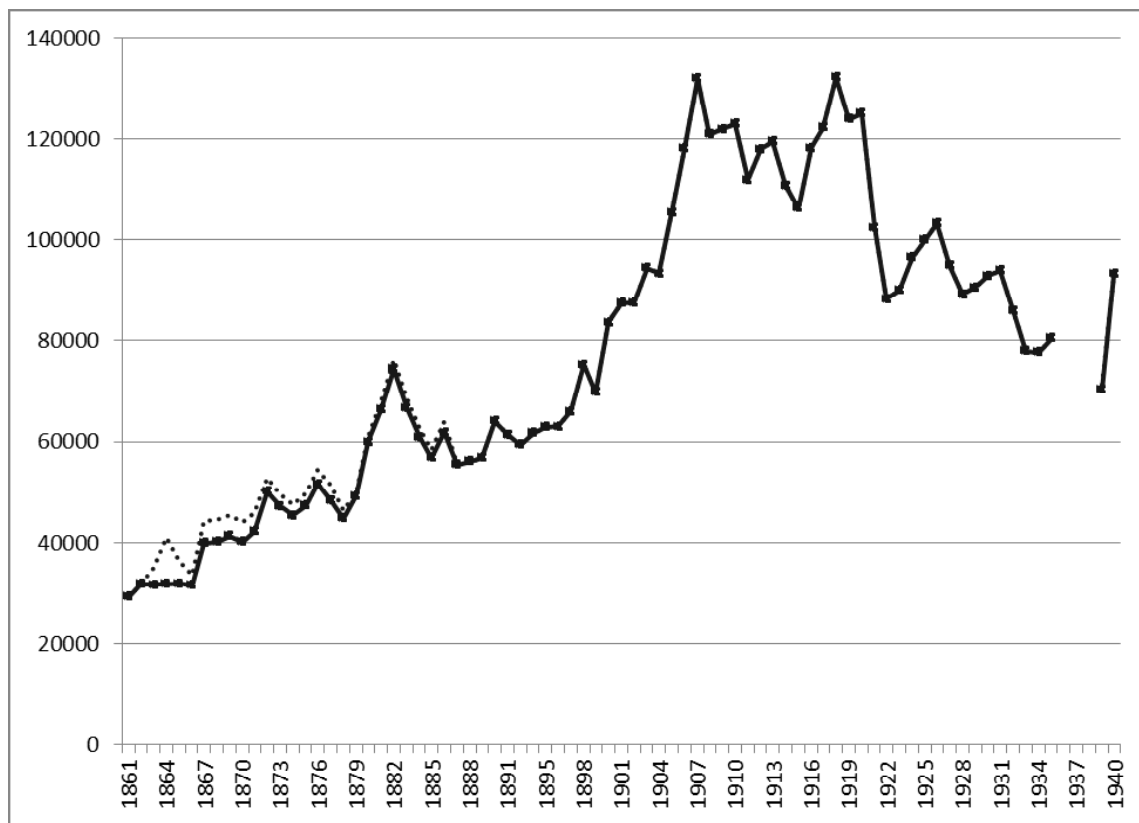
In Spain, the expansion of the mining sector in the nineteenth century was related to the increase in demand for mineral raw materials by European industry. In technological and energy terms, during that century, the extraction of underground resources was essentially organic; that is, it was based on the mass use of human and animal muscle power for the extraction, preparation and transport of the minerals. For the first three-quarters of the century, the incipient and partial mechanisation of mining tasks was limited to drainage in some of the larger mining sites (Sánchez Picón, 2001). The emergence of the railway as a result of the demand by Spanish mines for transport did not take place until the last quarter of the nineteenth century. The expansion of the large-scale and widespread mechanisation of mining activities did not begin until the 1890s, and was conducted alongside very rudimentary working systems.

The official statistics reveal that the workforce employed in the Spanish mining sector increased from 40,000 workers in 1866 to almost 120,000 in 1914, just before the First World War, which marked an inflection in the evolution of the sector. The average annual growth rate corresponding to this increase was 2.3% with significant differences between the different mining sectors: while the number of workers employed in iron ore mines increased at a rate of 5.2% per year and in coal and copper mines at more than 3.5%, in lead mines employment increased at a rate of only 0.8% throughout these fifty years.

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**Graph 1. Workers employed in the Spanish mining sector, 1861-1940\***



Source: Mining and Metallurgic Statistics, 1861-1940.

(\*) The dotted line represents the total number of workers in producing mines together with those who were engaged in activities that did not generate products, research and other preparatory jobs. Until 1886 these figures were represented separately. After this year a single figure was given for all workers.

This disparate behaviour points to two circumstances which were decisive in the organisation of labour markets in the Spanish mining sector throughout the nineteenth century. The first is the different chronology of the expansion of the Spanish mining industry: during the first fifty years after the law was passed to liberalise the sector in 1825 the expansion corresponded mainly to lead mining. This expansion then extended to the new mining specialities in the last quarter of the century (mainly iron ore, pyrites and coal). The second circumstance is the geographical disparity in the Spanish mining sector: lead in the southeast of the peninsula (Gador and Almagrera in the province of Almeria; Cartagena-la Union and Mazarron in the province of Murcia; and Linares-La Carolina in the province of Jaen); pyrites in the southwest of Andalusia; iron ore in Biscay which drifted towards the Penibetica mountain range at the beginning of the twentieth century; and coal, mainly in Asturias and Leon.

This chronological difference meant that lead mining in the south of Spain was relatively mature in the 1860s, which is the date from when official data is available in terms

of the working population. Lead mining therefore experienced its highest point earlier than the boom of the rest of the sector, which is why the growth in the workforce in this subsector did not grow as spectacularly as that of Spain as a whole between the 1870s and the 1900s.

In this paper we will first describe the overall evolution and distribution of child labour in the Spanish mining sector during the period. To do this we will analyse both the overall development of this workforce and that of the main basins and the most relevant minerals. Then we will focus on the two provinces with the highest incidence of youth and child labour: Almeria and Murcia. We will base this analysis on the official statistical information regarding employment and wages of a selection of mines and a study of family income during the period under study.

### **Evolution of child labour in the Spanish peninsula**

Child labour was extensively used in the Spanish mining industry in the nineteenth century and the first half of the twentieth century. There was a greater or lesser incidence of this type of labour depending on the region and the influence of a diverse series of factors. As Borrás and Cohen point out “it is difficult to understand child labour without contemplating the complex relationships between strategies of family economy and business strategies” (Borrás and Cohen, 1990: 57). Within this context and with the help of the employment figures of this segment of mine workers we will study its relevance in the mines in the Spanish peninsula.

To do this we will use the main source of this sector, the Mining and Metallurgic Statistics which has been published annually since 1861 and provide a basis for estimating the historical dimensions of the industry. Other authors have already identified the problems inherent in these figures so it is unnecessary to repeat them here. Suffice to say that it is important to be cautious when evaluating the data that has been obtained from these statistics<sup>1</sup>. In our case, for the period under analysis, we have processed all of the information

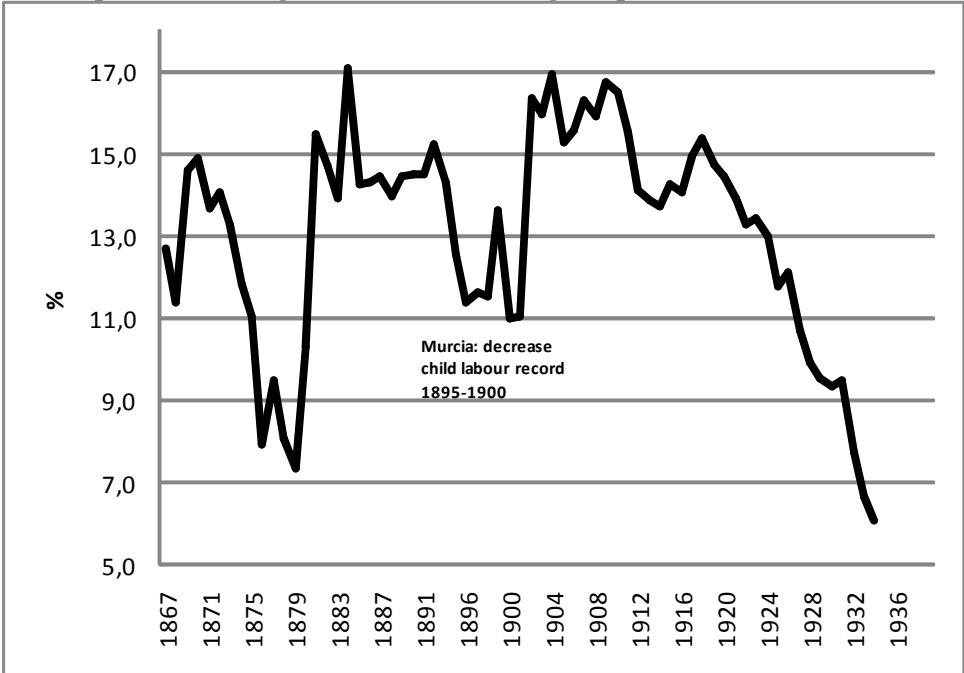
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<sup>1</sup> There is much criticism regarding the content of the figures of the mining statistics as a whole and the section related to the workforce. We do not consider it necessary to go into greater detail on this issue as it would unnecessarily lengthen the paper and has already been addressed by different authors including: Chastagnaret (2000), Instituto Tecnológico Geominero de España (1991), Pérez de Perceval and Sánchez Picón (2005). It is worth mentioning that the relative consistency of the figures limits the capacity to operate and carry out a study with a more complex statistical apparatus. With this base and pending a more detailed reconstruction of the Spanish figures, we seek to provide an overall view of the distribution of this type of labour throughout the period studied.

contained in this source related to labour; therefore our study constitutes the most complete analysis of Mining Statistics to have been carried out to date<sup>2</sup>.

With respect to the information drawn from the mining statistics: from 1867-68 to 1939 there is data available regarding the workforce employed organised by sex and age. There are variations in the data presented in this period: until 1901 the figures are divided into three blocks: men, women and boys. From 1902, men and women were divided into three age groups: from 10 to 16, from 16 to 18 and over 18. The figures corresponding to men were also divided by place of work: interior (where the minimum age allowed was 16 years; so there is only one group for children) and exterior. From 1909 the age of the first group of exterior workers was raised to 14-16, and was eliminated in 1916 in accordance with legislative changes<sup>3</sup>.

**Graph 2. Percentage of children working in Spanish mines, 1867-1939**



Source: Mining and Metallurgic Statistics 1867-1939

<sup>2</sup> Borrás and Cohen (1990) present figures of total child and youth labour in lead, zinc, quicksilver, iron ore, pyrites and sulphur mines together with figures on productivity and mechanisation. Sánchez Picón and Pérez de Perceval (1999) analysed the workforce in the industry between 1868 and 1900 for the principal minerals and basins, with a study of the mining registry of 1891. Pérez de Perceval and Sánchez Picón (2005) extended the period of study to 1940, but also processing only the information of the main mining inventories. In our case, all of the information regarding labour on these statistics between 1861 and 1940 has been mechanised.

<sup>3</sup> The problem that usually arises is how to consider the so-called “youths” and how to unify the data in order to produce a long series of child and youth labour. We have used the total number of children (“youths” first and under-18s, boys and girls when the age is specified) and we have related this to the total workforce. Furthermore, this grouping was used by the official statistics for the late 1920s. Another grouping could have been applied (for example Borrás and Cohen use the quotient of children and the male workforce), but the results obtained would be very similar.

First, we will describe the overall evolution of child and youth labour which is illustrated in Graph 2. As we can observe, there are two large fluctuations which can be perfectly related to defects in the information gathered in these years, as some provinces which used a significant volume of child labour during the period did not provided data. If we do not contemplate these alterations, we can establish in overall terms that in Spain the percentage of children employed in the mines between the 1860s and the end of the First World War was between 14% and 17% of the total workforce (particularly from the beginning of the twentieth century<sup>4</sup>). The ratio of children did not begin to fall significantly until well into the twentieth century.

From 1919, there was a continuous reduction in the percentages, falling to 9% of total employees in the 1930s. The decrease in these problematic years reflects a change in the situation and also the traditional organisation of labour in Spanish mines which we will explain below. We should also take into account the factors pertaining to the mining areas which most used this type of labour.

To do this we conducted the following exercise: we eliminated the amounts for Almeria and Murcia (as well as Albacete<sup>5</sup>), the two provinces with the highest incidence of child labour and which, as we shall see, distort the total measurements of this variable. The situation which we are left with, as we can see in Graph 3, is similar: the ratio remained stable until 1919 after which it fell rapidly but with slightly lower percentages. Now the average from the 1860s to the end of the First World War fluctuated between approximately 10 and 14% of total workers<sup>6</sup>, a figure that more accurately reflects the overall situation of the basins.

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<sup>4</sup> The evolution of Spanish legislation regarding children working in mines can be contemplated in Pérez de Perceval and Sánchez Picón (2005), Cohen (2002) and Ramas (2001).

<sup>5</sup> Albacete is included not because of its high relevance in this section but because of the importance of the mineral extracted in the mines there in which the highest rate of child labour was used; sulphur. Furthermore, its location fits perfectly with the series of provinces in the southeast.

<sup>6</sup> In this bracket we have compensated for the falls in the percentages of children due to the absence of or defectuous collection of information regarding this workforce.

**Graph 3. Percentage of children employed in Spanish mines, 1868-1939, without including Murcia, Almeria and Albacete**



Source: Mining and Metallurgic Statistics 1868-1939.

### *Evolution by province*

As we can see in Graph 4, the evolution of child labour in terms of the different mining specialisations and the situation of the different provinces was highly variable. The cases of Almeria and Murcia are particularly noteworthy with a higher percentage of child labour. These are the two provinces which, in the Spanish mining sector, were traditionally characterised by an extreme subdivision of activities, a predominance of underground extraction and a unique business organisation. When contemplating the figures herein presented, the problems encountered by those responsible for drawing up the official statistics tables for these provinces should be taken into account. They found it enormously difficult to find reliable information due to the large amount of concessions and the high incidence of concealment. The Mining Statistics reports for Murcia, for example, at the end of the nineteenth century specifically state that it was impossible to obtain acceptable results from the mines and that the statistical reports contained estimates made by the administrative personnel of the district.

Broadly speaking, it can be said that in Almeria and Murcia the percentage of children and youths working in the mines during the second half of the nineteenth century accounted

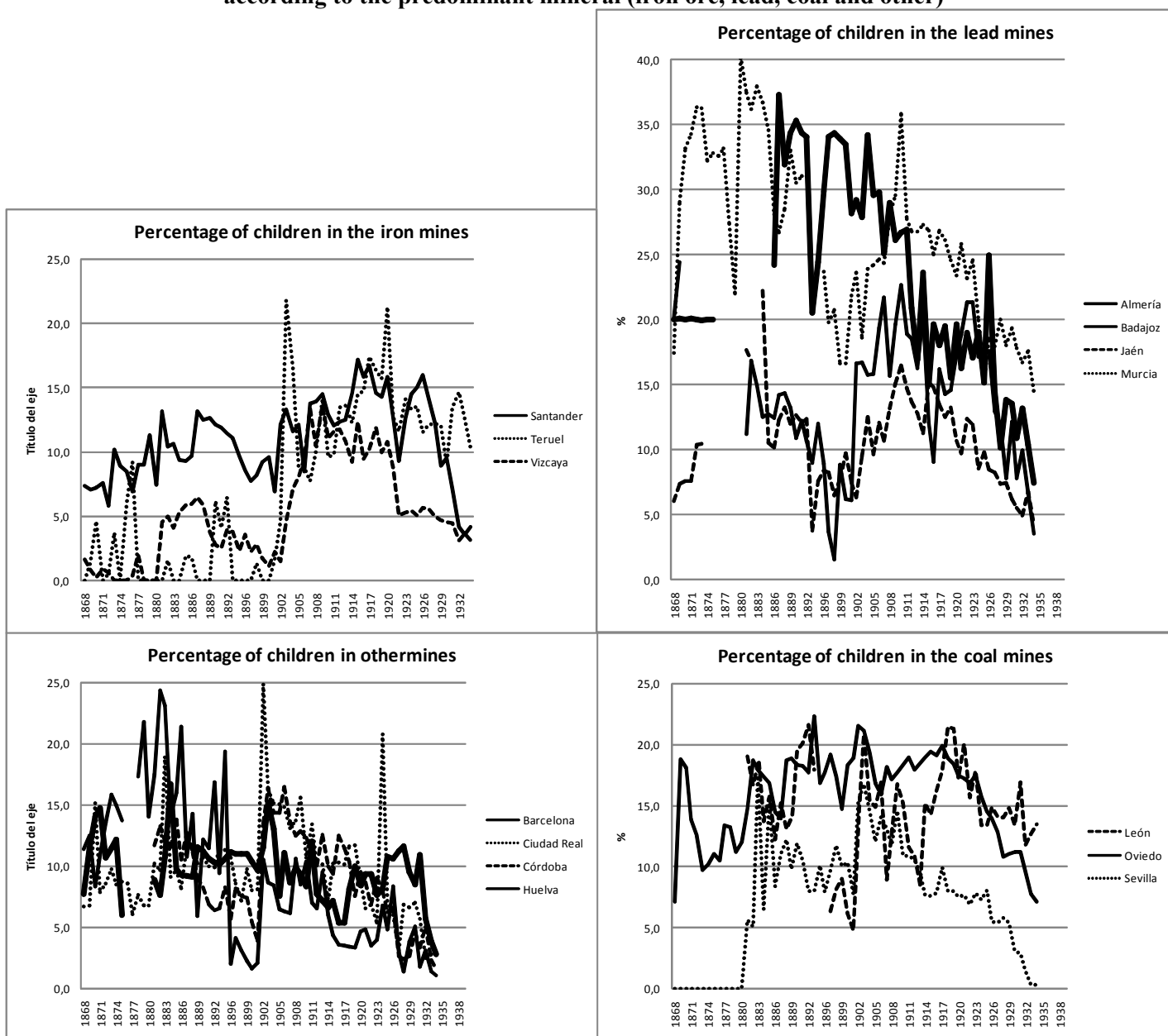


for around one third of the total work of their concessions, which was more than twice the national average. The interpretation of these figures is partly obvious: in the case of Southeast Spain, the use of this workforce segment constituted a fundamental element of the work process, and the significance of child labour was related to elements of production and to unique characteristics of labour relations.

Bearing in mind the weakness of the figures, the employment of children in the Spanish mining industry remained high until the beginning of the twentieth century when it began to fall before those of the national averages. At the end of the first decade of the twentieth century it seems that the ratio of child workers had begun to decrease (first in Almeria and then in Murcia) before the inflection in the curve of the national totals and with a considerable difference with respect to what was occurring in the main coal and ferrous mining basins.

The decrease in child labour was high in absolute and relative terms, and by the 1930s the percentage corresponding to Almeria had lowered almost to the national average. As we can see in the two tables of national averages (with and without the southeast), for this final phase there are hardly any differences between them, which shows that they had limited influence on the Spanish totals. On the other hand, some ferrous metal and coal mine basins (Teruel, Leon and in part, Asturias) exceeded Almeria in these years in the percentages of child labour and were closer to the values of Murcia.

**Graph 4. Percentage of children employed in mining activities in different provinces grouped according to the predominant mineral (iron ore, lead, coal and other)**



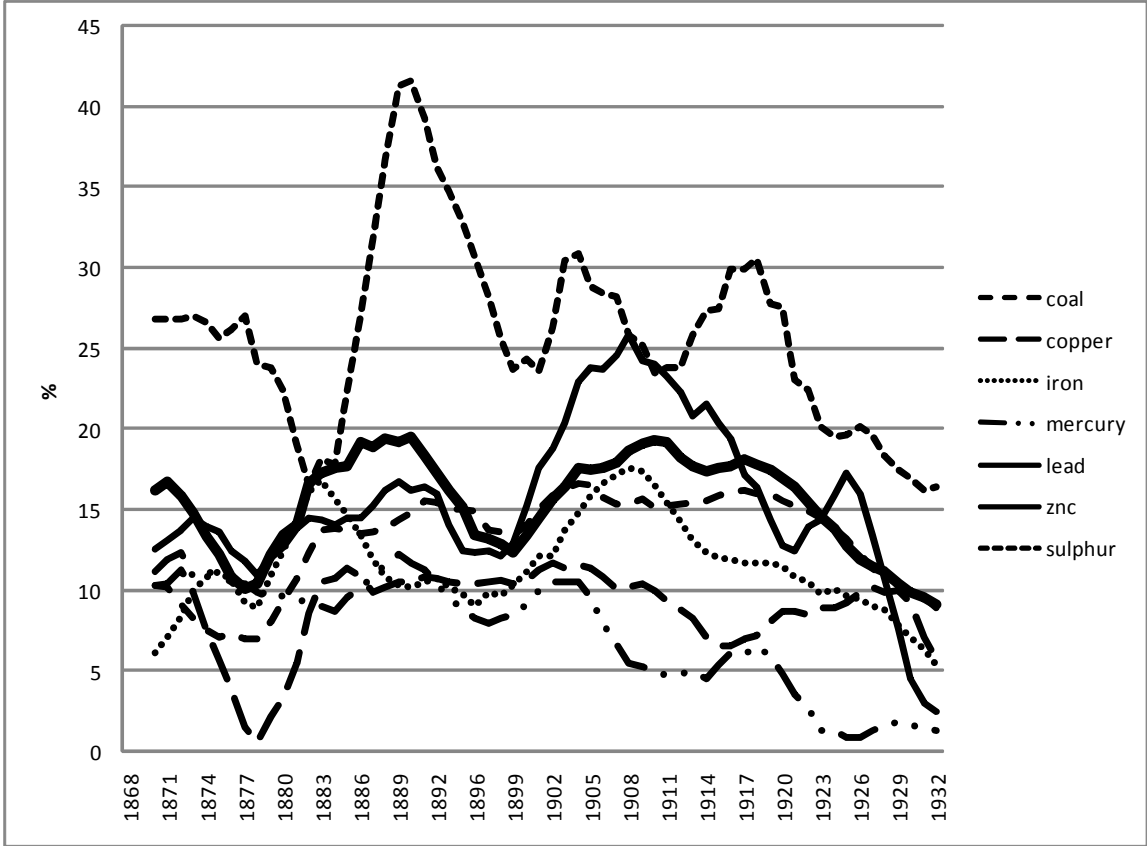
Source: Mining and Metallurgic Statistics 1868-1935

### *Characteristics of the mining activities of the principal minerals*

In the same way as we have compared the national totals, we have also created two tables for the most relevant minerals, with and without the south-eastern provinces. We considered it appropriate to smooth the lines with moving averages given the high volatility of the figures drawn from the mining statistics. In general terms, while in Graph 5 the percentages range between 2% and 30% (with a peak at 42% in sulphur at the end of the 1880s), in Graph 6 (which excludes the two above-mentioned provinces) the percentages

oscillate between 2 and 23%. If we exclude sulphur (which is a secondary mining product in Spain) and zinc, the differences between the minerals are lower both when the south-eastern provinces are eliminated and when they are included and on many occasions the percentages overlap.

**Graph 5. Percentage of children per mineral 1868-1935, five-year moving averages.**

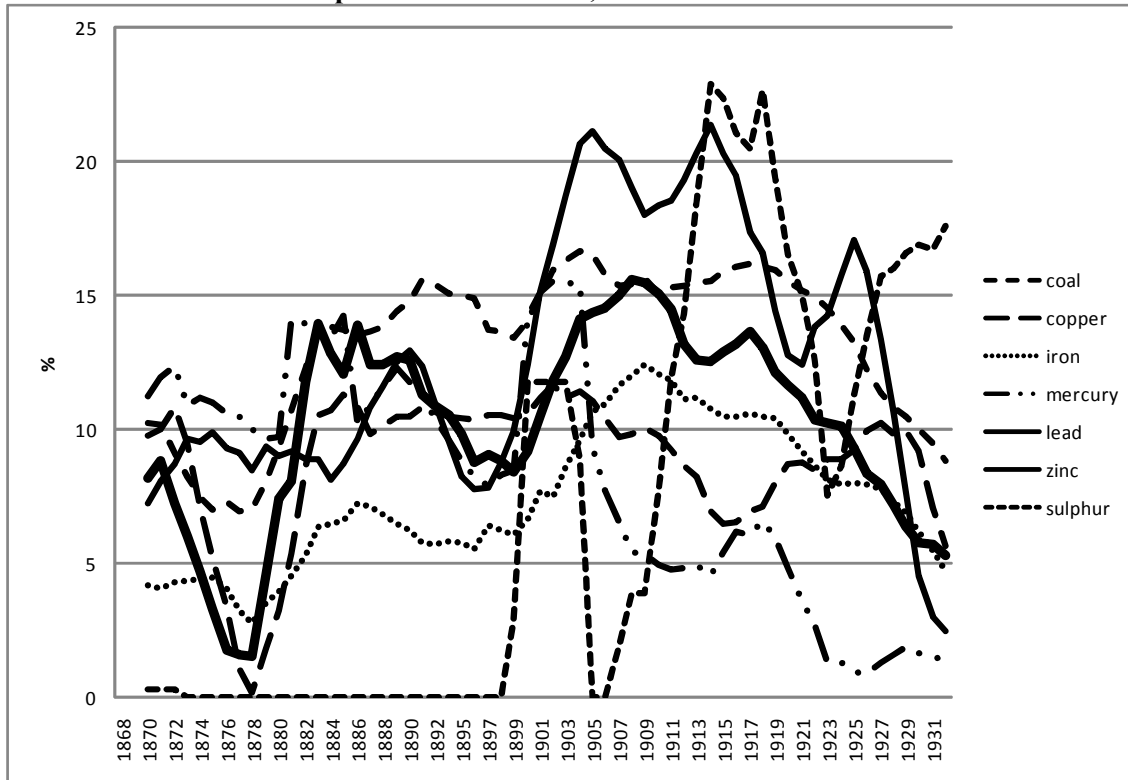


Source: Mining and Metallurgic Statistics 1868-1935

These data lead us to question which types of minerals do not constitute a relevant factor when establishing differences in child labour. If we calculate the average child employment percentages for the whole period analysed (excluding the three provinces), the results are: coal 13.5%; copper 9.2%; iron ore 8.4%; mercury 8.6%; lead 10.6%; zinc 13.2%; sulphur 22.9%<sup>7</sup>. Except for sulphur which clearly behaves differently, the rest of the minerals move within similar parameters. In this way, it seems that we can confirm the relevance of minerals, as opposed to other factors, in the use of children in the mines.

<sup>7</sup> If we obtain the averages of the annual percentages, the result would be as follows: coal 12.9; copper 8.6; iron ore 7.2; mercury 8.0; lead 9.9; zinc 12.0; sulphur 8.4. All of the values fall slightly except sulphur, which falls significantly. The reason is that for many years there were no figures available corresponding to child employment which makes the average percentage fall. In any event, sulphur requires a specific analysis.

**Graph 6. Percentage of children per mineral 1868-1935, five-year moving averages, without the provinces of Murcia, Almeria and Albacete.**



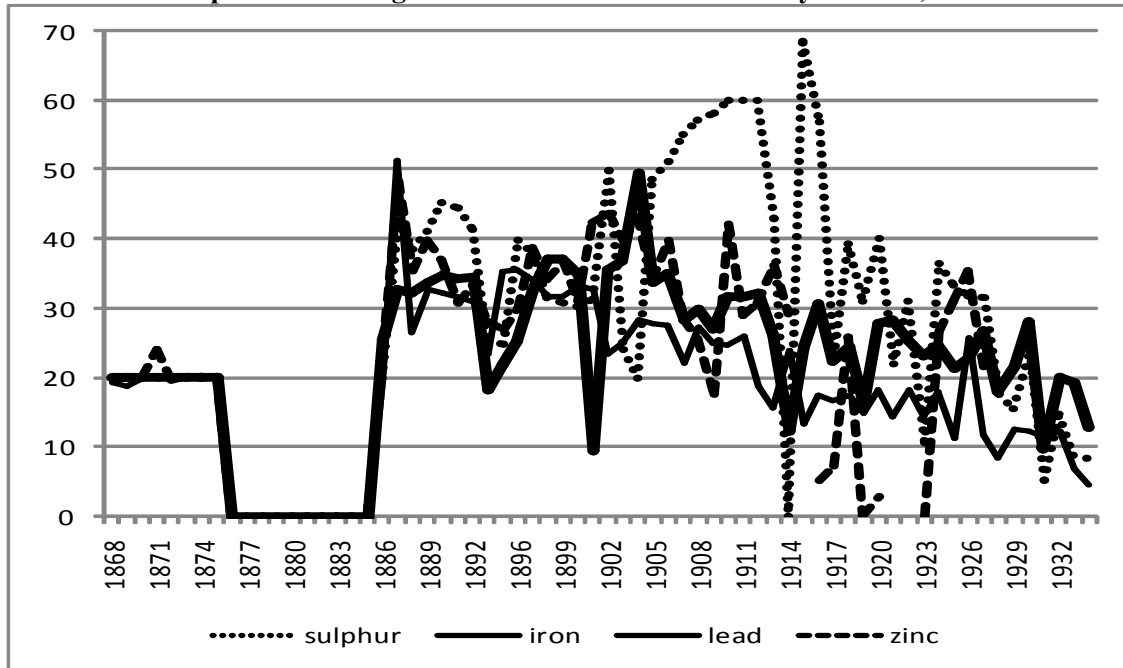
Source: Mining and Metallurgic Statistics 1868-1935

If we analyse the distribution by mineral, in the provinces with the highest incidence of child labour, namely Almeria and Murcia, which we have represented in Graphs 7 and 8, we can observe that there are no significant differences between the different minerals extracted. In the case of Murcia, we should take into account that the extraction of lead, iron ore and zinc was largely carried out in the concessions or the mining basins<sup>8</sup>, with the sharing of companies and labour, so the differences are small. However, for most of the period, the figures do not contemplate sulphur independently which was extracted separately.

The evolution in the case of Almeria cannot be studied before the end of the 1880s as there are many gaps in the statistical data. From this date, the percentage of child workers behaves similarly to that of Murcia with little differences between minerals (except sulphur). We should note that in Almeria there was a large difference between lead, iron ore and zinc with respect to the companies, the origin of the investment, extraction techniques and location (Sánchez Picón, 1983; Pérez de Perceval; 1989). However, this did not produce a divergence in the ratio of children which was highly similar, as we can see in Graph 7.

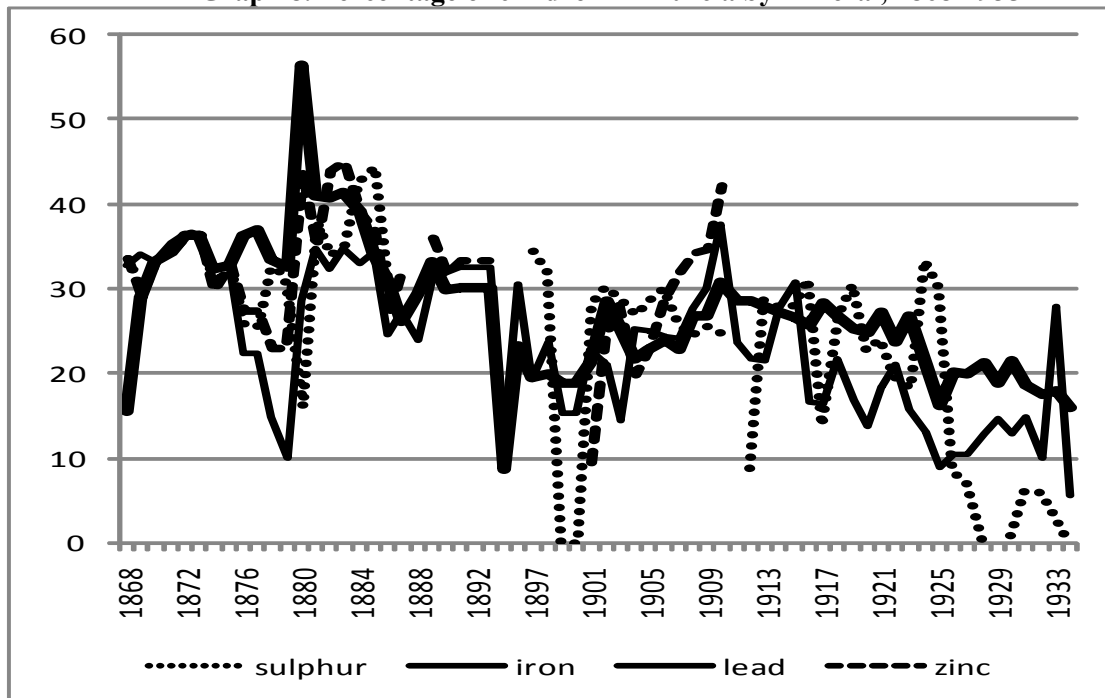
<sup>8</sup> Even in the case of zinc there are many years for which there are no figures corresponding to the workforce which, as specified in the mining statistics, were drawn from the lead concessions.

**Graph 7. Percentage of child workers in Almeria by mineral, 1868-1935**



Source: Mining and Metallurgic Statistics 1868-1935

**Graph 8. Percentage of children in Murcia by mineral, 1868-1935**



Source: Mining and Metallurgic Statistics 1868-1935.

The data reveal the essentially territorial nature of how the mining activities were organised, as we mentioned at the beginning of this section. There was a differentiated evolution of the mining basins related to the work organisation characteristics which depended on a series of factors such as the historical evolution, special features of the

business organisation, the type of investment and business concentration, the workforce and mining labour markets, etc. This structure meant that each of the different mining activities had their own individual mark.

### **Ages and conditions of child labour in the mining sector in Southeast Spain**

In Almeria and Murcia the widespread use of child labour was related to the structure of the labour market which adapted to the special characteristics of the mining activities in Southeast Spain (Martínez Soto, Pérez de Perceval and Sánchez Picón, 2008). The crisis in the traditional mining sector caused the reduction in the percentage of children employed in the industry before other areas, as we have already commented.

The mining boom which began first in the Gador mountain range (1820s), then continued in the Almagrera mountain range (from the end of the 1830s) and extended in the 1840s to the basins of Murcia, particularly the Cartagena-La Union mountain range, generated an increase in the demand for labour which was unprecedented in the sector. The almost exclusive supply source of labour was the population of the area, with a noteworthy contribution from the impoverished province of Almeria, which is reflected in the migratory flows between this province and its neighbour, Jaen (Martínez Soto, Pérez de Perceval and Sánchez Picón, 2008). These types of mines, which used mainly internal extraction methods, required workers who were used to working underground and who had knowledge of the techniques used, which implied a certain degree of specialisation. So, on the contrary to open-cast mines which used unskilled labourers (for example, in Biscay), a specific and specialised labour market was formed.

The demand for labour in the mining industry coincided with the demand for agricultural workers, so the new activity mixed with the traditional activity of these areas, generating a dual worker who did not sever his ties with the rural world. On different occasions throughout the nineteenth century, landowners and farmers united in order to combat this competition, calling for measures such as the paralysation of mining activities during the harvest season, such as the request made by the City Council of Murcia to the Governor in 1840<sup>9</sup>.

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<sup>9</sup> *Boletín Oficial de la Provincia de Murcia*, 9-VII-1840. "...it is ordered that the mining activities are suspended during the harvesting of the fruits in the fields so that agriculture is not harmed by a lack of workers employed in them" [own translation] It was not an isolated case but one which was repeated in other places. For example, in Almeria in 1830, on the suggestion of the Chief Engineer of the District, the mines of the Gador mountain range

The mines were highly labour intensive. They were faced with growing competition and lowering prices and the minerals were to be found increasingly deeper in the ground with less and less metal content. They were also confined to ownership and business structures that obstructed technological renovation and the adoption of more modern extraction methods. Therefore, the feasibility of these types of mines was mainly related to the remuneration of the work which was continuously squeezed in order for the mines to remain competitive.

In order to overcome the resistance of the miners other sources of labour were sought. The miners in Murcia went on strike in 1841 demanding a wage increase. The companies responded by threatening to resort to employing the inmates of the Cartagena prison in order to continue operations<sup>10</sup>. This request was not unique. The Economic Society of the Friends of the Country of Cartagena assembled the support of the City Council in 1866 in order to be able to use forced labour for the hardest tasks in the mines and foundries<sup>11</sup>.

The supply of labour was a key concern of the mining sector in Southeast Spain. Therefore, the mining societies employed recruiters who were responsible for ensuring a flow of workers. Furthermore, they developed indirect forms of employment and controlling work (“parties”, teams, etc.). This is the case of child labour, which was not simply an exploitation of this kind of workforce, but constituted a further piece in the whole process of maintaining and increasing the workforce. The income of the children completed a theoretical “family wage”, compensating the low remuneration and contributing to the sustenance of the domestic unit. On the other hand, the work performed by the children in the mines became a type of “miner’s school”: preparation working inside the mines, training for a mining specialisation

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were paralysed for a few months in order to reduce production and provide workers for agricultural activities (Pérez de Perceval 1989:34-35).

<sup>10</sup> *Boletín de Minas*, 25-XI-1841: “those who work in the mines earn 6 or 7 reales for lazing about for three-quarters of the day and when they are offered piecework they earn less than 10 to 20 reales. These people’s perfidy cannot be regarded with indifference and we do not see why the companies of San Ginés should not meet with the government to negotiate the use of inmates from the nearby prison in Cartagena in the mines. This would save the companies some money and also the government the bread that some men eat who contributed nothing to the State that maintains them” [own translation]. The Government reserved the prisoners for their own purposes, fundamentally for public works and occasionally lent them to local councils to use them to mend roads but never to private individuals. The regulations issued in 1865 by the National Prison Administration regarding the reduction of sentences in exchange for labour enabled this kind of workforce to exist in the labour market.

<sup>11</sup> Archive of the Economic Society of Friends of the Country of Cartagena, Libro Copiador de Correspondencia (book of correspondence), 1864-1868, page 20 v-21 r., putting prison inmates to work was justified as follows: “...because the mines and their offices are not overstaffed but on the contrary complain constantly of the lack of workers, whose daily wage is, consequently expensive, and is detrimental to the agricultural activities especially during the sowing and harvesting seasons. Therefore the recruitment of a few hundred prisoners would, although never entirely, help to achieve a balance and reasonable proportion between the number of hands and the needs of the mining tasks. This is even more the case if we take into account the constant law that leads industry to extend its field of operations when it finds the means to do so. Both in mining and metallurgy many works are not carried out because of a lack of free labourers. These activities could be performed by prison inmates for an economic payment who would benefit materially and morally” [own translation].

and even the development of the so-called “peculiar mining culture”<sup>12</sup>. In this way, the workforce was increased in an activity in which the main supply sources consisted in the miners’ children. These elements formed part of a strategy of the mine owners to manage labour that implied: the retention of the workforce, indoctrination, training within the “teams”, etc. Furthermore, it provided flexibility which adapted to the needs of the small mining companies of this part of the peninsula and which enabled them to adjust to the randomness of the labour system and the fluctuations of the metal markets.

The engineer Belmar (1885:76-77) describes child labour in the following way:

Children are employed in the mines, both for external and internal tasks during the day and at night. And, they are the best auxiliary workers in all services. In the internal transport of minerals from the cuts to the main galleries or to the cross cuts, their work is so remarkable that it is admired by fellow miners and outsiders alike.

Long lines of boys called ore-bearers ran with astonishing agility along the ramps and galleries, carrying a load of approximately 20kg of minerals on their backs. Several scholars analysed the work carried out by the children in this transport task (Mesa, 1889-90:308 and 355; Belmar, 1885; Verón García, 1903:34-36), calculating that they could do an average of 90 trips (of a distance of 100 m with the above-mentioned load) each working day (about 10 hours). This data shows that the useful work performed by a child between 10 and 15 years of age in a day was the transport of a weight of 1,800 kg of mineral along a distance of 100 metres. As pointed out by the engineer Belmar, a man would not transport more, even if he carried a heavier load, because this difference was compensated for “by far by the agility characteristic of youth”<sup>13</sup>.

The groups of children that worked in the mines were given different names depending on the different mining areas: ore-bearers, carriers, apprentices, auxiliaries, etc. They worked in external activities (washing minerals<sup>14</sup>, sieving, extraction, fillings and

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<sup>12</sup> In this respect, Cohen (2002) and Sierra (1990:117). Marvá (1910:97) pointed out: “...Although it seems as though there is unanimity with respect to the need to regulate child labour, is a complete ban of this kind of labour in the mines equally justified? Excluding children from underground work does not seem to be justified: it is essential that these workers become accustomed to this type of work, there is a learning process involved because it is not easy to improvise a mining worker. A period of time must be spent at the bottom of the mine for these workers to get used to the work and become good miners” [own translation].

<sup>13</sup> Belmar (1885:77), who also described the effects of this work on the health and development of these children.

<sup>14</sup> Sanz, Salillas and Pujol (1904:15). In the mines of Biscay this work was classified as gruelling: “...” the children’s work in the mechanical wash plant is more tolerable; as although it is not as hard in terms of physical effort, it is more gruelling due to the working conditions, because the child has to remain on his feet and still all



transport) and internal activities (carriage and transport of minerals<sup>15</sup> to the wagons or extraction points). They worked the same hours as the adults and also worked night shifts<sup>16</sup>.

As we have already mentioned, mining in Southeast Spain required a certain degree of specialisation. This is evident in the division of the work into categories, each with its own weight within the activity of extracting and preparing the minerals. From the accounting records of some of the mines in the area, we have been able to reconstruct the composition of the workforces and their distribution among the different categories and ascertain the corresponding wages<sup>17</sup>.

**Table 1. Types of working categories in the two mines in Murcia (Mazarron and La Union), 1879-1938**

Panel A. Fuensanta (Mazarron), 1894-1938

Interior	Exterior						
	General	Extraction	Workshop	Transport	Wash plant	Separation	Miscellaneous
- Foreman tasks - Overseer. - Loaders - Onsetter - Wagon operator - Faceworker - Stone crusher - Labourer <b>-Ore-bearers (children)</b>	- Supervisor - Guard	-Machine operator - Stoker - Destoner	- Forger - Carpenter	-Lever operator -Wagon operator	-Engine operator -Engine assistant - Greaser -Master ore washer - Labourer <b>-Ore-bearers (children)</b>	-Separator -Stonecutter - Labourer <b>-Ore-bearers (children)</b>	-Errand boy -Basket makers - Woodcutter - Truck drivers

Source: Wage books of the Fuensanta Mine in Mazarron 1894-1938. There were also administrative and management tasks and other categories such as: Engineer, Engineer's Assistant, Inspector, clerk.

day with constantly wet hands. In winter he needs to warm them on bonfires and stoves every ten or twelve minutes so they do not freeze”.

<sup>15</sup> Naranjo de la Garza (1893:177): “...the main service that they [the children] provide is in the interior, transporting soil usually in panniers on their shoulders. The work is gruelling because the load is heavy, strenuous, the distances are sometimes long, with winding galleries that are sometimes very narrow and with ramps and other types of uneven terrain. There is almost always water on the level of the mine, often half a rod in height, sometimes with mud, others with uneven and sharp stones and boards, nails, rails, etc. Furthermore, the only source of light comes from oil lamps which the children do not usually carry but for long distances three or four are spaced along the route... The boys who carry out this activity are called “paseantes”.

<sup>16</sup> Sanz, Salillas and Pujol (1904:15) comment in relation to the mines in Biscay “when we asked several youths between the ages of ten and sixteen who worked in the extraction of the mineral and in the wash plant they unanimously replied that they worked for ten and a half hours and thirteen in the summer which is the same as the adult labourers”[own translation]. Marvá (1910:97): “In Spain anyone under the age of sixteen is prohibited from working underground; however their working hours are not limited and they are not exempt from working at night”. [own translation]

<sup>17</sup> We have consulted the wage books of the two largest mines of Murcia that operated from the last third of the twentieth century until 1938: The Fuensanta mine in Mazarron (1894-1938), whose records can be found in the Municipal Archive of Mazarron, and the Remunerada mine of La Union (1875-1935), the documents of which were kindly lent to us by Mr. José Gerardo Vélez. These sources have provided highly valuable data regarding employment, working hours, tasks and remuneration of the child/youth workforce. For the case of Almeria we have used the Wage books of the Santa Isabel and San Antonio mines (1905 y 1906) and the Patrocinio mine (1894-1916), located in the Almagrera mountain range

Panel B. Payroll of La Union Mine, 1879-1935

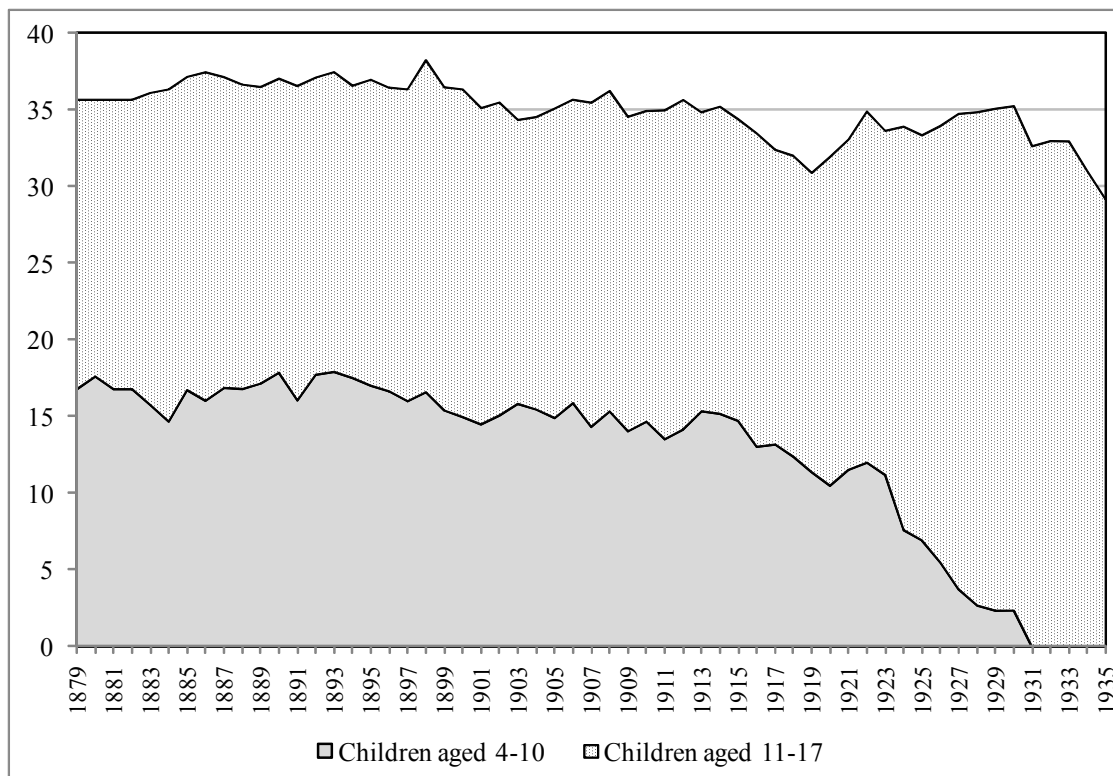
INTERIOR	EXTERIOR				
	General	Wash plant	Separation	Transport	Miscellaneous
- Foreman tasks - Overseer. - Loader. - Onsetter. -Wagon operator. - Faceworker. - Stone crusher - Labourer. - <b>Ore-bearers (children)</b>	- Supervisor. - Guard. -Machine operator. - Stoker. - Destoner. - Forger. - Carpenter. -Wagon operator.	-Engine operator. -Engine assistant. - Greaser. -Master ore washer. - Labourer - <b>Ore-bearers (children)</b>	- Separator. - Stonecutter. - Labourer. - <b>Ore-bearers (children)</b>	-Wagon operator	- Errand boy. -Basket makers. - Woodcutter. - Accountant. - Clerk.

Source: Wage book of the “Remunerada” Mine in La Union 1879-1935.

In Table 1 the categories for the two mines are classified according to the different tasks. The complexity of the labour structure is explained when we examine the weight of each task. In the Fuensanta mine (Mazarron), the interior and exterior labourers represented 25.8% of the workers employed by the company between 1894 and 1938; the different groups of ore-bearers, with unitary emoluments, accounted for 28.4%, so these two categories together represented 54.2% of the workforce. Other significant groups were the undercutters (10.2%) and the stone-crushers (9.7%). These categories constituted the majority of the workforce employed in lead mining and their wages were the most representative of the sector.

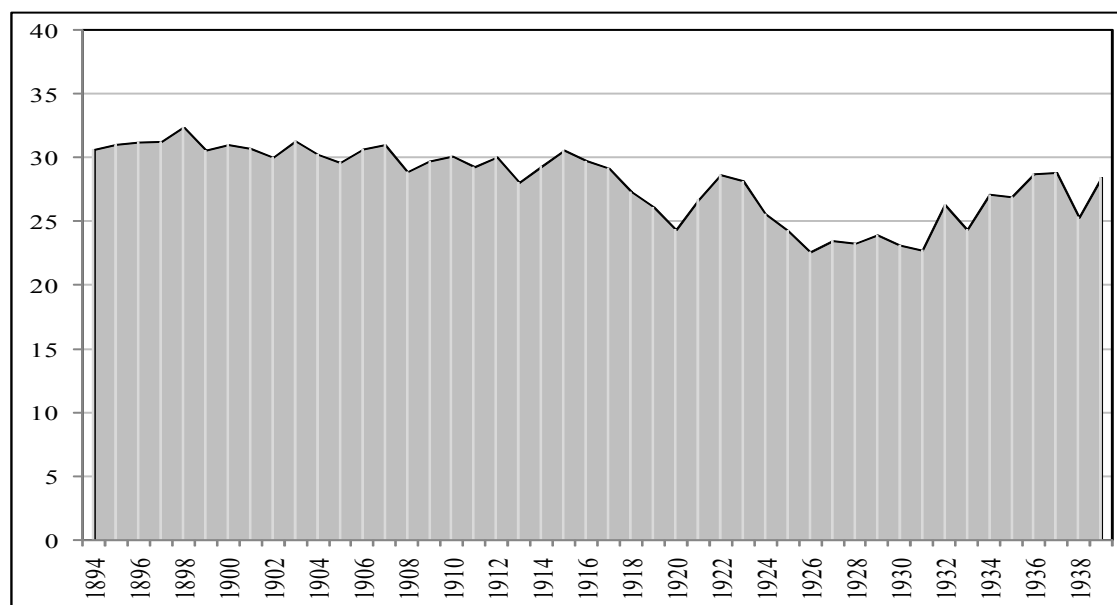
With respect to the evolution of child labour in the two mines under study, contrary to what we have indicated for the whole of the province (namely a sharp decrease in the ratio from the First World War), the proportion remained more or less stable throughout the period for which we have information. These percentages are represented in Graphs 9 and 10 standing at between 30% and 35% in the mines in La Union (1879-35) and in Mazarron (1894-1935).

**Graph 9. Evolution of the child workforce in the Remunerada mine in La Union, 1879-1935 (percentage of total employees by age)**



Source: Wage books of the Remunerada mine in La Union 1879-1935. There were also other tasks corresponding to administration, management and other categories such as: Engineer, Assistant Engineer, Inspector, Clerk.

**Graph 10. Evolution of the child workforce in the Fuensanta mine in Mazarron, 1894-1938 (percentage of total employees)**



Source: Wage books of the Fuensanta mine in Mazarron 1894-1938. There were also other tasks corresponding to administration, management and other categories such as: Engineer, Assistant Engineer, Inspector, Clerk

## **Legislation regarding child labour and its application: the difference between the law and reality**

The first law in Spain to regulate child labour in factories, workshops, foundries and mines was that of the 24 July 1873 (the Benot law), which prohibited the employment of children of both sexes under the age of ten and also imposed other limitations (Pérez de Perceval and Sánchez Picón, 2004:2-3). In practice, this law had no effect and a new law was created on 13 March 1900 (Law of 13 November 1900), relating to working women and children in order to regulate the activity of minors. This law established the guidelines for action for successive governments. Until 1934 the legislation was merely developed further, made more specified or complemented (Ramas Varó, 2001:173).

The law of 1900 prohibited the employment of children under the age of ten, but in the case of underground work this was increased to the age of sixteen<sup>18</sup>. This had a direct impact on the labour organisation of the mines, especially those that used this type of labour more intensively. Consequently, there was an immediate reaction from some local representatives such as the local council of La Union (Murcia), which in the session of 22 October 1900 approved that a request should be made to reduce the minimum age allowed for this type of work from 16 to 14 years of age, as they believed that these workers could not be replaced and constituted a fundamental source of income for the families<sup>19</sup>. In Mazarrón (Murcia), there was also a conflict of a similar nature in October 1900<sup>20</sup>.

Despite the protests, during the following years the limitations to child labour progressively increased. The Royal Decree of 26 June 1902 established that children should not work more than 11 hours (66 hours per week), including a compulsory break on Sundays. The Law of 12 August 1904 regarding child protection established limitations for employing children. The Royal Decree of the Home Office of 25 January 1908 prohibits children under

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<sup>18</sup> This age limit included the work in establishments engaged in the production or manipulation of inflammable materials and those industries classified as dangerous or insanitary. Furthermore, children under the age of fourteen were not permitted to work at night. The maximum working day of under-14s was six hours in industrial establishments (eight in commercial businesses). During the working day they had to take breaks which together could not add up to less than one hour. In addition they were not permitted to work on Sundays or on Bank Holidays.

<sup>19</sup> On 4 February 1901, after a report was issued by the Local Board of Social Reforms, the Mayor of La Union sent a note to the Home Office requesting the reduction in the permitted age as the employment of the children constituted an irreplaceable component of the workforce of the mines in the Cartagena-mountain range-La Union. The Law of 1900 had, according to the note, given rise to the paralysation of many mines and had even generated problems of public order due to the vast number of children who had been removed from the mines, which had been contained by the local authorities with the promise to request a reduction in the permitted age.

<sup>20</sup> According to the Local Board of Social Reforms (Municipal Archive of Mazarrón, Section 2, leg. 64, exp. 57), the disruption of public order “caused the Civil Governor from the Home Office to send a telegram to the Mayor on 9 November 1900, indicating that those workers under the age of 16 should continue in their employment until the corresponding regulations had been decided”.

the age of sixteen years from working in mines, quarries and coal pits in cutting and extracting tasks and the transport of minerals on the head or shoulders in the galleries. Law 27 of 1910 was more restrictive for the interior of the mines, prohibiting the employment of workers under the age of eighteen in the underground tasks of extraction and tasks involving the use of explosives.

We can observe the practical results of this legislation in graphs 9 and 10, where there is no substantial modification with the enactment of the Law of 1900. The employment of children under the age of ten was even maintained for several years and this age segment was expressly prohibited from any type of activity. The mining basins, particularly those in the southeast continued to operate outside of the law. The inspection of the mines was the responsibility of the mining police which had insufficient personnel and in some districts was hardly able fulfil the basic administration tasks (Pérez de Perceval and Sánchez Picón, 2005:4-5).

But above all, what is most striking is that there was no desire to adhere to the law. We have consulted the minutes of the Local Boards of Social Reform (established by the Law of 1900) of La Union and Mazarron. In the former there is no reference to this issue which was notorious<sup>21</sup>. In the case of Mazarron, in 1907 there are clear references that there were under-age workers but the use of this type of labour is justified as follows:

[...] there are hundreds of children under the age of 14 working in the interior of these mines. They constitute the only source of income for disabled fathers, widowed mothers or orphaned siblings; if these children were banned from working, these families would become destitute because they would not be able to find any occupation in any type of work or industry with a daily wage sufficient to maintain their respective families. [...] the workers between the ages of 14 and 16 can and should be considered essential in the exploitation of the interior of the mines in this region, even more so than those between 15 and 18 years of age. This is because, due to the special formation of the seams, the transport through tunnels and stepped shafts would be unpractical without the employment of these young workers whose

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<sup>21</sup> In 1907 there was no comment referring to the request for information regarding the compliance with the legislation regarding child labour. In the surveys that they had to fill in there was only information for a few mines (85) with a total of 1,856 operators, of which 93.7% were over the age of sixteen; 4.2% between the ages of 14 and 16 and 2.1% were younger than fourteen, with no mention of whether they carried out interior or exterior tasks.

flexibility of movements enable them to effortlessly pass through the mines without hardly stooping where grown men of average height would not be able to pass.<sup>22</sup>

Therefore, the irregularities in complying with the regulations regarding the minimum age for working in the mines was a constant feature of the mining industry in Southeast Spain<sup>23</sup>. There was a flagrant collusion between the parents (who signed authorisations for their children to work or altered their ages<sup>24</sup>), the mining companies and the government when employing children under the permitted age.

The figures relating to the reduction in child labour in the mines of the southeast are contradictory. While the Mining Statistics show, as we have already mentioned, a continuous decrease after the first decade of the twentieth century, the company data that we have examined show that high percentages of child labour were maintained until the end of the period considered. In a report on social and labour problems published in 1924, the Provincial Labour Inspector of Murcia was optimistic, claiming that although there were a high number of children working in the mines, the minimum age for working was respected and the infractions were related to the number of hours that they were made to work per day (Rolandi, 1924:25).

### **The remuneration of child labour in the mining sector of Southeast Spain**

The data regarding wages in the nineteenth century is highly dispersed and we only have access to information relating to the different provinces and minerals after the beginning of the twentieth century. An analysis of the daily wage of the mining sector of Cartagena-La Union carried out by the engineer B. Rolandi (1924:26) reveals the values distributed by labour category and type of work (Table 2). Rolandi considered that the wage received by the workers was a small amount and could not match those that were paid in other mining regions and cannot even be compared to the wages paid to industrial workers with less arduous jobs in Cartagena or La Union.

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<sup>22</sup> Municipal Archive of Mazarron, Section 2, leg. 64, exp. 57, Local Board of Social Reforms, 24 September 1907.

<sup>23</sup> This aspect had already been addressed in general terms by Borrás (1996:252-253).

<sup>24</sup> Cohen (1993) has also pointed out that in the first decades of the twentieth century the doctors of the companies responsible for the medical check-up prior to employment did not believe the ages that the children claimed to be.

**Table 2. Daily wage (ptas/day) in the mining sector in Cartagena-La Union according to professional categories and type of work, 1909-1923**

Daily wage	1909	1916	1923
<b>INTERIOR</b>			
Undercutters with drills	3.75	4.25	5.60
Undercutters with picks	3.25	3.75	5.10
Dray wall masons / timbermen	3.50	4.00	5.75
Stone crushers	3.25	3.75	5.10
Driller assistants	3.25	3.75	5.10
Wagon operators	2.75	3.25	4.50
Labourers	2.75	3.25	4.40
<b>Ore-bearers (children)</b>	2.50	3.00	4.00
<b>EXTERIOR</b>			
Extraction mechanic	3.75	4.25	7.00
Engine operators	3.00	3.50	6.00
Banksmen	2.75	3.25	4.00
Pile-driver	2.75	3.25	4.00
Master ore-washer	3.75	4.25	4.90
Roller operators	3.00	3.50	4.15
Labourers	2.50	3	3.65
<b>Children</b>	1.00/2.00	1.15/2.15	1.75/2.50
<b>BLEND LIMESTONERS</b>			
Masters	4	4.50	6.00
Servants	3.25	3.75	5.00
Mechanics and similar in the mines	4.50	5.00	7.00

Source: Rolandi (1924: 26).

We can compare these claims with the figures published in the official statistics (Ministry of Labour and Social Security 1931), which show how the lowest wages in the Spanish mining sector were those that corresponded to lead mining and in the provinces with larger mines. The district of Murcia had one of the lowest wage levels.

**Table 3. Lead mining. Nominal wages (ptas/hour) 1914-1930**

	<b>Jobs</b>	<b>1914</b>	<b>1920</b>	<b>1925</b>	<b>1930</b>
ALMERIA	Interior	0.47	0.59	1.03	0.76
	Exterior	0.43	0.69	1.00	0.65
MURCIA	Interior	0.50	0.63	0.75	0.69
	Exterior	0.40	0.63	0.75	0.65
JAEN	Interior	0.48	0.71	1.03	0.83
	Exterior	0.34	0.59	0.72	0.72
GRANADA	Interior	0.62	0.69	0.75	0.65
	Exterior	0.61	0.69	0.75	0.63
BADAJOZ	Interior	0.35	0.62	0.62	0.92
	Exterior	0.25	0.47	0.47	0.79
CIUDAD REAL	Interior	0.39	0.69	0.69	0.81
	Exterior	0.37	0.65	0.65	0.67
CORDOBA	Interior	0.35	0.97	1.00	1.17
	Exterior	0.40	0.58	0.66	1.05
TARRAGONA	Interior	0.30	1	1.25	0.78
	Exterior	0.40	0.62	0.73	0.77
MEDIA PLOMO	<b>Interior</b>	<b>0.47</b>	<b>0.84</b>	<b>0.98</b>	<b>0.90</b>
	<b>Exterior</b>	<b>0.41</b>	<b>0.61</b>	<b>0.68</b>	<b>0.72</b>

Source: Own elaboration based on the Ministry of Labour and Social Security 1931.

We can get a clearer picture of the daily wage of lead miners in Murcia if we compare them with the wages of the coal miners in Asturias and if we consider the huge gap between the payments of the two mining sectors.

**Table 4. Comparison of the nominal daily wages of the coal miners in Asturias and the lead miners of Murcia, 1914-1930 (ptas./day)**

Daily wage in the coal mining sector (ptas./day)					Daily wage in the lead mining sector (ptas./day)			
A) Interior		B) Exterior			C) Interior		% of C with respect to A	% of C with respect to B
Daily wage	Index	Daily wage	Index	Daily wage	Index			
1914	5.17	100.0	4.08	100	3.50	100.0	67.7	85.8
1915	5.56	107.5	4.64	113.7	3.57	102.0	64.2	76.9
1916	6.75	130.6	5.74	140.7	3.82	109.1	56.6	66.6
1917	7.68	148.5	6.49	159.1	4.00	114.3	52.1	61.6
1918	10.27	198.6	8.50	208.3	4.00	114.3	38.9	47.1
1919	11.70	226.3	9.48	232.4	4.00	114.3	34.2	42.2
1920	14.25	275.6	11.04	270.6	4.12	117.9	28.9	37.4
1921	12.58	243.3	9.30	227.9	4.12	117.9	32.8	44.4
1922	11.02	213.2	9.10	223.0	4.12	117.9	37.4	45.3
1923	11.25	217.6	8.79	215.4	4.12	117.9	36.7	46.9
1924	11.25	217.6	8.79	215.4	4.40	125.7	39.1	50.1
1925	10.99	212.6	7.68	188.2	4.40	125.7	40.0	57.3
1926	10.50	203.1	7.92	194.1	4.42	126.4	42.1	55.9
1927	10.72	207.4	7.90	193.6	4.42	126.4	41.3	56.0
1928	10.36	200.4	7.89	193.4	4.42	126.4	42.7	56.1
1929	10.50	203.1	7.94	194.6	4.55	130.0	43.3	57.3
1930	10.60	205.0	8.00	196.1	4.67	133.6	44.1	58.4

Source: Own elaboration based on the Institution of Social Reforms (IRS) 1922: 36-37; Ministry of Labour and Social Security 1931; Mining Statistics of Spain; Wage books of the mines of Mazarron and la Union. In both cases the wage of the undercutter has been used as an average salary.

The average wages of interior workers in the mining industry in Murcia during the period 1914-1930 on average represented 46.6% of those of the coal miners in Asturias and 59.1% of exterior workers. This shows us the wage difference between the different mining sectors and reinforces the affirmation that wages were lower in Almeria and Murcia compared with the rest of the country. In addition to this situation was the weight that child labour had in the mines in Murcia which limited the increase in wages.

### *Child wages*

The earliest available data regarding child wages in the mines in the southeast is very sketchy. We can find interesting information in the memoirs published by the pupils of the *École des Mines de Paris*, studied by A. Cohen (1997). We have used this information to create Table 5, extracting the data regarding child labour corresponding to the mines of Almeria and Murcia. The participation of children is evident in all of the concessions of these



provinces from the birth of the industry, with highly variable wages depending on the area or demarcation, the type of work, minerals extracted and working hours.

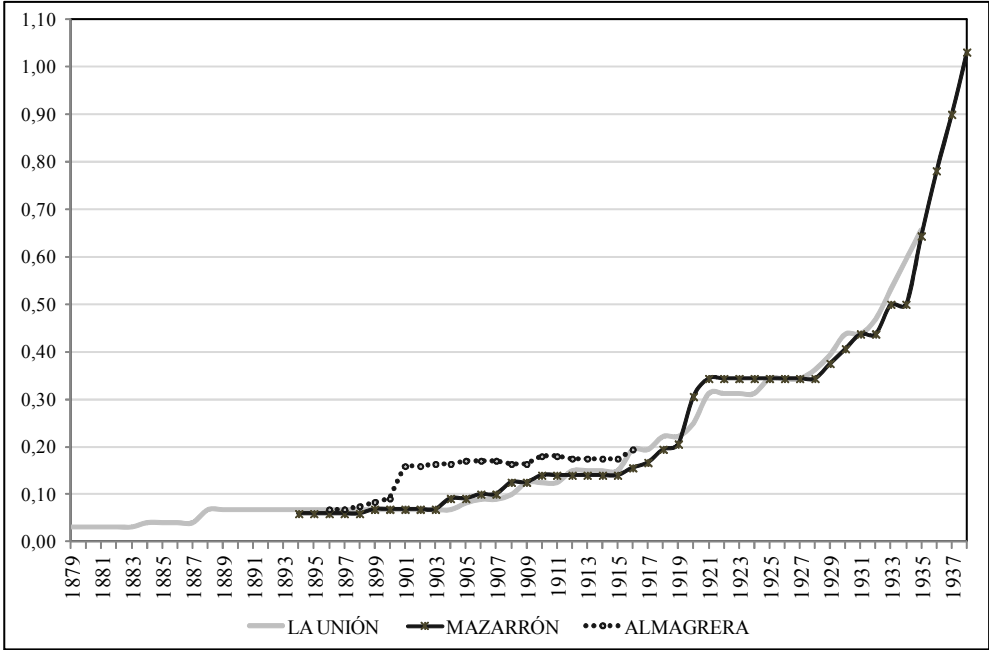
**Table 5. Information on child salaries in the south-eastern mines, 1839-1878**

Year	Mine, site	Labour category	Type	Quantity	Observations
1839	Gador (Almeria) Minas de Benahadux	Children	Daily wage	3/3.5 reales	From dawn to dusk with a one-hour lunch break
1845	Gador (Almeria) Mina La Baja	Boys (interior transport)	Daily wage	2 reales + food	30 children employed between the ages of 11 and 15
1850	Gador (Almeria)	Boys (interior transport)	Daily wage	3/5 reales	Paid according to their strength
1845	Almagrera (Almeria)	First interior ore-bearer	Daily wage	5 reales or 2.5 + food	Carried 20 to 25 Kg per trip (50 metres)
		Second interior ore-bearer	Daily wage	1.5 reales + food	Carried 15 to 18 kg per trip (50 metres)
		Third interior ore-bearer	Daily wage	1 real + food	Children under the age of 15 carrying 12 kg per trip (50 metres)
1850	Sierra de Cartagena-la Union (Murcia)	Boys (interior transport)	Daily wage	3/4 reales	According to strength
1861		Boys (interior transport)	Daily wage	2 reales	
1877		Boys (interior transport)	Daily wage	0.40/0.60 pesetas	According to strength
1878	Lorca (Murcia) Mina La Suerte de plomo	Boys (interior transport)	Daily wage	1/1.50	Calculated to exceed the wage earned in agriculture
1878	Lorca (Murcia) La Leona sulphur mine	Boys (interior transport)	Daily wage	5.5 reales	Paid in pairs for work completed
		Mule driver (child) (extraction and drainage)	Daily wage	3.5 reales	
1867	Mazarron (Murcia)	Children Interior transport	Daily wage	0.75 pesetas	
1876	Linares (Jaen) Mina La Cruz	Boys	Daily wage	5/8 reales	14-18 years old
		Girls	Daily wage	3/6 reales	
1878	Linares (Jaen)	Boys	Daily wage	4/5 reales	
1877	Linares (Jaen)	Children – Interior transport	Daily wage	8/10 reales	12-16 years old 11 hours per day
1878	Linares (Jaen) Mina la Tortilla	Children – exterior	Daily wage	4/6 reales	
		Children - exterior	Daily wage	3/4 reales	

Source: Based on Cohen (1997: 301-306).

Although these salaries correspond to occasional and one-off annotations, when we compare them to the data drawn from the accounting records of the mines, we can observe that, on the whole, the earlier wages were higher than those of the following period (1879 until the beginning of the twentieth century). This shows, therefore that there was a stagnation or even a drop in the wages of the children working in these mines in the last third of the nineteenth century.

**Graph 11. Evolution of wages/hour of children in the southeast, 1879-1938 (ptas.)**



Source: Own elaboration based on data drawn from the Wage Books of the Fuensanta (Mazarrón); Remunerada (La Union) and Patrocinio (Almagrera) mines.

The data on the emoluments of the three mines are expressed in wages/hour which gives us a better idea of the real amount than the daily wage as this depends on the duration of the working day. The overall evolution reveals a stagnation between 1879 and 1899, followed by a second period between 1905 and 1915 characterised by small wage increases and then another steep rise between 1916 and 1938. Of the mines in the Almagrera mountain range (Almeria) we were only able to draw information from the data contained in the wage books of the mines of Santa Isabel and San Antonio between 1905 and 1907, with which we have reconstructed the amount paid to the children in accordance with the existing labour categories in these mines for this period (Table 6).

**Table 6. Child wages of the mines of the Almagrera mountain range (Almeria) as a percentage of the other labour categories, 1905-1907**

	Child wages with respect to the other labour categories (%)								
	1905			1906			1907		
	Interior ore-bearer	Exterior ore-bearer	Average wage of the children	Interior ore-bearer	Exterior ore-bearer	Average wage of the children	Interior ore-bearer	Exterior ore-bearer	Average wage of the children
Administrator	41.56	36.00	38.67	31.17	27.00	29.00	31.50	24.67	27.83
Guard	187.00	162.00	174.00	187.00	162.00	174.00	189.00	148.00	167.00
Engine operators	53.43	46.29	49.71	62.33	54.00	58.00	63.00	49.33	55.67
Foremen	53.43	46.29	49.71	53.43	46.29	49.71	54.00	42.29	47.71
Undercutters	68.00	58.91	63.27	74.80	64.80	69.60	75.60	59.20	66.80
Labourers	88.21	76.42	82.08	88.21	76.42	82.08	89.15	69.81	78.77
Ore washers	83.11	72.00	82.08	83.11	72.00	77.33	84.00	65.78	74.22
<b>Children interior</b>		115.43	107.47		86.63	90.16		136.50	89.30
<b>Children exterior</b>	112.65		93.05	115.43		93.05	127.70		121.90
Banksman	88.21	76.42	82.08	93.50	81.00	87.00	94.50	74.00	83.50
Labourer - extraction	83.11	72.00	77.33	83.11	72.00	77.33	84.00	65.78	74.22

Source: Own elaboration based on the wage books of the “Santa Isabel” and “San Antonio” mines with respect to the three-monthly wage figures for 1905, 1906 and 1907.

The wage differentials that we observed in the case of the mines in Murcia are repeated in the case of the mines in the Almagrera mountain range, although in the latter, the difference between the wages of the children and the labourers is smaller than in the neighbouring province during these years. However, the difference was still substantial and, consequently, it motivated the companies to recruit this type of workforce.

In this case we have also been able to reconstruct the weight of the children with respect to the total wages that the company paid out during the years 1905 and 1907 and found that they represented 11.9% of total wages in the first year and 12.1% in the second. These figures are the fourth largest expense item which highlights their relevance.

The many reports issued by the IRS (1904, 1909, 1910, 1913, 1922 and 1923) on the condition of the different mining areas have provided us with examples to compare wages, working conditions, ages, working hours, etc. over a period of several years.

**Table 7. Child wages in different mining areas, 1914-1923**

	Peñarroya		Leon	Asturias		Biscay	La Union (Murcia)		Mazarron (Murcia)
	Children 14-16 years	Children 16-18 years	Children	Auxiliaries Interior	Auxiliaries Exterior	Auxiliaries	Children Interior	Children exterior	Children interior
1914	1.50	2.00	1.50	2.00	1.75	2.00	1.50	1.40	1.40
1915	2.75	2.50	2.00	2.25	2.25	2.81	1.50	1.40	1.40
1916	3.15	3.60	2.50	2.55	2.65	3.00	1.75	1.60	1.40
1917			2.75	3.75	3.25		1.75	1.60	1.50
1918			2.00	3.75	3.25		2.00	1.80	1.75
1919			2.50	3.00	2.50		2.00	1.80	1.85
1920				2.50	2.00		2.25	2.15	2.75
1921	2.65	4.10		3.00	2.50		2.50	2.40	2.75
1922	3.00	3.00		3.00	2.50		2.50	2.40	2.75
1923	2.00	2.50	3.00	3.25	2.75	3.00	2.50	2.40	2.75

Source: Own elaboration based on IRS (1922); Ministry of Labour and Social Security (1931); Wage books for the “Fuensanta” (Mazarron) and “Remunerada” (La Union) mines.

As we can see in Table 7, similarly to the emoluments of the adult miners, the children working in the coal mines in Asturias and the iron ore mines of Biscay were the highest paid in Spain, while those in Murcia were the lowest paid which once again is explained by the type of mining companies and the labour market in this region.

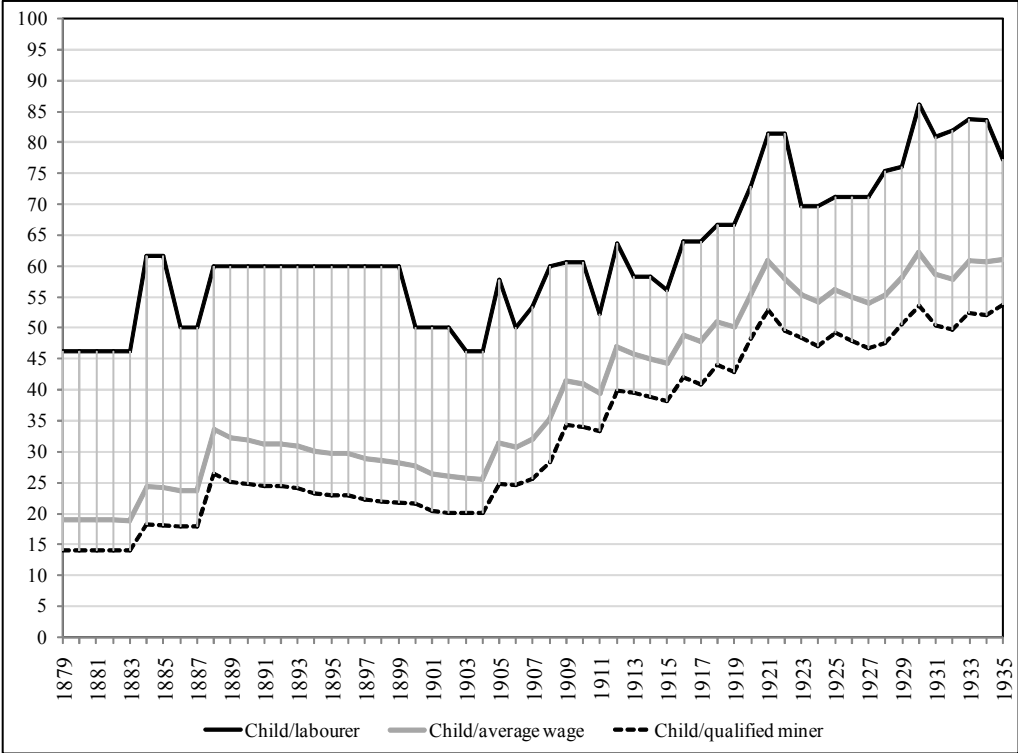
In many mines in Almeria and Murcia the children, called “gavieros”, worked in the interior of the mines carrying large esparto grass baskets. The work was task-based (each task was equal to 10 baskets). In this case they were paid an hourly wage rather than a daily wage in accordance with the energy spent per unit of time. This type of contract had highly negative repercussions on the overall physical condition of the children and injuries and hernias were frequent (Martínez Soto, Pérez de Perceval and Sánchez Picón, 2011), which, together with poor nutrition gave rise to a situation of persistent high morbidity in the mining towns (Navarro, Martínez Soto, Pérez de Perceval, 2004).

### **Evolution of child wages with respect to the adult workforce**

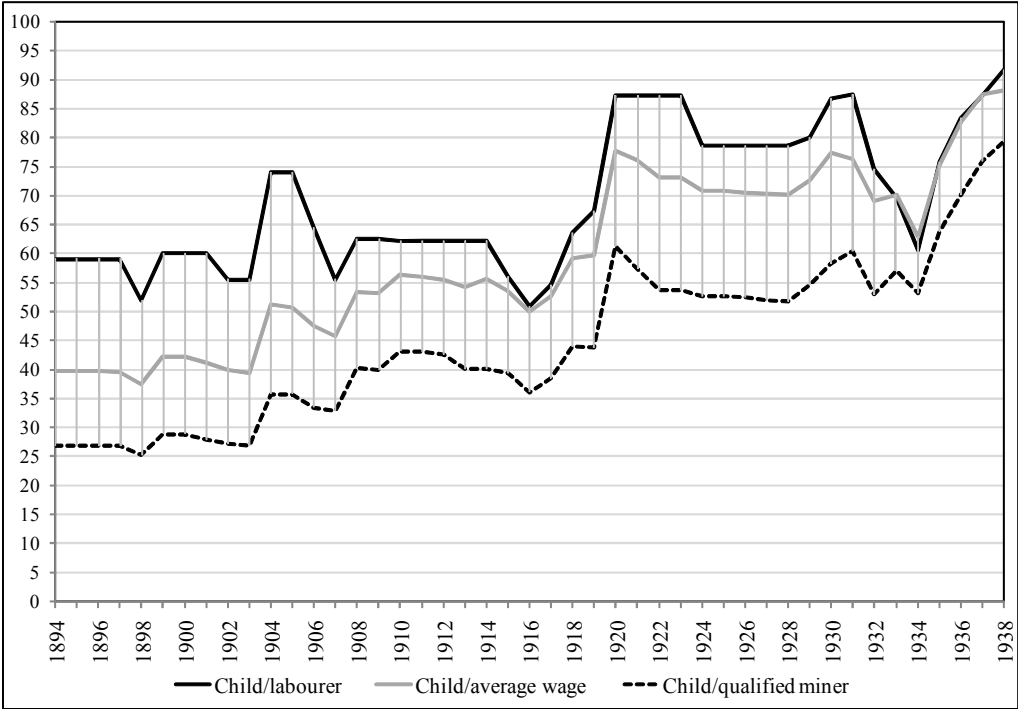
Another important aspect when analysing the wages of children is their comparison with the wages received by the adult miners. To do this we have calculated the child daily wage as a percentage of the average adult wage (all of the labour categories), the labourer’s wage and the qualified miner’s wage, as shown in Graph 12.

**Graph 12. Child wages as a percentage of adult wages (labourers, qualified miners) in two mines in Murcia (the “Remunerada” in La Union and the “Fuensanta” in Mazarron), 1879-1938.**

**A**



**B**



Source: Own elaboration based on the data from the wage books of the “Fuensanta” (Mazarron) and “Remunerada” (La Union) mines. Graph A: “Remunerada”; B: “Fuensanta”.

In the case of La Union, on average, the children's wages represented 63.2% of those of the labourers between 1879 and 1935, favouring the child workforce as this generated a considerable saving in this type of expenses. With respect to the average daily wage of the adults (all categories) the children's wages equated 40.2% and with respect to qualified miners; 33.2%. These percentages represented differentials of 36.7%, 59.8% and 66.8% respectively, which influenced the decision to maintain high levels of child labour due to the savings in wage expenses to be gained. In the case of Mazarron the situation was different. The percentage of children's wages with respect to the labourers was an average of 70.8% between 1894 and 1938. With regard to the average adult wage it was 60.7% (all categories) and 45.7% with respect to qualified miners. In this case the differentials were 29.2%, 39.3% and 54.3% respectively. The child workforce offered less incentives, but even with these margins companies were interested in maintaining a quota of child workers in order to save on wage costs and also to ensure that in the long term they had a supply of interior workers trained in the job and who were used to working in the conditions of the mines.

In any event, we should highlight the change that took place in the remuneration of the children which experienced a relative increase after the end of the First World War, considerably reducing the advantage of using this type of workforce. It should be asked whether the reduction of the differential was due to the increased cost in the youngest workers (progressive increase in the age of access to interior and exterior work, lower supply...) or, on the contrary, to the crisis in the mining sector and the increase in adult unemployment with a lowering of real wages. The basins of the southeast began to suffer the crisis in the early decades of the twentieth century, which caused a surplus in the population and affected both direct and indirect employment. In order to illustrate the effect we will use the example of the town of La Union which had a population of around 30,000 in 1910 and just over 10,000 in 1930. It was not just a market problem but constituted a crisis in this mining model which had reached its limits and was coming to the end of its life. The change that occurred in the percentage of the children's wages of the mines analysed and the fall in the percentage of child workers in the mines of Almeria and Murcia (which we mentioned earlier) are most likely to be related to these difficulties. The micro-mining sector of the southeast and the labour regime, characterised by a pressure on wages and the high use of child labour was a binomial that could no longer resist international competition and the economic difficulties which the international mineral market was experiencing.

### **The contribution of child labour to the family economy. An estimate**

Throughout the nineteenth century, child labour made a significant contribution to the survival of working-class families. In Great Britain, during the period between 1817 and 1839, it represented approximately 24% of family income. Other studies carried out on North American workers reveal that the contribution of child labour to working-class families in Massachusetts was also 24%, and was even higher in the case of families where the main bread winner was an unskilled labourer<sup>25</sup>.

In the mining towns of the southeast of Spain, the contribution of child labour was fundamental for the economies of the families, which were engaged equally in farming and mining, in order to guarantee their survival. We have analysed the estimates carried out by a highly qualified witness in the field of silver lead mines. In a meeting of the engineers society of the schools of Louvain, The Belgian engineer, Jean Baptiste André, who worked in the mines of Desagüe in the afore-mentioned mountain range for four years between 1875 and 1879, presented a study on the family budget of a working family from the town of Cuevas (the main town of the Almagrera district)<sup>26</sup>. He applied the Le Play method in his analysis which is the systematic collection of data regarding the expenditure and income of a working-class family which is taken as a typical model.

For his study, André chose the family of Cristóbal López Sánchez, a 62-year-old labourer who had worked in the mines but, due to the ailments that come with age, was only able to work occasionally in the fields. At that time the family had six members. Apart from Cristóbal, there was his wife Catalina Vázquez (54 years old) and the children; Alonso (21), Facundo (19), Cristobal (16) and Paula, the only daughter of the household, who was eleven. An elder son had died as a result of a mining accident and another three children, a boy and two girls had died in infancy. There were another three daughters who were married to two labourers and a miner and no longer lived in the home. This family was a typical model of this social sector that supplied the workforce of the mining industry in the southeast of the country in the nineteenth century.

We will not go into detail about the analysis of the family budget that the Belgian engineer made, but we will examine the data regarding the family income and the occupations of its members.

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<sup>25</sup> Quoted by Arenas (2003:37-38).

<sup>26</sup> André (1879).

**Table 8. Annual income per worker of a working-class family (Cuevas, c. 1878)**

	Days worked	Daily wage (in reales)	Annual income	%
Eldest son (ore-washer in the mines)	300	9	2,700	28.0
Second son (undercutter in the mines)	300	10	3,000	31.1
Third son (interior transport in the mines)	300	8	2400	24.9
Father (self-employed field worker)	53	6	318	3.3
Father (collection of firewood)	20	6	120	1.2
Father (occasional days working in the fields as a sharecropper)	160	6	960	10.0
Mother (dressmaking and repair)	35	4	140	1.5
			9,638	100.0

Source: André (1879). Conversion francs/reales: 1x4.

In Cristobal Lopez's family, the contribution of the youngest son who worked transporting materials inside the mines of the Almagrera mountain range represented 24.9% of the gross family income. This percentage is similar to those previously mentioned for different industrialised areas of Great Britain and North America. We should point out the difference between the mining wage and the strictly agricultural wage which is 40% lower than the former. We should also remark on the relatively high daily wage of the 16-year old son who worked as an ore-bearer in the mines which was 25% higher than an adult agricultural labourer. We can assume that given his age, maybe Cristobal, the third son, had more responsibility among the ore-bearers or could carry heavier loads than younger boys. In any event, the employment in the mines, despite the high risks and being the cause of death of a member of the family, was essential for the survival of the family at that time and even enabled a certain level of comfort. It is also possible to sense the effect that the paralysation of the mines which was a frequent occurrence in this area due to the drainage problem had on the family budget. The alternative in these cases was a more or less permanent emigration to one of the mining basins in Southern Spain.



## **Conclusions**

Based on the figures drawn from the official Spanish mining statistics, we have reconstructed the weight that child and youth labour had in this sector of activity which, during the second half of the nineteenth century stood at around 14-17%. This figure was not evenly distributed throughout the territory (naturally due to the heterogeneity in the organisation, technology and labour markets that accompanied the mining boom in Spain). The two provinces that had the highest incidence of child labour were Almeria and Murcia, with very high percentages.

After the First World War, there was a reduction in these percentages throughout the country although the intensity and timing of this reduction varied between basins and minerals. We can also observe a relative effect of the labour legislation, which since the twentieth century established a series of limitations and controls on the employment of children in the mining sector. An analysis of the company records reveals a high degree of non-compliance with the legislation in force in terms of the minimum age required in order to work. In addition, labour inspection was limited and a mentality prevailed that favoured the employment of children.

This situation can be verified with the age of the workers of the mines in Murcia for which we have been able to obtain information (in the towns of La Union and Mazarron). In these towns the employment of a significant percentage of 10-year-old children was maintained until well into the twentieth century, with figures of over 30% of total children. The most numerous segment in both mines is the 11 to 14 age group, with percentages of between 40% and 80% of the child and youth workforce.

The work carried out by this segment of the workforce constituted a part of the mining companies' business strategies (training and specialisation of the workforce, reduction in wage costs, etc.) and at the same time it was an important source of family income. This was particularly true in the case of the southeast of the country, given the intensity of child labour in this region and the existence of "dual workers" (in the farms and in the mines). We have presented a case study of a family in the area between 1875 and 1879 which, surprisingly, revealed an economic contribution of the children of 25%, similar to that of studies of working class families in Great Britain in the first half of the nineteenth century (and other industrial nuclei).

In the section on wages we have been able to relate child labour to lower overall remunerations. This is the case of Almeria and Murcia, with average incomes which were substantially lower than those of other basins such as those engaged in coal mining.

In a wage series study of two mines located in the two main basins of Murcia (Cartagena mountain range-La Union and Mazarron), we have described the relationship between the wages of the children and those of some adult labour categories. We have observed a progressive increase in the percentage of child wages after the First World War, which seems to be related to the crisis suffered by this model of mining organisation in this corner of the Spanish peninsula.

In any event, we should highlight the complexity involved in analysing the work carried out by this population segment in the Spanish mining sector, which is closely related to the unique characteristics of the mining activities and labour market and a variety of social and economic factors and others inherent in the extraction of underground resources.

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