



Family Firms in the Age of Globalization: Cooperation and Competition in Spanish Metal Manufacturing, 1870s-1970s

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Inter-firm cooperation in Spain was an entrepreneurial growth strategy that was well suited during a century of metal transformation activities. Independent regional family firms dominated this economic sector in a national economy relatively isolated from international competition. Metal manufacturing firms in the wire/wire derivatives sector provide a good case study to show the dominance of family firms and regional ties in a sector that apparently required only integration to grow in the age of globalization. The loss of ownership of most old-century firms in the last three decades of the twentieth century proves that cooperation alone is not a guarantee of survival, particularly when the firms studied needed to conquer foreign markets in addition to maintaining their regional markets.

The persistence of small-to-medium-size family firms, rather than the rapid creation of big corporate firms characterized industrialization in Spain.¹ These companies were often located in a few specialized industrial districts closely concentrated around the most dynamic city-markets of the country. Corporations and techniques of mass-production and

The author gratefully acknowledges financial support from Spanish Research Projects DGICYT (PB94-0892), and DGES (PB97-0931, PB98-1265, PB97-0875, and PB98-1167), and, more recently, from the II Convocatoria de la Fundación Banco Bilbao Vizcaya Argentaria para la Investigación en Economía, 2003. I also thank friends, colleagues, and entrepreneurs who helped me find useful historical sources, particularly Francesca Antolín, Elena San Román, Francisco Rivière Ribas, Josep Maria Benaul, managers of Global Steel Wire-MRT; Anna Llorensí, Jose Arrufat, managers of Trefilerías Codina SA in Capellades; archive director of the Francesc Cambó archive in Barcelona; and officers of the Spanish Association of Steel Wire Weaving (A.T.A.) in Madrid.

¹ For an overview of literature using a new methodological approach to the subject see Daniel Tirado Fabregat "Economic Integration and Industrial Location: The Case of Spain Before World War I," *Journal of Economic Geography* 2 (2002): 2312-21.

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distribution were more the exception than the rule.² It was the 1950s-1970s before a few public and private capital-intensive firms really developed the scientific production and management methods introduced in the early twentieth century in Catalonia and the Basque Country. Specialization in diversified activities closely relating persons and families across cities and regions was the dominant entrepreneurial image in Spain during the Second Technological Revolution.

Studies of several manufacturing sectors (textiles, chemistry, papermaking, staples, and shipping) revealed these characteristics were an efficient and flexible adaptation to market characteristics (low per capita rents, slow regional integration, high transportation costs).³ However, research on organizational aspects of some family firms indicates that specialization and diversification were well-suited to the entrepreneurial preferences of big Spanish family firms (such as general avoidance of the growth of external participation in ownership and management, and owners' personal commitment to clients regarding the quality of products and service).⁴ Finally, most scholars have underlined that institutional developments in Spain were key to explaining the slow development of transportation facilities, the scarcity of research and development (R&D) investment, and the long persistence of regional personal entrepreneurial groups-networks relatively isolated from international markets, in contrast with other peripheral western economies.⁵

Given this combination of economic and institutional conditions, cooperation has often been an efficient alternative to integration and growth in scale and scope among Spanish firms, as it has for other economies dominated by personal relations.⁶ Cooperation has also been a preferred strategy among Spanish firms involved in economic sectors with relatively few medium/big firms that had historically faced overproduction and declining prices. This fits well with what we know about formation of

² Data and explanations about the scarcity of big business in Spain are studied in recent works by Albert Carreras and Xavier Tafunell.

³ See Albert Carreras, Pere Pascual, David Sven Reher and Carles Sudrià, eds., *Doctor Nadal: La industrialización y el desarrollo económico de España*, 2 vols. (Barcelona, 1999), and articles published in *Revista de Historia Industrial*.

⁴ Andrea Colli, Paloma Fernández-Pérez, and Mary B. Rose, "National Determinants of Family Firm Behavior in Britain, Italy, and Spain," *Enterprise & Society* 4 (March 2003): 28-64.

⁵ Paloma Fernández and Núria Puig "Knowledge and Training of Family Firms in the European Periphery: Spain, Eighteenth to Twentieth Centuries," *Business History* 46 (Jan. 2004): 79-99.

⁶ Mark Granovetter and Richard Swedberg, *The Sociology of Economic Life* (Boulder, Colo., 1992). Mark Granovetter, "Economic Institutions as Social Constructions: A Framework for Analysis," *Acta Sociologica* 35 (1992): 3-11. Mark Granovetter "Coase Revisited: Business Groups in the Modern Economy" *Industrial and Corporate Change* 4 (1995): 93-130.

cartels in capital-intensive sectors of the most industrialized countries during the interwar years.⁷

Recent research in Spanish shipping agreements reveals that:

The existence of a kind of “culture of cooperation” made in local and regional spaces through kinship-friendship ties and common value systems was an alternative efficient strategy to competition. It was put into practice through more or less stable agreements which diminished transaction costs and allowed specialized firms to survive without the need of horizontal or vertical integration. Somehow this raises some questions about Chandler’s or Williamson’s theories on entrepreneurial growth because they mainly abandoned explanations about the search of market power and put emphasis on the achievement of economies of scope and scale.⁸

We argue that the development of important branches of metal manufacturing in Spain took place within such a regional “culture of cooperation” at least until the big shock of the late 1970s that changed the economic and institutional rules of the game.⁹

Family Firms and Metal Transformation in Europe

“Metal manufacturing” is a phrase that includes an enormous variety of products and services. The available literature predominantly deals with metal production of copper, iron and steel, aluminium, and other metals obtained from mineral transformation. Mainstream textbooks about economic history and industrialization often explain the evolution of this particular branch of metal manufacturing since the nineteenth century, outlining the history of technical innovations that allowed a progressive cost-reduction to obtain metal from minerals, a decline in prices, and the growth of cartels.

Metal transformation activities, the production of a broad variety of metal products in demand by other economic sectors (such as transportation, communications, construction, agriculture, energy, textiles, and staples production) have received considerably less attention.

⁷ A review of basic literature about cooperation as an efficient alternative to vertical integration or horizontal combinations, in Jesus Maria Valdaliso and Santiago López, *Historia económica de la empresa* (Barcelona, 2000), 287-96. About the creation of cartels there is abundant bibliography; for sources see the useful interwar cartel database which has findings from H. Kronstein -Sept.1944 (www.let.leidenuniv.nl/history/rtg/cartels/bal2.html)

⁸ Jesus M. Valdaliso, *La navegación regular de cabotaje en España en los siglos XIX y XX Guerras de fletes, conferencias y consorcios n avieros* (Vitoria, 1997), 13-14.

⁹ Here I use “region” in the more restricted sense of a territorial portion of a state although region sometimes refers to a more continental space, e.g., Europe vs. North America.

“Products” itself is a tricky word that includes a variety of items, from a single spoon, to air-conditioning filters, to a car, or a plane. Such internal diversity points up real difficulties in the scientific study of metal transformation as a homogeneous economic activity.

Maxine Berg in her well-known *Age of Manufactures* is one of the first historians who attempted to overcome these difficulties. In this book, and in her other work, Berg points out another way to approach the history of the metal sector: not just by studying the advance of mechanization and/or the use of inorganic energy, but by also paying attention to progress in product diversity and improvements in precision tools. In the last two decades, several scholars have provided new arguments along these lines, due to the impact of Nathan Rosenberg’s works about technological convergence achieved in machinery and metal production, and Phil Scranton’s about specialty production.¹⁰ These works draw theoretical insight from experience in the United States and United Kingdom. Empirical evidence from so-called peripheral European economies during 1980s and 1990s contributes to our understanding of the significance of metal transforming activities for knowledge transfer and growth, and its role in the creation of regional and national systems of innovation in line with Rosenberg and Nelson’s theoretical insights.¹¹ New branches of activity are rediscovered, and new ways of studying innovation and firms are being applied that improve our understanding of how differently globalization has taken place in such a globalized economic sector.

¹⁰ Nathan Rosenberg, *Dentro de la caja negra: Tecnología y economía* (Barcelona 1993), 73-74, 90-100, 148-49, 151.

¹¹ For Sweden Angus Floren, and Goran Ryden “Convergencia tecnológica y diversidad social: Mercados, centros de producción y cambio tecnológico en la industria del hierro europea 1600-1850,” *Revista de Historia Industrial* 12 (1997): 75-111. Eli F. Heckscher, *An Economic History of Sweden* (Cambridge, Mass., 1954). Lennart Jörberg “The Diffusion of Technology and Industrial Change in Sweden during the Nineteenth Century” in *Technology Transfer and Scandinavian Industrialisation*, ed. Kristine Bruland (Berg, 1991), 185-200. In Italy, Andrea Colli *Legami di ferro: Storia del distretto metallurgico e meccanico lecchese tra Otto e Novecento* (Catanzaro 1999) and Roberto Ferretti. For Spain there are many good publications about traditional ironworks by Rafael Uriarte, individual metal transformation firms studied by Eugenio Torres (Sota group) Jose Ignacio Martínez Ruiz (agrarian machinery, cartels in iron distribution), Agustín Sancho (Averly firm in Aragon) and German Ojeda (Duro Felguera firm in metallurgy). Approaches to branches of metal transformation in nineteenth-twentieth century Spain are, to name a few, those by Jose Luis García Ruiz (car industry) Francisco Cayón (auxiliary railway construction), Javier Vidal Olivares (air transport) and Jordi Catalan (tool machines in Basque country). With the exception of the work by Agustín Sancho and myself, in Spain there has been no research devoted to low-added value branches like wires and wire derivatives.

I hope this paper will be included within this new scientific research framework, and will contribute to our understanding of some aspects of the diverse ways through which Spanish firms are growing within the contemporary European economy. Spanish metal manufacturing is a good case study. On the eve of the World War II, it was traditionally an industrial sector atomized in small and technologically backward firms (as compared with leading firms in core economies); now Spain is at the top of world rankings of automobile production and European Union wire rod production. Although one could say automobile production is in the hands of non-Spanish multinationals, wire-rod production and its derivatives in Spain are mostly in Spanish hands, concentrated in several independent family firms. From the 1870s until the late 1970s, approximately 15 regional medium-size family firms preserved their autonomy and domestic market power in this manufacturing sector. They lost their independence after the impact of the general crisis of the 1970s and the difficult adaptation of their businesses to problems of excess production and workforce, little international expansion, and inefficient planning for successional leadership.¹² In the following two decades, a new firm, Global Steel Wire, progressively owned and managed this group of wire rod and woven wire derivatives sector family firms. Global Steel Wire, which accounts for 60 percent of wire rod production in Spain and is second in this activity in the European Union, is not a foreign multinational but a new Spanish family firm, controlled by the Rubiralta family.¹³

Is this an unusual case study or does it share common aspects with the same sector in other regions of the European periphery? How can we explain the historical dominance of regionally-based family firms in a sector dominated by vertical integration, corporations, and world finance since the turn of the nineteenth century?¹⁴ What role did inter-firm

¹² An approach with the Rivière firm case, in Paloma Fernández-Pérez (1999) “La empresa familiar y el “síndrome de Buddenbrook” en la España contemporánea: el caso Rivière (1860-1979)” in Albert Carreras, Pere Pascual, David S. Reher, and Carles Sudrià, eds., *Doctor Nadal: La industrialización y el desarrollo económico de España* 2 vols. (Barcelona, 1999), 2, 1398-1414.

¹³ Year 2002 sales of Global Steel Wire were 200 M euros; workforce 537; wire rod production 700,000 Tons. See www.globalsteelwire.com/compania/datos/datos.html. The historical family firms specialized in wire rod and its derivatives (wires, woven wire, cords, strands, meshes, jetties, cold heading screws, steel cord....) now under GSW control are Trefileria Moreda SA, Trefilerias Quijano SA, Trenzas y Cables SL, Trefileria Franco-Española, Rivière SA. The Rubiralta holding group bought most of them between the 1980s and 2002.

¹⁴ The theory of vertical integration in Mark Casson “The Theory of Vertical integration: A Survey and Synthesis,” *Journal of Economic Studies* 2 (1984): 3-43. Vertical integration requires important investments and management reorganization costs that small firms are not always able to pay, see Julio Segura *Teoría de la economía industrial* (Madrid, 1993), chap. 2. On problems in

cooperation play in the evolution of the Spanish wire rod sector, and its adaptation to changing economic and institutional conditions? This paper is a first attempt to address these questions; research is still in progress.

To begin with, research concerning other peripheral European countries such as Italy and Sweden suggests that family firms dominated metal transformation from the late nineteenth century until the end of the twentieth century, as in Spain. In addition, regional inter-firm cooperation was a frequent strategy for maintaining or overcoming market power to survive against external competition; it was local/regional institutions rather than national ones that supported such cooperation.¹⁵ Finally, studies of cartels indicate that cooperation to achieve/maintain market power (as an efficient alternative to integration, scale and scope) also worked beyond regions, extending to the continental level, particularly after World War II.

New information provided in Table 1 supports a growing European cooperation between medium and big family firms in the case of the production/distribution of wires and wire derivatives. These data come from the European association *Bureau International des Toiles Métalliques* (BITOM). This little-known association, still located in Brussels, was created in 1947 by western European firms specialized in woven wire products who were interested in linking efforts of knowledge transference to maintain market power against United States and Asian firms. The BITOM (first international convention in Paris 1949) came to represent in 1979 about 70 percent of the European production of woven wire products. Confidential reports of the association explicitly indicated that their goals were to exchange among associated firms useful information about prices and sales, and contribute to the formation of a commercial block of European firms whose cooperation could help survival of century-old firms, in face of the enormous competition from United States and

achieving vertical integration in Spanish distribution of metal products, see Jose Ignacio Martínez Ruiz, *La Unión de Almacenistas de hierros y la distribución de hierros comerciales en España. Una aportación al estudio del funcionamiento del mercado de productos siderúrgicos (c.1900-c.1960)*, Doc. Trabajo 9806, Programa de Historia Económica Fundación Empresa Pública, July 1998.

¹⁵ An introduction to the origins of iron wire in Henry .D. and Frances T. McCallum, *The Wire that Fenced the West* (Norman, Okla., 1965). For Italy, Andrea Colli, *Legami di ferro: Storia del distretto metallurgico e meccanico lecchese tra Otto e Novecento* (Catanzaro 1999). Other countries in G. L. Fontana ed., *Le vie dell'industrializzazione europea: sistemi a confronto* (Bologna, 1997). A. Floren, and Goran Ryden "Convergencia tecnológica y diversidad social. Mercados, centros de producción y cambio tecnológico en la industria del hierro europea 1600-1850," *Revista de Historia Industrial* 12 (1997): 75-111; Heckscher, *An Economic History of Sweden*; Jörberg "The Diffusion of Technology and Industrial Change in Sweden," 185-200.

Japanese firms after World War II.¹⁶ A list of associated firms of BITOM elaborated by mid 1978 (before many of them disappeared as independent businesses) included dominantly family firms from different western European countries. The list, in Table 1, shows that almost 90 percent of them were founded before World War II, more than half in the eighteenth and nineteenth centuries. Private business records reveal these firms held close networks of friendship throughout generations among them, and maintained “gentlemanly” conceptions about businesses and respect for each other’s market territories.¹⁷

Regionally Based Family Firms in the Production of Wires and Wire Derivatives in Spain

Historically, the commercial distribution and the production of wire derivatives like nails, pins, woven wires, cords, or grille-works took place earlier in Spain (before the mid-nineteenth century) than the production of wire. The most recent achievement was the capacity to produce wire rod, the semi-elaborated product that is the basis of the whole sector.

Technologically speaking, wires had been produced in Spain since the eighteenth century but, as was the case in other European cities of the time like the Birmingham studied by Maxine Berg, wires were at that time

¹⁶ BITOM. Rapport Annuel 1978-1979. Ce rapport est strictement confidentiel et est destiné exclusivement aux membres, 18-5-1979 (Family Archive of the Rivière Family of Francisco Rivière Ribas).

¹⁷ Family Archive of Rivière Family in Barcelona: “Memorias,” 2 volumes by Francisco Luis Rivière Manén in the 1960s. Ramón Bustamante Quijano, *José María Quijano (Vida y obra de un hidalgo emprendedor)* (Santander, 1986). Jan A. van Houtte, N. Maddens, R. Vandeputte, J. Deloof, L. Kymper, N. Maes, J. Meert, M. Naessens, (1980), *Bekaert, 100 Développement économique dans le sud de la Flandre Occidentale*. Andrea Colli, *Legami di ferro*. “Gentlemanly” often meant sharing religious ideas about entrepreneurship that spread in Europe in the late nineteenth century, and even more often meant respect for decisions and networks taken by previous generations of the family firm. Families of machine-makers and woven wire producers in Germany, France, Belgium, England, and Spain, maintained business contacts among them (providing products and services) through three and four generations, despite political turmoil, according to “Memorias” from Rivière Manén and according to Francisco Luis Rivière Manén *Francisco Rivière 1835-1911: Intimidades de una empresa barcelonesa* (Barcelona, 1954). On family businesses and the role of culture and region in family firms, see Mary B. Rose, ed., *Family Business* (Aldershot, 1995). Colli, Fernández-Pérez, Rose “National Determinants of Family Firm Behaviour in Britain, Italy and Spain.”

TABLE 1
Western European Wire Weavers Association Firms of the “Bureau
Internationale des Toiles Métalliques”

| Firm by Country | Foundation year | Beginning activity | Year entered in BITOM |
|---|--------------------|-----------------------|--------------------------|
| Austria | | | |
| Hutter & Scrantz AG | 1824 | 1851 | 1949 |
| Belgium | | | |
| Trefil Arbed SA | 1784 | 1784 | 1947 |
| Switzerland | | | |
| G. Bopp & Co. AG | 1881 | 1881 | 1966 |
| Germany | | | |
| Vereingung der Drahtwebereiene.v. | 1946 | | 1949 |
| August Baumeister | 1908 | 1934 | 1975 |
| Carl Beisser | 1891 | 1891 | 1965 |
| Dorstener Drahtwerke H. W. Brune&Co. | 1918 | 1924 | 1949 |
| Dürener Metalltuch Schoeller-Hoesch&Co. | 1898 | 1898 | 1949 |
| Carl Wilhelm Häcker | 1925 | 1925 | 1965 |
| Haver & Boecker | 1887 | 1887 | 1949 |
| Hein, Lehman AG | 1899 | 1948 | 1975 |
| Isenmann-Drahterzeugnisse | 1948 | 1948 | 1975 |
| Andreas Kuferath KG | 1782 | 1782 | 1949 |
| KGD-Gebr-Kufferath | 1925 | 1925 | 1949 |
| Lenzner Metallgewebe | 1913 | 1913 | 1959 |
| Neuwalzwerk Bettermann | 1827 | 1872 | 1949 |
| C .M. Pieper&Co | 1831 | 1831 | 1949 |
| Ratazzi & May CombH&Co. | 1778 | 1778 | 1978 |
| Rösler Draht AG | 1872 | 1872 | 1949 |
| Drahtwerk C.S. Schmidt AG | 1861 | 1861 | 1950 |
| Severin & Co. Drahtweberei | 1911 | 1911 | 1949 |
| Spörl & Co. Präzisionsdrahtweberei | 1956 | 1956 | 1965 |
| Spain | | | |
| M. Codina SA | 1895 | 1895 | 1973 |
| Rivière SA | 1854 | 1854 | 1949 |
| France | | | |
| Syndicat Français du Tissage Métallique | 1934 | | 1947 |
| Giron SA | 1924 | 1924 | 1965 |
| G. Michel Fils S. R. L. | 1748 | 1748 | 1947 |
| Tissmétal Lionel-Dupont SA | 1845 | 1845 | 1947 |
| Great Britain | | | |
| British Woven Wire Export Association | 1940 | | 1947 |
| Associated Perforated Weavers&Co.Ltd. | 1811 | 1878 | 1947 |
| Begg, Cousland&Co.LTd.(Glasgow) | 1837 | 1924 | 1947 |
| N. Greening LTd. Britannia Works | 1799 | 1799 | 1947 |
| Lockerwire Weavers LTd. | 1811 | 1878 | 1947 |
| Joseph Nichols&Son Ltd. | 1841 | 1892 | 1947 |
| F.W.Potter&Soar Ltd. | 1824 | 1824 | 1947 |
| Bedford, Steer, End&Co.Ltd. | 1824 | 1824 | 1947 |
| United Wire Limited | 1823 | 1897 | 1947 |
| Ireland | | | |
| Irish Filter Supply Ltd. | 1973 | 1973 | 1975 |
| Shannon Wire Weavers Ltd. | 1961 | 1961 | 1971 |

| Firm by Country | Foundation Year | Beginning Activity | Year Entered in BITOM |
|--|-----------------|--------------------|-----------------------|
| Italy | | | |
| Stabilimenti G. Fornara &C. SpA | 1856 | 1885 | 1947 |
| Stabilimenti Metallurgici Fratelli Mariani SpA | 1929 | 1929 | 1975 |
| Felice Schianetti &Figli SpA | 1861 | 1872 | 1974 |
| Netherlands | | | |
| Wire Weaving Co. Ltd. | 1917 | 1917 | 1947 |
| B.V. Metalgaas Twente | 1915 | 1915 | 1947 |
| Portugal | | | |
| Industrias Metalicas Presidente | 1937 | 1937 | 1949 |
| Pretela, Fabrica de Telas Metalicas Ltda. | 1973 | 1974 | 1974 |

Source: *Bureau Internationale des Toiles Métalliques. Liste des membres January 1979*. Family Archive of the Rivière Family in Barcelona. BITOM began activities in 1947 (First International Meeting, Paris, 1949).

made of gold and silver for a reduced market, for jewelry uses, in major city-markets of the country like Madrid, Seville, and Barcelona.¹⁸

The application of this technique to obtain wires from copper, iron, and steel was slow, depending heavily on technological transfer -machines and technicians- from abroad (United Kingdom, France, Germany), and becoming a nationalized production only since the end of the nineteenth century and first decades of the twentieth century.

The mechanization of the wire derivatives, and the required availability of wire rod production in Spain started to take place in the second half of the nineteenth century, as Table 2 reveals. Mechanization speeded relatively speaking in a few regions like Catalonia, the Basque Country, or Cantabria.¹⁹

In some firms like Rivière the process did not take place at a sudden, was not complete before mid twentieth century, and meant a long co-existence of mechanized and artisan production in the factories and a very slow disappearance of craftsmanship in the sector, something that a current research in tax records and company records is starting to unveil.

Before the Spanish Civil war (1936-39) women participated in the workforce of these activities (less dangerous than heavy metal industries),

¹⁸ Gold and silver wire weavers are documented in the most important cities of Spain, in tax information about artisans of the 1856 *Estadística Administrativa de la Contribución Industrial*, Ministerio de Hacienda, Biblioteca.

¹⁹ For first two decades of the twentieth century in Catalonia see Angel Calvo *La transformación de la estructura industrial en Cataluña 1898-1920* (unpublished Ph.D. diss., Barcelona University, Oct. 1985, vol. 1, pp. 114-241 and vol. 2, pp. 596-655). References for the sector for Basque Country (Alambres del Cadagua firm) and Cantabria in these years, in Ramón Bustamante Quijano, *José María Quijano (Vida y obra de un hidalgo emprendedor)* (Santander, 1986).

not weaving but more often producing nails, pins, and wire in the “*hileras*” or wire-plates.²⁰ In a few cases, women also shared management responsibilities particularly like Antonia Manén Massana when they were widows of entrepreneurs who legally trusted them –as it was also the case in the United Kingdom or Italy.²¹

Until the diffusion of electricity in industrial production, the major markets for wire rod derivatives were food production/distribution (flour, olive oil, oranges), cattle ranching, papermaking, mining, and textiles.

Demand for wire rod derivatives expanded enormously in the first three decades of the twentieth century for both external and domestic reasons. Electricity, transportation-communications improvements, and the increase in iron consumption in cities and industries in these decades demanded a larger and growing variety of products adapted to specific regional and local demands. However, the First World War meant a golden age of production and exports to the core industrialized economies of Europe, which benefited even firms that did not meet the standard quality requirements of the new European clients.²² For firms that benefited most from these good times (such as Rivière and Quijano), the year 1929 was the best year in history. Investments were made to consoli-

²⁰ MoredaRivièreTrefileras-GSW Historical Archive. *Matrícula de obreros. Fábrica de San Martín. Fábrica de Casa Antúnez. Fábrica de Badalona*. 8 volumes for years 1871-1939. Currently I am working on these sources. Maxine Berg, in *Age of Manufactures, 1700-1820: Industry, Innovation, and Work in Britain* explains how in the United Kingdom as iron technology advanced the new furnaces became a masculine activity whereas the traditional less mechanized production of nails and pins were left as a less well-paid feminine occupation. The case of the Midlands in the eighteenth century, in chapter 11 of Berg's book (in the Spanish edition, Barcelona, 1987, p 336-7)

²¹ Andrea Colli in *Legami di ferro...* mentions at least three cases of women entrepreneurs in the wire weaving and wire production sector in nineteenth century Northern Italy, who took a very active role due to widowhood and the legal manifestation of masculine trust. Berg in *Age of Manufactures* also mentions cases of widows in eighteenth century Britain taking management responsibilities (Spanish edition, 337). Antonia Manén Massana was Francisco Rivière Chavany's wife; her husband died in 1922 and left her sole heir of his share in the family business he had with his brother Fernando Rivière Chavany. Rivière Chavany only bequeathed his two sons a small amount of wealth and complete dependence on their mother's will for business participation (Francisco Luis Rivière Manén, unpublished *Memorias*, vol. 1). The wife of the founder of another Catalan wire weaving workshop, Codina of Capellades, also shared working responsibilities in the first years of the business, according to their historical records.

²² According to Damián Mateu, an important second-hand iron dealer of Barcelona quoted by a member of the Spanish Ministry of Defense in the reports for the *Comisiones para la Movilización Industrial*, 1917. Archivo Militar de Segovia. Thanks to Elena San Román for helping me locate these reports.

TABLE 2
Wires & Wire Derivatives Sector Spain, 1856 and 1915
(Workshops and Factories)

| | Nails & Paris Nails | Buckles & Pins | Woven Wire | Wire | Cords | Electrical Cords | Artificial Thorn | Grille- works |
|------|------------------------|-------------------|---------------|------|-------|---------------------|---------------------|------------------|
| 1856 | 50 | 12 | 14 | -- | -- | -- | -- | -- |
| 1915 | 37 | 14 | 28 | 19 | 12 | 20 | 6 | 4 |

Sources: For 1856: tax information from *Estadística Administrativa de la Contribución Industrial 1856* (that excludes Basque Country and Navarre), including mechanized and manual workshops. Figures for 1856 are “*unidades*” or tax units, which seem to indicate factories and workshops rather than separate firms. Only in the case of woven wire, the figure is “*contribuyentes de telas metálicas*” or taxpayers (probably firms) for lack of information on comparable tax units. For 1915: *Exposición Internacional: Asesoría Informativa-Organización de Propaganda, Índice y clasificación de las industrias correspondientes a cada una de las Provincias de España* (1915). Professor Francesca Antolín generously provided this reference. Figures are “the number of industries” which are probably factories/workshops, not firms.

date market power in Spain and to achieve national leadership in technological innovation. This was the first time in the history of the most successful firms that these investments and efforts took place at the national level. In the 1920s-30s, national and international markets made significant demands that small firms could not meet; many of the nineteenth century firms with regional market power started to disappear (Rosés, Detouche, Marull in Catalonia) while those who met the new needs began buying the small firms, consolidating leadership at the regional level, and became competitive at national levels. This was the case of Rivière in Catalonia and Quijano in Santander. The growth strategies they used, however, were different.

Quijano’s products and financing strategies were different from those of the Catalan Rivière. Because of the availability of better energy resources in Santander, Quijano specialized in high-carbon wire products. He raised capital by taking advantage of regional networks of kinship and friendship that extended to political friends and kin located in the Senate and Congress in Madrid. Rivière reinvested much more of his profits than Quijano because he initially lacked strong ties with regional elites, though he also maintained contacts with foreign friends and kin.

The Spanish Civil War (1936-1939) interrupted the process of growth and innovation these successful firms began in the 1920s. At this point, we only have information for the Rivière family. The family had to go into exile to Navarre and Basque Country, and to Italy and France; the

factories were controlled by anarchist groups C.N.T. and F.A.I.. The Rivière's Catholic upbringing led them to connections with Catholic groups of diverse Spanish entrepreneurs in the same situation, and they made contacts in exile with friends who belonged to the important political factions (Falange) that would eventually take power during Francoist dictatorship in the 1940s.

According to the more than 1,000 pages-Memoires of Francisco Luis Rivière Manén, friends made during this time of political and economic turmoil would be soon of fundamental importance for his family to successfully take over again their properties, obtain regular supplies of very scarce wire rod, achieve production levels of 1929 (in 1953) and obtain very important clients in the 1940s-1950s. Some of these clients were the national railways company (RENFE), the national car producer SEAT (producing reinforced seats), and the U.S. military bases in Spain.

Networks at national level were much more important for survival in the 1940s-1950s for Rivière and Quijano than in the 1920s, particularly with groups and individuals occupying relevant political positions in Madrid. However, Rivière and Quijano did not limit their networking activity to these new political needs. Aware as they had been before the civil war of the importance of technological innovation and regional networking they maintained close contacts with Universities and technical institutes of Europe and the United States, became members of European associations that coincided with them with the need to link efforts against U.S. and Japanese competition (see Table 1). They incorporated scientific organization of production and human relations approach to management in an eclectic way, following what other countries in Europe were doing to improve management of firms in an increasingly globalized economy. They maintained at the same time close networks with other entrepreneurs and specialized institutes of management education at the regional level (IESE).²³

²³ Paloma Fernández-Pérez and Núria Puig, "Knowledge and Training in Family Firms of the European Periphery. The Case of Spain." Paloma Fernández-Pérez, "La empresa familiar y el síndrome de Buddenbrook."