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**Networks of People in Specialty Production:
Family Firms in the Iron and Steel Wire Industries in Spain
(1870-2000)**

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Abstract

Capital intensive industries in specialized niches of production have constituted solid ground for family firms in Spain, as evidenced by the experience of the iron and steel wire industries between 1870 and 2000. The embeddedness of these firms in their local and regional environments have allowed the creation of networks that, together with favourable institutional conditions, significantly explain the dominance of family entrepreneurship in iron and steel wire manufacturing in Spain, until the end of the 20th century. Dominance of family firms at the regional level has not been an obstacle for innovation in wire manufacturing in Spain, which has taken place even when institutional conditions blocked innovation and traditional networking. Therefore, economic theories about the difficulties dynastic family firms may have to perform appropriately in science-based industries must be questioned.

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Resum

Les empreses familiars han estat a l'Estat espanyol protagonistes de nínxols d'especialització en indústries capital intensives com les indústries del metall que fabriquen productes llargs, i així ho demostra el cas de les indústries del filferro entre 1870 i 2000. La integració de les empreses familiars en els seus entorns locals i regionals, la creació de xarxes personals i condicions institucionals favorables, expliquen el predomini del "capitalisme familiar" en el filferro a Espanya. Les evidències per aquest subsector qüestionen la validesa d'algunes teories econòmiques que argumenten les dificultats que les empreses familiars tenen per aconseguir ser centenàries en indústries d'alt contingut científic i tecnològic.

Networks of People in Specialty Production: Family Firms in the Iron and Steel Wire Industries in Spain (1870-2000) ¹

1. Introduction

Specialty production and innovation are increasingly identified with geographical concentration and relationship between applied scientific knowledge and entrepreneurship, particularly –though not always- when favourable institutional conditions prevail.²

Recent literature about the Spanish industrialization between the late 18th century and the end of the 20th century confirms that specialization and innovation have often been developed by small and medium workshops and factories in some peripheral regions and cities of the country, and Madrid. Big corporate firms in Spain have been rather the exception than the rule.³ The reasons that explain this persistence of family capitalism are not peculiar to Spain, but common to other countries, and must be related to the importance of

¹ A draft with some of the ideas of this article was presented at the *Joint Business History Conference–European Business History Association Meeting* in Lowell, Massachusetts, June 2003. Comments received in Lowell from Philip Scranton, Robert Forrant, Jeff Fear, David Kirtsch, Agnes Pogany and Francesca Antolin have contributed to improve the organization and ideas, though the usual disclaimer of final responsibility should be applied. I also acknowledge financial support from Spanish Research Projects DGICYT (PB94-0892), DGES (PB97-0931, PB98-1265, PB97-0875, PB98-1167), and the 2003 “*Ayuda a la Investigación*” from *Fundación Banco Bilbao Vizcaya Argentaria*.

² Scranton (1997), Sabel and Zeitlin (1997), Rose (2000), Parsons and Rose (2004), Colli (1999).

³ Nadal dir (2003), Carreras y Tafunell (1993), y Tirado Fabregat (2002).

the locality and the region in entrepreneurship, and to institutional conditions that protected SMEs.⁴

This article aims first of all at contributing to a better understanding of the persistence of family entrepreneurship in Spain, in a specialized sector which was iron and steel wire manufacturing. Secondly, and on another ground, it also wants to contribute to recent theoretical literature about the difficulties family firms would have in science-based industries. Thus, according to some economic models about family firm performance, family firms with high requirements of capital and technology only with difficulties could have been “dynastic” family firms, and therefore very rarely could survive several generations of owners and managers linked by kinship ties.⁵ Available literature about family firm performance in Europe in the second half of the 20th century tends to question this assertion with many empirical evidences.⁶ For Spain, studies about the pharmaceutical and perfume industries in Spain have already stressed the innovative character of specialized family firms.⁷ This article adds more new evidences about the flexibility and innovation in capital intensive family firms of the iron and steel wire industries like Rivière and Quijano. The study also presents some explanations related to the creation of personal and entrepreneurial networks and the influence of institutional conditions.

⁴ Colli, Fernández Pérez and Rose (2003).

⁵ Casson (1999).

⁶ Rose (2000), Parsons and Rose (2004); Becattini, Pyke and Segenberger (1992).

⁷ Núria Puig has published several works about the perfume and pharmaceutical industries.

From the mid nineteenth century until the end of the twentieth century the overwhelming majority of firms in Spanish steelwire manufacturing have been owned and managed by families. Available information about surviving family firms suggest these families regularly invested in knowledge transfer and innovation from the late 19th to the late 20th century, even when institutional conditions blocked such transfer. In a few cases, some of these family firms actively cooperated among them to reduce transaction and information costs, and remove or reduce institutional difficulties. Therefore, a third contribution of this article is to reveal the importance that “networks of people” have had in maintaining family firms in this industrial sector. As M. Casson and other authors have rightly indicated, the concept of networks when applied to social sciences must consider not only a potential cooperative side, but also often often subordination and struggle when networks link unequal elements.⁸

2. Spanish Firms in Iron and Steel Wire Manufacturing

Families in steel wire production are commonly found in Western Europe until at least the late 1970s. Spain’s wire-manufacturing firms differed from those in other European countries like Belgium and Italy mainly in size, geographic concentration, chronology of technological innovation, and

⁸ Casson (2005).

markets.⁹ Regarding size, most Spanish firms between the 1870s and the 1970s remained small, with less than 100 employees, and a few grew to medium size (100-1000 employees) during the twentieth century. Concentration in the 1980s-1990s took place in the industry: a major leading holding company appeared that surpassed 1,000 employees with absorbed medium firms (*Compañía Española de Laminados S.A., CELSA*, owned by the Catalan Rubiralta brothers).

As for geographic distribution, whereas steel wire firms have been highly concentrated in a few industrial districts in some regions of Italy, Germany, and Belgium, Spanish wireworks were located in separated and very different regions of the North and NorthEastern periphery (Asturias, Cantabria, Basque Country, Catalonia). Besides, and with the exception of the Quijano firm in Los Corrales de Buelna (Cantabria), the regional territory that surrounds wire manufacturing centers in Spain has not heavily depended on the steel wire industry for local employment or GDP formation, in contrast with the Italian and Belgium cases.

Two final contrasts regarding other European steel wire firms are the chronology of technological innovation and market orientation. The German village of Altena started the first major innovation to mechanize wire production in the XVIth century (the wiredrawing bench with waterpower), which was transferred to France, Italy, the United Kingdom, and Northern

⁹ Colli (1999).

villages of Spain between the XVIIth and the XVIIIth centuries. Continuous wire machines, and looms for continuous wirecloth, powered with electricity started to be made in these countries in the 1870s-1880s by well-known firms like Wafios or Irmischer. These machines were fundamental to achieve mass production of iron and steel wires and also different kinds of wirecloth. The next important innovation was to mass produce very fine wires for high-tech products, and pieces made of tungsten (like the “widia”, invented by the Krupp firm in the interwar years) just allowed that in the 1930s and above all in the 1940s.

In the case of Spain, and more particularly in the above-mentioned Northern regions, technological innovations generally were transferred from France, Germany, and the United Kingdom, and innovation took place rather in the process of adapting foreign techniques to local needs and designing new commercial and managerial habits. The wiredrawing bench with water power arrived in the second half of the XVIIIth century, continuous wire machines and looms for continuous metal cloth in the 1910s-1920s, and the widia to produce cheap fine wires in the 1950s. Regarding markets, Spanish firms concentrated on selling to the national market and avoided expanding into markets outside the country, at least until the 1980s, when Spain became completely integrated into the European market. Their Spanish clients, for example, enjoyed flexible payment conditions that sometimes forced firms to finance their customers, jeopardizing their investment possibilities. Transportation and communication

difficulties were additional problems for Spanish exports. Because of the obstacles, only a small percentage of Spanish steel wire production was sold to foreign markets, particularly to Latin America, from the 1870s until the 1970s. After the 1970s the industrial crisis and the economic integration in Europe in 1986 modified the structure of the steelwire industries, and exports started to be more competitive in the European markets, and experienced a significant increase -although in general with percentages over production (30-35% in leading firms) that were lower than those corresponding to Italian or German competitors (up to 60-70% in leading firms)-.

The sector expanded in Spain modestly in the nineteenth century, growing from fourteen wire-weaving workshops and factories (*telas metálicas*) in 1856 to thirty in 1891 (sixteen of these were in Barcelona); by 1900 there were forty-five manufacturers engaged in wire weaving and forty-three producing *rejillas*, or thinner wire mesh. Production increased in the twentieth century; by 1915 there were nineteen steel-wire producers, thirty-two cable producers, thirty-seven manufacturers of wire nails, and twenty-eight wire weavers. Until the late 1890s, Spain's consumption of the raw material required for this industry depended heavily on imports from France, Germany, and Great Britain.¹⁰ Spanish wire manufacturing achieved the pinnacle of production between 1968 and 1974 but was hard hit by the oil crisis of 1974–76.¹¹ Many

¹⁰ Colli (1999). The strong growth of the wire nail sector in the U.S at the end of the 19th century in Lamoreaux (1985).

¹¹Nadal, dir., (2003), p. 278, table III.3.1.6.

family firms were unable to remain independent during the 1970s. By the 1980s and 1990s, many long-established companies had been bought by larger firms, partly because they were unable to survive the economic slump and partly because they could not adapt to the changes in the economic environment that accompanied Spain's inclusion in the European Union after 1986. Excess production, labor problems, inability to expand their operations into other countries, and failure to plan for leadership succession resulted in the absorption of family businesses like Quijano and Rivière by Global Steel Wire (GSW), a family firm created in the 1960s.¹² In 2000 GSW, controlled by *CELSA (Compañía Española de Laminados S.A.)* of the Catalan Rubiralta brothers,¹³ was leading the ranking of Spanish firms of the sector.

How do we explain the survival of many of Spain's regionally based family firms for such a long period of time in a sector that had elsewhere been dominated by vertical integration, corporate structure, and world financial markets?¹⁴ How did wire manufacturers manage to succeed in a technologically backward country endowed with few natural resources, and lacking enough capital to finance imports of raw material and support

¹² An approach with the Rivière firm case, in Fernández-Pérez (1999).

¹³ 2002 sales of Global Steel Wire are 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. Most of them were bought by the Rubiralta holding group between the 1980s-2002.

¹⁴ Casson (1984). On the problems to achieve vertical integration in Spanish distribution of metal products, see Martínez Ruiz (1998).

expansion into international markets? Wire manufacturers benefited from a combination of institutional conditions and personal networking. I will look at each of these factors in turn.

II Institutional conditions

During the 19th century and until the 1880s the introduction of metal imports had a very benign tariff system that allowed technology transfer. However, at the end of the 19th century metal manufacturers had already acquired capabilities to imitate and in some products even innovate what they previously imported. Spanish metal manufacturing in some regions developed, and some firms even exported to the Spanish Caribbean market of Puerto Rico and Cuba. When Spain lost these Caribbean markets after 1898, and when the agricultural crisis of these ending years of the 19th century decreased domestic sales, medium-sized wire manufacturers of the northern regions of Spain started to associate at the regional level, and joined forces to try to obtain from the State in Madrid effective tariff measures to protect their industries and reduce foreign competition. The State was sensible to some of these claims, as it also was for other industrialists like the metal producers. The government revised the relatively liberal tariffs that had been in place since 1869.¹⁵ Spanish foreign-trade statistics reveal that the average tariff on iron wires, nets, and springs rose

¹⁵ Sáez García (2005).

from between 20 percent to 25 percent of the value of imports in 1854 to 40 percent in 1900.¹⁶

After lobbying successfully to establish new tariffs, in 1891, 1906, and 1921, the steel-wire manufacturers consolidated former regional clubs and associations to ensure that the effect of the new laws was to stimulate import substitution and reserve the Spanish market for Spanish manufacturers.¹⁷ The *Central de Productores de Alambres y Puntas* (Central Association of Wire and Nail Producers) in the northern regions and the *Unión de Fabricantes* (Union of Manufacturers of Wire Derivatives) in Catalonia eventually united, forming a cartel in 1925. Cartels, as next section indicates, were not prohibited in Spain, and proliferated in these years either in capital intensive or labour intensive sectors.

The unpublished letters of François Rivière Bonneton and of his grandson, Francisco Luis Rivière Manén, reveal that, between 1891 and 1925, the new tariffs, technology transfer, and investment in innovative methods boosted

¹⁶ Ministerio de Hacienda, Dirección General de Aduanas. Estadística General del Comercio Exterior de España (1854), (1900) and (1934).

¹⁷ Arxiu Històric del Fomento del Trabajo Nacional in Barcelona. Francisco Rivière, “Telas metálicas”, in *Contestación al Voto Particular del Excmo. Sr. Don Segismundo Moret Prendergast al Dictamen de la Comisión Arancelaria*. Barcelona, Tipografía Hispano-Americana, 1891, pp. 31-50. *Memoria leída en la Junta General Ordinaria de Socios celebrada el día 29 de enero de 1893*. Barcelona, Imprenta de Henrich y Cia, 1893. *Memoria leída en la Junta General Ordinaria de socios celebrada el día 26 de enero de 1896*. Barcelona, Tipografía Española, 1896. *Memoria leída en la Junta General Ordinaria de socios de 31 de enero de 1904*. Barcelona, Imprenta de Domingo Casanovas, 1904. Agrupación de Industrias Siderúrgicas y Metalúrgicas del Fomento del Trabajo Nacional. *Memoria de los trabajos realizados hasta la fecha por la actual Junta Directiva leída en la Junta General celebrada el 13 de mayo de 1909*.

Spanish production of steel wire.¹⁸ The Spanish cartel lobbied to maintain tariff protection throughout the 1920s, a decade when investment in public infrastructure was increasing and industry was expanding under the umbrella of new protectionist industrial laws. Records of meetings and private gatherings from the Spanish public and private archives confirm that relations between the state and the metal producers during this period were cordial.¹⁹

The Spanish Civil War (1936–1939) interrupted these arrangements, and the cartel firms' new strategies were undermined by Franco's autarkic policies initiated in 1939. Between 1938 and 1975 Franco's dictatorship changed the rules of the game for entrepreneurship in Spain. Public intervention enormously modified the strategies of private firms. In some sectors the State created firms to compete with the private initiative, foreign investment was prohibited or drastically reduced (until 1959), and new institutions were imposed to mediate between the entrepreneurs and the State and between entrepreneurs and workers.²⁰ Thus, for example, in 1941 the state created a public holding organization, Instituto Nacional de Industria (I.N.I.), in which to invest its funds for a new industrial policy. It forced some private firms in the transportation industries to sell a controlling portion to I.N.I. and established new firms in this sector, in the energy, iron, and steel industries, and in the chemical industry,

¹⁸ Unpublished letters of François Rivière Bonneton and unpublished memoirs of Francisco Luis Rivière Manén, Historical Archive of Francisco Rivière Ribas in Barcelona.

¹⁹ Archivo Militar de Segovia. Legajos de la Comisión de Movilización Industrial, 1916-1921. Memorias.

²⁰ Sánchez and Tascón, eds. (2003).

which had the effect of concentrating scarce resources in a few capital-intensive industries.²¹

Major steel-wire firms did not experience competition from the new public industrial holding, in part because their owners had friends in the Franco regime and in part because wire manufacturing had less strategic importance than heavy metal production. I.N.I. did not bother to impose control over the steel-wire firms. The impact of the state's attempt to control heavy industry in the 1940s and 1950s, while negative for much of Spanish industry, allowed the wire manufacturers, by contrast, to develop unhindered (though with higher costs when raw materials had to be bought to inefficient public industries).

A factor that benefited Spain's large steelwire firms, such as Quijano, Moreda, and Rivière, during the 1950s and 1960s, was that wiring was required in critically important industrial sectors, such as building construction (which utilized mesh, cables, and nets), the automobile industry (which needed springs for seats and reinforced cables for pneumatic tires), and telecommunications and electronics (which used cables and filters). Production was pushed by strong demand and a favorable institutional environment, and by the technological requirements of the updated processes installed in the 1960s. However, overcapacity and a bloated labor force soon impeded the growth of the domestic market. While, on the one hand, their integration into world markets enabled Spanish wire manufacturers to acquire modern technology and

²¹ Nadal, dir. (2003).

enjoy increased demand, on the other hand, they had to contend with rigid Francoist labor policies, which protected permanent employment so that firms could not reduce or restructure their labour forces, at the expense of maintaining low salaries in a very inflationary period.

In 1974 new legislation directed the four major steel-wire producers, Quijano, Rivière, Moreda, and Echevarría, to reduce production in exchange for tax benefits. The legislation was passed in order to compel the industry to “rationalize” and curtail its output as a way of ensuring its survival. However, the legislation did not include measures that would force the companies to cut production costs and reorganize their management practices.²² Tariff rates, high before the Spanish Civil War, were prohibitive in the 1940s and early 1950s, a result of Francoist isolationism. The Stabilization Plan of 1959 launched a new period. Integration into the European market in 1986 meant convergence with European tariffs, allowing imports to flow into the country. .

To sum up, the State between the 1870s and the 1970s indirectly or directly benefited the dominance of some family firms in the Spanish steelwire industry. First of all, by being sensible to their claims for tariff protection in critical market conditions at the end of the 19th century. Then, by openly allowing a few firms to control the domestic market with cartel agreements in the 1920s. The support was carried out without calculating the costs that a heavily concentrated

²² Acción Concertada de la Siderurgia-Trefilería. Estadísticas de capacidad productiva pertenecientes a Quijano, Echevarría, Rivière y Moreda, 1974-1978, Historical Archive of Francisco Rivière Ribas in Barcelona..

and not always technologically advanced industry could have on market prices. After the Civil War (1936-39), during Franco's dictatorship (1939-1975) the creation of an industrial public sector, and the imposition of new rules in the relationship between the State, the entrepreneurs, and the workers, imposed either serious restrictions and drawbacks or benefits to the family firms in the wire manufacturing industry. Some examples of the negative impact the new State had on the sector were technological backwardness (by limiting technology transfer from abroad until 1959), high prices in raw materials and energy, and restrictions to their previous freedom to manage labour conditions. However, the benefits steel wire family firms obtained from State intervention in the 1940s-1970s appear also quite clear: as in other economic activities "peace" in labour relations was aggressively achieved and guaranteed by suppressing pre-civil war traditional unions and associations, and possible competitors were legally expelled until the 1960s (with laws that reduced imports and foreign capital investment, and other laws that since 1939 arbitrarily controlled the number and size of new industrial establishments in Spain). The few family firms that survived the civil war and established closed ties with the new regime, significantly influenced Franco's institutions in order to reduce competitors, receive special tax reductions, and maintain a reserved domestic market. These conditions help understand family dominance in these years in the Spanish steelwire industry, a sector which was experiencing an

increase in financial capital, corporate management and transnational ownership in other Western economies.

After 1959, but above all after Franco's death, the new democratic governments started a structural reform of the Spanish industry and the Spanish economy that affected foreign trade and taxes, among other aspects. In the late 1970s death duties paid by family firms affected by generational succession rose impressively up to a maximum of 50 per cent of the value to be transmitted, and new taxes on wealth were imposed, in coincidence with the years of the strong impact of the industrial crisis in Spain. The result of both critical changes was a high death rate of family firms in Spain that also affected, in the 1980s and 1990s, steel wire family firms like Quijano and Moreda (bought by Global Steel Wire-CELSA of the Catalan Rubiralta brothers) and Rivière (bought by a group of Spanish investors led by Manuel Varela Mato in 1979).

III- Networks of People

Another factor contributing to the persistence of family-owned firms in the wire-drawing industry was the development of strong personal networks between individual manufacturers and their families and friends. Cooperation was critical to the survival and growth of these firms, although the forms it took changed with shifts in market dynamics and in the institutional environment.

During the last two decades of the nineteenth century a combination of declining agricultural prices and industrial sales in the countryside led many entrepreneurs to unite forces. The objective was first to establish regular institutional forms of cooperation and knowledge transfer, and parallel to that to have a stronger voice in their conversations with State representatives in order to achieve protection against foreign competition. In 1889-1891 metal manufacturers started to associate at a regional level with these aims.²³ The tradition of cooperation among small and medium-sized firms stretched back for centuries, and was particularly strong in the metal districts located in Barcelona and Catalonia and in the industrial districts of the Basque province of Guipúzcoa. Cooperation took the form of trade associations that facilitated the spread of technical knowledge among their members, and of educational centers. Cooperation among the leading firms of the metal transformation activities, between the 1880s and the 1920s, took place at a regional level but in contrast with the smaller firms it also took place at State level and included as a main objective to exert political pressure to obtain protection from foreign competition. In this second case, as we have just seen in the previous section, cooperation often meant pressure to obtain from the State tax reductions for national products and tax increases for foreign products, and informal

²³ On the evolution of formal and informal institutions of knowledge transfer in Spain since the 18th century, see Fernández and Puig (2004).

agreements among firms to fix prices and divide the Spanish market in reserved areas for particular products of each firm.

Historically, capital-intensive sectors like iron, steel and concrete production have faced problems of overproduction and declining prices and, in many countries, producers have formed or tried to form cartels in order to overcome these difficulties. In Spain, and during the first three decades of the twentieth century, these problems affected also light metal transformation industries, and as an example major firms in steel wire and wire manufactures created their own State-level cartel in 1925. Cartels were never prohibited in Spain, and they appeared in the first three decades of the 20th century in concrete production, maritime transport, beer production, metal production, the distribution of commercial irons and steels, and in steelwire production, to name only a few sectors that have received research and publications.²⁴

The creation of cartels was the result of previous associationist activities, that adopted a new form in changing market circumstances. In her study of the merger movement in the United States in the late nineteenth century, Naomi Lamoreaux has suggested that firms within capital-intensive sectors that dominated slowly growing, stable markets had few reasons to form associations until they were faced with a sudden change in market conditions. Such a sudden

²⁴ Gómez Mendoza (1987); González Portilla (1985). About the role of the State in the creation of a cartel in the beer industry in Spain in the 1940s, and in maritime transportation in the 1950s, Torres Villanueva (2003). About cartels in iron and steel production, and also in the commercialization of commercial iron and steel in Spain in the interwar period references in Fernández Pérez (2004), chapters 1-4.

change occurred in Spain at the end of the nineteenth century, when Spain lost the Caribbean islands of Cuba and Puerto Rico after the Spanish-American War. This affected the Quijano and Rivière firms, which had been exporting around 10 percent of their products to these markets.²⁵ At the same time, in the domestic market, wire manufactures were suffering from falling prices in agriculture, the main sector of the Spanish economy, and the prices of raw materials needed to produce wire products were being pushed up by European protectionist measures.²⁶

These events triggered the formation of associations, which tried to influence state policy in the direction of protective legislation. Thus, the Catalan *Fomento del Trabajo Nacional* (translated as Promotion of National Work, although it was composed of entrepreneurs, not workers) established a special branch of associated metal firms between 1889 and 1891. François Rivière Bonneton, for one, whose firm, Rivière, was a member, wrote letters and pamphlets. In a thirty-page report, the manufacturers appraised the Spanish government of the impact of imports, production, and prices on the metal sector, arguing against the liberal tariffs that had been in place since 1869. They urged legislators in Madrid to add conditions to the 1891 tariff that would raise

²⁵ Historical Archive of the Barcelona Chamber of Commerce.

²⁶ Metal manufacturers of the Tarragona area indicated prices of iron tripled as a direct effect of the I WW. See Arnavat (1987), 114. I must acknowledge my colleague Ramon Ramon for kindly providing me a copy of this book.

the price of imports of wire products, thereby protecting the sector in Spain.²⁷ Northwestern entrepreneurs, led by Quijano's founder, José María Quijano, pressed regional entrepreneurs to unite behind efforts to pass favorable legislation and increase protection.

These associations drew in entrepreneurs from several regions. Personal networking resulted in more private -even secret- agreements regarding market distribution and price fixing, which were made outside the arena of political debate. Neither kinship or friendship were here the basis for networking, nor belonging to similar regional or cultural backgrounds. In fact Francisco Luis Rivière Manén in his private unpublished memoirs says that the leading members of each family in charge of signing the cartel agreement in 1925 had opposing personalities and did not like each other. Contrary to what Mark Granovetter's theoretical arguments say about the formation of business groups, these agreements among regional business groups in the Spanish steelwire industry had, more than a cultural basis, an economic basis.²⁸

²⁷ Rivière Manén (1954), indicates that Francisco Rivière Bonneton was the autor of the section about woven wires (Telas Metalicas) in the Catalan answer to the rise of tariffs in semi-elaborates and metal manufactures -that could protect iron & steel production but was perceived as a damage to metal transformation-. The whole discourse, including the defense about woven wires, in *Contestación al voto particular del Excmo. Sr. D. Segismundo Moret y Prendergast al dictamen de la Comisión Arancelaria* (Barcelona, 1891), preserved in the historical archive of Fomento del Trabajo Nacional. The Catalan associates wrote their arguments in this debate, but also travelled to Madrid twice to talk with politicians. Agrupación de Industrias Siderúrgicas y Metalúrgicas del Fomento del Trabajo Nacional, *Memoria de los trabajos realizados hasta la fecha por la actual Junta Directiva, leída en la Junta General celebrada el 13 de mayo de 1909*, p. 6)

²⁸ Granovetter (1992), 3–11, and Granovetter (1995), 93–130.

Agreements initially occurred between two firms producing complementary products. Soon, however, these private agreements became multilateral, and the signatories included companies engaged in similar branches of production. The signers' goal was to control the markets in their own and adjoining regions, and the Spanish market was apportioned among the parties to avoid open competition among major firms. Another reason for the firms' willingness to negotiate was that technological innovation and improvements in transportation were reducing production costs and prices while the number of competitors in Spain remained stable (though they were increasing abroad).²⁹ When Basque iron and steel producers began to integrate the manufacture of wire and wire derivatives, manufacturers in Cantabria and Catalonia, which had only a few wire-rod factories and steel furnaces, experienced a diminished supply of raw materials. The firms in these two regions then started their own cooperative movement, forming associations to ensure regular shipments of the wire-rod they needed to stay competitive.³⁰ In the late 1890s, Quijano agreed to provide Rosés with 1,500 annual tons of the wire it needed to produce nails, in exchange for Quijano's promise not to sell its

²⁹ Archivo Histórico de Francisco Rivière Ribas in Barcelona. F.L. Rivière Manén, unpublished *Memorias*, vol. II.

³⁰ In Quijano's historical archive there are documents in which José María Quijano, the founder, said that he started producing wire rod and establishing contacts with Catalan wire derivatives producers in a multilateral scale when Basque iron & steel producers (Alambres del Cadagua, Castrejana) started to manufacture wire and when traditional Basque providers of wire-rod (*palanquilla*) like *Altos Hornos* and *La Vizcaya* reduced the quantities sent to Quijano. Summarized in Bustamante Quijano (1986),180. Quijano said he did not want to compete in Catalonia with Rosés selling the nails both produced because of friendship, and he did not build a factory he had in mind in Barcelona in 1899-1900 for this reason (Bustamante Quijano, 1986, 183).

own nails in Rosés' territory, which encompassed eastern, central, and southern Spain.³¹ Another agreement, regarding woven wire products for the papermaking industry, was worked out between 1898 and 1902 and signed by the Catalan Rivière company and the Navarrese company, Perot.³² Still another arrangement, between Marull and Rivière, that fixed prices of triple-twist grillworks, lasted for eight years, from 1902 to 1910.³³

The first multilateral agreement, which was signed by Catalan, Asturian, and Cantabrian entrepreneurs who feared competition from the Basque region, grew out of a series of meetings held in 1907 in Barcelona. The *Union de Fabricantes de Alambres*, (Union of Wire Manufacturers) comprising six Catalan firms of wire entrepreneurs, and a northwestern association, *Central de Fabricantes de Alambres y Puntas* led by José María Quijano, reached agreements of production for individual products on the basis of the percentage of sales each firm could make of a particular product.

Although the two regional associations represented competing firms, their members were determined to remain independent, and thus they were willing to cooperate with each other in order to avoid being absorbed. Another agreement, signed in October 1925 in San Sebastian, resulted in the creation of a national cartel, *Sociedad Anónima de Trefilería y Derivados*, comprising seven independent firms from Catalonia, Asturias, Basque Country and Cantabria,

³¹ Rivière Manén (1954), 162.

³² Rivière Manén (1954), 184.

³³ Calvo Calvo (1985), vol. 1, 177-179.

under the leadership of Juan José Quijano (representing the second generation of the family firm Quijano of Santander) and the Rivière Chavany brothers (also representing the second generation, in this case of the family firm Rivière from Barcelona).³⁴

The Spanish Civil War (1936–1939) interrupted this process of inter-regional cooperation, just as it had interrupted technological innovation. We have more information for this period for one particular Catalan firm, Rivière S.A.. This family firm founded in 1854 was unable to match its 1929 level of production—its highest—until 1953.³⁵ The factories were taken over by the Republican government in 1937 and controlled by the anarchist group, *Confederación Nacional del Trabajo*, or National Confederation of Work (C.N.T.) until 1939, when the family took control again. The Rivières' Catholic connections (they had attended Jesuit schools and had a network of Jesuit friends based in Barcelona) enabled them to start new businesses in Pamplona and San Sebastian with the support of Catholic entrepreneurs who had also been uprooted by the war. Other members of the family called upon their French origins, moving to France to stay with relatives in Pau in southern France. The family used its network of friends and relatives to build relationships with individuals who came to enjoy top-level positions in the Francoist dictatorship

³⁴ Description of the process of constitution, products and firms involved, and percentages of market agreed, in F.L. Rivière Manén, unpublished *Memorias*, vol. 1, pp. 126-129 and 132.

³⁵ Historical Archive of Francisco Rivière Ribas. *Carpeta 5. Rivière S.A.*

during the 1940s.³⁶ These networks, created during the civil war years of political and economic turmoil, enabled the Rivières to regain its properties, obtain regular supplies of scarce wire-rod, boost production levels, and obtain important clients in the 1940s and 1950s. Some of these clients were the national railway company (RENFE), the national car producer SEAT (producing springs for the seats of the FIAT 1.400 model) and the U.S. military bases established in Spain, among others.³⁷

The 1940s and 1950s witnessed, as we have already said, significant changes in the market conditions in Spain. As we indicated before, after the Spanish civil war Franco's new regime started isolationist policies that meant a drastic fall of imports and foreign capital and technology. This new regime also imposed new institutions (strongly linked to State departments) to control labour relations in public and private firms. Very often entrepreneurs supported the changes, but in some regions and economic activities the State intervention was considered very inefficient and alternatives were sought. One of the most important examples of the latter was the *Centro para el Estudio y Asesoramiento Metalúrgicos (C.E.A.M.)* created in Barcelona in 1951. Its purpose was to train workers and executives of the metal industry in Catalonia, and to provide information about international markets and relevant state

³⁶ Rivière Manén (1938), *Tradición, Espíritu y Estilo de la Casa Rivière* (Pamplona, unpublished). And from same author the already mentioned *Memorias* in 2 volumes with about 600 pages (Calella-Cardedeu-Barcelona, 1961-70, unpublished). Some details, in Puigdomènec Tey (1993).

³⁷ Interview to Francisco Rivière Ribas by the autor, in Barcelona, October 1996.

policies. In the 1960s its members represented the most important medium and big metal firms in Catalonia.

Networks were critical to the survival of the two leading firms in the steelwire industry (Rivière and Quijano) in the 1940s and 1950s, when it was important to have contacts with groups and individuals occupying high-level positions in Madrid. Interruptions in regular supplies of raw materials, technology, and the international currency needed to pay for imports, resulting first from the upheaval of war and then from the harsh economic conditions imposed by the military dictatorship, impeded interregional cooperation during the 1940s.³⁸ Each region's firms decided in the 1940s to connect directly with the central government to obtain the now restricted imports and currency. After the war the state took a central role in distributing inputs to factories.

Firms found that it was more useful to communicate with the State and to intensify networks of cooperation with other firms of the same region than to keep networks with firms located in other regions -as they had been doing before the war-. Basque iron and steel producers reduced their sales to outside regions.³⁹ Asturian and Cantabrian manufacturers had iron and steel furnaces, and used them to provide raw material to their regional wireworks. Catalan manufacturers, poor in iron, coal, and wire-rod, suffered the reduction of sales of raw materials from Basque and Asturian providers and intensified personal

³⁸ Catalan (1995).

³⁹ According to testimonies of Catalan entrepreneurs in 1939 preserved in the Barcelona Chamber of Commerce.

inter-firm contacts within the Catalan region, by pulling together financial resources from different family firms. Documents from the Rivière company and the Catalan family firms Roca and Torras offer testimony of these common efforts.⁴⁰ An early initiative, in 1942, was the creation of *Siderúrgica Asturiana SA* (SIASA), a firm that used the German Renn-Krupp process to produce low-quality iron and steel in the Asturian mines of Avilés. SIASA was formed in Madrid, and it had factories in Asturias and partners in Catalonia and Asturias, but it was composed of the Catalan firms Torras Herrería y Construcciones, Aceros Calibrados M. Aracil Bonas, A. Bianchini Ingenieros Trefilería, Tubos y Perfiles SA, Metales y Platería Ribera SA, Rivière SA Trefilería, and Altos Hornos de Cataluña (bought by Rivière in 1942).⁴¹ A second postwar initiative was the joint acquisition of an old factory in Mieres, located in the important coal region of Asturias, by four Catalan metal firms: Rivière, Torras, Suñer-Comercial de Laminados, and Roca. Neither initiative lasted very long, because the public industrial holding company INI bought out SIASA, and strong internal conflicts doomed the Mieres venture.⁴²

⁴⁰ See for the Rocas a summary in Fernández Pérez (2000). For the Can Torras dels Ferros, see Cabana and Feliu i Torras (1987), chapter 4.

⁴¹ In 1942 works to start the factory in Aviles started, but the fall of the Nazi regime left technological transfer stopped, and INI bought a 20 per cent of its shares in November 18 1948, while the Krupp firm kept also some percentage of property. By 1965 the Catalan firm Torras was the main shareowner with 20 per cent of the capital. In Cabana and Feliu (1987), 150.

⁴² About SIASA and the presence of INI, see Cabana and Feliu, chapter 4. About the Mieres story, Jaime Rivière Manén –who was direct witness and actor in the conflict- before his death a year ago kindly explained me his memories of this event, and provided me a copy of a confidential letter sent to him by the Spanish Vice-president José María Fernández Ladreda. According to these evidences and to F.L.Rivière Manén *Memorias* vol. 2 it seems

From the mid-1950s to the late 1970s the character and goals of interfirm cooperation underwent, again, a qualitative shift. After 1953 and particularly 1959 the Spanish government accepted the need to break the isolationist policies of the 1940s and slowly started to adopt more open international economic policies. Technology transfer and foreign investment accelerated as a consequence, and European and U.S. firms started to invest in Spain. To reduce the accumulated technological gap in the 1960s required heavy investments of capital, and leading family firms in the steel wire industry such as Rivière established limited partnerships with foreign leading family firms of the industry, preferring this kind of arrangement to the unwanted alternative of sharing ownership with unknown shareholders. Francisco Luis Rivière Manén and Fernando Rivière Caralt, managers of Rivière, renewed old contacts with the transnational company Bekaert (owned by the Belgium Bekaert family). Leo Bekaert had initiated the personal friendship and entrepreneurial contacts with the Rivière family before IIWW. When Leo Bekaert died his son-in-law renewed their privileged commercial relations with Rivière. Besides looking again to European leading firms Spanish leading firms in the wire industries started to look with new eyes at unknown U.S. firms and managerial models.. Some firms like Rivière had participated in productivity commissions and

that the “Catalan group” was deeply divided after the war regarding the different needs of raw materials and semi-elaborates. Firms more dependent upon raw materials, particularly the Roca Soler family and the Suñer Group, pressed in a violent way to obtain more percentages of such inputs than wire/wire derivatives producers like the Rivières. The conflict ended in personal hatred and strong economic losses for Rivières.

travelled to the United States to visit IBM, Ford, and American steel-wire manufacturers in the late 1950s to observe first-hand examples of scientifically organized production. Bedaux methods started to be adapted to Catalan industrial firms, by the Gombert consultant company and the Spanish engineers that enthusiastically adopted scientific organization methods. Again, Rivière pioneered the introduction of these methods in the Catalan steel wire industry with one of such engineers, Carmelo María Cabré Rabadá.⁴³ The growth of wire-manufacturing production in these years was important. The total Spanish production of wire rose from 17,200 tons in 1922 to 178,800 tons in 1973.⁴⁴ The unpublished memoirs of Francisco Luis Rivière Manén show that the Rivière directors did not lose sight of the significance that technological innovation and regional networking during the war had, and they maintained close contacts with European and American universities and technical institutes. Rivière joined European associations whose aims were similar in order to join forces against competition from countries outside Europe, such as Japan and Korea. As we said, Rivière also adopted scientific methods of organizing production and management, following business practices that were transforming firms in other European countries as they adapted to a newly globalized economy. Rivière also established close networks with other

⁴³ Unpublished Memoirs of Francisco Luis Rivière Manén, vol. 2, 1965-1971, Historical Archive Francisco Rivière Ribas.

⁴⁴ Private Archive of Francesc Cambo in Barcelona, *Carpeta "Transformados metálicos" (1921-23)*. Private Archive Francisco Rivière Ribas in Barcelona, *Acción Concertada Siderurgia-Trefilería 1974-78*.

entrepreneurs and with specialized regional institutes of management education.⁴⁵

IV Conclusions

Steel-wire manufacturing in Spain has been historically controlled by a few family firms until today, during well over one hundred and fifty years. The holding company Global Steel Wire–CELSA, which has absorbed the most important historical family firms (Quijano, Rivière, Moreda) is itself controlled by another family, the Rubiraltas, who owns around 60 percent of the holding. The family structure of ownership and control in Spanish wire manufacturing was facilitated, at least until the 1970s, by a combination of personal and regional networks of opportunity, and innovation, and favourable institutional conditions protecting family firm ownership.

Inter-firm and inter-regional networks of firms changed the mechanisms of relationship throughout this long period. As Casson has said, networks were sometimes about cooperation though sometimes were also about fierce competition. Between the end of the nineteenth century and 1936, entrepreneurial associations tried to protect themselves from foreign competition, while maintaining at the same time personal networks abroad to preserve knowledge transfer and innovation opportunities. After the Civil War and during Franco's regime, the associations tried to shield themselves from the

⁴⁵ Fernández-Pérez and Puig (2004), and Fernández-Pérez (1999).

institutional difficulties that were created by the Spanish state. Franco's ministers erected many obstacles to foreign investment in Spain during the 1940s, but in the late 1950s they began to encourage foreign firms to invest, particularly after the Stabilization Plan was instituted in 1959. New agreements were designed then not to capture foreign markets but, rather, to preserve – again- their own markets in Spain.

During the 1970s, Spanish wire manufacturers continued to abide by early agreements they had signed to safeguard their individual specialties and stave off competition. Thus, in 1925 the most important steel-wire manufacturers had created a cartel to ensure shares of the Spanish market for individual products. In 1974, four of the cartel's surviving firms (Quijano, Rivière, Moreda, Echevarría) signed a private agreement reconfirming the network, this time with the main goal of gaining the tax benefits and favourable financial conditions conferred by recent legislation (the “Acciones Concertadas”).⁴⁶ The success of a handful of family firms in a particular market niche no doubt meant steeper entrance costs for other companies and higher prices both for consumers and for sectors that relied on steel wire.

Political and economic conditions abruptly changed after the 1970s as Spain underwent the transition to democracy. Its integration into international institutions made it increasingly vulnerable to global economic crises, such as

⁴⁶ Private Historical Archive of Francisco Rivière Ribas in Barcelona. *Acción Concertada de la Siderurgia-Trefilería, 1974-1978*.

rising prices, overproduction, and competition from the United States and Asia. Older firms that were unable to adapt to the new conditions went bankrupt. Those that survived were bought by Global Steel Wire: Quijano and Moreda over the course of the 1980s and Rivière in 2000. Even with this acquisition, a Spanish family was able to control this industrial sector in a globalized market.

The historical evolution of the economy and the politics of the country highly determined the long dominance of family firms at regional level, in a branch of industry that invested greatly on satisfaction of local needs of their clients. Satisfaction of clients and personal relations between them and the manufacturers were another reason that helps explain the long life of family firms in a relatively capital intensive sector like the iron and steel wire industries. During the second half of the nineteenth century a very weak liberal State was not capable to create in Spain what we call today a national system of innovation, and Schumpeterian entrepreneurs interested in the iron wire industries (many of French origins) played a determinant role in transferring technology from abroad and establish these industries, in close connection with the needs of the local and regional clients. They produced first wire manufactures such as wirecloth, nails, or springs, and only in the late nineteenth century –when the Spanish iron industry also expanded- some firms started to produce iron and steel wires. This process was, as in other European countries, located in a few regions well endowed with natural resources and/or human capital like Cantabria, Asturias, Basque Country and Catalonia.

Sudden and important changes in market conditions at the turn of the century made the entrepreneurs and the State get together to protect the industry from foreign competition with new tariffs between 1891 and 1921. The protection was expanded indirectly when the State allowed the creation of a cartel in 1925 that imposed prices in the Spanish market. Family firms associated and established personal networkings to be able to obtain these privileges, though often the basis for networking were neither kinship nor friendship nor cultural affinities but economic convenience.

After the Spanish Civil War institutional and economic conditions abruptly changed again. Franco's dictatorship isolated Spain and increased the technological gap the country had with other developed economies. Commercial policies strongly reduced imports and created obstacles for production. However, new industrial and labour legislation protected leading family firms in the steelwire industry that survived the civil war from domestic and international competition, until the industrial crisis of the late 1970s. U.S. new relations with Francoist Spain since the 1950s plus the effects of the 1959 Stabilization Plan stimulated young heirs of big family firms to learn new organizational and business techniques to update their businesses and get global, abroad and in the new business schools.

During the 1970s the imposition of a modern tax system, in coincidence with a strong industrial crisis in 1978-1979, provoked financial problems to capital intensive family firms. This combination of problems, together with the

new European support to Spanish industrial reforms, favoured strong changes in ownership that took place in the steelwire industry between 1980 and 2000. Strong, though not radical, cause new families took over and absorbed old ones, significantly blocking financial capital to control this specialized niche of production. Families unable to adapt flexibly, and rapidly, to the new challenges were forced to sell their century-old business to new families that were prepared and ready to rationalize activities and get global.

As in the case of the Italian clusters or the specialized production niches of the Spanish pharmaceutical and parfum industries, the example of the steel wire industries in Spain suggests that Mark Casson's model about dynastic family firms in science-based industries does not fit well with empirical evidence. When specialty production, regional clusters, personal networks and institutional conditions combine, flexible family ownership structures can control for centuries a particular niche of a capital intensive industry.

Referencias bibliográficas

1. Arnavat, A. (1987), *L'impacte de la primera guerra mundial sobre l'economia reusenca 1914-1923*.
2. Becattini, G.; Pyke, F. and Segenberger, W., eds., (1992), *Los distritos industriales y las pequeñas empresas*, Ministerio de Trabajo y Seguridad Social.

3. Bustamante Quijano, R. (1986) *José María Quijano (Vida y obra de un hidalgo emprendedor)*, Nueva Montaña Quijano.
4. Cabana, F. and Feliu i Torras, A. (1987) *Can Torras dels Ferros 1865-1985. Siderúrgia i construccions metal·liques a Catalunya*, Tallers Gràfics Hostenchs.
5. Calvo Calvo, A. (1985), *La transformación de la estructura industrial en Cataluña 1898-1920*, unpublished Ph.D. diss., Universitat de Barcelona.
6. Carreras, A. and Tafunell, X. (1993) “La gran empresa en España”, *Revista de Historia Industrial*, 3, 127-176.
7. Casson, M. (1984) “The theory of vertical integration: a survey and synthesis”, *Journal of Economic Studies*, vol. II, n.2, 3-43.
8. Casson, M. (1999), “The Economics of the Family Firm”, *Scandinavian Economic History Review*, 47, pp. 10-23.
9. Casson, M. (2005), “Economic Analysis of Social Networks”, *X Symposium of Economic History “Analysis of Networks in Economic History”*, 9 January 2005, Universitat Autònoma de Barcelona, unpublished inaugural conference.
10. Catalan, J. (1995), *La economía española y la Segunda Guerra mundial*, Ariel.
11. Colli, A. (1999) “Networking the Market: Evidence and Conjecture from the History of the Italian Industrial Districts”, *European Yearbook of Business History*, vol. 1, pp. 75-92.

12. Colli, A. (1999) *Legami di ferro. Storia del distretto metallurgico e meccanico lecchese tra Otto e Novecento*, Donzelli.
13. Colli, A.; Fernández Pérez, P. and Rose, M.B. (2003), “National Determinants of Family Firm Development? Family Firms in Britain, Spain and Italy during the Nineteenth and Twentieth Centuries”, *Enterprise and Society*, vol. 4, no. 1, 28-64.
14. Fernández-Pérez, P. (1999) “La empresa familiar y el “síndrome de Buddenbrook” en la España contemporánea: el caso Rivièrè (1860-1979)” in A. Carreras, P. Pascual, D. S. Reher and C. Sudrià, eds., *Doctor Nadal. La industrialización y el desarrollo económico de España*, Publicacions UB, vol. II, 1398-1414.
15. Fernández Pérez, P. (2000), “Angela, Matías, Martín y Josep Roca Soler” in E. Torres coord. *Los 100 empresarios españoles del siglo XX*, LID.
16. Fernández, P. and Puig, N. (2004), “Knowledge Transfer and Family Firms of the European Periphery: The Case of Spain, 18th-20th centuries” *Business History*. Vol. 41, 79-99.
17. Fernández Pérez, P. (2004) *Moreda (1879-2004) and Rivièrè (1854-2004). Un siglo y medio de trefilería en España*, MRT-Trivium.
18. Gómez Mendoza, A. (1987), “La formación de un cartel en el primer tercio del siglo XX: la industria del cemento Pórtland”, *Revista de Historia Económica*, 2.

19. González Portilla, M. “Las nuevas siderurgias vascas y los primeros sindicatos (cárteles) siderúrgicos, 1886-1896” in Jose Luis García Delgado, ed., *La España de la Restauración: política, economía, legislación y cultura*.
20. Granovetter, M. (1992), “Economic Institutions as Social Constructions: A Framework for Analysis,” *Acta Sociologica* 35 (1992): 3–11.
21. Granovetter, M. (1995), “Coase Revisited: Business Groups in the Modern Economy,” *Industrial and Corporate Change* 4 (1995): 93–130.
22. Lamoreaux, N. (1985) *The Great Merger Movement in American Business, 1895-1904*, Cambridge University Press.
23. Martínez Ruiz, J.I. (1998), *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.
24. Ministerio de Hacienda, Dirección General de Aduanas (1854), *Estadística General del Comercio Exterior de España*, Imprenta de D. Ramon Ballone a cargo de S. Baz; (1902), Establecimiento Tipográfico de J. Sastre y Compañía; y (1934), Sucesores de F. Peña Cruz, tomo 1.
25. Nadal, J., dir., (2003), *Atlas de la industrialización de España 1750-2000*, Crítica.

26. Parsons, M.C. and Rose, M.B. (2004), “Communities of Knowledge: Entrepreneurship, Innovation and Networks in the British Outdoor Trade, 1960-1990” *Business History* vol. 46, no. 4, pp. 609-639.
27. Puigdomènec Tey, F.de P (1993), *Historial de la industria metal.lúrgica Rivièrè 1835, 1854-1979*, Imprenta Tura Calàbria.
28. Rivièrè Manén, F.L. (1954), *Francisco Rivièrè 1835-1911. Intimidades de una empresa barcelonesa*, Limonograph, 1954.
29. Rose, M.B. (2000), *Firms, Networks and Business Values: The British and American Cotton Industries since 1750*, Cambridge University Press.
30. Sabel, C.F. and J. Zeitlin eds. (1997), *World of Possibilities: Flexibility and Mass Production in Western Industrialization*, Cambridge University Press.
31. Sáez García, M.A. (2005), “Hacia un cartel perfecto. Los acuerdos colusivos en el sector siderúrgico español (1871-1907), *Investigaciones de Historia Económica*, no.1, 131-164.
32. Sánchez, G. and Tascón, J., eds. (2003), *Los empresarios de Franco. Política y economía en España, 1936-1957*, Crítica.
33. Scranton, Ph. (1997) *Endless Novelty: Specialty Production and American Industrialization, 1865-1925*, Princeton University Press.

34. Tirado Fabregat, D. (2002), "Economic Integration and Industrial Location: The case of Spain before World War I," *Journal of Economic Geography* 2: 2312–21.
35. Torres Villanueva, E. (2003), "Comportamientos empresariales en una economía intervenida: España, 1936-1957" in Sánchez. G. and Tascón, J., eds., *Los empresarios de Franco. Política y economía en España, 1936-1957*, Crítica.