LSE 'Europe in Question' Discussion Paper Series

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LEQS Paper No. 73/2014

March 2014

LEQS is generously supported by the LSE Annual Fund






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## Abstract

This paper discusses convergence through the concept of industrial upgrading and its application to the Spanish case. The paper explains the recent rise of Spain's firms in high value-added service sectors and the fall in capital and skill-intensive manufacturing through the characterisation of Spain's institutional structure. I argue that Spain's institutional system is defined by peer coordination (PC), a non-hierarchical form of strategic coordination based on the presence of public-private interdependencies and direct state-business interactions. Under PC, Spanish firms in complex services sectors enabled the state to achieve developmental goals in exchange for sector-specific advantages that facilitated upgrading. The absence of effective intermediary agents hindered the development of PC in manufacturing sectors dominated by small firms. Furthermore, PC limited their access to the patient capital and stable demand necessary to develop new, complex products. The central state and some regional governments were able to circumvent these limitations only in exceptional cases.

**Keywords**: convergence, business and public policy, models of capitalism, production systems, Spain

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**Acknowledgements**

I am grateful to Bob Hancke and Geoffrey Owen for their advice developing the thesis on which this paper is based. I am also grateful to the attendants at the Seminar in Politics and Society at the Collegio Carlo Alberto in November 14 2013 and to the LEQS anonymous reviewer for his or her comments and suggestions on an earlier version of this paper.

# Industrial Upgrading in Mixed Market Economies: The Spanish Case

## 1. Introduction

This paper explores the characteristics of the Spanish institutional model through the analysis of changes in Spain's productive structure from the mid-1980s to the late 2000s. The paper speaks to political economists interested in the nature and dynamics of different forms of capitalism. It contributes to the literature of models of capitalism by characterising a "mixed" of hybrid institutional model, and by providing the perspective of a country that is neither a world leader, nor a developing nation.

I examine Spain's institutional model by asking why between the mid-1980s and the 2000s Spanish large firms in a handful of high value-added service sectors (banking, telecommunications, energy, and infrastructures/civil engineering) managed to transform and upgrade whereas most manufacturing sectors, especially those that required technically skilled labour and sustained capital investments, failed to achieve an equivalent transformation.

The paper uses the concept of industrial upgrading to characterise the transformation of different sectors of the Spanish economy. Upgrading is the process by which economic actors (nations, workers, producers) move up the Global Value Chain by generating outputs that have more value-added invested in them because they are higher quality, are produced more

efficiently, or require more complex skills (Gereffi 2005, Gibbon and Ponte 2005, Gereffi and Fernandez-Stark 2011). The concept of upgrading implies that higher returns at the firm or sector level will lead to improvements in national socioeconomic conditions (Milberg and Wrinkler 2010). This connection between firm- and national-level outcomes confers upgrading a national dimension that likens it to development. However the concept remains broad enough to be applicable to "second world" industrialised countries that aim to close the gap with the world's richest countries, as was the case with Spain.

My argument is based on an institutional perspective. I contend that upgrading in Spain's high value-added services was enabled by a national institutional structure defined by Peer Coordination (PC). PC was a non-hierarchical variant of non-market or strategic coordination among economic actors based on the presence of public-private interdependencies and direct business-state interactions. PC constituted an offer of conditional, mutual support by which firms in service sectors complemented the state's strategic planning and financial limitations in exchange for sector-specific advantages. Under this quid pro quo arrangement, the state was able to reclaim policy-making powers that had historically been delegated to private or quasi-private firms, fulfil developmental goals, such as universalising public utilities in the 1980s and 1990s, and carry out the generational change that defined Spain's political and economic transitions. In exchange, large, well-established firms in service sectors maintained control of the home market and were able to undertake far-reaching structural transformations.

PC was less likely to flourish in skill- and capital-intensive manufacturing sectors dominated by small and medium enterprises (SMEs). These sectors depended more on what the state could do less well: mobilise organisational

resources and provide stable capital. Furthermore, for historical reasons, Spain's intermediary agents (unions, employer organisations) lacked a tradition of participating in firm's strategic decision-making processes and of acting as bridges among small firms, and between them and the state. Finally, PC in service sectors like banking and telecommunications made it difficult for skill- and capital-intensive manufacturing firms to access the patient capital and stable demand they needed to develop new, complex products, compounding the obstacles to upgrading. In exceptional cases, however, the central state and some regional governments were able to circumvent these limitations.

The paper concludes that Spain's institutional model generated a dual economic structure in which support concentrated in a few sectors, whereas many others were left to fend for themselves and often failed. Changes in Spain's production structure derived from this model translated into low demand for labour with technical skills, and a heavy base of labour with little beyond basic education. As of 2014, such a labour structure threatens short-term economic recovery and long-term sustainable growth. It leaves Spain with two options: transforming its institutional model to provide support for a wider range of sectors, or lowering labour costs to compete with less developed economies. The choice between these two options will ultimately determine whether Spain can maintain its status as an advanced economy.

## 1.1 Methodology

The paper combines micro- and macroeconomic analysis to connect the firm- and sector-centric nature of upgrading with the institutional ecosystem in which it took place. Insights are based on in-depth qualitative case studies that explore the structure of key sectors over time and evaluate the

contribution of diverse institutions (specialised bureaucracy bodies, regulators, and industry associations) to changes in performance. In each case, the analysis starts by looking at upgrading from the outcome. Then, it proceeds to reverse-engineer the process of upgrading to unpack the institutional factors that shaped it. Comparisons across several case studies are used reveal systemic patterns and draw national-level conclusions.

Cases are taken from three sectors: banking, telecommunications, and professional electronics. These sectors were selected for their skill- and capital-intensity, density of connections to other sectors, and centrality to Spain's economy. These features were identified as signals that sector-level upgrading could unleash national economic transformation through interdependencies with adjacent industries.

The literature on models of capitalism (Whitley 1999 , Hall and Soskice 2001, Amable 2003) attributes to the structure of financial markets a substantial role in the definition of a national model of capitalism. Therefore, the banking sector was selected as the key sector through which to introduce the concept of peer coordination. However, banking is a highly technical and specialised sector. Therefore, to prevent the particularities of the banking industry from driving the conclusions of the analysis, the paper uses evidence from a second sector, telecommunication services. This second case helps generalise conclusions to a broader set of high value-added service sectors. Finally, I use evidence from three mini-cases in the professional electronics sector (telecommunications, defence, and industrial electronics) to evaluate the impact of PC on skill- and capital-intensive manufacturing, and to explore the contribution of regional institutions to upgrading. Overall, the analysis relies on within-sector cross-country comparisons with the UK, Germany, and

France to reveal the distinct features of Spain's institutional structure, and to situate Spain in a broader constellation of different models of capitalism.

In its present form, this paper frames the debate, presents the argument summarily, and outlines the contributions of a book-length project. It also discusses the practical implications of the findings in the context of the economic crisis that started in 2008. This paper should be seen as an introduction to the book, a summary of its main conclusions, and an instrument to stimulate further discussion about convergence. The remainder of this paper is structured as follows: Part two contextualises the Spanish case. Part three outlines the conceptual bases of the argument. Part four presents the argument and discusses alternative hypotheses. Part five summarises theoretical contributions, and part six discusses practical implications and concludes.

## 2. Spain as a critical case

Spain industrialised rapidly in the 1960s through a Fordist model based on mass production of standard manufactures and sheltered service sectors. However, by the 1980s, new technologies, advances in transport, and lower barriers to trade and capital movements had transformed manufacturing production and high value-added service sectors, placing Spain's production structure under stress.

Spain's European Union (EU) membership in 1986 brought about the rapid opening of many product markets and a large influx of foreign investment. This initially enabled Spain to reorient manufacturing sectors toward the export market without significantly increasing the value-added of their

outputs. However, by the early 1990s, the EU decisions to integrate Central and Eastern Europe into the EU and to liberalise service sectors increased the pressure for Spain to change its productive structure. The country was now at risk of losing the market for standard, low-cost manufactures to lower-cost competitors from Eastern Europe. In addition, Spain stood to lose local control of liberalised services sectors to more sophisticated Western European investors looking to expand into the Peninsula. The only feasible alternative for Spain to maintain or improve its hard-earned standard of living was to upgrade. This implied entering segments where outputs could not be easily replicated by producers from emerging markets, and improving processes and operations to compete effectively with sophisticated rivals.

By the mid-2000s, Spanish firms in a few high value-added service sectors had become world-class players, but productivity and comparative advantages in most manufacturing sectors were flat or negative. Such an outcome was unexpected. As Tables 5, 6, 9, and 10 (in the Appendix) show, Spanish firms in services started from positions of disadvantage in terms of size, resources, productivity, quality of service, and international scope. Upgrading in these sectors required deep process adjustments; costly organisational restructuration; and changes in firm strategies that were complex, risky, and had long-term horizons. On the other hand, manufacturing in the early 1980s represented a high share of Spain's GDP, yet, it dropped more steeply than in any other large European economy, including the UK (see Table 11 in the Appendix).

Why did the Spanish productive structure transform the way it did? Why were high value-added services much more successful than most manufactures? What type of institutional structure shaped this trajectory?

## 3. Conceptual bases

The paper relies on a group of firm-centric contributions and on the statist literature to identify the state and large firms as the key catalysts of upgrading, and to establish that the key to the process lies in the structure of interactions between these two actors.

According to Porter (1990), firms are indispensable contributors to upgrading because they are responsible for the decisions that result in superior, more complex outputs, more efficient processes, and effective organisational structures. However, this paper deviates from the management literature by contending that states are as essential to upgrading as firms. The concept of upgrading assumes a change in a country's productive specialisation, which in turn needs to be based on a shift in a nation's resource endowment. States' overarching capacities to undertake public investment and provide basic collective goods, and their responsibility toward the common welfare, place them in a unique position to modify a country's resource endowment and therefore contribute to upgrading.

Rodrik (2011) argues that some sectors are more likely than others to act as catalysts for development. He calls these elevator sectors because they accelerate the rate at which a country can absorb ideas and new knowledge. Rodrik identifies manufacturing sectors such as automotive, metals, and machinery as elevators. However, he does not establish a set of characteristics that define elevator sectors more generally. This paper combines contributions from other authors to fill in this gap. It identifies four defining features of elevator sectors: high skill and capital intensity, density of connections to other sectors, centrality to a country's economy, and in some instances, industry concentration. The paper works on the assumption that

any sector that fulfils these requirements, whether in manufacturing or services, could help support a broader process of upgrading and socioeconomic development.

Amsden (1989) discards low-capital and low-skill sectors as catalysts of upgrading because they can maximise and sustain their profits over relatively long periods of time through capacity expansion rather than costly qualitative changes. Low skills are also difficult to apply to other activities and offer low potential for diversification. Rodrik and Hausmann (2006) and Hidalgo (2009) argue that industries with deep linkages to other sectors are more likely to transform a whole economy by transmitting change through proximity and interdependence mechanisms. The Resource Based View literature (Dierickx and Cool 1989, Barney 1991 and 2001, Peteraf 1993, and Whitley 1999) contends that centrality to a country's economy -or control over imperfectly mobile strategic resources (physical, human, organisational)- increases the likelihood that a firm can develop strategies that lead to sustainable growth. Finally, Zysman (1983) adds that sectors dominated by a few large firms are more likely to unravel investment patterns in physical or market infrastructures that generate systemic benefits.

However, Zysman's argument needs to be qualified because it runs against evidence from Germany, where midsize firms are engines of innovation and sustainable wealth. According to Streek (1991) and Herrigel (1996), small and medium firms can play such a role when three conditions converge: a universe of several equally efficient competitors; a high-trust climate conducive to transversal alliances across competitors; and socialisation of risk through collective organisations, such as regional governments, regional banks, technical schools, and trade associations. Consequently, elevator

sectors will be characterised by market concentration only in contexts where these preconditions are absent or where there are no functional equivalents.

Similarly, not all states are equally likely to spearhead change. Contributions from the state-centric literature identify competence, autonomy, and financial resources as three crucial factors that influence state's efficiency. Rueschemeyer and Evans (1985) define competence as the ability to pull in organisational capabilities, knowledge, and skills through a cohesive bureaucracy with common orientations, assumptions, and expertise. Skocpol (1985) defines autonomy as the ability to develop goals and insights free from pressure from other elites. However, it is unclear what guarantees autonomy and studies of French developmentalism (Hancke 2001, Loriaux 2003) question whether it requires structural separation between civil servants and entrepreneurial groups. Skocpol (1985) also points out the importance of financial resources and the flexibility in their collection and use, especially for undertaking capital-intensive projects.

The presence of a capable state and firms in elevator sectors alone is not sufficient to explain upgrading. Building on Teece and Pisano's (1998) relational view of the firm, this paper contends that the key to upgrading lies in the way the two actors articulate their interactions. The literature has developed a variety of taxonomies that define coordination across economic actors. Despite the nuances of different classifications, they all tend to capture the same dichotomy between mechanisms that operate via spot market arrangements in response to price signals, and those in which coordination is based on negotiations among groups of insiders. To facilitate the discussion, this paper uses Hall and Soskice's (2001) terminology and calls these two forms of coordination market and strategic coordination, respectively. However, this paper introduces a variation, based on Williamson's (1975)

argument, to contend that there are at least two variants of strategic coordination: hierarchical and peer-group, depending on whether one actor is subordinate to the other.

Although the VoC literature does not consider the role of an actor's capabilities in consolidating a certain form of coordination, this paper contends that different variants of strategic coordination make important assumptions about the roles and characteristics of firms and the state. In the hierarchical variant, the state is the primary agent of economic change, and firms become instruments for policy implementation. The state in this variant is assumed to have a highly competent, autonomous bureaucracy and substantial financial resources. Firms are kept dependent on the state through state control of key resources, such as capital and licenses, and through tight networks of insiders who straddle the high echelons of public policy making, the civil service, and large firms. By contrast, the peer-group variant is based on the presence of interdependences among economic actors. Each actor is incapable of undertaking change on its own; but it has unique capabilities the other needs. States in these systems lack one or more of the attributes that would make them effective (competence, autonomy, or financial resources), and firms possess the corresponding attribute or attributes the state needs.

This paper also departs from the VoC's expectation that national economies can be defined by a single institutional structure based on national-level institutions. This approach is considered too limiting to "map" highly decentralised economies such as Spain's. Instead, the paper complements the traditional national-level analysis with a subnational perspective to examine the contribution of regional institutions to upgrading.

# 4. Argument

This section outlines and discusses alternative hypotheses before presenting the paper's argument in detail.

## 4.1 Alternative hypotheses

There are two main interpretations of Spain's economic transformation, each of which contends that the relationship between the state and large firms was dominated by one of these two actors. Under the firm-driven explanation, firms in high value-added service sectors would have achieved upgrading through competition thanks to advantages in project evaluation, execution, and negotiation skills (Guillen 2005, Guillen and Garcia-Canal 2010). Firms in most manufacturing sectors would have been unable to counter cost and product-quality competition, leading to stagnation and decline. Under the alternative state-driven explanation (Chislett 2003, Rozas Barbotin 2008, Martinez 2008), Spain's state would have driven upgrading by defining, directing, and shaping the strategy of large firms.

The firm-driven explanation finds support in Spain's two periods of privatisation: 1983–1985 and 1997–1998; the liberal background of most of its economists; two waves of banking mergers—one that followed the 1977–1985 banking crisis and another around the introduction of the Euro in 1999; and the rapid expansion of Spanish banks and the telecommunications incumbent to Latin America, where Spain's recent experience could have been a source of competitive advantage.

On closer examination, the firm-driven hypothesis weakens. Competition in high value-added services required institutional changes to create markets in

sectors that had remained under control of former local oligopolies or public monopolies. This required at least the separation between policy-making and policy-implementation functions and, often also, that of service provision functions. Spain initiated the privatisation of the public telecommunications operator early on: by 1987, the state only held a 20% stake in Telefonica. However, the country failed to develop an institutional environment that guaranteed competition. The Spanish Telecommunications Bill of 1987 stated that telecommunications were "essential services, owned by the state and managed by the public sector". It wasn't until 1997 that the sector regulator was created, and since its inception, it has been heavily criticised for a lack of independence from the government (Marti del Moral 2000, Molinas 2013, Garicano 2014). Similarly, in the banking sector, Spain went to great lengths to limit competition between Spanish large banks and foreign rivals by imposing heavy constraints on the expansion of foreign banks (Royal Decree 1388/1978). Until 1993, only four foreign banks operated in Spain whereas in 1985 the number of foreign banks operating in France was 147, in Germany 287, and in Italy 40 (White 1998).

The claim that the Latin American expansion of Spanish banks and the telecommunications operator was based on pre-existing competitive advantages is also hard to sustain. When Spanish banks initiated their international expansion in 1992, they had feeble pre-existing international structures, they were significantly smaller, and they had limited experience with internal or external competition. These features were a result of Spain's late industrial development, the closed nature of its economy until EU accession in 1986, the smaller size of the Spanish economy[1], and the legacy of Francoism[2]. Similarly, Tables 6, 9, and 10 (in the Appendix) show that, when

[1] Spain's GDP was 50% of Germany's GDP in 1985 (World Bank, own calculations).
[2] Franco vetoed mergers among large banks, and none occurred until 1987.

Telefonica initiated its international expansion in 1989, it had few competitive advantages in project execution or satisfying unmet demand. Between 1985 and 1996, Telefonica added 6.1 million new lines, but these figures are small compared to Germany's 18 million or France's and the UK's 9 million. Moreover, waiting lists for service continued to increase in Spain until 1989, by which time they had disappeared in most developed economies (Table 10 in the Appendix).

Finally, the assumption that manufacturing sectors declined because they could no longer compete in costs is simplistic. As Spain's cost advantage eroded in standard manufactured outputs, firms could have remained competitive by offsetting higher costs with higher value through increases in product complexity and productivity. However, Spain never invested heavily in research and development to support new product development. In 1985, Spain invested only 0.6% of its GDP in research and development, and it peaked at 1.3% of GDP in 2007. This contrasts sharply with Korea's experience, a classic case of manufacturing upgrading, which invested an average of 2.5% of its annual GDP in research and development for 1985-2007 (OECD 2012). In addition, Table 13 (in the Appendix) shows that labour productivity declined in most manufacturing sectors. Given Spain's reduced investment in innovation, and overall productivity decline, it is not surprising that manufacturing declined. The question is why Spanish firms took no measures to address it.

The state-directed hypothesis is supported by evidence of high-profile personal relationships between top government officials and company CEOs, firm internationalisation patterns heavily focused on Latin America, the existence of national plans to modernise sectors like electronics, the use of executive decisions to allocate telecommunication licenses, and public

procurement practices that favoured local firms. However, a more detailed analysis shows that the Spanish state lacked the willingness, the strategic capabilities, and the financial resources necessary to articulate state-directed upgrading. In most cases, PC in complex service sectors also prevented the state from playing a more active role.

After the strong Socialist Party victory in the 1982 election, the incoming government replaced any remaining Opus Dei[3] planners in office with liberal economists trained at the Central Bank. This group of economists had been vocally critical of the planner's methods and had little inclination to use strategic planning. In addition, up to the early 1980s, the state had delegated policy-making functions in banking and telecommunications directly or indirectly to large firms. As a result, the state initially lacked the competences, and sometimes the specialised manpower, to undertake policy-making functions independently from large firms. For instance, although Spain's Central Bank was considered the home base of Spain's economic elite, it lacked the tools to exercise monetary policy. Until the early 1980s, Spain did not have an interbank lending market, a necessary feature to exercise monetary policy through interest rates. The alternative approach, based on control of the monetary base, required an agreement with large banks, which increased the monetary base through their regular credit operations. The case of telecommunications is even clearer. Until 1986, the telecommunications sector was regulated through a contract between Telefonica and the state. There was neither a dedicated ministry for telecommunications nor a secretariat (the hierarchical level directly below that of minister), and there was no specialised civil service body. Although the state was represented on

[3] Opus Dei is a Spanish-founded Orthodox Catholic organisation whose members are encouraged to participate actively in public service at the highest levels, often supported through the Opus' extensive financial resources and personal networks. Opus members had played significant roles in Francoists governments in the 1960s and 1970s, introducing multiannual planning strategies inspired by the French model.

the board of directors of the operator, strategic decisions were taken directly by Telefonica, who negotiated on behalf of Spain at intergovernmental organisations like the International Telecommunications Union (ITU).

Finally, the state lacked the financial means to implement capital-intensive plans linked to public policy objectives. Instead, large firms were usually responsible for the implementation of public strategies that aimed to address critical episodes and overhaul basic infrastructures. For example, during the 1977–1985 banking crisis, Royal Decree 3048/1977, RD 54/1978, and RD-Law 4/1980 made large banks responsible for providing the funds and the expertise to rescue the 51 banks that required support. Similarly, in telecommunications, RD 2248/1984 established the framework for the universalisation of telephony services between 1985 and 1996 but attributed the articulation of specific plans, decisions over deadlines, development of technical solutions, and 75% of funding to Telefonica.

Evidence of a conventional state-directed approach is even scarcer in skill- and capital-intensive manufacturing sectors, like electronics. After repeated demands from industry representatives, the state approved two successive biannual National Electronics Plans in 1984 and 1987. These plans achieved their stated goals, but they were not the protectionist instruments the industry demanded. More than four-fifths of the investments, production, and exports associated with them corresponded to foreign firms (De Diego 1995). Foreign direct investment had little positive impact on upgrading for local firms, and some of the largest projects were linked to legal provisions that limited spillover effects (Ministerial Order of 5 June 1985). In addition, competition with more sophisticated foreign rivals hurt Spanish firms, forcing most of them to downsize and many to sell their interests to foreign investors (Cubero Postillo 1992, El Pais 1995).

Finally, with a few exceptions, the Spanish state did not use public or semi-public firms as proxies for public policies to support ancillary manufacturing sectors. In telecommunications for instance, the state helped the incumbent operator broker agreements with foreign investors to sell its industrial arm. The state also failed to take any measures to prevent Telefonica from substituting historical procurement policies based on contract allocation to historical providers with practices based on competitive tenders (CSIC, Cubero Postillo 1992, focus groups transcripts, Interview[4]).

## 4.2 Introducing peer coordination

This paper contends that upgrading in Spain's complex services was enabled by peer coordination. PC is a non-hierarchical, variant of strategic coordination based on the presence of interdependencies among economic actors. It works through a system of direct exchanges of sensitive information among small groups at decision-making and working levels within the state and large firms.

As it evolved in the Spanish context, PC was based on the presence of functional interdependencies and complementarities between the public and private spheres. The financial and organisational resources of large, well-established firms complemented state weaknesses in these areas and enabled the state to undertake crucial policy reforms, address sector-specific crises, and overhaul critical infrastructures. In exchange for their contributions, large firms involved in this system benefited from non-neutral regulation that enabled them to implement deep restructuration plans, secure large market shares, and substitute an older generation of decision makers during a crucial

[4] Jose Luis Adanero

transformational period. Behind PC stood a developmental state that aimed to modernise Spain between 1982 and 1996 through a strategy based on the universalisation of basic services (healthcare, basic education, electricity, telephony service) and the development of communication infrastructures (road, train, water) (Organic Law8/1985), but which often lacked the competences, manpower, and financial resources to achieve these goals autonomously. The state's initial weaknesses however, should not be interpreted to mean that the state could be easily controlled by large firms. In fact, from the mid- 1980s until the 2000s, the state strengthened its position vis-à-vis firms in high value-added service sectors, progressively recovering policy-making powers that had historically been delegated to firms, and expanding civil service capacity with the creation of new civil service branches.

Two additional features inherited from Francoism defined the context in which PC developed in Spain. The first was the existence of a fragmented elite structure, which the Francoist regime had actively fostered to prevent any single interest group from overshadowing the dictator. The elite were fragmented based on specialised groups with relatively narrow fields of action in either the public or private spheres. The second feature was the limited role of social intermediaries and professional interest groups in corporate decision-making. Unions had been effectively banned until 1977, and once legalised, they focused fundamentally on negotiating beneficial working conditions for employees with permanent contracts. Similarly, associational activities remained restricted until the democratic transition in the late 1970s.

PC was different from other variants of strategic coordination. Differentiating the Spanish from the French institutional structure was Spain's chronic state

deficit, the position of privately owned banks as the main financiers of industrial activity, and the lack of cohesive elites straddling the higher echelons of the public and private sectors. These features diminished the capacity of the Spanish state to design and implement multi-annual strategic plans that required extensive coordination across the civil services and severely limited the state's ability to use firms as subordinated instruments of public policy. Distinguishing Spain's structure from German-style coordination was the lack of involvement of labour intermediaries and professional associations in corporate decision-making. Instead, the state and firms in the Spanish system managed their interactions directly through high-level contacts between executives and public sector officials, an approach that benefited large firms in concentrated sectors over SMEs.

The strategic planning and financial limitations of Spain's state, and the limited role of social intermediaries help explain why PC thrived in concentrated infrastructure sectors, such as banking and telecommunications, but was less likely to flourish and support upgrading in skill- and capital-intensive manufacturing sectors. The state's lack of financial means was not an obstacle for leading firms in the banking or telecommunications sectors because their average size, publicly listed nature, and historical trajectories enabled firms in these two sectors to raise funds through the financial markets. In addition, the state's weak planning capacities granted private firms enough freedom to elaborate strategies that helped fulfil public objectives without compromising the firms' priorities. By contrast, most Spanish firms operating in skill- and capital-intensive sectors had severely limited or no independent financial and organisational capacity for new product development (Orkestra 2012). Those that did often concentrated on low- and mid-value-added segments, lacked critical mass, and had little exposure to foreign markets. Therefore, manufacturing firms depended more

on what the state could do less well: elaborate and implement long-term plans, facilitate access to patient capital and stable demand, ease internationalisation processes, and provide access to shared research facilities for the development of new complex products. Finally, market concentration meant that firms in complex service sectors could (and probably preferred to) communicate with the state directly, without using intermediary organisations to aggregate the sector's interests and play the role of interlocutors. In contrast, SMEs needed a platform of intermediary agents through which they could articulate sector-wide positions and manage interactions with the state.

Skill- and capital-intensive manufacturing sectors also suffered the negative externalities derived from PC in complex service sectors. The case of telecommunications electronics illustrates how PC in banking and telecommunications made it difficult for manufacturing firms to access the credit, patient capital, and stable demand they needed to develop new, complex products through which to upgrade. By virtue of the quid pro quo arrangement that defined PC in the banking sector from the late 1970s, large banks agreed to restrict credit to curb inflation and accepted a reform package that strengthened the powers of the Central Bank, and set the sector on a future path to liberalisation. In return, large banks maintained control of the internal market and obtained the progressive elimination of mandatory investment coefficients. Lack of banking competition and credit restraint enabled banks to charge high interest rates for loans, which exacerbated the liquidity problems of telecommunication equipment firms. In addition, decreasing investment coefficients enabled banks to divest from industrial investments that did not offer immediate profit prospects, as opposed to forging long-term strategic alliances with manufacturing firms based on the provision of patient capital.

In addition, the arrangement between Telefonica and the state meant that the operator assumed responsibility for the universalisation of the public telecommunications network, and relinquished its policy-making attributions, in exchange for strategic independence and legal protection from competition. Under these conditions, the state was unlikely to force Telefonica to support local producers through preferential allocation of purchasing orders, as France did (Owen 2013), or force the operator to maintain its industrial arm. In absence of state pressure, Telefonica preferred to divest from a sector that lacked enough technological capacity to develop next-generation network equipment (Telefonica Annual Reports).

The state, however, was able to overcome PC's negative externalities when the political climate favoured direct state intervention, the state could rely directly on its own organisational and financial capabilities, and local firms had some independent capacity for new product development. As the case of Defence electronic shows, in such situations the state took a textbook industrial policy approach consisting of capital injections, incentivised mergers, allocation of public contracts, and public appointments, despite opposition from some of the firms involved.

After the failed military coup of 1981, the modernisation of the Spanish armed forces was considered critical to the stability of Spain's new democracy (El Pais 1982). To carry out this objective, military budgets increased sevenfold between 1982 and 1991 (Telos 1995). Investment programs included the development and purchase of a new air surveillance system, a project entrusted to Ceselsa, the only Spanish defence firm that developed its own technology. Between 1986 and 1993, in preparation for EU's Single Market, the Ministry of Industry aimed to reorganise the Spanish defence sector

through a merger between Ceselsa and a group of state-owned defence firms. To overcome Ceselsa's reticence, the Ministry tied the purchase of the air surveillance system, on which Ceselsa had invested millions, to the merger with the state-owned group (Expansion 2013). Driven into financial dire straits, Ceselsa agreed to the merger in 1992. Between 1994 and 1998, the new company, Indra, received 15,000 million pesetas as part of a restructuration plan that aimed to prepare it for full privatisation (SEPI). By 2012, Indra embodied success in complex, capital-intensive, high value-added technology, obtaining 3,000 million Euros in revenue and employing 42,000 people worldwide.

Finally, under exceptional circumstances, regional governments developed institutional frameworks tailored to the needs of manufacturing sectors underserved by the national system to support upgrading. The case of industrial electronics in the Basque Country is perhaps the most representative. The Basque institutional structure revolves around a network of intermediary entities, including an industrial development agency; specialised technology centres; regional savings banks; technical schools; higher-education institutions; and cluster associations that help firms gain access to patient capital, enter into collaborative-competitive arrangements with other firms, take part in product development platforms, access suitably skilled labour, and communicate effectively with the regional government. This structure helped increase the sophistication of industrial electronics outputs in Basque SMEs and place the Basque Country, a region of only 2 million people, among the world's largest producers of manufacturing technologies, especially machine tools (see Table 14 in the Appendix).

However, the Basque model is unlikely to be replicated across Spain, because it was based on exceptional conditions. Among these stands out the

"Concierto Economico", a special fiscal regime that attributes the capacity to collect taxes to the three Basque provincial governments and most spending decisions to the regional government. All except one other region in Spain (Navarre, historically linked to the Basque Country) lack equivalent taxing capacity. In the mid-1980s, the division of responsibilities that characterises the Concierto led to a political schism, which was resolved in favour of a faction that preferred a collaborative structure across the local, provincial, and regional levels of government (as opposed to the centralisation of all powers in the regional government). That collaborative framework was then extended to the economic sphere, fostering the interlocked structure that supported upgrading in industrial electronics.

## 5. Contributions

Spain's combination of high- and low-performing sectors and the presence of complementary institutional systems based on different forms of coordination challenge the VoC literature's general assumption of underperformance in hybrid institutional models and the identification of institutional complementarity with institutional homogeneity. In addition, PC's non-hierarchical, multi-agent structure calls for better integration between firm-centric and state-centric views. Finally, the peculiarities of PC relative to other forms of strategic coordination indicate a need for more detailed analyses of economic models based on strategic coordination. The rest of this section develops these themes.

## 5.1 Performance in hybrid models and complementarity through heterogeneity

The VoC literature (Hall and Soskice 2001, Hall and Gringerich 2009) concentrates fundamentally on national-level institutions. It also identifies institutional coherence with institutional homogeneity- the application of the same form of coordination across several spheres of the economy. Homogeneous systems are associated with the generation of advantages that enable firms to perform certain types of activities more efficiently, whereas hybrid systems are expected to perform less efficiently.

Spain's analysis does not undermine the idea that institutional systems need to be internally coherent to generate advantage; both PC and the Basque regional structure are based on a single form of coordination and high-performing sectors are closely aligned with each of the systems. However, by showing that Spain has a primary system and at least one subnational structure, the paper challenges the assumption that a political economy should be defined by a single institutional system. The contribution of subnational institutional systems to upgrading in the Spanish case also suggests that approaches based solely on national-level institutions have limitations for the analysis of highly decentralised economies.

The presence of two self-contained, internally coherent institutional systems based on different forms of coordination challenges the conventional view that advantage can only stem from institutional homogeneity and that institutional heterogeneity is to be considered a primary cause of economic under-performance. In Spain, the primary institutional structure operates through direct reciprocal exchanges between the central state and large firms,

whereas the Basque structure relies on a dense network of intermediary agents to articulate the relationship between SMEs and the regional government. The two systems are complementary rather than antithetical because each supports different types of economic activities and firms, thereby increasing the total number of sectors that receive institutional support for upgrading. Two features ensure that the national and regional system do not undermine each other. First, the distribution of powers between the central and regional governments enshrined in the Constitution guarantees that policy-making powers associated with banks, infrastructures, and utilities are not decentralised. Second, the Basque government has political incentives to support sectors that are underserved by the national system: these sectors constitute the economic backbone of the region and are directly associated with the powerful Basque entrepreneurial class which supports the nationalist party. This party has ruled the region, almost uninterruptedly since 1980. As a result, upgrading continues to be an effective political took for the Basque political elite.

## 5.2 Integrating firm- and state-centric perspectives

The firm-centric literature places firms at the centre of economic analysis because of their role as generators of wealth. The role of the state in firm-centric frameworks is unclear, although it is presumably vicarious to that of firms. By contrast, the statist literature identifies the state as the main catalyst for economic transformation and places firms in a second plane. This paper's argument speaks in favour of integrating these two positions and considering the possibility that both states and firms can be co-responsible for upgrading through a non-hierarchical, interdependent relationship.

This paper argues that large, established Spanish firms in banking and telecommunications not only engaged in a relationship with the state, but also needed the state's unique capabilities as negotiator, legislator, and advocate to upgrade. Therefore, evidence from Spain supports the argument that while firms are the cornerstones of economic transformation due to their ability to generate wealth, states are equally necessary to stimulate and orchestrate changes in the country's resource endowment, a prerequisite of upgrading. Liberalisation and globalisation have affected states' ability to exercise power over firms through conventional avenues such as control over suppliers, price regulation, and explicit trade barriers everywhere, but states maintain unique competences and capabilities specific to each of these sectors such as supervision and day-to-day control over competition, that continue to make them indispensable.

The institutionalist literature is based on the idea that institutions are the result of a negotiated process between the actors involved. Yet, the Hall and Soskice (2001) approach does not consider how the resources and capabilities of economic actors influence their positions in the negotiation game. This paper suggests that integrating the firm-centric and statist views requires taking into account the capabilities and resources of economic actors in their national context and viewing these capabilities as complementary. Spain's PC developed within a historical context defined by the state's chronic lack of capital, historical delegation of governance functions to the private sector, late economic development, a concentration of economic elites in a handful of protected sectors, and recent political and economic transitions. These factors determined the relative strengths and weaknesses of the state and large firms, the range of options available for coordination between them, and the choices adopted. The state's willingness to make concessions to firms depended on its ability to accomplish policy objectives through its own resources. When firms'

resources complemented the state's own and helped further public policy goals, the state was willing to offer firms favourable regulation and to support their restructuration. The state was willing to make these offers despite the fact that PC prevented the state from providing more substantial support to smaller, more vulnerable firms in a large number of manufacturing sectors. This decision was consistent with a modernisation strategy based on the universalisation of basic services and with Spain's integration in the EU. Large firms entered into PC because the agreements enabled them to protect their home market positions and undertake deep restructurations that they deemed essential to compete in a wider European market. The SMEs that suffered the negative externalities of PC could do little to object; they did not control strategic resources through which they could exercise leverage, and they lacked a platform to articulate their demands. In the exceptional cases when the state had sufficient autonomous planning and financial resources to fulfil its developmental policy objectives independently it did not take a peer-group approach. Instead, it adopted a conventional top-down industrial policy approach.

## 5.3 Variants of strategic coordination

According to the VoC literature, firms in CMEs depend heavily on strategic relationships to build their core competencies. Strategic coordination "generally entails more extensive relational or incomplete contracting, network monitoring based on the exchange of private information inside networks, and more reliance on collaborative, as opposed to competitive, relationships" (Hall and Soskice 2001). Although this definition of strategic coordination is broad, in practice the literature has considered the German institutional model as the CME paradigm.

This paper challenges such identification by suggesting that strategic coordination can adopt different forms. Spain's PC specifically, emerged as a structure in which policy making, policy implementation, and service provision functions are not clearly separated but rather determined through negotiation among several groups of elite civil servants and private sector decision-makers.

Unlike Germany, intermediary agents were absent from decision-making roles in Spain, and the state disengaged from direct intervention in firms based on ownership or board-level representation. In addition, Spain's public service lacked the organisational skills of its French counterpart, in part as a result of Spain's specialised and siloed civil service structure.

These characteristics translated into a specific set of constraints and advantages for firms in terms of market share; restructuration; relationships with adjacent sectors; and participation in programs and services with redistributional aims such as the universalisation of telephony services. Generally, PC underscored the capacity of large firms in banking and telecommunications to maintain large market shares in established segments and to establish solid positions in emerging segments, while minimising constraints related to restructuration and long-term relationships with clients and equipment suppliers.

Although PC was linked to the public objectives of developmental state, it did not compromise the priorities of Spanish firms in banking and telecommunications (profit generation and internal transformation). As a result, large firms were able to overcome historical deficiencies and reach the efficiency frontier. These advantages came at the expense of skill- and capital-intensive manufacturing sectors that needed patient capital and steady

demand to develop more complex products. Furthermore, as the state prioritised PC, there was no significant national effort to build a common platform to help atomised sectors overcome their limitations. Instead, the state opted to incentivise foreign investment in these sectors, and often helped broker arrangements between local firms and foreign buyers.

These findings call for a more detailed characterisation of institutional structures based on strategic coordination to identify the implications of different variants. Analyses should include complex services in addition to manufacturing sectors. Although manufacturing is an important part of the economy of any country, the Spanish example shows that complex service sectors, like banking and telecommunications, are also central to any economy because of their thick network of interconnections to virtually all other sectors, the types of outputs they generate, and their capital and skill intensity. This argument challenges two types of conventional views regarding complex services. The first identifies some of them, and especially the financial sector, as "part and parcel" to specific models of capitalism (Zysman 1983) but does not consider them as a productive sector in its own right. The second view (Rodrik 2011) fails to include complex services in the definition those industries that can act as catalysts for sustainable economic development. By defining elevator sectors through a set of general characteristics and viewing complex services as potential elevator sectors, this paper engages directly with current debates regarding the role of manufactures and services in generating the basis for "good new jobs, new enterprises, and sustainable growth" (MIT 2013).

# 6. Practical implications, conclusions and future avenues for research

The crises that started in 2008 have affected Spain more than most European countries. Although unpacking the institutional structure of the Spanish economy does not guarantee that the Spanish government will take effective measures to stimulate a sustainable recuperation, it is a first step toward identifying common causes to the problems Spain faces and evaluating policy alternatives.

This paper provides important clues to understand Spain's current situation. Specifically, PC in banking and telecommunications generated negative trade-offs for skill- and capital-intensive manufacturing sectors, making it hard for them to access the key resources they needed to develop new complex outputs. As a result, Spain achieved upgrading in a handful of high value-added service sectors, but firms in many manufacturing sectors downsized or were purchased by foreign investors, who in turn transferred production capacity abroad, often to other advanced economies.

The result was significant manufacturing's downsizing. Between 1980 and 2010 the contribution of manufacturing activities to Spain's GDP dropped by 15 percentage points (see Table 11 in the Appendix), more than any other large European country. Changes in Spain's productive structure affected the structure of demand for labour, translating into low demand for professionals with technical skills and a similarly narrow demand for those with tertiary education, which concentrated primarily, in the handful of sectors that managed to upgrade. This context had perverse effects on educational attainment. In 2012, only 22% of people aged 25–65 in Spain (versus 48% for

the EU-21) had upper secondary education qualifications, which are the basis for most professional and technical occupations. By contrast, 46% of people in Spain had capped their education below upper secondary levels (at 16 years of age), which is almost double the EU's average proportion of 24% (OECD 2013). The concentration of upgrading in a handful of sectors, also limited the career prospects of those with university degrees. In 2007, 44% of people under 29 years old with tertiary education were employed in roles that did not require such qualifications, which is the highest rate in the OECD (OECD 2010).

Spain's current labour structure threatens short-term economic recovery and long-term sustainable growth. Since the onset of the economic crisis, most firms have aimed to increase their competitiveness by adjusting their costs—primarily labour costs—not by increasing productive investment to foster upgrading. The result has been higher unemployment, a drop in permanent employment contracts, an increase in temporary contracts, and overall lower salaries (INE 2013). As a consequence, many of those with only basic education are now unemployed. Those with higher education also face a market in which career-enhancing opportunities are scarce and often underpaid. If opportunities for those with higher qualifications remain scarce, many will opt to seek employment elsewhere, a trend that is already taking shape (El País 2011, Financial Times 2012, El País 2013, NYT 2013). Moreover, a large pool of uneducated labourers cannot be the foundation of a productive structure based on high value-added outputs.

The analysis in this paper implies that to stop and reverse these negative developments, and to ensure that Spain is able to sustain and improve the standard of living of its citizens in the future the current institutional model needs to change. Only a change in institutional incentives will stimulate a

virtuous cycle that fosters upgrading in a wider range of sectors, increases demand for skilled individuals, and supports sustainable growth. A change in the basis of Spanish capitalism is unlikely to damage the standing of Spain's firms in high value-added services, because most of these firms are now global multinationals with solid strategies and well-diversified investments. On the contrary, a burgeoning Spanish economy with a diversified productive structure would benefit firms' bottom lines and strengthen their reputations.

Alternatively, Spain could choose to follow a path of shallow institutional reform, relying on lower salaries to stimulate foreign investment and heavy promotion of traditional low-skilled activities, such as tourism. Such a strategy would help Spain move toward recovery in the short term, but it has limited potential to generate sustainable growth because it would make Spain more vulnerable to cost-cutting competition. Furthermore such a strategy would generate few incentives to create a base of highly skilled workers and accelerate the migration of qualified individuals, sowing the seeds for inexorable economic decline.

Finally, the characterisation of Spain's institutional structure, and the economic trajectory of the country raise questions regarding the uniqueness of the Spanish case and the applicability of its experience to other cases. As mentioned earlier, the capabilities and resources of Spanish large firms and the state played a key role in the development of PC but these features were historically embedded. Therefore, additional comparative research would be needed to reveal in more systematic fashion the circumstances under which different institutional ecosystems develop and their impact on a country's ability to upgrade. The fall of the Berlin Wall brought into the picture a range of countries that shared some similarities with Spain including limited government capacity to develop and implement strategic plans, capital

scarcity, the need for managerial skills to transform outdated manufacturing industries, and lack of experience with open market competition (Lipton et al 1990, Sachs 1994). These countries also shared with Spain their peripheral situation and the prospect of EU integration. Consequently, comparisons between the Eastern and Western European peripheral processes could be particularly fruitful to elucidate this question.

However, it is worth bearing in mind that PC consolidated in Spain at a time when states had only started to retrench from direct intervention in economic activities and when liberalisation was not yet the sweeping force it would become in the 1990s and 2000s. These circumstances influenced the ability of Spanish economic actors to negotiate institutional structure and could be a key difference between the upgrading processes that started in the 1980s and those that took place a decade later.

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# Appendix 1: Tables

**Table 1. Spain's GDP per capita as percentage of other countries' (1985 and 2009)**

| Country | 1985 | 2009 |
|---|---|---|
| OECD | 48% | 95% |
| France | 48% | 78% |
| Germany | 50% | 79% |
| Italy | 59% | 90% |
| United Kingdom | 56% | 90% |

Source: World Bank Development Indicators, own elaboration.

**Table 2. Spain's top 20 firms by market capitalisation (2009)**

| Ranking by market capitalisation | Ranking Forbes 500 | Company | Sector |
|---|---|---|---|
| 1 | 34 | Telefonica | Telecommunications |
| 2 | 21 | Grupo Santander | Banking |
| 3 | 40 | BBVA | Banking |
| 4 | 122 | Iberdrola | Energy |
| 5 | 113 | Repsol-YPF | Energy |
| 6 | 609 | Inditex | Textiles |
| 7 | 451 | Cepsa | Energy |
| 8 | 341 | Gas Natural | Energy |
| 9 | 571 | Abertis | Infrastructures |
| 10 | 278 | Banco Popular | Banking |
| 11 | 226 | Grupo ACS | Infrastructures |
| 12 | 363 | Acciona | Infrastructures |
| 13 | 485 | Banco Sabadell | Banking |
| 14 | 409 | Mafre | Insurance |
| 15 | 1411 | Gamesa | Energy production |
| 16 | 383 | Grupo Ferrovial | Infrastructures |
| 17 | 867 | Metrovacesa | Infrastructures |
| 18 | 680 | Sacyr Vallehermoso | Infrastructures |
| 19 | 1665 | Red Espanola Electrica | Energy |
| 20 | 642 | FCC | Infrastructures |

Source: ICEX/Esade: First annual report from the Observatory of the multinational firm 2009.

**Table 3. Main Bank ratios (1985)**

| 1985 | Spain | Switzerland | USA | Sweden | Germany | Italy | Netherlands | France* |
|---|---|---|---|---|---|---|---|---|
| Net income/Assets | 0.042 | 0.027 | 0.045 | 0.031 | 0.029 | 0.040 | 0.029 | 0.023 |
| Net non interest income/Total income | 0.18 | 0.49 | 0.27 | 0.35 | 0.21 | 0.26 | 0.26 | 0.19 |
| Operating expenses/ Net income | 0.64 | 0.53 | 0.67 | 0.62 | 0.61 | 0.63 | 0.63 | 0.70 |
| Operating expenses/Assets | 0.027 | 0.014 | 0.030 | 0.019 | 0.017 | 0.025 | 0.018 | 0.016 |
| Tier 1 and Tier 2 Capital/ Assets | na | na | 0.062 | na | na | na | na | na |
| Institutions | 139 | 223 | 14,427 | 15 | 4,370 | 422 | 84 | 2,050 |
| Branches per 1,000 inhabitants | 0.43 | 0.45 | 0.19 | 0.17 | 0.50 | 0.21 | 0.33 | 0.46 |
| Employees per branch | 9.7 | 30.3 | 35.2 | 16.0 | 14.0 | 27.1 | 19.2 | 17.1 |

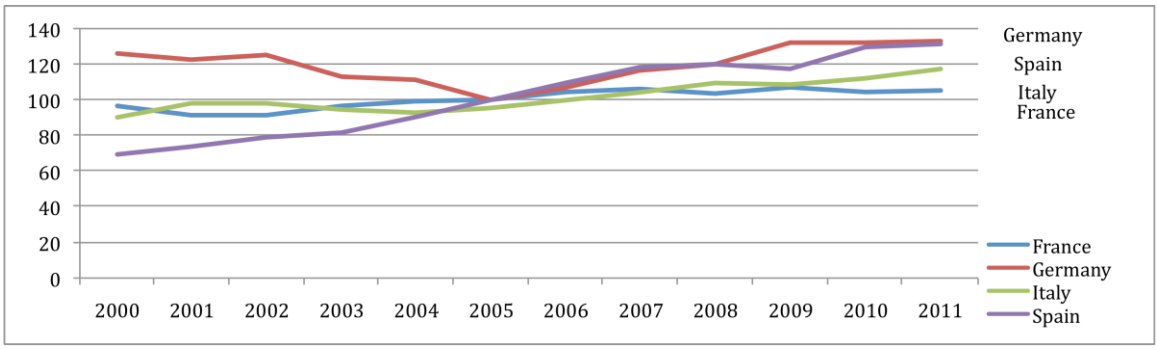
Source: OECD Banking statistics and Factbook statistics (population). Own elaboration.
Footnote: * Data for 1988

**Table 4. Main bank ratios (2009)**

| 2009 | Spain | Switzerland | USA | Sweden | Germany | Italy | Netherlands | France |
|---|---|---|---|---|---|---|---|---|
| Net income/Assets | 0.023 | 0.021 | 0.051 | 0.020 | 0.017 | 0.022 | 0.016 | 0.015 |
| Net non interest income/Total income | 0.31 | 0.64 | 0.40 | 0.48 | 0.20 | 0.36 | 0.31 | 0.58 |
| Operating expenses/ Net income | 0.37 | 0.77 | 0.59 | 0.57 | 0.76 | 0.63 | 0.69 | 0.62 |
| Operating expenses as % of assets | 0.009 | 0.016 | 0.030 | 0.011 | 0.013 | 0.014 | 0.011 | 0.009 |
| Tier 1 and Tier 2 Capital as % of assets | 0.086 | 0.064 | 0.112 | 0.082 | na | 0.065 | 0.055 | na |
| Institutions | 153 | 207 | 6,905 | 59 | 1,774 | 768 | 93 | 325 |
| Branches per 1,000 inhabitants | 0.32 | 0.21 | 0.27 | 0.20 | 0.46 | 0.56 | 0.19 | 0.61 |
| Employees per branch | 7.4 | 53.8 | 23.2 | 22.0 | 17.0 | 9.7 | 35.1 | 11.1 |
| Inwards FDI positions (Millions USD) | 27,812 | 319,729 | 254,411 | 256,694 | 53,654 | 91,957 | 91,870 | 111,109 |
| Outwards FDI position (Million USD) | 157,633 | 344,217 | 733,245 | 420,433 | 194,384 | 312,116 | 175,864 | 237,307 |

Source: OECD Banking statistics, Factbook statistics (population) and International Direct Investment Statistics (FDI positions). Own elaboration.
Note: FDI positions exclude insurance and pension funding activities.

**Table 5. Annual person-based productivity, financial, and insurance activities (2000-2011)**




Source: European Commission and European Central Bank calculations based on Eurostat data. Own elaboration.

**Table 6. Telecommunications, network, profitability and investment (1985)**

| | Standard access lines per 100 inhabitants | Revenue per access channel in USD | Investment per access channel | Investment as % of revenue | Investment as % of fixed capital formation | Investment per inhabitant in USD |
|---|---|---|---|---|---|---|
| **Sweden** | 62.78 | 347.50 | 104.36 | 30.03 | 2.56 | 66.44 |
| **UK** | 52.93 | 358.93 | 73.14 | 20.38 | 2.65 | 38.78 |
| **United States** | 49.24 | 946.76 | 180.17 | 19.03 | 2.58 | 88.97 |
| **France** | 40.69 | 381.55 | 161.94 | 42.44 | 3.46 | 65.89 |
| **Japan** | 37.48 | 474.81 | 152.83 | 32.19 | 1.88 | 57.36 |
| **Germany** | 32.95 | 447.22 | 195.74 | 43.77 | 3.50 | 64.49 |
| **Italy** | 30.74 | 363.54 | 159.69 | 43.93 | 2.99 | 49.10 |
| **Spain** | 24.21 | 267.69 | 113.84 | 42.53 | 3.03 | 27.56 |
| **Ireland** | 19.85 | 670.91 | 204.16 | 30.43 | 3.84 | 40.55 |
| **Korea** | 18.48 | 253.39 | 177.65 | 70.11 | 4.98 | 32.84 |

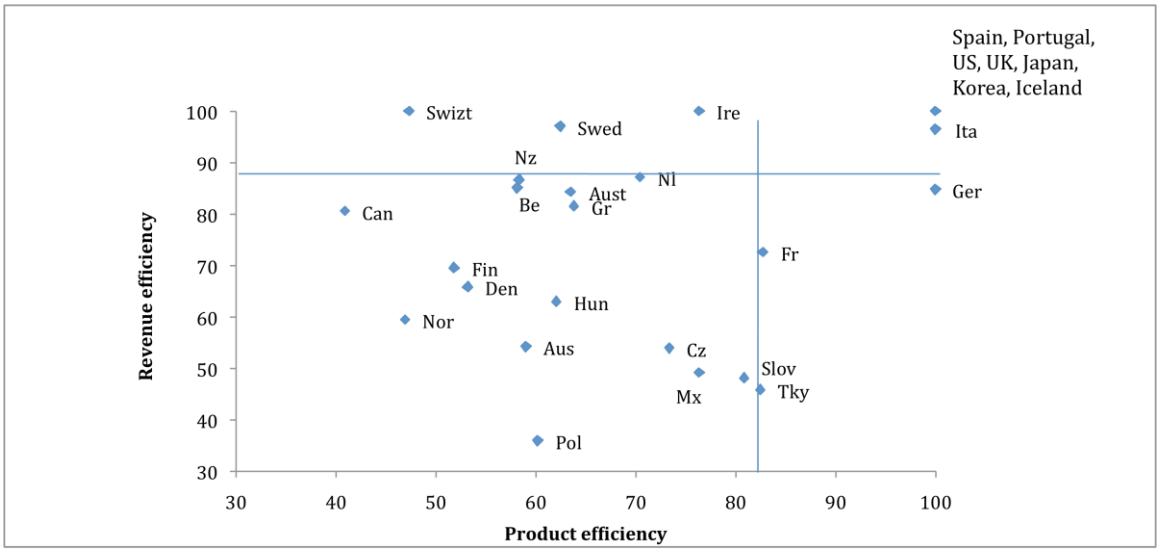
Source: OECD Telecommunications and Internet Statistics.

**Table 7. Telecommunications, network, profitability, and investment (2009)**

| | Total access channels per 100 inhabitants | Revenue per access channel in USD | Investment per access channel in USD | Investment as % of revenue | Investment as % of fixed capital formation | Investment per inhabitant in USD |
|---|---|---|---|---|---|---|
| **Japan** | 146.98 | 816.78 | 128.71 | 15.76 | 2.42 | 189.18 |
| **Ireland** | 162.83 | 767.76 | 84.07 | 10.95 | 1.06 | 137.41 |
| **United States** | 151.97 | 759.08 | 123.96 | 16.33 | 2.44 | 201.85 |
| **France** | 200.02 | 724.11 | 81.18 | 11.21 | 1.33 | 128.46 |
| **Spain** | 177.10 | 713.15 | 73.03 | 10.24 | 1.29 | 129.33 |
| **Germany** | 201.90 | 507.19 | 50.22 | 9.90 | 1.16 | 101.78 |
| **UK** | 197.78 | 500.06 | 63.20 | 12.64 | 1.42 | 129.85 |
| **Korea** | 205.45 | 464.10 | 53.43 | 11.51 | 1.65 | 92.49 |
| **Italy** | 158.23 | 399.16 | 73.08 | 18.31 | 1.79 | 143.05 |
| **Sweden** | 163.45 | 351.94 | 72.40 | 20.57 | 1.39 | 145.38 |

Source: OECD Telecommunications and Internet Statistics.

**Table 8. Telecommunications efficiency (2007)**



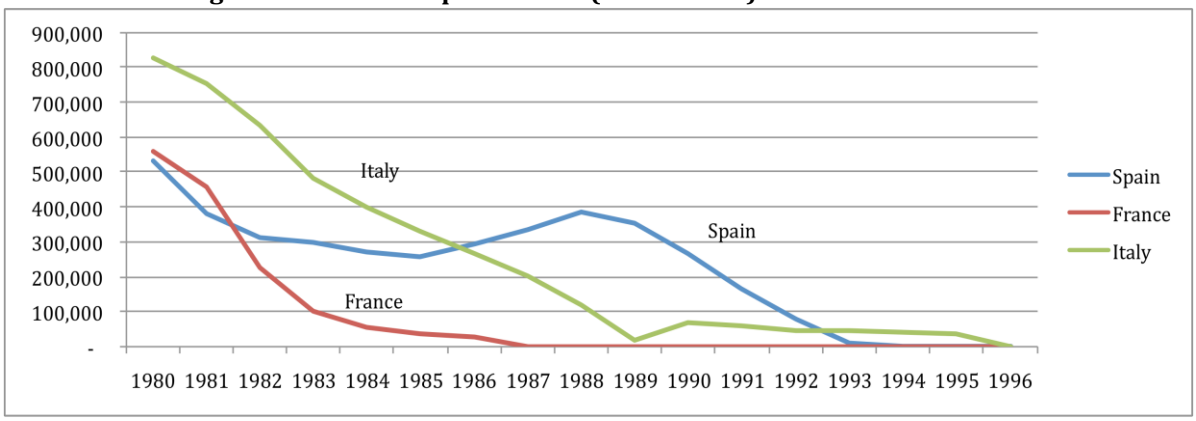

Source: Giokas and Pentzaropoulo 2008.
Note: The axes dividing the quadrants represent the efficiency scores of a hypothetical average country, as calculated using DEA revenue and productivity. Their values are 74.18% for productivity and 83.10% for revenue.

**Table 9. Telecommunications network expansion (1985–1996)**

| Additional fixed lines | | | |
|---|---|---|---|
| **Country** | **Increments 1985-1989** | **Increments 1989-1996** | **Total increments 1985-1996** |
| **United States** | 15,518,752 | 34,941,432 | 50,460,184 |
| **Japan** | 7,153,880 | 11,583,360 | 18,737,240 |
| **Germany** | 3,456,000 | 15,252,200 | 18,708,200 |
| **Korea** | 5,274,279 | 7,809,276 | 13,083,555 |
| **France** | 3,911,888 | 5,957,548 | 9,869,436 |
| **United Kingdom** | 3,622,000 | 5,880,756 | 9,502,756 |
| **Italy** | 3,869,406 | 3,993,482 | 7,862,888 |
| **Spain** | 2,456,701 | 3,615,626 | 6,072,327 |
| **Poland** | 636,949 | 3,407,994 | 4,044,943 |
| **Portugal** | 788,582 | 1,632,890 | 2,421,472 |
| **Switzerland** | 507,480 | 786,494 | 1,293,974 |
| **Ireland** | 213,000 | 474,000 | 687,000 |

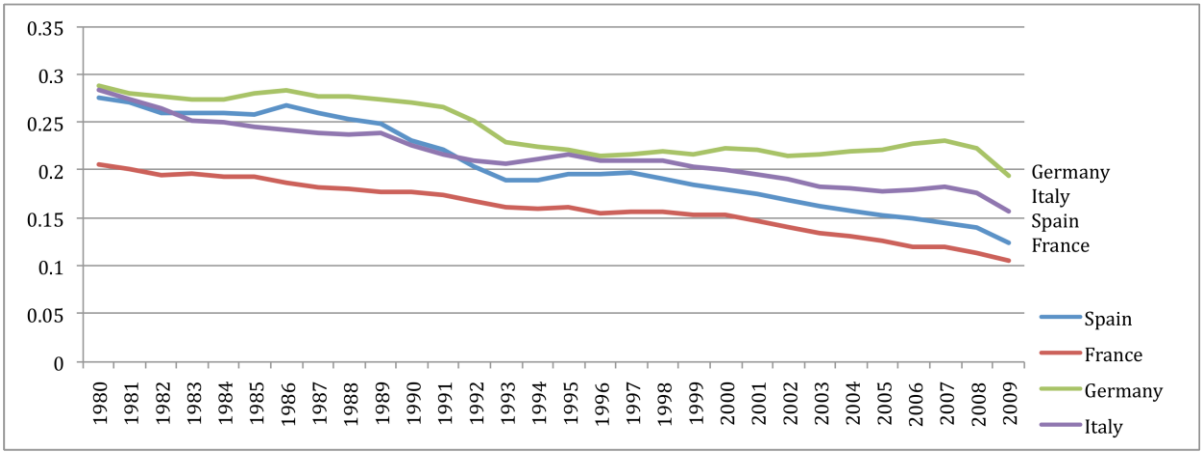
Source: ITU 2010. Own elaboration.

**Table 10. Waiting lists for fixed telephone lines (1980 –1996)**




Source: ITU database 2010. Own elaboration.

**Table 11. Manufacturing as percentage of GDP (1980-2009)**




Source KLEMS. Own elaboration.

**Table 12. Spanish manufactures Revealed Symmetric Comparative Advantage (1994-2007)**

| Sector | Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
| 5. Chemicals | -0.108 | -0.092 | -0.159 | -0.147 | -0.138 | -0.112 | -0.082 | -0.069 | -0.071 | -0.086 | -0.093 | -0.051 | -0.047 | -0.034 |
| 6. Machinery and transport equipment | -0.029 | -0.028 | -0.022 | -0.051 | -0.042 | -0.045 | -0.057 | -0.063 | -0.065 | -0.042 | -0.029 | -0.031 | -0.034 | -0.032 |
| 77. Electrical machinery apparatus and appliances | -0.283 | -0.327 | -0.297 | -0.316 | -0.287 | -0.294 | -0.339 | -0.290 | -0.303 | -0.292 | -0.277 | -0.255 | -0.267 | -0.275 |
| 69. Manufactures of metal | 0.044 | 0.055 | 0.078 | 0.180 | 0.061 | 0.068 | 0.086 | 0.085 | 0.080 | 0.082 | 0.088 | 0.092 | 0.071 | 0.090 |
| 78. Road vehicles (including parts and accessories) | 0.328 | 0.354 | 0.340 | 0.317 | 0.323 | 0.308 | 0.334 | 0.311 | 0.277 | 0.292 | 0.300 | 0.277 | 0.273 | 0.278 |
| 79. Other transport equipment (railways, aircraft and ships) | -0.036 | -0.142 | -0.076 | -0.122 | -0.247 | -0.132 | -0.146 | -0.294 | -0.154 | -0.123 | 0.066 | 0.145 | 0.104 | -0.069 |
| 76. Telecommunications and sound recording apparatus | -0.256 | -0.211 | -0.251 | -0.244 | -0.248 | -0.277 | -0.348 | -0.310 | -0.301 | -0.268 | -0.335 | -0.344 | -0.332 | -0.335 |

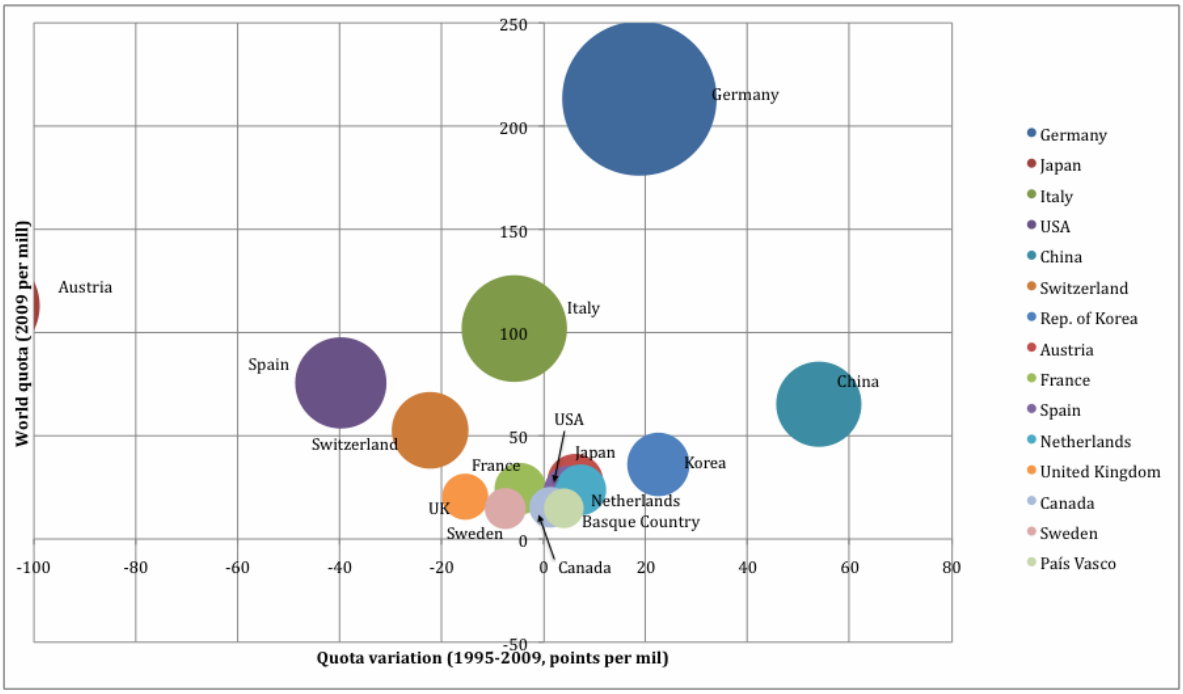
Source: OECD International Trade and Commodity Statistics, Own elaboration.

**Table 13. Spain's Labour Productivity by Sector (1996-2007 average)**

| | Labour productivity growth (%) | | | | Average share in total economy added value (%) | | |
|---|---|---|---|---|---|---|---|
| | Spain | EU | US | | Spain | EU | US |
| **Electrical and optical equipment** | 1.8 | 5.6 | 17.2 | | 1.1 | 2.3 | 2.3 |
| **General purpose machinery** | 1.1 | 2.1 | 3.8 | | 1.2 | 2.2 | 1.1 |
| **Transport equipment** | 1.7 | 3.1 | 5.2 | | 1.9 | 2.1 | 1.8 |
| **Chemicals and chemical products** | 0.6 | 3.6 | 5.2 | | 1.6 | 1.9 | 1.9 |
| **Basic metals and fabricated metals** | 0.2 | 1.6 | 1.8 | | 2.8 | 2.6 | 1.7 |
| **Total manufacturing** | 0.9 | 2.6 | 5.1 | | 17.2 | 19.1 | 15 |

Source: OECD 2012 Economics department working paper N 973.

**Table 14. Bubble chart, Manufacturing Technologies (machine-tools) (1995-2009)**




Source: http://tools.orkestra.deusto.es/klusterbolak data from UN Comtrade and AEAT, Own elaboration.

# Appendix 2: Sources of information

**Databases**

| Sector | Sources | Indicators |
|---|---|---|
| **Banking** | ECB banking statistics; IMF Financial Access Survey; Banks' annual reports; OECD International Investment Statistics | Operating expenses to income, net income to total assets, Tier 1+2 capital over assets |
| **Telecommunications** | OECD Telecommunication Statistics; ITU Database (2010 Edition); Operators' annual reports; OECD International Investment Statistics | Total access channels, revenue and investment per access channel, investment as percentage of fixed capital formation, investment per inhabitant, FDI |
| **Professional Electronics** | AMETIC annual reports; SEPI/INI archive; Eurostat Structural Business Statistics and International Investment Statistics | Production, exports, imports, consumption, productivity, gross value added, wages, degree of specialisation |

**Other secondary sources of information**

- Annual company reports, sector-specific reports elaborated by the national government or their specialised bureaucracies, regulators, industry associations, multilateral organisations, and other entities including research institutions
- National and regional legislation
- Transcripts from Congress and Senate sessions
- Published interviews of key stakeholders, transcripts and videos/podcasts of conferences or public events
- Seminar presentations
- Opinion articles, press releases, and interviews published by the specialised media
- Blog posts
- Focus groups transcripts and unpublished research reports offered by research institutions and interviewees

## Interviews

| Sector | Interviews | Total Interviews |
|---|---|---|
| **Banking** | Two interviews with Bank of Spain experts, one with a Spanish expert at the IMF, three academic experts, one interview at the Spanish Banking association, three consultants, four interviews with current bank employees, and two with retired employees, presentations by 17 banking experts including the sub-governor of the bank of Spain and the head of research | 16 interviews |
| **Telecommunications** | One interview at the SETSI, one at the regulator, one at the college of telecommunication engineers, two with expert at the OECD, five firm-level interviews, two with technology suppliers, one with an academic, | 15 interviews |
| **Professional Electronics** | 7 for Telecommunications electronics (3 with academics/researchers and 4 with practicioners), 3 for Defence (One with an Indra board-member, one with the director of strategy and one with a former politician involved in the sector's transformation), and 7 for Industrial electronics in the Basque Country ( 2 with researchers/academics, 4 with current or former public employees and civil servants, 1 firm-level) | 17 interviews |
| **Other general interviews** | Three interviews with industrial manufacture academics | 3 interviews |
| **Total** | | 51 interviews |

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