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The Economic Performance of Clustered and Non Clustered Firms along the different Phases of the Cluster Life Cycle: The Portuguese Cork Industry Case

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ABSTRACT

This paper is about the relative economic performance of clustered and non-clustered companies in the different phases of the cluster life cycle. It starts with the explanation of a puzzling localization behaviour, namely that most of the Portuguese cork manufacturing firms are concentrated in Santa Maria da Feira, a small county in the north of the country, whereas the bulk of the cork is produced in the south (Alentejo and Ribatejo). The historical roots and past and path dependence of the trajectory of this cluster are examined, as well as the identification of its life cycle phases. A comparative analysis of the economic performance of firms localized in Santa Maria da Feira and in other regions of the country is then made, using labour productivity data for a long time span of several decades. This exercise is a quantitative illustration of the crucial importance of history for the understanding of cluster dynamics, as well as many other (evolutionary) economic phenomena.

Keywords: Cork Industry, Cluster Life Cycle, Santa Maria da Feira, Portugal.

JEL codes: R12; L73; N60; O14

1. Introduction

This paper is about the relative economic performance of clustered and non-clustered companies in the different phases of the cluster life cycle. According to the relevant literature on the subject, clusters tend to follow a predictable path in time, from emergence to the development phase, followed by maturity and eventual decline or renewal.

As clusters can be an important determinant of the economic evolution of the regions where they are located, the identification and understanding of the different phases of a cluster life cycle are crucial to regional policy. In this sense, to obtain a better knowledge of the economic dynamics of regions and the strengths and weaknesses that they have in the complex process of the location of industrial production activities in the globalization era of our times.

In this study, an empirical application is tentatively made of the Portuguese cork industry and its well established cluster at Santa Maria da Feira. This is an important sector in Portugal and is in fact the only one where Portugal has world leadership, both in production and international trade, as well as in the research, technological and innovation domains. It is also an interesting case study given that the environmental and rural development advantages of this industry are very important in some rural areas of the country, as cork is a renewable raw material that is removed from (without destructing) a forest tree (cork oak).

First of all, the main facts and trends of this industry are briefly discussed, and an explanation is given for a puzzling location behaviour, namely that most of the Portuguese cork manufacturing firms are concentrated in Santa Maria da Feira, a small county in the north of the country, whereas the bulk of cork is produced in the south, in the Alentejo and Ribatejo districts. The main historical reason explaining this puzzle is connected with the dominant position in that region of an anchor firm - Amorim & Irmãos – which created a hub and spoke format for this cluster, although some elements of a Marshallian industrial district are also evident in Santa Maria da Feira where there are a large number of small firms with a predominance of a traditional (family-owned) cork industry.

After this brief panoramic view of the cork industry in Portugal, the historical roots and past and path dependency of the trajectory of the Feira cork cluster are examined, with the main purpose of identifying its life cycle phases, which is the main contribution of this paper. Along with some qualitative trends, the analysis is based on a quantitative approach, using four indicators: 1) the number of firms, 2) workers, 3) working hours and, 4) the value of production.

The analysis covers a long time span, from 1947 until the present (in fact, up to 2009, which is the last year data is available for empirical analysis).

As well as the identification of the stages of the cluster life cycle, an analysis of the economic performance of firms located in Santa Maria da Feira and in other regions of the country is made, also covering a long time span of several decades. This compares labour productivity values and hourly wages as well as those from export performance for a recent period (2004-2011).

This empirical analysis is a quantitative illustration of the crucial importance of history for the understanding of cluster dynamics, as well as many other (evolutionary) economic phenomena. They constitute a useful contribution to the understanding of this important industry in Portugal, together with the qualitative analysis of the historical, social, political and institutional features of the lengthy development process of the Santa Maria da Feira cork cluster.

The paper is organized as follows. The theoretical framework about clusters and their life cycle phases is presented in section 2. Section 3 describes the main features of the Portuguese cork industry, with particular focus on the cork cluster of Santa Maria da Feira. In section 4, the historical roots and past and path dependency of the trajectory of this cluster are exposed, as well as the identification of its life cycle phases. Section 5 concludes, presenting a synthesis of the main findings and some lines for future research.

2. Theoretical background: a life cycle approach.

Clusters are very important for regional development (Porter 2003), since they improve regional prosperity, as of clustered firms obtain high returns resulting from agglomeration economies and external economies in the Marshallian sense. A better and more profound understanding of the cluster in all its facets helps regional policy decision makers.

In his masterpiece, *Principles of Economics*, Alfred Marshall (1890) argued that external economies emerging from an industrial district resulted from the agglomeration of small firms, strongly connected with each other and specialized in different phases of the same production process. A concentration of this kind permits the creation of a pool of specialized workers and forces the creation of subsidiary industries and specialized suppliers.

During the 1970's, the concept of Marshallian district was applied to the case of Italy by Giacomo Becattini, which retook the concepts of industrial atmosphere and external economies,

but also introduced new elements, such as the local people's historical and social roots and the relationship between the people and the production system, whereby firms and market institutions are one small part of the Industrial District. The "localized industry is embedded in a community of people" (Becattini, Bellandi and De Propis 2009).

The same type of economies can also be included in the notion of cluster described by Porter (1990 and 1998)[1]. According to Martin and Sunley (2003), the conceptualization of a "cluster" can be chaotic, as there are many definitions and forms of clusters. Putting aside the critics, according to Porter's definition, there are two strong features that determine the concept: the connections between firms and their geographical proximity. Thus clusters can be described as a geographical concentration of interconnected firms, specialized suppliers, service providers and institutions[2], competing and cooperating in the same location. The advantages of clustered firms result from Marshallian external economies and from agglomerated economies which boost the competitive advantage of a sector and/or a region. The local grouping of similar firms in related industries within a well-defined area refines this concept and allows for the identification of the cluster's basic units: firms and institutions that are connected to a specific sector (defining a value chain) and geographically concentrated. Menzel and Fornahl (2009) argued that interconnections inside the "spatial and sectorial involucre" refer to traded and untraded interdependencies[3].

Empirical studies making comparisons between clustered and non-clustered firms reinforce the conclusion that companies inside the cluster tend to perform better that non-clustered companies (Spencer et al, 2010).

An analysis over a long term perspective may bring new conclusions to the fore which emphasize the understanding of how and why the cluster actually became a cluster and how it evolves. However, the historical factors that were prevelant at the time of the origin of a cluster may not be the same in terms of its functioning and sometimes the advantages of the clustered

[1] Clusters and Industrial districts are different concepts, as clusters can have different sizes and the firms within clusters can also have different dimensions. Similarly, the "industrial atmosphere" present in industrial district can also be found in the cluster, to the extent that the formal relation between enterprises can be strengthened by the presence of a social network of cooperation with roots in local history and culture. In this paper we use these concepts indistinctly.For further discussion, see Soler i Marco (2008); Becattini, Bellandi and De Propis (2009) and Catalan, Miranda and Ramon-Muñoz (2011).

[2] These institutions include universities, standards-settings, agencies, think tanks, vocational training research providers and trade associations.

[3] Market exchange of goods and services; labour market mobility; imitation behaviour, social networks, face-to-face interaction and cooperation.

firms diminish and are not permanently present, or can even become a threat in the face of external pressures or internal changes.

A more dynamic approach is necessary to be able to capture all the different phases of the evolution of a cluster, considering it as a complex and adaptive system. The evolutionary economic geography approach (Boschman and Frenken 2006) contemplates the life cycle of clusters, placing focus on their origin, how and why they decline and how and why they shift into new fields. Examination of the life cycle of a cluster allows the identification of different stages and associated characteristics. Menzel and Fornahl (2010) distinguish between emergence, growth, maturity and decline, as phases of a cluster's life and attach different characteristics to the different stages.

However, few clusters follow a rigid life cycle from emergence to growth and decline. Following Martin and Sunley (2011), the adaptive cycle model can be used for understanding complex systems such as a cluster. This approach tries to deal with two contradictory features of a dynamic system: stability and change. Stability implies a growing internal interconnection among the parts of the system but tends to reduce the capacity to adapt to a changing environment. The concept of "Resilience" plays a crucial role in the survival of a dynamic system. The adaptive life cycle conciliates these contradictory features by taking into account several phases of the cycle which can be evaluated according to three dimensions: 1) accumulation of resources; 2) internal connectivity of a system's components; 3) Resilience, a measure of system vulnerability to (and recovering from) shocks.

Some studies, like Sedita and Belussi (2009), applied to Italian industrial districts, link the several phases of the life cycle to quantitative and qualitative characteristics. Also Menzel and Fornahl (2010) point out quantitative and qualitative aspects that are determinant during the several phases of a cluster's evolution.

In terms of the quantitative aspects, the number of firms and employees is different along the cluster's life cycle. In the emergence phase, with only a few but growing number of small firms; in the growth phase with a growing number of employees; in the mature phase, when the cluster is able to maintain employment at a high level; in the declining phase, when a diminishing number of firms and employees can be observed.

In terms of a qualitative perspective, several factors influence the different stages during the life cycle of a local cluster, some related with the external environment of the cluster and others specific to the cluster and its dynamics.

2.1. The Emergence phase

The roots and genesis of a cluster are hard to identify, but this stage is crucial for establishing the cluster basis and its subsequent growth process. The understanding of how and why clusters emerge is critical, since the choices made in the past can influence the subsequent choices.

What factors influence the emergence of a cluster? There are several prominent factors at the origin of a cluster: factors specific to the cluster and/or its territory ("local factors") and "global factors", such as the entry of multinational corporations (Belussi and Sedita 2009).

The local factors are determined by historical legacy and social capital connected to industrial structure (for instance ancient craft tradition, the values and attitudes towards entrepreneurship, cooperation, innovation and institutions). Also relevant, are the resource endowments (natural resources, labour, infrastructures, etc.) and the presence of an anchor firm that could pave the way to success and stimulate several start-ups. Local demand and national/local policies complete these local factors.

Menzel and Fornahl (2009) sustain that the context in which the cluster arises is decisive for its growth, because the cluster must reach a critical level in terms of firms and employees in order to move on to the next phase. The growth rate of the firms inside the cluster must exceed the growth of the non-clustered firms. The number of spin-offs is crucial and they can be boosted by the local business environment.

This phase coincides with rapid growth and the accumulation of resources, such as: specialized productive capital, supporting institutions and specialized labour. The interconnectivity of the system components increases (between firms and institutions) and the resilience (adaptability) is high (Martins and Sunley 2011).

Some authors argue that the establishment of a cluster in a certain region can result from random facts or "coincidences". Krugman (1991) claims that "historical accidents" are responsible for the cluster emergence, meaning that specific features of a location are not so important in an initial phase and evolution emerges randomly within the economic landscape. Along these lines Arthur (1994), Boshma and Frenken (2006) described the origin of a cluster as a stochastic process of start-ups and spin-offs. The cluster establishes itself when the number of firms reaches a threshold and generates increasing returns. Klepper (2001) offers a more company-focused perspective: successful firms attract more firms and the location of these firms is accidental. Martin and Sunley (2006) argue that "coincidences" are not random, but a result from a strategic option by the firms and sometimes the regional particularities are important.

During the origin of the cluster, its main functioning and features are established, in terms of sectorial specialization and networks between firms, leading to the definition of a technological direction.

2.2. The Development phase

This stage is dependent on initial conditions and also of local firms' ability to anticipate or react to changes affecting international demand and/or global competition. A strong increase in employment as a result of the strong growth of existing firms and a high number of start-ups characterizes a growing cluster. The cluster becomes well established and may eventually stabilize around a particular form, structure and mode of self-reproduction. The interconnections are high and resilience is lower.

During this phase, the clustered firms perform better, reinforcing the spacial concentration and resources accumulation. The creation of a specialized labour market and supportive infrastructure leads to the competitive advantage of the clustered companies, based on innovation and higher productivity.

According to Elola et al. (2012), the development phase is mainly driven by the path dependent mechanism and the cluster can be in this stage for a considerable amount of time, depending on how inflexible it becomes and on the nature of external shocks. The factors present during this stage can also be local and/or global. In terms of local factors, Elola et al. (2012) highlight the social capital accumulation and also the firms' strategies. The strategic capabilities developed by clustered firms and regional agents are determinant for the competitive advantage of the cluster and firms can adopt a strategy based on cost leadership or diversification. In terms of the global factors, these authors emphasise the role of cluster-leading firms and cluster associations in bringing in outside knowledge to the cluster. In other cases, a reallocation process can take place in order to get some relationships with services outside the cluster.

2.3. The Maturity Stage

The maturity stage is decisive for the future of the cluster and the lock-in situation may be or may not be avoidable. In quantitative terms, a mature cluster is in equilibrium, with neither a significant growth or a decrease in terms of employees and firms. Martin and Sunley (2011) call this phase the "conservation" phase. The cluster stabilizes around a particular form, structure and self-reproduction mode.

According to Martin and Sunley (2011), when facing a sudden change or shock, the cluster can enter into a "release phase": some firms close, others disinvest and the cluster contracts in size.

The decline can result from a "downward causation" (cluster to firms) or an "upward causation" (firms to cluster).

Menzel and Fornahl (2009) refer to the fact that declining clusters face a decreasing number of firms and specialist employees due to failures, mergers and rationalizations. Start-ups become rare. The cluster loses the ability to sustain its diversity, to adjust to changing condition as well as the potential for independent renewal.

Considering Elola et al. (2012), it appears that the former local factors no longer provide sources of competitive advantages to the firms and the cluster and "lock-in" situations may occur. The survival capacity of the cluster depends on the firms' capabilities to react to changes and renew.

Following Martin and Sunley (2011) three alternatives are possible: 1) Firms have the upgrade capacity to enter in a new development path through the implementation new, yet related, technologies; 2) an old cluster declines and disappears, but is replaced by a new one with new specialization; 3) the cluster declines and no new cluster emerges, leading to the industry disappearing in that location.

To sum up, the evolutionary process of clusters is accompanied by the evolution of path dependence, influenced by the initial conditions and the subsequent capabilities developed by firms during their growth phases. The development of the clustering process is influenced by multiple path dependences and this phenomenon cannot be solely attributed to Marshallian external economies, but also depends on local firms' specific experiences of learning and innovation.

3. The most relevant facts and trends of the Portuguese cork business

Before entering into the identification of different phases of the life cycle of the cork industry cluster of Santa Maria da Feira the main facts of the historical evolution of the cork business need to be presented, as they can also shed some light on the understanding of the cluster formation and evolution.

The cork business has three facets[4]. Firstly, in the forest, cork is obtained from the cork oak tree (*Quercus suber*) and in Portugal these trees can be found in the "montado" ecosystem. The Iberian Peninsula possesses soil and climate conditions which give Portugal and Spain an

[4] In respect of the different facets of the cork business and its evolution in Spain and Portugal, see Zapata 1996, Zapata 2002; Parejo 2010.

absolute competitive advantage in the production of cork. The western Mediterranean Basin presents optimal natural conditions for growing cork oak and, in particular, the southwest of the Iberian Peninsula is the most important region in terms of the area occupied by this tree for almost two centuries (Aronson, Pereira and Pausas 2009: 13). The cork in raw-material goes to the cork industries.

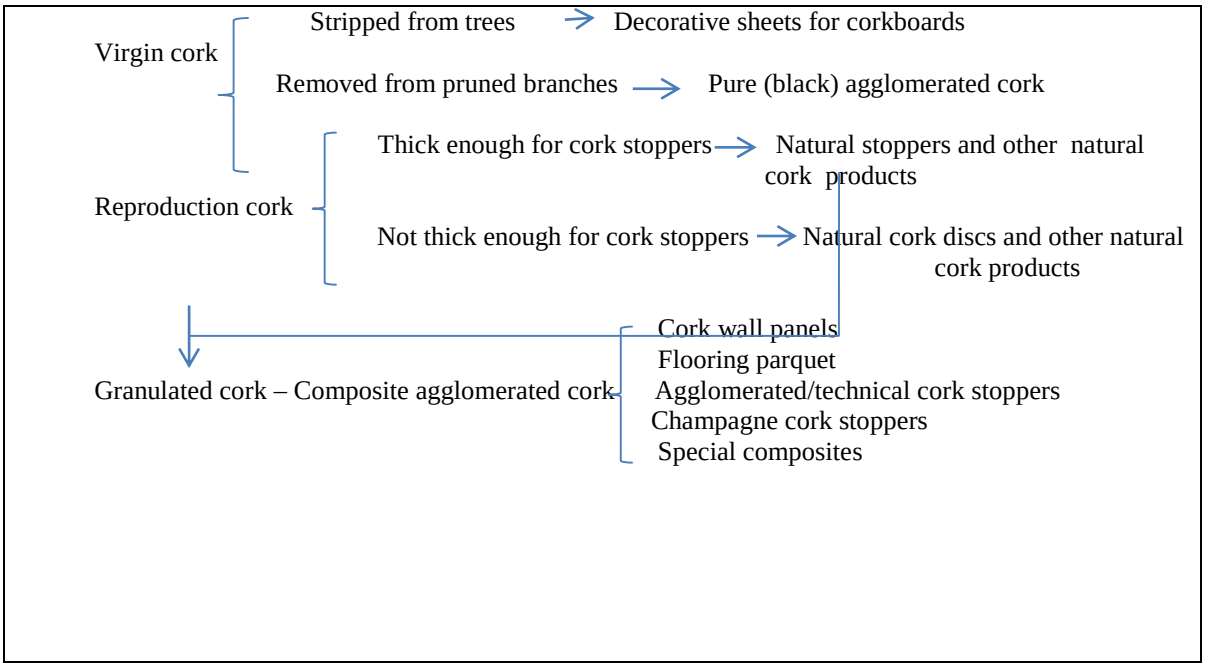
Secondly, there are several types of cork industries. The Cork Planks industry produces planks, a semi-transformed product that can be used to produce bottle stoppers; the manufactured industry, which is emblematic the natural cork industry where stoppers and discs are produced; and the Agglomerates industry which produces agglomerated cork products.

Thirdly, the international trade of cork and cork products is dominated by Portugal and Spain, as they are the most important producers of cork and export the majority of their cork products. So, the international dimension of the cork business was always present in these two Iberian countries.

Concerning technological breakthroughs, the most important innovation was the discovery of the capabilities of cork as a stopper for bottles with liquids, namely champagne. This radical innovation marked the beginning of the cork industry. Still today the major use for cork is the production of stoppers. This discovery is attributed to a French monk, Pierre Perignon, at the end of the 17th century. The onset of this industry in Portugal occurred later (during the first years of the 19th century) and was initially organized in small units with manual and family labour. Mechanization began in 1820 with the plane, a tool designed to cut the cork planks for the manufacture of stoppers. The most relevant feature of the dominant stopper industry is the fact that it was essentially a handicraft until the 1890s.

At the end of the 19th century another major radical innovation took place: the agglomerated cork. This innovation led to a more capital-intensive industry, coexisting with the traditional cork stopper industry that is highly intensive in specialized labour (Zapata et al. 2009). It also allowed for the production of a range of cork products with several uses for construction as well as the production of agglomerated stoppers. This new period was marked by the growing importance of the cork business worldwide. Also in Portugal, the cork agglomerated industries took off, albeit financed by foreign capital.

Figure 1: Cork and its products



Source: designed by the authors based on Mendes and Graça (2009: 62).

During the first half of the twenties century, raw cork and planks remained the most important exports of Portugal and the cork manufacturing industry expanded in advanced countries that have no cork oak trees, such as the USA, Germany and the United Kingdom. In contrast, the Catalonian region (Spain) appeared as one of the most important stopper producers in the world, benefiting from the proximity to the production region of champagne and to the other European markets.

The trade by these two most important producers of cork, Portugal and Spain, was undertaken by different ways up until the Spanish Civil War (1936-1939): Portugal exported cork and cork planks and Spain exported manufactured cork products. The Portuguese ascendance began in the 1930s and after the Civil War and Portugal became the world leader in the cork business, although still with a lower proportion of transformed cork exports (Branco and Parejo 2008; Parejo 2010).

In the mid-twentieth century, huge competitors to cork emerged: synthetic materials and substitutes. This affected the cork business and led to the inauguration of the third phase of the cork business. Synthetics were a strong competitor to agglomerated products and the industrial groups that supplied these products entered in decline of importance and some disappeared. This period also witnessed the decline of the cork industry in most developed countries that imported cork as a raw material. Simultaneously, and the facts are correlated, Portugal and Spain take over all the facets of the business in a process that Zapata (2002) called the

"Iberization of the Cork Business". As a result Portugal's position was reinforced and it became the world leader in the export of cork and also in the production of manufactured cork products, the latter having been dominant in the Portuguese cork exports structure since the second half of the 1960s (Branco e Parejo 2008; Parejo 2010).

Finally, the cork business has three strong features that have been reinforced since the second half of the 1980s (Zapata et al. 2009): the concentration of demand in the market of wine producers, mainly from Europe, enhanced by the positive effect of the entry of Portugal and Spain to the European Union; the cork industry became a mono-product, specializing in the production of stoppers; Portuguese cork exports showed a stable, although slightly diminishing trend.

4. The life cycle of the cork industry cluster of Santa Maria da Feira

In this section we will try to analyse the life cycle of the cork industry cluster of Santa Maria da Feira, using the concepts and methods described in section 2. It is necessary to identify the different phases of this cycle chronologically, which is a difficult task, given the somewhat nature of the concepts in question (Martin and Sunley, 2003). To start with we describe a brief history of the origins of the cork industry in this region of Portugal.

4.1 The origin of the cork industry in Santa Maria da Feira

At the end of the 19th century, according to the *Inquérito Industrial* (Industrial Census), which took place in 1890, four cork workshops were located in the Aveiro district, with only seven employees.

The origins of the *Amorim Group*, which acted as an anchor firm, go back to 1908, when the Amorim family established a small workshop producing manufactured cork stoppers at Santa Maria de Lamas (in the county of Santa Maria da Feira).. In 1917 the Amorim family already had a factory in Cortinhas (also in Santa Maria da Feira). *Amorim&Irmãos*[5] was founded in 1922, being a family business that would prompted the Portuguese stoppers to the world. In the 1930s it was already the largest producer in the north region, with 150 workers. During this decade, the firm adopted a strategy of backward vertical integration by acquiring a small store in Abrantes, near one of the biggest area of cork oak forest and also near the railway line. In

[5] Regarding the history and importance of *Amorim&Irmãos* see also Santos (1997) and Branco and Parejo (2011).

1939 this store became a factory, producing planks for the main factory. In the 1940s, *Amorim&Irmãos* employed 321 workers with a production capacity of 70,000 tonnes of cork a day. Using a definition by Chandler (1990), *Amorim&Irmão* can now be classified as a "big business". The firm also controlled the distribution channels, cutting out the intermediaries and had a dominant presence in the cork business at the time, buying Portuguese cork and selling it to wine producers. Surrounding this "big business" at Santa Maria da Feira were a large number of small handicraft workshops, based on family labour, producing stoppers to supply the Porto wine producers. Several studies[6] highlight the importance of two elements in cork industry of Feira: the ties between *Amorim&Irmãos* and the other small firms, and; the small size of these firms enabled them to cope better with fluctuations in external demand.

As emphasized in section 2, the local factors behind a clustering situation are based on a historical, cultural and social legacy. Several aspects can be pointed out: since the onset of the cork industry, Santa Maria da Feira has been connected with stoppers production; the existence of small and family firms in the north, including Santa Maria da Feira, was a consequence of the development of the Porto wine business, although producers often sold their product to intermediary exporters, sometimes with low quality; the internal consumption of stoppers was very low as Porto wine was exported in wine barrels; as an anchor firm, *Amorim&Irmãos* always demonstrated specific and differing characteristics, with an integrated business, a considerable number of employees and a dominance of distribution channels; a social network and strong bonds between the big firm and other small businesses (some of them functioning out of family homes, others being small handicraft workshop) in both a formal and more informal way, creating a Marshallian industrial atmosphere.

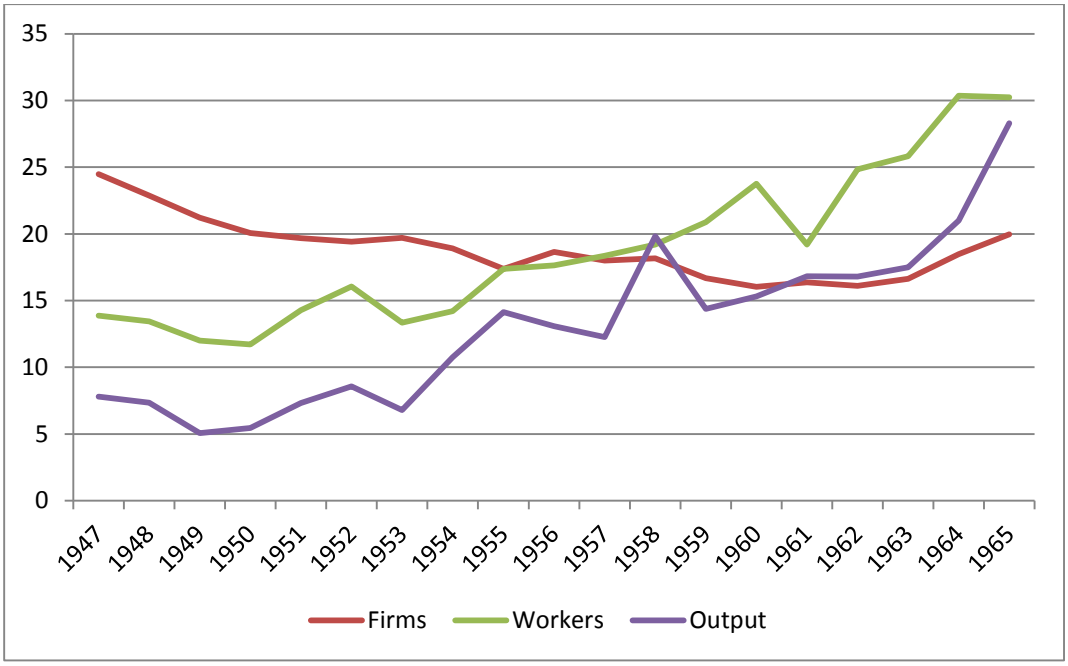
4.2 The Emergence phase

Bearing in mind all relevant factors it is considered that the emergence stage of the Santa Maria da Feira cork cluster started in the 1930s, when the number of firms in this region increased and attained a level of about a quarter of all Portuguese cork firms in the 1940s. However, the relative weight of the number of employees and hours worked is only around 15% and the percentage of output value is below 10%, which points to a small average size of firm. As we only possess data for all of the most significant indicators as from 1947, this is the starting point of our chronology. The end of the emergence phase of the Santa Maria da Feira cork cluster

[6] Ruivo 19996, 1995 and 1992; Mira 1998a, 1998b and 1994.

can be traced back to the mid1960's, as although the relative number of firms diminished a little, their average size increased (20% in 1965, the year chosen for the end point). Also the relative weight of employees and hours worked doubled and the output value more than tripled (see Figure 2).

Figure 2: Emergence phase – relative weight (%) of the Santa Maria da Feira cluster



Source: INE.

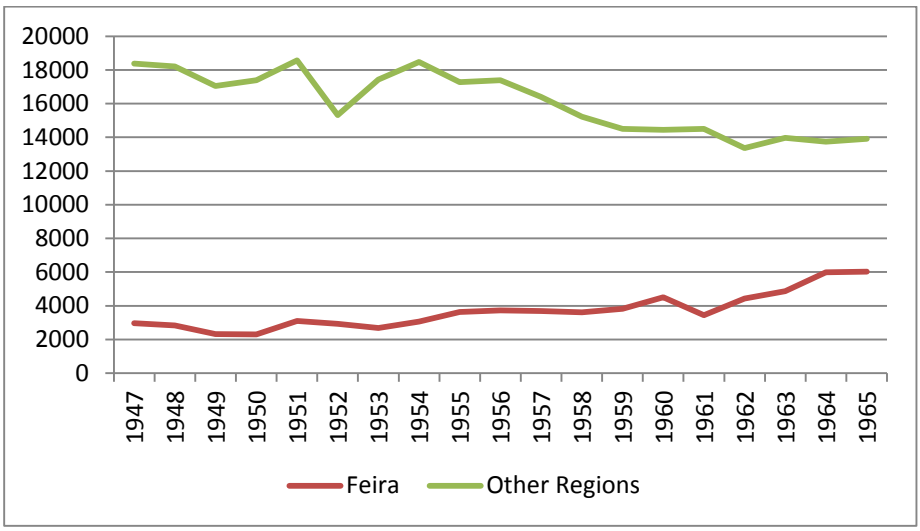
In order to assess the performance of Santa Maria da Feira's cork transformation firms better at this period, it is important to take into account the context of the entire cork industry life cycle, both nationally and internationally. In Portugal, this period corresponds to a positive trend in cork stripping and the export of cork products, and a negative trend in exports of unprocessed cork (Mendes, 2002). The good performance of the industry in Santa Maria da Feira was not shown by other regions of Portugal, where the labour force declined over this period (see Figure 3).

It is very interesting to track the evolution of the industry in terms of employees and firms in Santa Maria da Feira since the *Condicionamento Industrial* (Industrial Conditioning)[7] came into effect at the beginning of the thirties, being an institutional framework for the Portuguese industrial sector which aimed to control the competition between firms within the same

[7] The cork industry became subject to Industrial Conditioning by Decree nr. 19.354 of January 1931 and by Decree nr. 19.409 of the same year. Regarding its effects on the cork industry, see also Brito (1989), Dias (2005) and Branco and Parejo (2008 and 2011).

industrial sector. The national industrial policy did not hinder the growth of activities in the cork sector, at least in the stoppers industry, although the same cannot be said about agglomerates. The governmental organisms that conducted the industrial licencing scheme were very "tolerant" of the expansion of the cork business, paving the way for the Portuguese domination of the international trade of cork stoppers. The decline of the Catalonian cork industry contributed too.

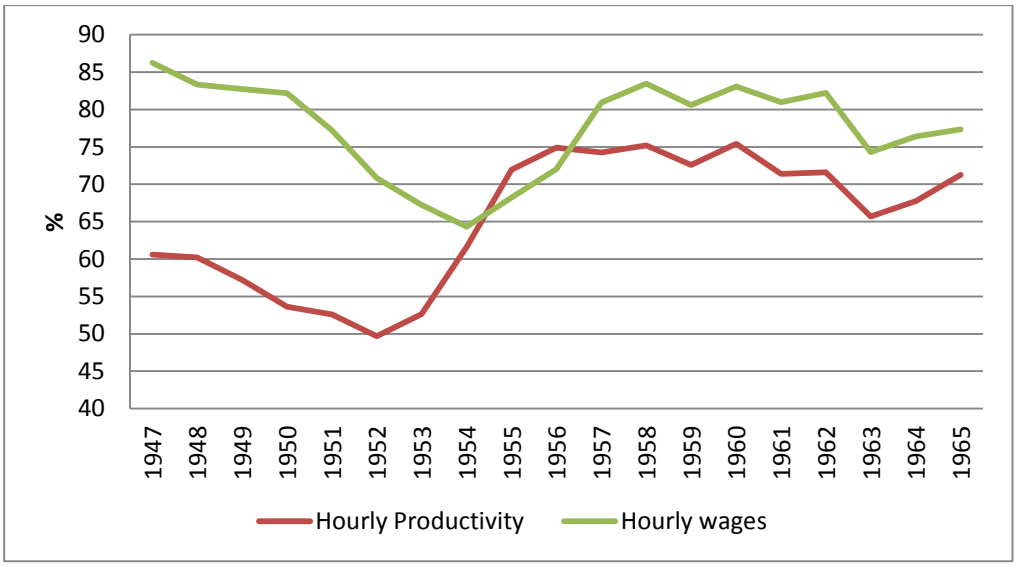
Figure 3: Emergence phase – Number of employees in S M da Feira and other regions



Source: INE.

In fact, the evolution of Spain, the other major world producer of cork products, is even worse, as a sequence of the serious problems caused in the 1930's by the Civil War, from which the Spanish cork sector never entirely recovered, particularly its strong Catalonian cluster, (Zapata 1996, 2002; Branco and Parejo 2008, 2011, Mendes 2009).

Figure 4: Emergence phase - Labour productivity and hourly wages in Santa Maria da Feira (relative to Portugal)



Source: INE.
Note: 3 years moving average values

Finally, it is interesting to see that the emergence of the Santa Maria da Feira cluster at this period was based on low hourly wages that went hand in hand with low labour productivity, as measured by gross output value per hour worked (Figure 4). This conjuncture was favourable for the cluster, as relative wages tended to decline and relative productivity tended to increase.

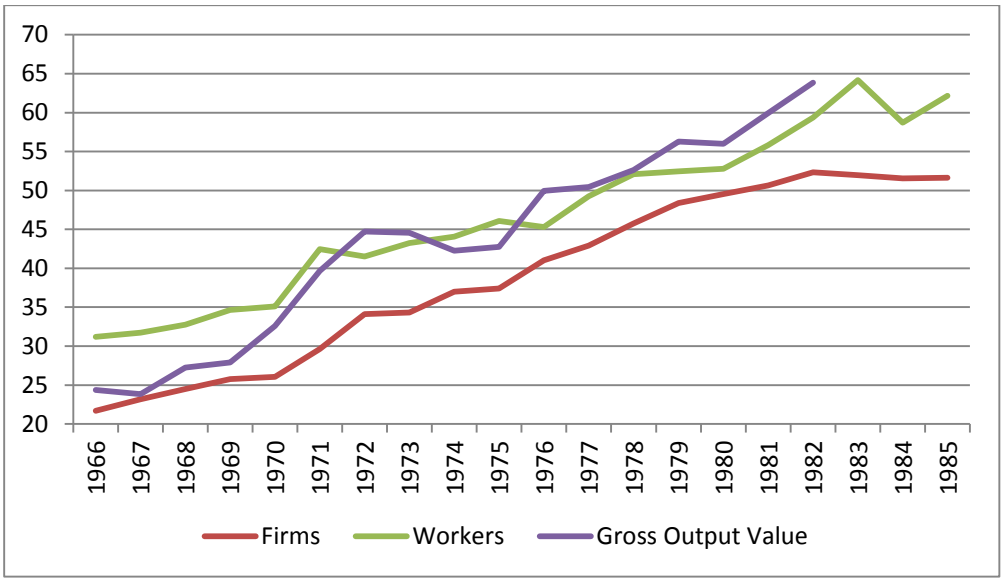
The wage differential between the south and especially the centre of Portugal reinforced the competitive advantage of Santa Maria da Feira. This differential was contemplated by the legal framework for the national wages policy for the sector (Dias 2005; Branco e Parejo 2008, 2011).

Both the Industrial Conditioning and legislation regarding cork industry wages supported the national position of the Feira cluster, reinforcing the regional specialization in the stoppers industry.

4.3 The Development phase

The development phase of the Feira cluster corresponds to the period between the mid 1960's and the mid 1980's. For the sake of simplicity and empirical purposes, let us say 1966-1985. Over these two decades, the cork industry in Santa Maria da Feira had a remarkable relative growth. In fact, in around 1980, more than half of all the Portuguese cork industry was concentrated in this region, in terms of the number of firms and employees as well as production value (see Figure 5).

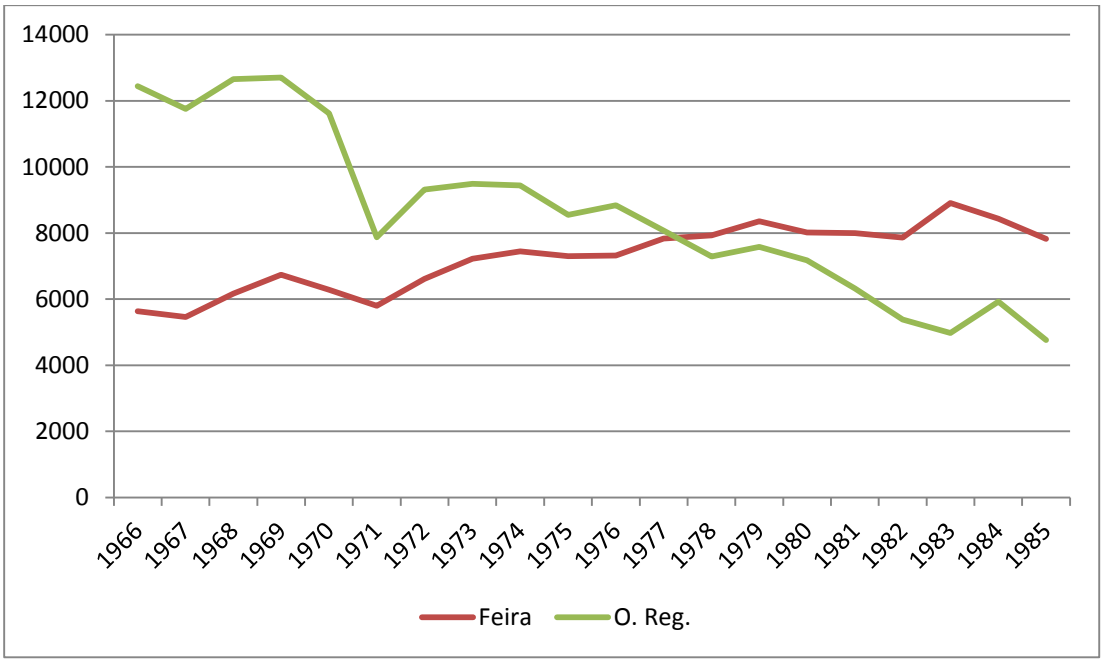
Figure 5: Development phase – relative weight (%) of the Santa Maria da Feira cluster



Source: INE.

This positive relative trend of the Santa Maria da Feira cork cluster was also a lasting one, as the number of employees in this region grew to around 2,000 in this period. On the other hand, this industry suffered a serious definitive decline in other regions of Portugal, with a loss of more than a half of employees between 1966 and 1985. As we can see in Figure 6, in 1978, employment in Santa Maria da Feira overpassed employment in all other regions of Portugal.

Figure 6: Development phase – Number of employees in Santa Maria da Feira and other regions



Source: INE.

According to the cluster life cycle approach (see section 2), the Development phase corresponds to the growth and dominance of the industry in the region, taking advantage in full the advantages of external economies of scale, a skilled labour supply, face to face contacts (social capital), the improvement of infrastructures, and the presence of auxiliary institutions. Also relevant are the strategic capabilities of the anchor firm.

In 1963, the anchor firm of the cluster, *Corticeira Amorim,* was founded, initiating the launch of a new phase of vertical integration and product diversification, combined with horizontal integration. *Corticeira Amorim* also started to produced agglomerated cork products, using as a raw material the residues generated by the other main company in the *Amorim Group*, *Amorim&Irmãos*. This firm also bought several competing companies in the business (for instance *Wicanders*) [Mendes 2009].

Another important element in the dynamics of the cluster, the Portuguese Cork Association (APCOR)[8], had its origins in the creation of the *Grémio Regional dos Industriais Corticeiros do Norte* (Regional Corporation of Northern Industrial Cork Producers) and dates from 1956. The first general assembly of this organism took place at Santa Maria de Lamas.

In 1985, the *Centro Tecnológico da Cortiça* (the Cork Technological Centre) [CTOR] was created, together with the *Centro de Formação Profissional da Indústria da Cortiça* (The

[8] Designation acquired in 1999.

Centre for Professional Training of the Cork Industry) [CINCORK]. The CTOR was of great importance, as it changed the technological centre from France to Portugal, being one of the most advance research centre of its kind in the world (APCOR 2006). The CINCORK started its activity also in Santa Maria da Feira, promoting the training of highly skilled employees.

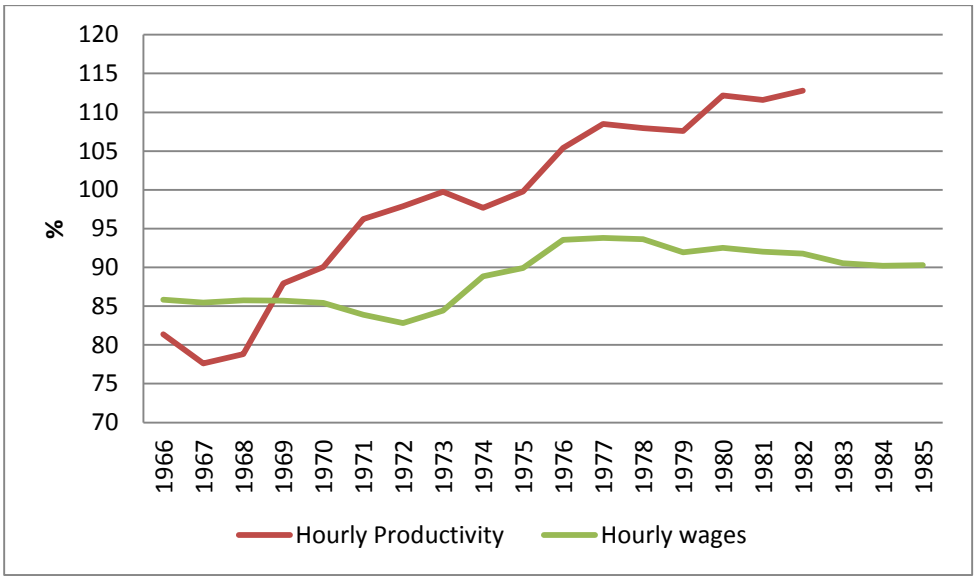
The onset of synthetic and plastic products was a death sentence for several cork agglomerate industrial groups in the region of Setúbal, namely Mundet. Amorim&Irmãos resisted better to strong competition from these products since its business was essentially the production of cork stoppers. Furthermore, the initial low-cost strategy, a potential creator of a "lock-in" situation, was abandoned. The cluster of Santa Maria da Feira overcame the challenge of globalization, benefiting also from the decline of other foreign cork industries, located both in Portugal and outside the country.

In the Development phase, the most relevant empirical signal of the strength of the santa Maria da Feira cluster was the remarkable increase in relative (hourly) labour productivity, from around 80% of the national average at the beginning of this period to around 115% in the end. The firms of Santa Maria da Feira also benefited from the relatively small increase in (hourly) labour costs (Figure 7).

The wages evolution was a result of the the agreement of 1968 between the three corporations (*Grémios*) representing the cork industry (north, centre and south) which converged the wages of employees from the cork industry in the north with those paid in the rest of the regions for the same industry.

A final word is reserved for the structure of Portuguese exports. At the end of the Second World War, manufactured products began to increase in importance, accompanying the emergence of the Santa Maria da Feira Cluster and in the 1950s the status of these products was already consolidated (Branco and Parejo 2008, Parejo 2010, Mendes 2009). The life cycle of the cork business became the life cycle of the cluster and Santa Maria da Feira became synonymous of cork.

Figure 7: Development phase - Labour productivity and hourly wages in Santa Maria da Feira (relative to Portugal)



Note: 3 years moving average values.

4.4 The Maturity phase

In the mid 1980's we can consider that the cluster of Santa Maria da Feira was entering the Maturity stage. It is more difficult to empirically illustrate this stage, because we do not know exactly when and how it will end.

Some studies covering the cork industry in this period (Branco and Lopes, 2013) tend to detect an absence of clear and sustainable advantages of concentration of production beyond a certain level, largely because of eventual congestion effects, shortages of skilled labour and other infrastructures, or a technological lock in. This can imply the decline of the cluster.

The strategy and performance of the anchor firm, Corticeira Amorim, could be determinant for the fortune of the cork industry in this region.

We will now present the most important empirical trends of this stage, from 1986 until the present (2009, in fact, for data restrictions), which can be divided in two periods, until and after the advent of the Euro (1999).

Between 1986 and 1999, there was a remarkable growth in the number of firms in Santa Maria da Feira, pointing to the continuation of the Development phase of the cluster. However, the number of employees remained static, pointing to a phase of Maturity. This last perspective is reinforced in the subsequent period, with a marked decline of all the indicators available (see Table 1). The numbers are much worse for the other regions of Portugal, meaning that even in

its maturity stage the Santa Maria da Feira cork cluster reinforces its role in the country, representing more than 80% of all the industry.

Table 1: Firms, employees and monthly hours in Santa Maria da Feira and other regions of Portugal

Year	Firms							
	Feira			Other regions			Portugal	
	Number	%	Av. Gr. (%)	Number	%	Av. Gr. (%)	Number	Av. Gr. (%)
1986	336	63,6	-	192	36,4	-	528	-
1999	679	77,7	102,1	195	22,3	1,6	874	65,5
2009	484	81,1	-28,7	113	18,9	-42,1	597	-31,7
Year	Workers							
	Feira			Other regions			Portugal	
	Number	% do total	Av. Gr. (%)	Number	%	Av. Gr. (%)	Number	Av. Gr. (%)
1986	9702	59,2	-	6679	40,8	-	16381	-
1999	9673	75,7	-0,3	3105	24,3	-53,5	12778	-22,0
2009	7387	84,7	-23,6	1336	15,3	-57,0	8723	-31,7
Year	Monthly Hours							
	Feira			Other regions			Portugal	
	N. (10^3)	% do total	Av. Gr. (%)	N. (10^3)	%	Av. Gr. (%)	N. (10^3)	Av. Gr. (%)
1986	1503,5	58,3	-	1073,2	41,7	-	2576,7	-
1999	1410,1	75,8	-6,2	450,0	24,2	-58,1	1860,0	-27,8
2009	1104,7	84,9	-21,7	196,5	15,1	-56,3	1301,3	-30,0

Source: *Quadros de Pessoal*

The economic performance of the cluster in this phase, measured by average labour productivity, increases over the whole period, but to a larger degree up to the introduction of the Euro in Portugal. The same trend occurs outside Santa Maria da Feira, although with lower absolute values, pointing to some economic advantages of clustered firms even in the Maturity stage, but at a stabilized level (see Table2).

Table 2: Labour productivity in Santa Maria da Feira and other regions of Portugal

	Output value by worker							
	Feira			Não Feira			Total	
Ano	Value (€)	%	Av. Gr. (%)	Value (€)	%	Av. Gr. (%)	Value (€)	Av. Gr. (%)
1986	15914,2	109,0	-	12684,5	86,9	-	14597,4	-
1998	28843,6	105,2	5,1	23013,8	83,9	5,1	27427,0	5,4
2008	40754,8	102,4	3,5	34551,2	86,8	4,1	39804,6	3,8
	Output value by working hour							
	Feira			Não Feira			Total	
Ano	Value (€)	%	Av. Gr. (%)	Value (€)	%	Av. Gr. (%)	Value (€)	Av. Gr. (%)
1986	102,7	110,66	-	78,9	85,1	-	92,8	-
1998	197,9	105,01	5,6	158,8	84,3	6,0	188,4	6,1
2008	272,5	102,13	3,3	234,9	88,0	4,0	266,8	3,5

Source: *Quadros de Pessoal*

Using a different indicator of economic performance, namely exports, available at regional basis only for a short period of recent years, a similar conclusion emerges, pointing to the weakening of cluster advantages in the Mature phase of the life cycle (see Table 3).

Table 3. Cork Exports, values - 2004-2011

	S.M. Feira		Other Regions		Portugal	
Year	€	R.Ch. (%)	€	R.Ch. (%)	€	R.Ch. (%)
2004	759,244,039	n.a.	99,138,104	n.a.	858,382,143	n.a.
2005	604,712,785	-20.35	95,074,739	-4.10	699,787,524	-18.48
2006	687,816,755	13.74	106,500,329	12.02	794,317,084	13.51
2007	707,779,078	2.90	110,511,072	3.77	818,290,150	3.02
2008	682,061,140	-3.63	90,404,401	-18.19	772,465,541	-5.60
2009	573,787,169	-15.87	73,549,222	-18.64	647,336,391	-16.20
2010	636,290,505	10.89	77,709,977	5.66	714,000,482	10.30
2011	677,184,734	6.43	94,365,659	21.43	771,550,393	8.06
2004-2011	-	-1.62	-	-0.70	-	-1.51

Source: INE and the authors' calculations

It must be stressed that this period was marked by the great recession of 2009, which strongly penalized exports. However the cork industry as a whole has shown a remarkable resilience since then. What the future will bring to this sector both in Santa Maria da Feira and other regions of Portugal is, obviously difficult to assess now.

5. Concluding remarks

This paper concerns the relative economic performance of clustered and non-clustered companies in the different phases of the industry and cluster life cycles.

It starts with the theoretical discussion and identification of four sequential stages, namely Emergence, Development, Maturity and (eventual) Renewal or Decline, based on the findings of relevant literature on this subject.

The empirical research is focused on the Portuguese cork industry case, approached from a historical and socio-economic long term perspective. The main focal point is an apparently puzzling situation regarding location, namely that most of the Portuguese cork manufacturing firms are nowadays concentrated in Santa Maria da Feira, a small county in the north of the country, whereas the bulk of cork is produced in the south (Alentejo and Ribatejo).

After a brief explanation of this and some other relevant facts and trends about the cork manufacturing business in Portugal, the historical roots and past and path dependence of the Santa Maria da Feira cork cluster was exposed, as well as the identification of its life cycle phases.

A comparative analysis of the economic performance of firms localized in Santa Maria da Feira and in other regions of the country was then made, using labour productivity and wages data for a long time span of several decades, covering all the stages of the cluster evolution.

This exercise is a quantitative illustration of the crucial importance of history for the understanding of cluster dynamics, as well as many other (evolutionary) economic phenomena.

The main conclusions substantially support the theoretical predictions found in the cluster life cycle literature. In the emergence phase, between the mid 1940's and the mid 1960's, the Santa Maria da Feira cork cluster became slowly more important, in terms of the number of companies, employees and production, but the economic performance (productivity) is below the country's average. In the Development phase, until the mid-1980's, a remarkable growth of the cluster occurs, as well as a substantial improvement in its absolute and relative economic performance, measured by hourly labour productivity. Finally, the Maturity stage in the 1990s and the first decade of the new millennium is denoted by an apparent exhaustion of the advantages of clustering, with congestion and possible lock in effects.

It has not yet been clearly and unequivocally determined whether the future phase of the Santa Maria da Feira cork cluster will be one of decline or renewal as this depends on many factors, which warrant continuous and careful observation and research. One of the most determinant factors is the business strategy and behaviour of the anchor firm, *Corticeira Amorim*, which has led for a long time the cork business in Portugal and indeed the rest of the world.

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