Was the Portuguese Forest Policy a contribution towards economic modernization? The case of the Paper Pulp Industry during the Estado Novo (1930-1974)

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Introduction[1]

The second half of the twentieth century marks the beginning of modern economic growth in Portugal.[2] This statement is corroborated by the definitive identification in the Portuguese economy and society of several characteristics denoting modern economic growth just as it was systematized by Simon Kuznets.[3] In aggregate terms the gross domestic product grew at the unprecedented rate of more than 5% per year, exceeding the population growth rate. As a result, the Gross Domestic Product (GDP) *per capita* increased, thus reducing the gap between Portugal and the rest of Europe, which had existed since the XIX century.[4] This period of accelerated economic growth was accompanied by structural changes in the Portuguese economy and society; in particular there was a shift in the labour force away from agriculture, and the added value of the agricultural sector declined in relative terms. At the same time, there was a corresponding increase in industry and the services for the same variables. Finally, the share of external trade in the GDP rose, indicating Portugal's greater integration in the world economy.

The Portuguese industrial take-off occurred in a political and institutional framework characterized by the strong interventation of the State in the economy,

1. The author thanks Nuno Valério and Manuela Rocha for comments, and two anonymous referees for helpful suggestions.

2. See Lains (2003); Neves (1994); Mata and Valério (1994); Valério (1993b); Nunes and Brito (1992).

3. Kuznets (1969).

4. Reis (1993).

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this being not only a consequence of the fact that Portugal was a latercomer[5] but also a result of a dictatorial regime known as the *Estado Novo* (New State)[6].

Consequently, while the State intervention was a response to the economic situation – the 1929 crisis and the Second World War–, it also involved structural changes, connected to a political regime marked by authoritarianism and a state-controlled economy[7]. The State used structural means[8] to initiate a catching-up process by creating an institutional environment that was favourable to industrialization**.**

With regard to the process of industrial take-off, it has been argued in the Portuguese historiography that there was a problematic relation between the primary sector and the manufacturing sector during the period of *Estado Novo.* The differences in the rythm of the two sectors, whether in terms of growth or in structural changes, would place strain on the sustainability of economic growth after 1960. According to Fernando Rosas, "the agicultural mode of production could not sustain industrial development in cultural, price or productivity terms"[9]. This author further contends that one of the consequences of this agricultural backwardness was the difficulty in maintaining competitiveness in the industries that supported the industrial modernization[10]. These difficulties worsened from the 1960s onwards as Portugal opened up its economy to the outside world.[11]

Against this backdrop, a sectorial analysis can shed new light on the relation between industry and agriculture in the process of take-off, and this can be done through a case study of an industry that depends on the agricultural sector in terms of its raw material. Hence, this work analyses the interdependence between the paper pulp industry and the forestal sector. This industry was chosen for two reasons: first, the paper pulp industry was one of those targeted by the State to kick-

5. See Gerschenkron (1966), pp. 5-30.

6. The constitution of a government presided over by General Domingos de Oliveira, in January 1930, marks the beginning of a period of governmental stability, culminating in the nomination of António Oliveira Salazar to President of the Council of Ministers in 1932. In the following year, the new Constitution was published, institutionalizing the *Estado Novo* (New State). For the characteristics of the *Estado Novo*, see Madureira (2000); Valério (1993a); Oliveira (1989).

7. Article 33 of the 1933 Portuguese Constitution states, "The State has the right and the obligation to oversee and manage economic and social life".

8. The main characteristics of this institutional framework can be found in Marques (1980) and Nunes (1996).

9. Rosas (2000), pp. 88-101. See also Rosas (1994). In a different perspective, see Reis (1984) as regards the question whether the natural resources, their scarce supply and/or poor quality, hindered the Portuguese take-off in the 19th century. Also, in the Spanish case, one of the causes presented for the slower growth is based on the backwardness in the agricultural sector. See Simpson (2005); Tortella (1987); Sanchez-Albornoz (1977); Fontana-Nadal (1976); Nadal (1976).

10. Capital-intensive strategic sectors included cement, fertilizers, iron and steel, heavy metallomechanics, paper pulp, and chemical industries.

11. The Portuguese economy began opening its markets to the outside immediately following the Second World War, when it became a member of the Organisation for European Economic Cooperation (OEEC), which emerged from the Marshall Plan. Later, the participating countries formed two economic zones: the European Communities (EC) and the European Free Trade Agreement (EFTA). Portugal signed the Stockholm Convention in 1959, and received full EFTA membership rights in 1960. See Valério (1997).

start economic growth; and second, the production of paper pulp depends on a raw material – wood – which comes from the forest subsector.

In view of a general consensus in Portuguese historiography, which argues that the relatively underdeveloped agricultural sector hindered development in the industrial sector, this article seeks to answer the following question: how can the dynamic productivity and exports of the paper pulp industry during the 1950s and 1960s be explained, given the fact this industry was dependent upon the primary sector for its main raw material?

To answer this question we shall argue that the Portuguese forests were able to respond to the pulp industry's demand for raw materials. This response was based on changes in the area and in the species composition of Portuguese forests, which in turn were the result, at least in part, of the forest policy measures carried out by the *Estado Novo*. We shall centre the analysis on two of these measures: the *Plano de Povoamento Florestal* (Afforestation Plan, PPF), which constituted a direct intervention by the state in the afforestation of communal land; and the *Fundo de Fomento Florestal* (Forest Development Fund, FFF), a financial incentive designed to support afforestation on private property.

The study focuses on the period 1930 to 1974. We chose the 1930s as a starting point for two main reasons. First, it allows us to analyse the characteristics of the Portuguese forests before the beginning of the Afforestation Plan, which came into effect in the following decade. Second, those years were also an important political, economic and institutional reference in building the foundations of the *Estado Novo*. The basic characteristics of the institutional framework of the *Estado Novo* were constituted in the 1930s and 1940s, particularly with regard to the industrial sector. The formal institution of Industrial Conditioning (*Condicionamento Industrial*) in 1931 marks the beginning of the intervention in the industrial sector.[12] With the Law of Economic Reconstitution[13] (*Lei de Reconstituição Económica*), of 1935, the interventionist role of the State was structurally reinforced through a set of State investments in diverse economic areas projected over a period of fifteen years. [14] State investment in afforestation was covered in this Law, under the rubric of Economic Development (*Fomento Económico*). The Estado Novo's industrial policy is clearer still in Law Nr. 2005, of 14 March 1945 – Law of Industrial Development and Reorganization (*Lei do Fomento e Reorganização Industrial*). In this law the paper pulp industry was classified as a 'strategic sector' – along with base materials and chemicals – and, as such, it received several incentives as an industry that the State wanted to stimulate and develop[15]. The move towards sustained economic growth

12. Industrial Conditioning was established by the Decree Nr. 19354 of 14 February. For a more detailed study of this political measure see Brito (1989a).

13. Law Nr. 1914, of 24 May.

14. See Nunes and Valério (1983).

15. On the development of those industries see Aguiar and Martins (2005), p.185-226; Rodrigues and Mendes (1999), pp. 277-341*;* Rosas (1998), pp. 59-90, 402-422; Santos (1989); Brito (1989b), pp. 125-162.

did not alter the main lines of State intervention in the economy, despite changes in the international setting, which were the result of a new international economic order set up after the Second World War. Finally, the Forest Development Fund (*Fundo de Fomento Florestal*) was created in the 1960s.

The choice of 1974 as the end of the period under focus is thus justified, since, in addition to marking the end of a cycle of growth, 25 April 1974 marks a State intervention in the economy with different characteristics, under a different political regime.

Following the introduction, the rest of this work is structured in four parts. First, we shall evaluate the contribution of the paper pulp industry to modern economic growth. There then follows a description of the basic characteristics of Portuguese forests in the 1930s in terms of their area, composition, juridical framework and the dimension of property. Still in this context, we approach the objectives, the main guidelines and the consequences of the more emblematic forest policy measures of the *Estado Novo* (New State): the afforestation of communal land (the PPF) and the development of forests on private property (the FFF). Then we shall assess the impact that these measures had with regard to prices and quantities of wood. We conclude that the development of the paper pulp industry was underpinned by the planting of forests with a fast-growing species as well as by the expansion of species already present in the Portuguese forests. This main change in the Portuguese forest provided the pulp industry with the capacity to respond to a national and international market featuring growing demand. Thus, the forestry sector was able to meet the demand from a new sector of the Portuguese industry for a raw material, and therefore, it did not constitute an obstacle to economic growth.

The paper pul industry in the portuguese modern economic growth

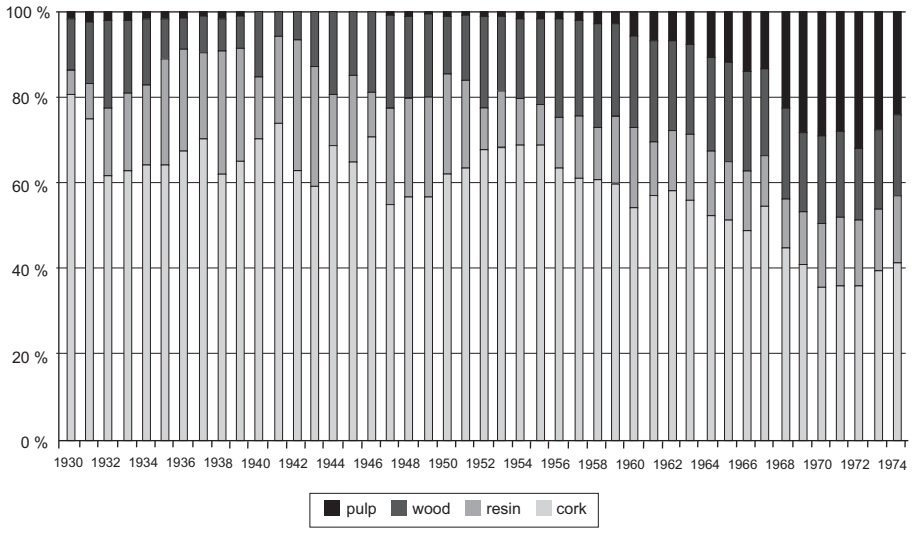
Forest-based products have always played a key role in Portugtuese exports. In 1930 they accounted for 19% of total exports. Cork ranked first in importance; it made up 16% of total Portuguese exports and 81% of forest-based exports. Following cork in order of importance were wood and resinous products (see Figure 1). Paper pulp was last, accounting for 2% of forest-based exports and 0.3% of total exports for the country. By the end of the period under study, 44 years later, there was a slight decline in the relative importance of forest-based exports (18% of total exports), but the relative share of each had radically changed. While the traditional product, cork, retained its leading position (42% of forest-based exports), paper pulp ranked second (24% of forest-based exports and 4% of total Portuguese exports).

In the period 1930-1974 the growth rate for exports of paper pulp was greater than that for national exports. While paper pulp exports saw an increase of 10.7% (prices adjusted to 1963), national exports increased by only 7.5%.[16] This increase

16. Dias (2005), p. 473.

FIGURE 1

EVOLUTION IN THE RELATIVE SHARE OF FOREST-BASED EXPORTS



Source: Based on External Trade Statistics. INE (Statistics Portugal).

was not apparent until the 1950s, and it suggests the emergence of a new productive specialization for the country: one that was successful in external markets. The rapid and significant success was without a doubt accompanied by structural changes both upstream and downstream in the industrial subsector involving paper pulp.

Let us start by a historical overview of the paper pulp industry in Portugal. Until the 1950s there was only one paper pulp mill in the country, the Caima Timber & Wood Pulp Company, and this was underpinned by foreign capital: Although this company had been established since the end of the XIX century, its production was almost entirely taken up by the external market. Portuguese paper companies imported most of the pulp they needed, and the country was dependent on imports for the supply of some types of paper, as was the case for newspaper. The paper companies' dependence could be seen in its imports; in 1930 19% of all paper pulp imports were destined for the paper companies and by the end of the decade this had reached over 30%. This dependence prompted the State to target paper pulp mills among the subsectors to develop in the country, given the need for greater internal paper production and the need to guarantee national raw materials for this end[17].

17. One common problem for the Southern European Countries was the dependence on pulp imports. Again the similarities between the Portuguese and the Spanish cases emerge. In Spain, early

Nevertheless, several issues hindered this aim in the 1930s. Among others were the backwardness of the chemical industry in Portugal and a shortage of wood for use as a raw material. The former was overcome by the opening of the Soda Póvoa Company[18]. To overcome the latter, the State took direct action through the *Plano de Povoamento Florestal* (Afforestation Plan, PPF).

These two actions coincided with two independent projects to establish a pulp mill in Portugal[19]. In 1940 a project to install a paper pulp mill using chemical and mechanical processes was presented to Industrial Conditioning for approval. In the same year, another project to install a paper mill appeared, accompanied by a report on the feasibility of the paper pulp industry in Portugal. The then Secretary for Trade and Industry, Ferreira Dias[20], responded with a proposal that the two interested parties combine forces to launch the paper pulp industry in Portugal. Both parties accepted and in 1941 the *Companhia Portuguesa de Celulose, S.A:R.L.* (CPC) was established. On 11 March 1942, in compliance with Industrial Conditioning, the project was authorized to proceed with the production of mechanical and chemical pulp[21] using wood from the Portuguese forests, mostly pine[22].

During the 1940s under the aegis of the industrial policies of the *Estado Novo* (New State) whose aim was to modernize the country's industry, two laws were

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in the 20th century, the public initiative also boosted cellulose production. The "La Papelera Española" was the most important producer and its role in the production of pulp was accompanied by an important forest policy. The production pattern was also that of chemical pulp and the final destination of this product was for exportation as well. For more detailed knowledge about the Spanish paperpulp industry see Novales, Rico Boquette (2003); Rico Boquete (1997); Gutiérrez-Poch (1996); Novales, Sebastián, Servén and Trujillo (1987).

18. Soda Póvoa began production in 1934 but it was only from 1939 that it began to produce hydrochloric acid and sodim silicate.

19. Towards the end of the 1930s there were two projects to establish pulp mills in Portugal. In view of these projects and given the existence of potential users for the paper pulp, namely the paper sector, in 1939 a Ministerial Dispatch commissioned a study on the organisation of the paper industry. The study, by Oliveira Sarmento, recommended setting up a nationally funded pulp mill. The study also suggested using the existing sources of wood as raw materials. In particular pine wood could be used to produce Kraft paper with the soda method [Alves (2000b), p. 42-43].

20. In the preface to his book *Companhia Portuguesa de Celulose* Ferreira Dias states, "(…) In 1940 the State had or formulated a well-defined purpose to establish dominance in the paper pulp industry, an activity eminently suited to a country endowed with natural forest (…)" [AA.VV. (1958)].

21. A brief description of the productive process is in order here. Pulp can be obtained using two production processes: mechanical and chemical (there are intermediate situations in both cases). In the mechanical method softwoods such as conifers should be used. The resultant pulp is used in newspaper, printing paper and paper for domestic use. The chemical production process has two main methods. The first, the sulphate method results in a pulp that can be used to produce printing paper and writing paper. In the second method, which uses sulphate (Kraft), a wider range of woods can be used – softwood and/or hardwood and the resultant pulp can be used for many varied purposes.

22. The CPC equipment came from the USA, although it was a Finnish engineer who conceived the plant and who was its technical director. The choice of American equipment was due to the fact that the Southern States of the USA were already producing pulp with success from pinewood.

passed: the *Lei de Electrificação Nacional* (National Electrification Law – Law Nr 2002 of 26th December 1944)[23] and the *Lei de Fomento e Reorganização Industrial* (Development and Industrial Reorganization Law – Law Nr 2005 of 14 March 1945). Under the latter law the State proposed that a group of new industries that were considered strategic for economic growth – foundation industries – should receive financial and fiscal support from the State for their establishment.

The choice of industries of national interest reflected the goal of economic autarky and, because of this, priority was given to industries that would make the greatest contribution to substituting imported commodities in order to solve the problem of the structural deficit of the Portuguese balance of trade[24]. Among these industries was the paper pulp industry. The classification of the paper pulp industry as a 'strategic industry' was important not only for the fiscal and financial benefits it entailed, but also because it enabled the project of CPC to proceed without the hurdles imposed by the Law of Industrial Conditioning. This last aspect was relevant since within the paper production chain was one of the principle opponents to the project: the paperfirms[25].

Although the paper pulp industry had been recognized by the Law 2005 (1945) as a 'strategic industry', it was only on 24 April 1947 that the Council of Ministers classified it as such and thereby the production of paper pulp was able to avail itself of the protection and benefits granted by Law 2005. Once again State support was considered justified because the industry would help the balance of trade, on the one hand by consuming raw materials of a national origin, enabling the substitution of imports, and on the other by raising exports. The pulp mill project even benefited from the Marshall Plan, aid from which was channelled to the purchase of machinery and equipment.[26] In 1952 CPC applied for a new licence as the first had expired. The new licence granted the right to produce bleached and unbleached paper pulp, mechanical pulp and paper, namely newspaper.

The CPC began operations in 1953 with a production capacity of 39,000 T/year. But only in 1957 did it integrate eucalyptus wood into its production pro-

23. The energy question is crucial for the paper and pulp industry. The needs of energy for this kind of industry are always high but the consumption levels depend on the production process adopted. In the case of mechanical pulp, it is much higher, and in the case of chemical pulp, lower. Another factor to be taken into account in terms of energy consuption is the vertical integration of the production of pulp and paper. A more efficient use of energy is obtained in this case. Forthermore, in 1944 a National Electrification Law was passed relying on large dams as the first energy source of the country and in 1945 the State promoted the creation of two large companies to develop the basins of the Cávado and Zêzere rivers [Saraiva (2009)].

24. On this question see Afonso and Aguiar (2005), p. 311.

25. The paper firms saw this new industry as a threat because it would take over the production of paper, as in fact did happen. For this reason the new competition was feared by the existing firms. As Dias (1946, p. 363) put it, the paper industry was little more than "(…) a cartel stamping its feet in refusal".

26. The Marshall Plan contributed 125,000 thousand escudos to the project. This sum was for the purchase of machinery and equipment. See Alves (2000a), p. 167.

cess[27]. Replacing pine with eucalyptus wood proved decisive for the success of the project and it was the outcome of research carried out by the CPC laboratories. Although the equipment installed in the Cacia (Aveiro) pulp mill had been selected for use with pine wood, tests using eucalyptus wood proved successful. This pioneer research led to an innovation: a paper pulp made from hardwood that was chemically produced using sulphate but with no loss of strength to the final paper. This was the principle gain of this method, and it enabled resinous woods with long fibres to be replaced by short-fibred woods, thus also enabling a wider range of paper types – from paper for printing to paper for domestic use or toilet paper – to be produced from the pulp. This change was a crucial step towards gaining international market share, as *Pinus pinaster* was considered inferior in quality to the resinous woods from the Scandinavian countries.

Apart from being a success in terms of exports, paper pulp was also a reference in the industrial sector. Among other things, it exhibited a growth rate of 13.4% in its added value between 1960 and 1974, while the rate for the manufacturing industry was 5.9% for the same period[28]. This new specialization in production was not affected by Portugal's joining EFTA.[29] The presence in EFTA of some of the largest producers of paper pulp in no way thwarted the success of Portugal's exports and chemical pulp retained its importance in both European and world trade.

In 1974 the chemical pulp produced in Portugal accounted for 5% of European exports of chemical pulp and 81% of Southern Europe exports. These values can be considered exceptional since the CPC had only begun operating in the second half of the 1950s.

This success was further recognized by the increased interest shown by private initiative in the cellulose sector, both in the number of projects for expansion put forward by the existing companies as well as by a steady stream of new projects.

The following tables provide an overview of the cellulose industry in the 1960s with regard to the working mills and their applications for enlargement, as well as the licensed mills that were not yet working.

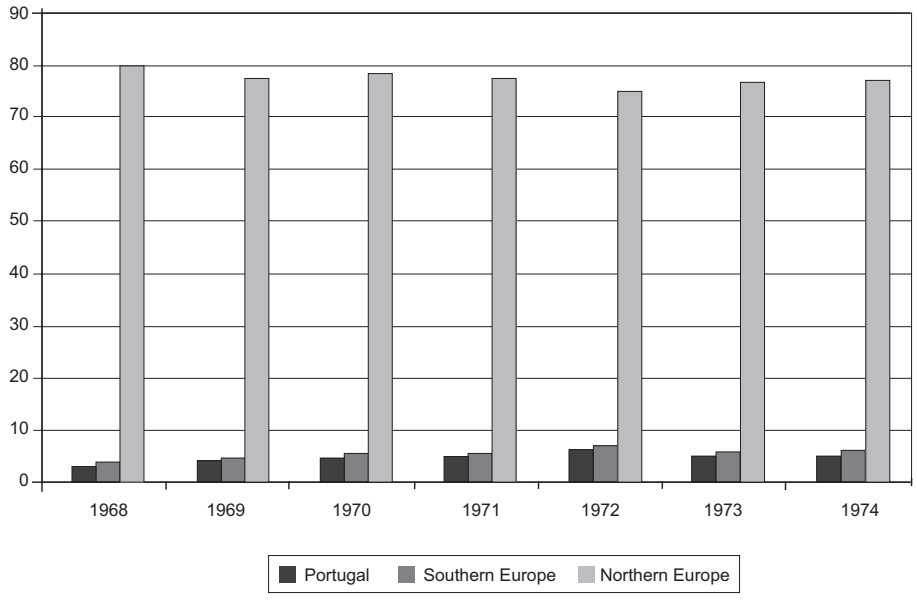
27. In 1955 CPC began to produce paper for newspaper and in 1957 mechanical pulp with pinewood. Both production processes were abandoned in 1969 and 1968 respectively. One of the main problems of mechanical production was the high consumption of electricity and the high electricity tariffs in Portugal. This fact was a further reason why Portugal was not competitive in this product and constituted one of the reasons why CPC abandoned the mechanical pulp production.

28. See Dias (2005), p. 470.

29. On joining EFTA, chemical pulp became covered by Article 6 of Annex G, which granted it protection as an emerging industry. However, in 1967 chemical pulp fell under the general regime. The opposite happened to mechanical pulp: first it was covered by the general regime and then it received the protection from Annex G in order to stimulate its production internally.

FIGURE 2

IMPORTANCE IN PERCENTAGE (%) OF CHEMICAL PULP EXPORTS OF PORTUGAL, SOUTHERN EUROPE AND NORTHERN EUROPE IN THE EUROPEAN CONTEXT (VALUE AT CURRENT PRICES)



Source: FAO Statistics Division. http://faostat.fao.org/site/626/default.aspx#ancor

Note: "Northern Europe" - Denmark, Finland, Ireland, Norway, Sweden, United Kingdom; "Southern Europe" – Albania, Bosnia and Herzegovina, Croatia, Greece, Italy, Malta, Portugal, Serbia and Montenegro, Slovenia, Spain, The former Yugoslav Republic of Macedonia.

In 1967 Portugal already had five units operating in the paper pulp industry, and despite the constraints imposed by Industrial Conditioning (projects were evaluated in terms of the raw material to be used, its availability on national territory and the type of paper to be produced[30]), all of them had applied for enlargement of their production capacity. Current production capacity was around 280,000 T *per* year. After enlargement, the production capacity would reach 360,000 T *per* year, mostly from the use of Eucalyptus as the raw material.

We shall now focus on the new mills whose licence applications were granted.

If all the enlargement projects and new production units had been realised, Portugal would have had 11 mills with a production capacity for paper pulp of around 770,000 T *per* year (excluding soluble pulp). The new projects predomi-

30. See Confraria (1992).

TABLE 1

THE PAPER PULP INDUSTRY: WORKING MILLS

Company	Location	Production capacity (T/year) 1967	Production capacity (T/year) After enlargment	Raw material (wood)	Production process	Pulp produce
Caima	Albergaria-a-Nova	25,000	30,000	Eucalyptus	Sulphite	Paper
	Constância	20,000	70,000	Eucalyptus	Sulphite	Paper
CPC	Cacia	65,000	150,000	Maritime pine	Kraft and mechanical	Paper
Socel	Setúbal	90,000	111,000	Eucalyptus Maritime pine	Sulphate	Paper soluble
Celbi (Billerud)	Leirosa	80,000	100,000	Eucalyptus	Prehydrolysis sulphate	

Source: Abecassis (1969), p. 932.

Note: In 1949 Caima was authorized to increase its productive capacity to 14,000T/year, and in 1962 it received authorization to establish a new mill in Constância. Socel was registered in April, 1958 and began production in 1964. Celbi was authorized to set up a mill in 1967.

TABLE 2

PAPER PULP INDUSTRY: AUTHORIZED MILLS

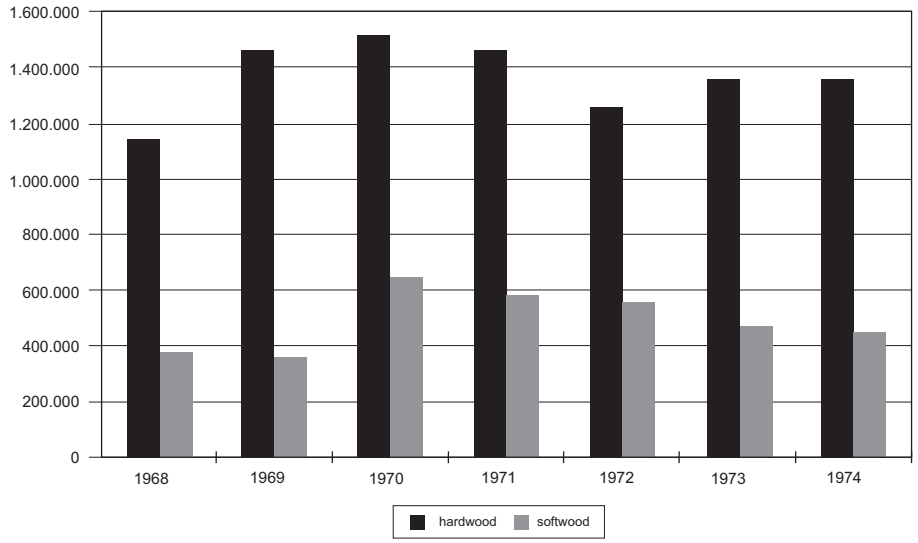
Company	Location	Planned capacity (T/year)	Raw material (wood)	Production process	Pulp produce
Cemil	Braga	100,000	Pine	Sulphate	Paper
Celulose do Tejo	Vila Velha de Rodão	60,000	Pine	Sulphate and semi-chemical	Paper
Celnorte	Viana do Castelo	100,000	Pine	Sulphate	Paper
Sebastião Alves	Vale do Tejo	60,000	Holm Poplar oak Cork oak	Sulphate	Paper
Pastax	Viseu	60,000	Pine	Mechanical	Paper
Celpor	Beja	30,000	Cork oak and other species	semi-chemical	Paper

Source: Abecassis (1969), p. 932.

Note: In 1963 licence was granted for Celulose do Minho, S.A.R.L. – Cemil. In 1965 licence was granted for Celnorte – Celulose do Norte S.A.R.L.. In 1966, Sebastião Alves was given permission to establish two mills. In 1967 Pastax – Sociedade Industrial de Pastas de Madeira, Lda. and Celpor – Companhia Portuguesa de Madeiras e Fibras Têxteis, S.A.R.L. were also granted licences.

FIGURE 3

CONSUMPTION OF WOOD FOR THE PRODUCTION OF PAPER PULP (TONNES)



Source: Based on Industrial Statistics, INE (Statistics Portugal).

nantly used pine as the raw material. In 1974 there were six factories operating in this subsector, producing 542,000T of paper pulp[31].

Despite the above-mentioned measures and the State's preference for pine wood, the type of wood used by the pulp factories actually altered little; eucalyptus being the most commonly used species (Figure 3).

Having given an overview of the expansion of pulp mills between the 1950s and 1974, we return to the central question of this paper: in light of Portuguse historiography, which argues that industrial modernization was hindered by a backward primary sector, how can we explain the success of an industry that was so dependent on a renewable resource for its raw material? Were the Portuguese forests underexploited before 1950? Would the pulp mills have imported wood? Or was it that upstream of the paper pulp subsector, there had been profound alterations in Portuguese forests?

The answer to these questions begins with an understanding of the composition and size of the Portuguese forests before the 1930s, that is, before the Afforestation Plan (*Plano de Povoamento Florestal*) introduced by the *Estado Novo*.

31. CPC, SOCEL, CAIMA, CELBI, Celulose do Tejo and Celulose do Norte.

The portuguese forest during the estado novo

The Portuguese forest in the 1930s: size, composition and ownership

In the mid-1930s, Portugal had a forested area of 2,520 thousand hectares, which corresponds to a forest coverage of 28% of the territory. In Table 3, we can see how the areas of the main species evolved between the beginning of the XX century and 1934.

Between the beginning of the XX century and 1934, the area occupied by pine trees more than doubled. This already dominant species gained even greater prominence in the Portuguese forest with an increase in area of 709,000 hectares. By 1934, pine occupied 45% of the Portuguese forested area.

Another important aspect is the 564,000 hectare increase in total forestland. Of this, only 47,000 hectares were the result of intervention by the Forest Services from the XIX century through forestation plans for dunes and hills,[32] In other words, the variation in forested area between the beginning of the XX century and the mid-1930s was essentially the result of private initiative, which was motivated by the high prices for wood.[33]

TABLE 3

EVOLUTION OF THE AREAS OF THE MAIN FOREST SPECIES IN CONTINENTAL PORTUGAL
UNITS: 1.000 HECTARES (HA)

	1902		1934		Area variation 1902-34 (1000 ha)
Species	**Area**	**%**	**Area**	**%**	
Pine[a]	430	22	1,139	45.2	+ 709
Cork oak	366	19	741	29.4	+ 375
Holm-oak	417	21	380	15.1	- 37
Others[b]	744	38	260	10.3	- 484
Forestland	1,957	100	2,520	100	+ 563

Source: Agriculture Statistics. INE (Statistics Portugal).

Notes: [a] *Pinus pinaster* A. and *Pinus pinea* L., although the latter species never occupied an area of more than 10%. [b] Chestnut trees, oaks and other species.

32. This figure refers to 1936 and is calculated in Dias (2005), pp.78-79.

33. The demand for wood increased as a result of the expansion of the railways and also due to greater exports, stimulated by the need for supports in coal mines

This is not surprising if we take into account the juridical form of property. In 1928, over 90% of forest property was privately owned. The State held 2.3% and the rest was communal property. Furthermore, property size was predominantly small, and pine was above all concentrated north of the River Tagus.[34]

But during the thirties, the State found a means to gain a wider intervention in the Portuguese forests by connecting the forested areas to the communal lands. This was the main reason behind Law Nr. 1971, of 15 June 1938, the Afforestation Law (*Lei do Povoamento Florestal*).

Forest Policy during the Estado Novo

In the 1930s, the State's plans to support a paper pulp mill using Portuguese capital was still conditioned by the supply of wood. The State feared that the Portuguese forested area would become depleted very quickly due to the high consumption of wood.

Forested land was essentially privately owned, but there were vast areas of communal land, and it was in the latter that the State found a way to meet the country's need for wood by direct public investment in a project for afforestation of communal land.

The proposal for the Afforestation Law was presented by Rafael Duque, then Minister for Agriculture, and was accompanied by a report in which different fundamental aspects concerning the justification and implementation of the law were detailed. This document was published in 1940 by the Agriculture Ministry, with the title *Plano de Povoamento Florestal*.[35]

The implementation of this Plan – its duration being forecast for thirty years (1938-1968) – confirmed a trend that had been observed since the XIX century: an increase in the area of *Pinus pinaster A*.

The main aims of the Plan were to reinforce the supply of pine wood in Portugal, guaranteeing its self-sufficiency, and if possible, to provide for exports. The economic goals fixed were connected to the supply of quality wood for exportation and to the supply of fuel for industry. The Plan also concerned industrial activities directly connected to the transformation of forestry products, which included paper pulp. Other objectives connected to the natural function of forests were also presented, such as regulation of rainwater, consolidation of dunes and flood barriers. Yet others were related to national defence, the creation of new jobs, the improvement of pasture in the areas connected to the wool industry, tourist development, climatic improvement, and public health. The range of objectives stipulated by the Minister for Agriculture corroborated the connection between forests and industrialization.

34. Radich and Alves (2000) , p.87.
35. Agriculture Ministry (1940).

As we have mentioned above, pine was the chosen forest species because it was better adapted to the soil and the climate, and in general terms it served the economic and natural objectives defended at the time. Several economic advantages were attributed to this species. As well as supplying wood for exportation, it provided resin and was an important source of fuel and wood for the construction industry. Furthermore, it was an important raw material for the furniture industry and for the production of paper pulp, of which there was a shortage in Portugal.

In terms of the intervention area of the Plan, the State's choice fell on the communal lands north of the River Tagus, this option being justified not only due to the fact that these lands were larger in area, but also due to their vocation towards forests, as had been demonstrated in studies undertaken by the General Directorate of Forest Services [*Direcção Geral dos Serviços Florestais (DGSF)]*. In *Memorandum on the Recognition of Communal Lands North of the River Tagus* [*Memória sobre o Reconhecimento dos Baldios a Norte do Tejo* (1935)], which was a reference for the drawing up of the Afforestation Plan, the DGSF calculated that the area of communal land was 507,000 hectares, of which 432,000 hectares were suitable for forests.

The target for the afforestation plan was finally fixed at 420,000 hectares, distributed over six five-year periods. For each five-year period an area to be planted was defined, as shown in Table 4[36].

TABLE 4

AFFORESTATION PLAN: PLANTING TARGEGT AND AREA PLANTED
UNIT: HECTARES

	Target (a)	**Planted (b)**	**(b)/(a) %**
(before 1938)		20,973	
1939-1943	20,000	14,964	75
1944-1948	36,000	19,095	53
1949-1953	58,000	38,338	66
1954-1958	79,000	67,137	85
1959-1963	100,000	73,972	74
1964-1968	127,000	55,474	44
Total planted	**420,000**	**268,980**	**64**

Source: Dias (2005), p. 95.

36. In 1941 a new study was published [Junta da Colonização Interna (1941)]. Covering a wider area, the conclusions of this study support the decision to plant trees on the communal lands north of the River Tagus.

The results from the first 5 years of the Plan were very encouraging, and in the 1940s there was general optimism with regard to the ablility of the Portuguese forests to supply wood. This is evident in remarks by Ferreira Dias: "Doubts have been raised as to whether the Portuguese forests can support the demands of the new industry [CPC] (...) we shall see how this doubt lacks substance since we are talking about densely forested areas"[37]. In other words, what was considered more important was the location of the pulp mill rather than the availablility of the raw material.

In fact, when the CPC began operations, it was forcasted that it would consume around 70,000 T of pine wood *per* year in a country whose pine forests would increase to cover 420,000 hectares should the Afforestation Plan be fully carried out. However, the State project suffered from several delays[38] during the scheduled time period, and only 64% of the total targeted forest area was in fact planted. Nevertheless, it would seem that the increase in areas planted with pine and their potential timber yield, as well as the pine timber from the already-existing pine forests, would be enough to meet the needs for this raw material. Yet, there remained a problem. The paper pulp mills were using eucalyptus wood as the raw material in their production process. How could the State meet the need for eucalyptus wood when this species was almost inexistent in Portuguese forests?

Again, the solution lay at the heart of a new law: Law Nr. 2069, of 24 April 1954. This law introduced a new path of action in the *Estado Novo*'s forest policy by fostering initiatives in forests belonging to the private sector. In doing so, it appears to underline what the State was already trying to achieve on its own: an increase in the forested area. Analysis of Table 4 reveals that in the period 1954-1958 of the Afforestation Plan there was an increase in the rythm of planting, and the percentage of land to be planted that actually was planted rose to the order of 80%. While it may be a coincidence, this peak in planting occurred shortly after the CPC began operating in 1953.

The main aim of Law Nr. 2069 was to halt the destruction of the topsoil, which was the result of an increase in cereal crops, which was causing serious problems of erosion in certain regions. In some cases, the only viable technical solution to recuperate these soils was through forestation, and this was considered a public utility because it defended the "collective heritage which was [important] to be conserved and valued", as the preamble to this law stated.

Intervention was considered to be more urgent in certain regions, such as

37. Dias (1946), p. 358.

38. Among the causes of these delays was the opposition of the mountain-dwelling populations against the conversion of the common lands into forested areas [see Mendonça (1961) about the econmy of the commom lands and its importance for the mountain-dwelling population]. On the resistence of the mountain communities against the Forestry Services see Fonseca and Freire (2003), pp. 195-222.

Baixo Alentejo, the hills of the Algarve, the frontier areas of Beira Alta and Beira Baixa, the lands of Trás-os-Montes, and Ribatejo. These regions were targeted because all State land that was considered unfit for agriculture but suitable for forest had been exhausted. The Forest Services were responsible for making the studies that underpinned the decisions about forestation. Special attention was paid to lands where the soil was unfit for agriculture, subjected to intense erosion, and where it was not economically viable to adopt solutions other than forestation to protect and conserve the soil. [39]

Law Nr. 2069 also defined various options for those involved in the forest sector. As far as the options for forestation on private property were concerned, the State intended to make the most of private initiative. To this end, three measures were proposed to support forestation. In the first, owners took the responsibility for planting upon themselves; in the second, they could choose to divide the tasks, with the forestry services taking responsibility for the technical and more specialized aspects; and in the third, the task of forestation would rest only on the State. The benefits[40] for the owners increased, the more they participated in the forestation process.

During the 1960s, there was a clear change in the direction of the State's policy for forestation with regard to the objectives and agents involved: there was a move towards eucalyptus and private initiatives to carry out afforestation. Again, by conincidence or not, less than 50% of the planting targets of the PPF were achieved.[41]

An instrument was (re)created to finance a forestry planting process on private property: The Forest Development Fund (*Fundo de Fomento Florestal).* The aim of this fund was to help and to implement forestation on lands stipulated as priority areas, under the terms of Law Nr. 2069. It was also applied to areas of land that were not included in the plans, these being areas outside the scope of the Law[42].

The preference for eucalyptus was further consolidated by the Third Development Plan [*III Plano de Fomenro*](1968-73): the State set a planting target of 50,000hectares/year, of which 25,000 were to be pine and 15,000, eucatlyptus. It was also determined that should the planting rates not go according to plan, priority should be given to eucalyptus.[43]

In the 1950s the pulp industry already consumed around 40% of the national production of eucalyptus wood, which was about 200,000m³. With the projected increase in production capacity as a result of the granting of licences[44], wood

39. For forestation on private property see Gomes (1969).
40. V. Dias (2005), p.110-119.
41. Cf. Table 4.
42. This Fund was originally established in 1945 in response to the deforestation brought about by the Second World War.
43. Presidência do Conselho (1968).
44. Cf. Tables 1 and 2.

consumption would reach 600,000m³.[45] Thus, unlike in the 1940s, in the 1960s the estimates by the General Directorate of Industry on the availability of raw material for pulp mills were pessimistic. Fearing the deterioration of forest resources and an increasing shortage of raw material, they predicted a rise in price for wood. The situation would be worse for eucalyptus wood because the areas planted with this species were clearly unable to meet the demands of the pulp mills.[46]

As a response to this situation, whether due to the difficulties in obtaining abundant and cheap raw material or due to the growing competition in the pulp subsector, two conditions were introduced in the evaluation criteria for projects submitted under Industrial Conditioning: the need to reevaluate the country's potential wood supply in view of the high demand for wood as a raw material in competition with other uses for the forests, and the need to restructure the paper industry in order to prevent pulp production from becoming a burden due to its major dependence on external markets. As to commercial policy, quotas on the export of eucalyptus wood as logs were introduced.

These limitations were stipulated in the Guidelines for the pulp subsector, issued on 11 July 1966 by the State Secretary for Industry. This document outlined rules for the localization of new pulp mills on the basis of the areas or regions targeted for afforestation plans as well as a set of conditions related to the technological and financial viability of the project.[47] The most important effect brought about by the Guidelines was the rejection of all licence applications that were not in line with the restrictions concerning the raw material or the type of goods to be produced.[48] A second major outcome was to spur pulp mills to invest in the planting of new forests.

Socel was one of the first units to develop an important forestry policy either on its own or in partnership with rural property owners in the vicinity of their operations south of the Tagus. In 1970 it was one of the largest producers of eucalyptus. By contrast, CPC supplied seedlings to rural property owners and only began its own forest planting in 1970.

We shall finish this section with an evaluation of the State's performance with regard to forest policy. Between 1939 and 1969 the State planted 269,000 hectares, when it had forecast to plant 420,000. This means that it planted 64% of the area projected in the plan[49]. The area planted under the Forest Development Fund did not exceed 45,000 hectares, a poor result when compared with what was forecast under the Development Plans: in the Second Development Plan the need to

45. Ferreirinha (1984), p. 229
46. Caldas (1998), p. 399.
47. Alves (2000a), p. 176-8.
48. Confraria (1992), p. 67.
49. Mendes (2007), p. 94, notes that the Plan was eventually prolonged until 1972 and the forestland reached 318,000 hectares.

forest an area of almost one million hectares south of the River Tagus is underlined.

In summary, between 1939 and 1974 the direct and indirect intervention of the State resulted in an increase in forested area of 314,000 hectares (269,000 from the Afforestation Plan and 45,000 from the Forest Development Fund). How did these 314,000 hectares change the Portuguese forest?

Table 5 shows a breakdown of the composition of Portuguese forests between 1939, the year in which the PPF was first implemented, and 1974.

TABLE 5

FOREST COMPOSITION

Species	1939		1974		Area[a] variation (1000 ha)
	Area[a](1000 ha)	%	Area[a](1000 ha)	%	
Pine[a]	1,161	47	1,335	45	174
Cork oak	690	28	645	22	-45
Holm oak	601	15	536	18	176
Eucalyptus	n.a.[c]	_	215	7	215
Others[b]	256	10	225	8	-31
Forestland	2,467	100	2,956	100	489

Source: Agricultural Statistics, INE (Statistics Portugal).
Notes: [a] See table 4.
[b] See table 4.
[c] n.a. – not available.

First, between 1939 and 1974 the forest area increased by 489,000 hectares (Table 5); 74% of this was the direct result of the State's actions.[50] The increase in the area planted with pine trees accounts for 174,000 hectares of this area. Bearing in mind the fact that under the PPF the species planted was mainly pine, we can conclude that the State intervention prevented a decrease in the area occupied by this species.

However the most spectacular increase occurred in the area occupied by eucalyptus: 215,000 hectares in 45 years[51]. The paper pulp factories were responsible for 45,000 hectares, these being plantations made between 1966 and 1974.[52] The remainder was the result of action taken by non-industrial owners, some of

50. This takes into account the 318,000 hectares forested by the PPF until 1972 and the 45,000 hectares under the FFF.

51. This positive evolution in the Eucalyptus area was more marked in the South of Tagus river and is, according to Sampaio [(1977), p. 50], one of the causes of the diminuishing area of the Cork oak.

52. Baptista (1993), pp. 297-298

them receiving aid from the State under the Forest Development Fund, whereby eucalyptus seeds were distributed.[53]

This second overview of the Portuguese forests provides a reflection of the forest policies of the *Estado Novo*. Two fundamental changes are of note: there was a significant change in the species making up the forests, brought about by the introduction of a new species; and forest landuse was strengthened, with an increase in the forested areas of 489,000 hectares. There now follows an analysis of how these changes affected the supply of wood in terms of quantity supplied and prices.

Wood supply: quantities and prices

We will focus our analysis on two species: pine and eucalyptus. [54] These species were chosen for several reasons. First, *Pinus pinaster* was the State's choice for planting under the Afforestation Plan. Second, pine was also recommended by the State for the production of paper pulp. Finally, Eucalyptus was also important because it was an essential raw material for the production of paper pulp due to the use of new technology.

Let us begin with *Pinus pinaste*r. This autochthonous species in the Portuguese forests becomes financially viable between 35 and 45 years of age. Its average productivity oscillates between 5 and 10m^3 per hectare *per annum* north of the River Tagus, but to the south, it does not surpass 3m^3. In the mountainous regions in the centre and north of Portugal productivity can reach 8 to 13m^3 per hectare *per annum*. By contrast, *Eucalyptus globulus* is an exotic and fast-growing species. Its rotations are short, varying between 10 to 15 years. With a rotation of 12 years, the productivity of this species would be 16 m^3 per hectare *per annum*. Further to these technical characteristics, we can add the fact that pine predominated on small properties with non-industrial owners while eucalyptus was more widely grown on the large properties south of the River Tagus, these being exploited by industrial owners.

Having concluded that the area planted with pine and eucalyptus increased, did this increase mean an increase in the supply of wood? Figure 4 shows the evolution of wood production from 1938 to 1974.

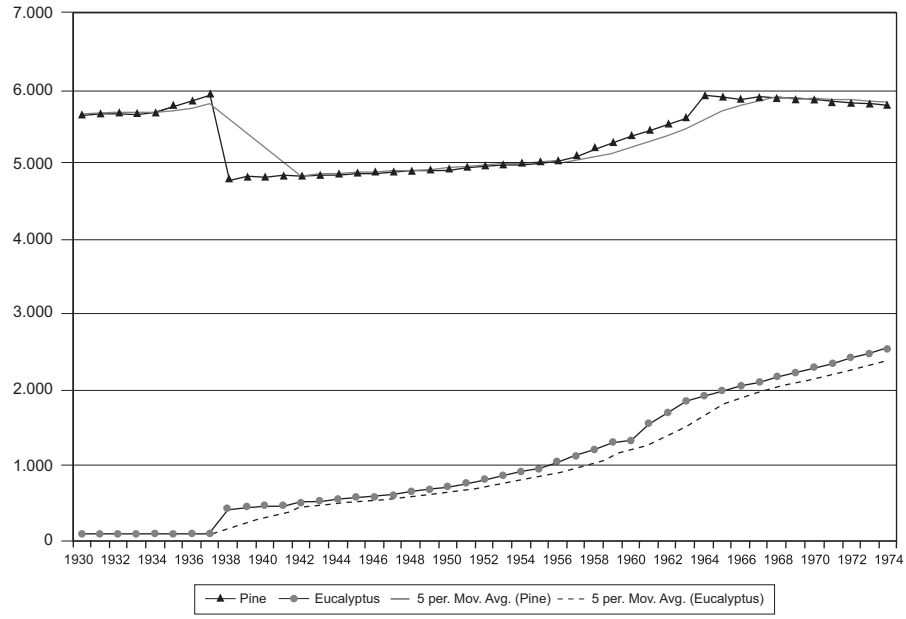
In general terms, whether through private initiative or action by the State, the supply of wood during the *Estado Novo* increased. The supply of eucalyptus wood – due to its quick growing characteristic – rose steadily from the end of the 1930s. By contrast, the supply of pine suffered a downturn in the second half of the

53. Gomes and Quaresma (1998), p. 20.

54. For a more detailed study of these two species, see Soares and others (2007), pp. 27-59; Alves and others (2007), pp. 12-24; Correia and Oliveira (2003); Teixeira and Matos (2000), pp. 139-143; Costa (1998), Fabião (1996); Costa *(*1995).

FIGURE 4

EVOLUTION OF WOOD REMOVALS
(IN THOUSANDS OF CUBIC METERS)



Source: Dias (2005), p. 401.

1930s, followed by a slight but steady increase, which from the second half of the 1950s became more marked. In the 1960s, the supply of pinewood stabilized at levels similar to those of the 1930s.

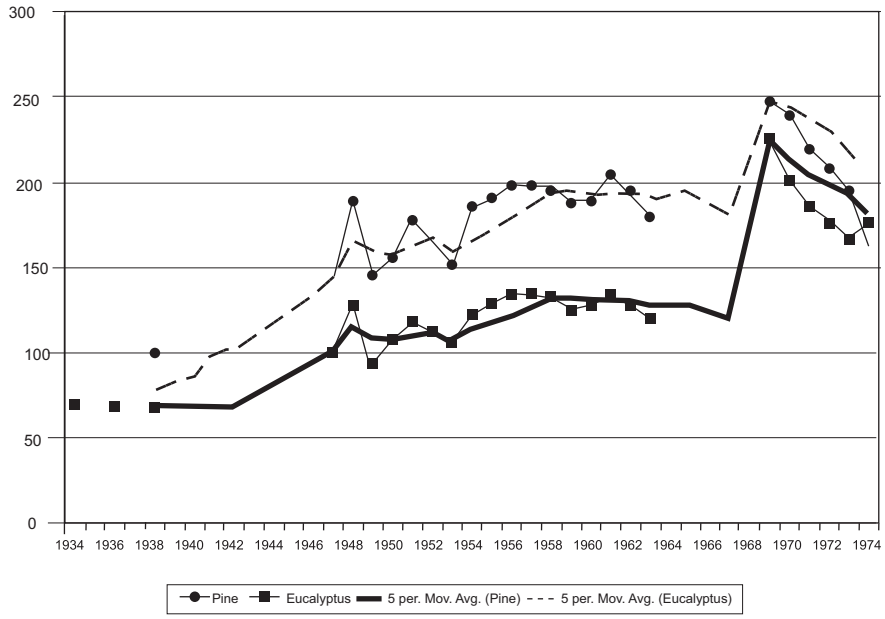
In Figure 5 we depict the evolution of prices per unit for eucalyptus and pine in the forestry market.

First, in real terms, the prices of pine wood decreased between the 1930s and the end of the Second World War. Following this period, prices rose steadily for both eucalyptus and pine and at the end of the 60s there was a peak in prices. Prices for pine were higher than those for eucalyptus, reflecting the difficulty in providing for a greater supply of this type of wood in a time span that was shorter than three decades. It should also be noted that in comparative terms there was a convergence in the prices of the two woods from the end of the 60s.

Let us return to the forest policy to examine its priorities. Pine was the species initially chosen by the State's forest policy. The State had a direct influence in boosting the expansion of this species, with a positive impact on the increase in supply of pinewood. Despite the fact that the forest coverage was not wholly fulfilled, the absence of any intervention would have resulted in a slower increase in the

FIGURE 5

EVOLUTION OF PRODUCER PRICES FOR PINE AND EUCALYPTUS WOOD (ESCUDOS PER CUBIC METRE) (1963 = 100)



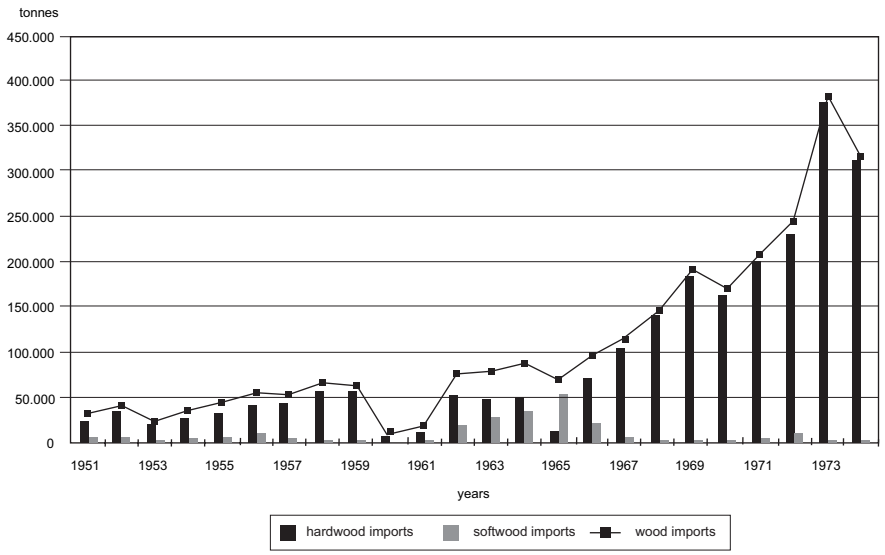
Source: Dias (2005), p. 405.

supply of pinewood, given the constraints associated with the economic results of pine trees. Although rising prices in the 1950s – due to the appearance of the paper pulp factories – could act as a stimulus for forest owners to expand pine forest or to cut down more trees, the waiting time and uncertainty involved would not guarantee the same results as the State's direct intervention in afforestation. As for eucalyptus, the State did not participate directly in the increase of its area. However, the constraints imposed through the Laws of Industrial Conditioning led the pulp mills to expand the area covered by eucalyptus on their own initiative, increasing the eucalyptus wood supply, an essencial measure to respond to the increasing consumption of this kind of wood by the paper pulp industries. Consequentely, the area planted with this quick expanded. Nevertheless, it was not enough. Pine, on the other hand, is a slow growing species, so the effort to increase the area planted with pine in the 1940s and 1950s would only be able to answer the needs of the pulp factories after 20 or 30 years had elapsed. [55] Furthermore, although it occupied a greater area than eucalyptus and it could have sup-

55. The 1950s was one of the most intense periods of afforestation in implementing the PPF.

FIGURE 6

WOOD IMPORTS (TONNES)



Source: Based on External Trade Statistics, INE (Statistics Portugal).

plied more wood, its market prices were higher. Hence the paper pulp industry preferred to use eucalyptus. Thus, the behaviour of the prices and the weight of the raw material in the production costs of the pulp mills provided an incentive for technological innovation.

Also in response to rising prices, the pulp factories set up a large wholesale-buyer, *Madeiper – Organização Central de Abastecimento de Madeira* (Central Organization for Wood Purchases). Demand created a monopsony, but supply remained fragmented. These two very unequal sides of the market favoured the pulp mills.

Finally, a review of wood imports (Figure 6) will provide information to confirm whether the pulp mills' demand for wood was wholly satisfied by the internal market.

Although there was potential for an increase in wood supply when the new plantations reached their productive maturity, the pulp factories overcame the wood shortage by importing. Nevertheless, the decline in imports at the end of the period under study and the success in paper pulp exports seem to contradict the idea that obstacles to supply impeded industrial growth[56]. These obstacles

56. It should be pointed out that in 1970 the paper pulp industry consumed 83% of eucalyptus wood and 10% of pinewood. The saw-mills consumed 53% of the pinewood and 10% of the eucalyptus [see Radich and Baptista (2005), p.149]. If, as had been planned, CPC had used exclusively pinewood, then the price of this raw material would have been under pressure.

were overcome either through direct support from the State in afforestation or by private owners of forest and the forest-based industry, which developed its own afforestation projects upstream in the production processes.

Conclusions

Portugal's endowment with forestry resources was the result of not only its edafo-climatic advantage, but also human intervention. This was carried out by private agents and by the State, causing changes in the dimension of forestland and its composition in terms of species. The area covered by *Pinus pinaster*, which had been increasing in the Portuguese forests since the XIX century, was reinforced, and a new exotic species appeared: *Eucalyptus*.

In a first phase, the State's intervention in the endowment of the forestry resources came in the form of public investment in the communal land north of the River Tagus, through the Afforestation Plan (*Plano de Povoamento Florestal*). In a second phase, the contribution by the State was indirect, conceding favourable conditions to private forest owners for the afforestation/reforestation process on their lands.

In the 1930s, the objectives of economic autarky underlined the need to stimulate the development of the forestry sector. The presence of activities connected to the economic exploitation of the forest would not be anything new, because cork and resin, or even wooden supports for mines had been contributing towards the growth of Portugal's exports. However, the potential of the forest was not limited to these products – the Afforestation Plan created the belief that forest policy was working in tandem with Portugal's industrial policy and towards economic autarky. It was forecast that pine could be used for the production of paper pulp, of which there was a shortage in Portugal. Portugal's natural advantage regarding the supply of pinewood was reinforced with the afforestation process carried out by the Forest Services, and this accelerated an increase in the long-term supply of wood. When the *Companhia Portuguesa de Celulose* (CPC) began operating, it had a guaranteed supply of raw materials.

The changes in the 1950s, with the gains obtained by CPC in the production of paper pulp from eucalyptus, caused a readjustment in the instruments used by the forest policy and the adoption of an entirely new species, which had hitherto been non-existent or extremely rare in the Portuguese forestland.

The forest policy was in keeping with the aims of the industrial policy of the *Estado Novo*. Initially oriented towards substituting imports of paper pulp and later oriented more towards exports, the paper pulp subsector needed a safe supply base of its raw material – wood. This base was guaranteed by the State, opening the way for new industrial projects in this subsector. Further guarantee came from the private sector, which was stimulated not only by demand, in this case by the

signals given by the market, but equally by the signals given by the State's new forest policy, begun in the 1950s. The conditions had been laid for successful exportation of paper pulp, consolidating and guaranteeing the position of Portugal's chemical pulp industry in the international marketplace in less than a decade. Thus, this was a new economic specialization for Portugal that was successfully exported, with a clear competitive advantage compared to the traditional producers of paper pulp in the northern European countries. It stemmed from an advantage created by Portugal's capacity to "grow" forests, a capacity that was recognized and further reinforced by the State's forestry policy.

In conclusion, the State ensured the expansion of forested areas, thus creating a supply market for the demand coming from the pulp industry. Forestry was an economic tool in the *Estado Novo*'s policies, exploiting a natural advantage that the Portugal had. This natural endowment stemmed from the prevalence of a species growing throughout the country. The forest policies further contributed to the expansion of forests of an exotic species, which became the main raw material for pulp.

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Was the Portuguese Forest Policy a contribution towards economic modernization? The case of the Paper Pulp Industry during the Estado Novo (1930-1974)

Abstract

In the period following the Second World War, Portugal witnessed a take-off in modern economic growth. The paper pulp industry was one of a group of new industries that underpinned the process of industrial modernization.

The productive process of this industry relies on a forest-based renewable raw material: wood. This paper aims to demonstrate that the forest policies of the *Estado Novo* (New State) contributed to the development of the paper pulp industry through the expansion of the forested area in Portugal.

It will be shown that the expansion of the forested area occupied by a fast-growing species – *Eucalyptus* – as well as that occupied by a species already present in Portuguese forests – *Pinus pinaster* – was fundamental for the development of the paper pulp industry. Furthermore, a change in the composition of Portuguese forests enabled the pulp industry to respond to a national and international market featuring growing demand. As such, the Portuguese forest showed a positive response to this demand for a raw material from a new sector in Portugal's industrial structure, and, in doing so, did not hinder economic growth.

Key words: Forest Policy, Paper Pulp Industry, *Estado Novo* (New State), Modern Economic Growth, Portugal.

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¿Contribuyó la política forestal en Portugal a la modernización económica? El caso de la industria de pasta de papel durante el Estado Novo (1930-1974)

Resumen

Tras la Segunda Guerra Mundial, Portugal inició su despegue en el crecimiento económico moderno. En este país, la industria de la pasta de papel formó parte del grupo de nuevas industrias sobre las que se sustentó el proceso de modernización industrial.

El proceso productivo de esta industria se basa en una materia prima forestal renovable: la madera. Este trabajo pretende demostrar que las políticas forestales del Estado Novo contribuyeron al desarrollo de esta rama de la industria a través de la expansión de la superficie forestal de Portugal.

Se verá que esta expansión, en especies de crecimiento rápido –como la Eucalyptus– y en otras autóctonas de los bosques de Portugal –como la *Pinus pinaster*–, fue fundamental para el desarrollo de la industria de la pasta de papel. Además, el cambio en la composición de los bosques de Portugal permitió a la industria de la celulosa responder a un mercado de demanda creciente, tanto a nivel nacional como internacional. De esta forma, el bosque portugués mostró una respuesta positiva a esta demanda, permitiendo el desarrollo de una nueva industria en Portugal, y al hacerlo, contribuyó al crecimiento económico de la nación.

Palabras clave: Política Forestal, Industria de pasta de papel, Estado Novo, Crecimiento económico moderno, Portugal.

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