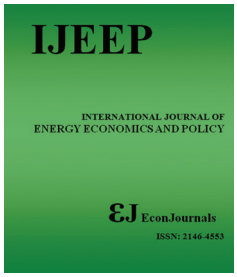

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Green Taxation on Competitiveness: The Effect of the ISP Tax on the Portuguese Retail Sector of Road Fuels

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ABSTRACT

There hasn't been much clarity on the issue regarding the effects of green taxation on competitiveness as researchers use different conceptual and methodological parameters in defending their arguments. In this sense, and given that most studies provide mixed results, we aim to contribute to the clarification of the issue with the analysis of a specific case-study. Through the effect of the ISP tax on the competitiveness of the Portuguese retail sector of road fuels we intend to demonstrate that the microeconomic approach is more enlightening than the meso/macroeconomic one, and that the effect of environmental policy on competitiveness will depend on the characteristics of the firms and of the markets to which they sell. Our findings come close to the Porter hypothesis.

Keywords: Fiscal Policy, Environmental Tax, Energy Demand
JEL Classifications: E62, Q41, Q52

1. INTRODUCTION

The EU has been defending the use of green fiscal instruments - more specifically green taxes - instead of other green instruments as they are considered "a quick-fix solution for rapid economic recovery" (Blionis, 2013). In other words, their benefits go beyond environmental protection as they also promote efficiency and economic growth. Nonetheless it has also been argued that taxes raise production costs and prices, thus potentially affecting the firms' competitiveness and, ultimately, the competitiveness of regulated sectors, regions and countries. Given the strong opposition between the two major arguments used in the study of the impact of green taxation on competitiveness, there hasn't been much clarity around the issue.

Therefore, we intend to contribute to the clarification of the issue by demonstrating that: (i) The theoretical controversy is justified by the fact that researchers use different methodological and conceptual parameters in defending their arguments; (ii) methodological and conceptual clarification is essential to study the effects of green taxation on competitiveness; (iii) the signal of the relation between the two concepts will depend, ultimately, on the characteristics of the firms and of the markets to which they sell. As a case-study we analyzed the impact of the ISP tax[1] on the retail sector of road fuels in Portugal, since road fuels have a significant weight in the Portuguese trade balance and the ISP tax represents a major portion of the green fiscal revenue both in Portugal and in the EU. We tested two assumptions - the effect of the ISP tax on the firms' competitiveness is dependent on their market power and on the sensitivity of the consumers' reaction to the price increase caused by the tax - to show that the greater it is the firms' market power the greater it will be their ability to transfer the fiscal burden onto consumers, and the more rigid it is the demand for road fuels the smaller it will be the impact on sales' revenue caused by the price effect of the tax. Consequently, we can conclude that in a sector, such as the one of fuel products and energy, where firms have market power and their products face rigid demand structures, the introduction of environmental protection policies will not significantly affect the competitiveness and survival of these firms.

1 ISP (Imposto sobre Produtos Petrolíferos e Energéticos) taxes petroleum and energy products.

In this sense our study sets apart from most studies on the issue for two reasons. First, we focus on the microeconomic approach of the concept of competitiveness, while the majority of studies apply the meso/macroeconomic perspectives. Second, our methodology that can be replied in the analysis of other case-studies, therefore allowing the comparison of results between studies and the formulation of broader conclusions, something which the current literature is somehow lacking.

The present paper is structured as follows: In section 2 we do the theoretical framework by defining the concepts of competitiveness and green fiscal policy, presenting the two main theories that explain their interaction, and doing a literature review; in section 3 we define the methodology and present our results; in section 4 we discuss our findings; finally, in section 5 we make our final remarks.

2. THEORETICAL FRAMEWORK

2.1. Concepts of Competitiveness and Green Fiscal Policy

2.1.1. Competitiveness

There isn't a single definition of competitiveness. In fact "the concept of competitiveness is different depending on the level at which it is applied" (Ekins and Speck, 2010. p. 1), that this, whether it's applied at a microeconomic, a mesoeconomic or a macroeconomic level.

From a microeconomic perspective competitiveness refers to the firm's ability to reach new and higher market shares through the production of good/services with higher quality or lower costs in comparison to their rivals (Hitt et al., 2015). The strengthening of a firm's ability to increase their sales - therefore the strengthening of its competitiveness - ensures the sustainability of its profits, and thus of its market value (Dechezleprêtre and Sato, 2014).

From a mesoeconomic perspective competitiveness refers to a sector's market share increase in relation to its external competitors in the domestic and international markets (Ekins and Speck, 2010). It can be obtained with greater availability of inputs, advantages related to the economies of agglomeration and supply chain linkages, or industrial economic policies (Dechezleprêtre and Sato, 2014). Ultimately, these factors affect the firms' costs, thus also their competitiveness at a microeconomic level.

From a macroeconomic perspective competitiveness might be defined as a country/region's ability to achieve high and sustainable welfare levels by increasing firms' market shares, attracting new investments and skilled workers, and improving the inputs' productivity (OECD, 2003; Schwab, 2010). Using the concept of competitiveness at a national/regional level the same way it is used in the firm/sector's point of view, however, has been criticized by some authors (Krugman, 1994; Dechezleprêtre and Sato, 2014). They argued that the enhancement of the national/regional welfare doesn't necessarily have to be achieved at the expense of the commercial rivals. On the contrary, specialization based on their own comparative advantages may provide new export markets, more specialization opportunities for the competitors and greater incentives to the use of newer and more innovative production factors (Dechezleprêtre and Sato, 2014).

Despite the differences between the three approaches there's a common denominator between them: The market shares' gains. Hence, the microeconomic perspective seems to constitute the focus of the discussion on competitiveness, as other authors have already stated (e.g., Porter [1990], Annoni and Kozovska [2010]).

2.1.2. Green fiscal policy

Green fiscal policy comprises the following instruments (Schlegelmich and Joas, 2015): Green taxes, which tax goods/services whose impact on the environment is potentially harmful; green charges, which are compulsory payments required as a counterpart of the provision of services that use environmental resources; and green subsidies, which intend to encourage a more eco-friendly production and consumption structures. They belong to the wider market-based set of green instruments since they induce changes in the economic agents' structure of incentives through markets. Command and control; self-regulation; co-regulation; and information-based are other existent instruments (Taylor et al., 2012).

The environment emerged as a national policy matter in the sixties (US) and seventies (Europe), but it was only in 1986 that the environmental policy was institutionalized as an European policy with the Single European Act (SEA). SEA highlighted the green fiscal instruments over the ones used at the time - the command and control instruments - by recognized their flexibility and cost efficiency in terms of the application of the polluter-pays and user-pays principles and the fact that didn't constitute a technical barrier - like the command and control instruments did - and therefore didn't compromise the achievement of a European Single Market (Holzinger et al., 2006; Schmitt and Schulze, 2011).

2.2. Main Theories on the Relationship between Green Taxation and Competitiveness

Is there a cause-effect relation between green taxation and competitiveness? If so, what is the signal of that relationship? In the literature this debate has been sustained by two distinct arguments: The neoclassic hypothesis versus the Porter hypothesis.

The neoclassic hypothesis sustains that green taxes interfere with the firms' decision process and restrain their competitiveness by increasing their costs: Initially due to the direct effect on prices and then by adding the costs associated with investments in less polluting technologies, processes and products encouraged by the environmental regulation (Ambec et al., 2013). The main consequences will be the significant changes in the industrial structure of the regulated country, as the more polluting firms will transfer to countries in which environmental regulation is absent/more permissive, and the inefficient transfer of resources from the production process to the environmental protection (Ambec et al., 2013). Thus, the absence of regulation would always be the most efficient way to promote competitiveness, neoclassical claims.

The Porter hypothesis, on the other hand, states that the core of competitiveness lies in the ability to innovate: "Competitive

advantage (…) rests not on static efficiency nor on optimizing within fixed constrains, but on the capacity for innovation" (Porter and van der Linde, 1995. p. 98). It acknowledges that market structures are imperfect and that firms are unable to efficiently maximize their private profits, thus green taxes act as a signal to unexplored business opportunities and as a stimulus to innovation. Furthermore they generate productivity gains and costs reductions by promoting a more efficient use of the inputs and by incentivizing the use of greener technologies (Triebswetter and Wackerbauer, 2008). These "early-mover advantages" (Porter and van der Linde, 1995. p. 114) may even compensate for the losses incurred by the less efficient and more polluting firms. Consequently, an expansion in the market shares and income levels could occur even in the presence of green taxes or any other form of environmental regulation.

On a final note, to the extent that the two theories strongly oppose one and other regarding existence and the type of effects that environmental regulation has on competitiveness we can only conclude the same as Jaffe et al. (1995): Probably the real explanation is somewhere between the two extremes of the theoretical debate.

2.3. Literature Review

There is a wide range of empirical studies on the issue but most of them provide mixed, thus not very conclusive results. Additionally, the use of different methodologies also hampers their comparison. Nonetheless, the major consensus based on the evidence found has been that green taxes have a small negative impact on firms' productivity during their adaptation period - and in the long run these impacts seem to become positive. In this sense, "the available evidence suggests that there is no case to cut back environmental regulations for competitiveness reasons" (Dechezleprêtre and Sato, 2014. p. 18).

Our literature review revealed that researchers favor the use of the meso and macroeconomic approaches when it comes to the study of the impact of green taxes on competitiveness. Some, like Scrimgeour et al. (2005) and Liu and Lu (2015), found evidence of a mainly negative relation between the two concepts, that is in general the use of taxes on petroleum products, carbon emissions or energy worsens the macroeconomic context (contractions in the GDP, investment and fixed capital levels, employment rate, real wages, productivity and the deterioration of the terms of trade). On the other hand, others like Ekins and Salmons (2007) and Barker et al. (2009) determined that green taxes can have a positive effect by stimulating innovation in the regulated sectors, which could offset the compliance costs and generates productivity gains. Yet others, such as Ekins et al. (2012), obtained mixed results and didn't reach a clear conclusion.

In this sense we confirm Dechezleprêtre and Sato (2014)' findings: Empirical studies from a meso/macroeconomic perspective don't offer much clarity on the issue. On one hand, the variables/indicators used don't fully grasp the complexity of the concept of competitiveness. On the another hand, the methodologies applied - from CGE models to E3ME models and linear regressions with panel data - are often complex and vary between studies, in addition to the differences in the time series and baseline scenarios, making it difficult to compare results and to establish broad conclusions.

The current literature has also referred the need to use the microeconomic approach in the study of the effects of green taxation on competitiveness (Kozluk and Zipperer, 2013). According to Arlinghaus (2015), microeconomic studies should tackle the issue by focusing on the analysis of the cost pass-through mechanism, that is firms may be able to avoid the negative impacts of taxation by transferring the burden onto consumers through the increase of the prices of the taxed products: "Competitiveness effects on the firm and sector level can be attenuated if firms manage to pass-through […] rather than having to absorb parts or all of the costs" (Arlinghaus, 2015. p. 10). We weren't able to find many empirical studies that focused on this type of analysis but the few we did (Alexeeva-Talebi, 2010; Oberndorfer et al., 2010) concluded that cost pass-through not only differs among sectors (different market structures) but also between products of the same sector (different price demand elasticities). For example, these studies found that green fiscal costs represented a very small portion (around 2%) of the European oil refineries total production costs. As so, the fuels' prices could be raised without causing major shifts in demand, but they had to keep in mind that the price increase couldn't be equal for all fuel products as their price demand elasticities were different, and so were their cost pass-through percentages.

In the end, studies from a microeconomic point of view appear to be more enlightening when it comes to the effects of green taxation on competitiveness and for that reason researchers should focus on analyzing the issue with the use of methodologies that favor this perspective, as Kozluk and Zipperer (2013) have already concluded.

3. METHODOLOGY

We followed Arlinghaus' microeconomic approach according to which the smaller it is the firms' exposure to competition and the price demand elasticity that they face the more likely it is for them to transfer the fiscal burden onto consumers without significantly hurting their revenue levels, thus avoiding hurtful impacts on their competitiveness. The country we chose was Portugal and the sector we selected was the one regarding the retail sales of road fuels, as it best fits our analysis. That is, in 2014 refined petroleum was one of the top three Portuguese exports (10.4%) and was the country's main import (19.6%) (AICEP, 2015). Furthermore, in 2013 the export of fuel products explained ⅔ of the national export growth in the first semester (Aníbal, 2013). As for the ISP tax it constitutes a significant portion of the road fuels' retail price: Around ⅔ of the gasoline's price (in average 0,584 EUR/liter); almost ½ of the diesel's price (in average 0.368 EUR/liter) (Autoridade da Concorrência, 2013). Moreover, it is the most relevant green tax in Portugal - despite the sustained reduction of its revenues between 2007 and 2012 - reaching 3.9 Billion Euros in 2014 (72% of the national green tax revenue) (INE, 2015).

Our analysis of the market power degree in the retail sector of road fuels was achieved with the use of industrial concentration indexes.

To obtain the price, income and cross-price demand elasticities we estimated the demand functions for the most common road fuels - gasoline and diesel (LPG was excluded from the analysis due to the lack of adequate statistical information).

3.1. Market Power in the Portuguese Retail Sector of Road Fuels

There are two important players in the Portuguese retail sector of road fuels: The oil companies, which controlled 71% of the market in 2014 - where GALP was responsible for 25-30% of the market sales - and the food chains, which were able to double their market share to 22% since 2008. We calculated some of the most used industrial concentration indexes - the concentration ratio (C_k), the Hirshman-Herfindahl (HH) and Theil indexes (T) - to better understand the concentration levels in the sector. The results are showed in Table 1.

Table 1: Industrial concentration indexes in the portuguese retail sector of road fuels

Indexes	2008	2014	Δ2014-2008
C_2	0.60	0.46	−0.14
C_4	0.81	0.71	−0.10
HH	0.67	0.55	−0.12
T	0.27	0.34	0.07

Source: Own calculations based on Gomes (2015)' data

Between 2008 and 2014 the market share concentration of the two major oil companies, GALP and REPSOL, fell by 14% (C_2) and, as a group, the four oil companies operating in the national market lost 10% (C_4) of their sales mainly to the food chains. A more homogeneous market share distribution among the sector's players was also captured by the seven points increase of the T index to 0.34 and the twelve points decrease of the HH index to 0.55. Nonetheless, a HH index value above 0.18 signals a highly concentrated sector which seems to be the case of the Portuguese retail sector of road fuels (HH_{2014} >0.18). That this, despite the increase in competition - especially between the oil companies and the food chains - there is still a high concentration of the sales in one player, the oil companies. The main reason for these continuously high levels of concentration is the rigidity of the sector's entry barriers since they hamper the entry and the development of new competitors (Autoridade da Concorrência, 2009).

We conclude that the sector is characterized by a clear oligopolistic structure, which still remains despite some signs of increased competition. This structure allows for the largest players - in this case GALP - to have some degree of market power thus make it easier to transfer the fiscal burden to the consumers.

3.2. Estimating the Demand Elasticity of Road Fuels

3.2.1. Demand functions specifications

We based the specification of our demand functions for gasoline (1) and diesel (2) accordingly with Dahl and Sterner (1991)' literature review of the demand functions for road fuels in over 100 studies:

$$\log GASOLINE_t = \beta_0 + \beta_1 \log GASOLINE_{t-1} + \beta_2 \log PGASOLINE_t + \beta_3 \log PDIESEL_t + \beta_4 \log GDP_t + \beta_5 \log VGAS_t + U_t \quad (1)$$

$$\log DIESEL_t = \beta_0 + \beta_1 \log DIESEL_{t-1} + \beta_2 \log PDIESEL_t + \beta_3 \log PGASOLINE_t + \beta_4 \log GDP_t + \beta_5 \log VDIESEL_t + U_t \quad (2)$$

$GASOLINE_t$ and $DIESEL_t$ represent the demand for road fuels quantified by the annual consumption per capita of the various types of gasoline and diesel, respectively. The inclusion of the dependent variable lagged one period is also important as its omission may cause the overestimation of the short run elasticities and the underestimation of the long run elasticities (Fonseca, 2009). According with Oliveira (2001), gasoline, diesel and LPG are substitute products among themselves, and for that reason their prices should be considered - $PGASOLINE_t$ and $PDIESEL_t$ quantify the average of the prices of the various types of gasoline and diesel based on their weight in total consumption. The author adds that the same is true for the prices of vehicles since they are complementary products of road fuels - such inclusion, however, proved to be difficult to achieve due to the lack of statistical information. As an alternative some demand functions include variables related to the number of vehicles by type of fuel in circulation to try to capture that complementarity relation (Pock, 2010: $VGAS_t$ and $VDIESEL_t$ refer to the number of gasoline-powered and diesel-powered vehicles per capita, respectively. The consumers' income was quantified by GDP per capita (GDP_t)[2]. We also included dummy variables to infer if certain events had some influence on the demand for fuels: The entrance of LPG in the fuels' market in 1995 (LPG), the fuels' market liberalization in 2004 (LIB), and the recent financial crisis of 2008 (CRISIS).

We assume that the demand for road fuels varies negatively with their own price (h1), the commercialization of LPG (h5) and the financial crisis (h7); and varies positively with the price of substitute fuels (h2), the consumers' income level (h3), the quantity of vehicles in circulation (h4) and the market liberalization (h6). We further assume that the fuels' price variation will originate a less than proportional variation in their demand, i.e., the demand for fuels is rigid both in the short and in the long run (h8). If these assumptions are verified, we can determine that road fuels are ordinary and normal goods with rigid demands in relation to their price, which combined with the firms' market power will lead us to believe that it is possible to increase the fuels' price - to offset the green fiscal burden - without harming the firms' long run sustainability.

3.2.2. Results

Table 2 shows the best estimations that we obtained for the demand functions of gasoline and diesel with the OLS method.

We can conclude that the consumption per capita of road fuels varies positively with the real price of substitute products and the consumers' income; and varies negatively with their own real price, the quantity of vehicles in circulation, and the financial crisis. $PGASOLINE_t$ and $PDIESEL_t$, respectively on the gasoline' and diesel's functions, are statistically significant at 1% and indicate that the fuels are ordinary goods with short run rigid demands: −0.6 (gasoline) and −0.2 (diesel). GDP_t is also statistically significant on both functions at 5% and 1%. The estimated coefficients of

2 Both the variables regarding the fuels' prices and the consumers' income were evaluated in real terms (base year = 2006).

Table 2: Gasoline and diesel demand functions in Portugal (1980-2013)

Variables	Log ($GASOLINE_t$)	Log ($DIESEL_t$)
C	−2.454*** (3.207)	−5.864*** (−5.549)
Log ($GASOLINE_{t-1}$)	0.712*** (13.554)	-
Log ($DIESEL_{t-1}$)	-	0.715*** (9.917)
Log ($PGASOLINE_t$)	−0.591*** (−8.118)	0.215** (1.826)
Log ($PDIESEL_t$)	0.031 (0.686)	−0.214*** (−3.685)
Log (GDP_t)	0.176** (2.385)	0.576*** (5.264)
Log ($VGASOLINE_t$)	−0.196*** (−4.197)	-
Log ($VDIESEL_t$)	-	−0.032 (−0.367)
LPG	−0.006 (−0.428)	0.032 (1.593)
LIB	0.001 (0.011)	−0.010 (−0.329)
CRISIS	−0.014 (−0.765)	−0.011 (−0.436)
R^2	0.998	0.998
R^2 (adjusted)	0.997	0.998
F-statistic	1418.097	1642.119
Prob (F-statistic)	0.000	0.000
Durbin-Watson	1.949	1.961

Source: EVIEWS outputs. ***Statistically significant at 1%; **Statistically significant at 5%; T-ratios corrected of heteroscedasticity in parentheses

Table 3: SR and LR demand elasticities

Road fuels	SR: Price elasticity			LR: Price elasticity			SR: Income elasticity			LR: Income elasticity		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
Gasoline	−0.6	−0.4	−0.2	−2.1	−0.9	−0.5	0.2	0.3	0.6	0.6	0.7	0.8
Diesel	−0.2	−0.1	−0.3	−0.8	−0.2	−0.4	0.6	0.6	0.9	2.0	1.5	1.8

Source: (a) EVIEWS outputs and own calculations; (b) Oliveira (2001)'s results; (c) Compilation of literature review. SR: Short run, LR: Long run

0.2 (gasoline) and 0.6 (diesel) show that the fuels are normal goods. In the diesel's function $PGASOLINE_t$ is statistically significant at 5% and its negative signal allow us to infer that the two fuels are substitute goods: A 10% increase in the gasoline's price would increase the diesel's consumption per capita by 2%. In relation to the vehicles in circulation we can only analyze gasoline's case - $VGASOLINE_t$ is statistically significant at 1%. The consumption per capita of gasoline is negatively associated with the increase of gasoline-powered vehicles in circulation (elasticity of −0.2). The exponential growth of hybrid vehicles which use gasoline as one of the fuels may explain this result. That is, despite their contribution to the growth of gasoline-powered vehicles in circulation, the other fuels/energies which they consume (such as LPG; natural gas; electrical energy) are much more cost-efficient and therefore may have had a discouraging effect on the consumption of gasoline. Other relations showed mixed signals - negative relation between LPG and $GASOLINE_t$, and a positive one with $DIESEL_t$; LIB with a positive effect on GAS_t and a negative effect on $DIESEL_t$ - but they weren't statically significant.

The calculation of the long run demand elasticities was based on the methodology used by the empirical studies that apply the OLS method and that introduce a variable regarding the demand for fuel lagged one period[3]. We compared our results with the ones of Oliveira (2001), who estimated the demand functions of gasoline and diesel in Portugal in the period of 1977-2000, and we also reviewed the estimates for the demand elasticities obtained in similar studies. Our results are summarized in Table 3.

Both our short run price elasticities as our short and long run income elasticities confirm our hypotheses and the findings in similar studies. That is, road fuels are normal goods with short run rigid demands. As for the long run price elasticities our results showed that diesel continues to faces a rigid demand in the long run, but the elasticity value is higher than expected (−0.8 versus −0.2 and −0.4); gasoline faces an elastic demand in the long run contrary to what the majority of studies found (2.1 versus −0.9 and −0.5). This last result might be explained by the shift of consumers' long run preferences from gasoline to diesel which arises from the following: (i) The retail price of diesel is lower than the one of gasoline because the ISP fiscal burden is relatively minor on the former (Autoridade da Concorrência, 2013); (ii) diesel-powered vehicles are more efficient and less polluting which compensates for their relatively higher prices (Pock, 2010). This trend - the "dieselization" of the portuguese economy (Autoridade da Concorrência, 2009) has also been confirmed by the national statistics: The current consumption of gasoline is below 1988's consumption levels; sales of gasoline-powered vehicles in national territory have fallen sharply between 1993 and 2013 from 217,000 sold annually to just close to 28,000, while diesel-powered vehicles' sales have fallen substantially less in the same period. Additionally, it is possible that the development and adaptation to alternative forms of road fuels (such as LPG; biodiesel; natural gas; electric energy), less polluting and more cost-efficient, and whose expansion has been more pronounced in recent years, may have also contributed for the discrepancy between our estimates for the long run price elasticities and those obtained in other studies, in particular in the one by Oliveira (2001).

3 See Oliveira (2001), Fonseca (2009).

4. DISCUSSION: IMPLICATIONS FOR THE PORTUGUESE AND EUROPEAN FUELS' SECTOR

In the previous section we concluded that: (i) The rigid market structure of the road fuels' retail sector allows large players such as GALP to influence the price of fuels, thus making it easier to transfer the tax burden onto consumers; (ii) road fuels are ordinary and normal goods that generally face rigid demands (exception: Gasoline in the long run). Taking this into account, we examined the impact of the ISP tax on the profitability - and therefore on the competitiveness - of the firms in the Portuguese retail sector of road fuels. We focused mainly on GALP as the company satisfies - directly or indirectly - around 80% of the national consumption of gasoline and diesel; it was the only company in the sector that registered a major drop in its market share; even so, it still maintained a dominant position which allowed some degree of market power.

We tested the impact of the ISP tax burden on the retail prices of gasoline and diesel in relation to GALP's turnover and financial performance through the use of simple linear regressions. From that analysis we can only conclude that there seems to be a negative relation between the increase of the ISP tax burden on the price of diesel and GALP's turnover ($R^2 = 0.831$) which may indicate that a significant portion of the company's revenue comes from the sales of this fuel. The other linear regressions showed very low R^2 and for that reason we can't draw irrefutable conclusions about those relations. Nonetheless, we can safely assume that GALP transferred at least a part of the ISP tax burden onto consumers without suffering major profit reductions due to the rigidity of the short run sales of gasoline and diesel and long run sales of diesel. Furthermore, GALP has also been developing "new processes, products, technologies, services and business models, providing a differentiated offering (…) that contributes to (…) the efficiency of the energy and the reduction of environmental harmful impacts" (GALP, 2015), and is continuously expanding its presence in the external market. As for the sustained loss of market share that GALP faced since 2008, according to Autoridade da Concorrência (2009) it seems to be related with the aggressive pricing policy set by the food chains and not so much with the increase of the ISP tax burden on the fuels' price. Regarding the other players in the market - remaining oil companies and independent retailers - there weren't significant changes in their market position as they follow GALP's pricing policy up close (Autoridade da Concorrência, 2009).

In the end we can say that if there were negative long run effects on the fuels' sales - and thus competitiveness losses - associated with the ISP tax, that didn't seem to reflect in the firms' financial performance. On one hand because cost pass-through levels are apparently high as the demand for road fuels is rigid. On the other hand because it seems that the innovation effects more than offset the potential loss of competitiveness caused by the increase in the fuels' prices. Hence, our results and conclusions come close to the Porter hypothesis.

According to some studies (Alexeeva-Talebi, 2010; Pock, 2010; Bonilla, 2012 the same can be said about the EU's road fuels sector, i.e., firms operating in this sector often seek to offset the potential negative impacts of the green fiscal policy by using the cost pass-through mechanism - given the rigidity in the demand for fuel products - and/or by developing new and more efficient products which gradually replace the existing ones, more pollutants and heavily taxed. The need for innovation is even greater in economies where the sector structure is close to perfect competition, which actually may be the case on several European countries (OECD, 2013). We cannot say, however, that this is a globalized reality: "Evidence points that higher fuel taxes (in the EU), as opposed to the US case, do encourage sustained improvements in real-world fuel economy" (Bonilla, 2012. p. 286).

5. CONCLUSIONS

The study of the impact of green taxation - and environmental regulation in general - on competitiveness is not a linear process. Firstly, it's necessary to clarify the concept of competitiveness that we will be using, given the existence of different levels of analysis. Secondly, we must define the type of regulation that we will be studying as environmental policies differ on both industrial and national basis, and therefore don't consider the same instruments nor impose the same goals. Thirdly, we should take into account the existence of two different theoretical visions. Fourthly, if the objective is to study the isolated effect of an environmental measure on competitiveness, such as green taxes, then we should keep in mind that these are only a part of a broader package of other measures. Lastly, the study from a microeconomic perspective should be a requirement because the focus of competitiveness is, ultimately, the firms; and due to the fact that findings at a meso/macroeconomic level often revealed as to be unclear, not comparable, and therefore inconclusive.

Following Arlinghaus' microeconomic approach, we analyzed a single case: The effect of the ISP tax on the competitiveness of the firms in the retail sector of road fuels in Portugal. We concluded that the financial performance - and thus the competitiveness - of the firms in the sector weren't significantly compromised by the ISP tax. Two reasons may explain it: (i) The high levels of cost pass-through motivated by the sector's oligopolistic structure and by the rigidity associated to the sales of road fuels, especially in the short run; (ii) the development and commercialization of alternative fuels/forms of energy (LPG; biodiesel; electrical energy; natural gas) that gradually replace the more polluting and heavily taxed fuels.

Our study is a contribution to the issue at stake in that only captures a small part of its complexity. For example it would be interesting to analyze the fuel sector of more countries; or to understand the effects on the consumption of LPG, as it is considered less polluting than gasoline and diesel. Also, the rise in the price of road fuels, as a result of the imposition of green taxes, could affect the competitiveness of other economic sectors and, ultimately, the economy as a whole. It would be necessary to expand our analysis in order to understand if green taxes could act as harmful measure in other industrial contexts and what should be done to counteract such negative effects - lowering labor taxes rates, applying partial exemptions or allocating compensatory allowances financed by the green fiscal revenue to key sectors. Nevertheless it's important to point out that

the main targets of the ISP tax are the highest consumers of road fuels, such as the industries linked to transport and logistics. Other sectors, such as those associated with energy production, normally use other type of fuels as inputs in their production process.

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