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SECTOR PRODUCTIVITY AND GEOGRAPHICAL DIVERSIFICATION AS EXPORT  
ENHANCING FACTORS: THE CASE OF PORTUGAL

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## **Abstract**

An investigation of the relationship between productivity growth and exporting is vital to understand whether the policies of productivity-enhancing or of export-promotion are more adequate for economic progress. This thesis considers the relationship between exporting and productivity for thirty-two economic activities, in Portugal, from 2005 to 2017. I find that economic activities with high productivity levels are systematically likelier to register higher export levels than less productive ones. This result corroborates the self-selection theory. Furthermore, I test for the effect of geographical diversification on the volume of exports, and the presence of diminishing returns in this association. For both cases I find significant results, suggesting that economic activities enlisting more export destinations tend to possess higher export volumes, but also that after a certain threshold the negative effects of geographical diversification offset the associated positive benefits.

**Keywords:** Exporting, Productivity, Geographical diversification, Portugal

## **1. Introduction**

Strengthening industry competitiveness is a crucial factor for economic growth. The productivity gap between countries and its growth are regarded as key aspects determining the comparative advantage in international trade. Theoretically, it is evidenced that international trade (and specifically exports) boosts economic development and enhances companies' productivity (Beckerman, 1962; Kaldor, 1970; Balassa, 1988; Bhagwati, 1988). Therefore, an investigation of the relationship between productivity growth and exporting is vital to understand whether the policies of productivity-enhancing or of export-promotion are more adequate for economic progress (Clerides et al., 1998; Aw et al., 2000; Melitz, 2003; Wagner, 2007; Vendrell-Herrero, Gomes, Mellahi and Child, 2017).

The present study aims to empirically investigate the relationship between export and productivity during the Portuguese financial crisis and recent post-crisis period, and ultimately to help Portuguese firms develop their competitiveness in foreign markets and become more productive, before commencing to engage in foreign direct investment and become multinationals. As far as I can tell, this is the first work on the relationship between productivity and export focusing particularly on the Portuguese economy and on a period of financial distress, and hence, this research efforts can enrich the vast literature on firms' internationalization by filling this gap, since it is important to know if the self-selection theory also applies to periods of economic crisis.

Moreover, it is very relevant because in order to face the recent crisis the Portuguese government utilized a policy that stimulated and incentivized exporting and tried to attract more foreign direct investment. Thus, the extent to which the productivity of Portuguese companies influences their capacity to compete in international markets and their export behaviour merits

academic and scholarly attention, because it is vital to assess if these policies are the most effective ones to achieve economic growth.

Furthermore, the choice of the specific case of Portugal is additionally justified because of concerns associated with the inferior degree of productivity of Portuguese firms compared to other European economies (Alves, 2017) and the acknowledgement that if they become more actively involved in international business, they could improve their productivity through the exposure to best practices and technological innovations.

Besides, the international marketing and business literatures indicate other aspects empowering export capacity, like the degree of geographical diversity, and I also aim to assess how this variable influences the exports volume of Portuguese companies.

In this way, the predominant influence of this project is to deliver a response to the discussion “How can Portuguese firms become more productive and increase their exports volume?”.

Also, one should notice the fact that most studies on this subject relate either the productivity at firm level (Clerides, Lach, and Tybout, 1998; Melitz, 2003; Yang, 2003; Loecker, Love and Mansury, 2007; Wagner, 2007; Vu, Holmes, Tran, and Lim, 2016; Gomes, Vendrell-Herrerob, Mellahic, Angwind and Sousa, 2017; Newman, Rand, Tarp and Anh, 2017; Vendrell-Herrero, Gomes, Mellahi, and Child, 2017) or the productivity of general manufacturing or services sectors (Bernard and Jensen, 1999; Ayadi and Matoussi, 2014; Sharma and Mishra, 2011) with exporting activity, and that there does not exist a vast literature that tests this relationship using macro-data for specific economic activities (Nelson and Yaşar, 2003; Loecker, 2007), rather than company level or merely two vast cluster sectors. This study also attempts to fill this gap.

The paper is organised as follows. In section 2, I provide a review of previous literature and I develop hypotheses. To do so, I first resort to the self-selection and learning-by-exporting literature to enlighten the relationship between exports and productivity. Additionally, I review some other studies that try to explain why exporting firms are more productive than non-exporting ones. Afterwards, I make use of further research to describe the relationship between geographical diversification and performance and I apply these concepts to the specific case of Portugal. In section 3 of this study, I describe the utilized research methods, and in section 4 I portray the main findings of the thesis. Finally, in section 5 I discuss the aforementioned results, the theoretical, governmental and managerial implications of this research, I draw this project's main limitations, and I provide suggestions for future research.

## **2. Literature review and hypotheses**

Nowadays, the pressure for international growth and expansion is being intensified by the increasing rate of globalization. At the beginning of their internationalization process, companies lean towards exports, rather than towards foreign direct investment, since this mode of entry entails inferior levels of foreign market acquaintance and of factor engagement (Johanson and Vahlne, 1977). Moreover, literature focusing on the link between economic performance and international trade has highlighted that an orientation towards exports is frequently linked to superior levels of GDP growth, and it is even argued by many scholars that emerging countries pursuing export strategies usually out-perform others implementing import-substitution policies (Havrylyshyn, 1990; Feenstra, 1995; Edwards, 1998). Thusly, it is very relevant to study the role of international trade, and more specifically of exports, in economic growth and on firm performance.

In this way, there is a vast literature that attempts to explain the relationship between exports and productivity. For instance, it is posited that a company's productivity improves because of its exporting activity. Theoretically, this can be expected: the competition exporters face abroad is often fiercer than the one sensed by companies circumscribed to internal markets, obliging them to increase productivity to be capable of competing in foreign markets. Furthermore, companies may benefit from economies of scale resulting from the entry in foreign markets and increased product specialisation (Baldwin and Gu, 2004). Additionally, a theory known as learning-by-exporting proposes that both the exposition to surpassing external technology and knowledge, and the access and absorption of know-how by experience from contacting and collaborating with suppliers, customers, intermediaries and competitors or additional types of stakeholders, improve the productivity of exporting companies (Clerides et al., 1998; Vendrell-Herrero, Gomes, Mellahi and Child, 2017).

Further academic work on exporting starts from the premise that entering export markets involves fixed costs. Hence, relatively more efficient companies alone manage to export (Clerides et al., 1998; Helpman et al., 2004). Costs associated with market research and the development of new marketing strategies, negotiating with further associates, contracting employees skilled on leading offshore chains, setting up additional distribution and transportation grids, adapting the domestic product range to foreign consumption, must be incurred by companies contemplating entry into foreign markets. Solely the companies with marginal costs low enough can generate the profits necessary to compensate the aforementioned costs. Therefore, exporting firms tend to be more productive because their productivity levels are higher in the first place, and not particularly because of gains resulting from selling abroad. This theory is known as the self-selection model.

This line of thought is also in accordance with the export literature on the resource-based view (RBV) theory (Lafuente, Stoian, and Rialp, 2015; Peng, 2001), since companies are

regarded as “packages” of varied and diverse resources utilized to attain and preserve comparative advantage (Barney, 1991; Wernerfelt, 1984). As a matter of fact, the research developed by Bloodgood et al. (1996) found that the uniqueness of resource bundles of certain companies helps explain their higher levels of productivity. In this way, it is logical to hypothesize that a company’s capabilities and resources also encourage productivity.

However, Gomes, Vendrell-Herrero, Mellahi, Angwin and Sousa (2017) point out that the self-selection theory is moderated by the quality of the business environments, like the presence of prominent levels of corruption and institutional voids. Following the same line of thought, Aw et al. (2007 and 2011) and Lileeva and Trefler (2010) found that trade liberalisation encourages companies to start exporting, increase the exports’ volume and participate in more innovative activities and technology adoption, thus increasing their efficiency. Moreover, Cassiman and Golovko (2011) showed that the self-selection effect does not manifest itself in the case of innovative firms, because they possess a differentiated product range from their foreign competitors. This is also valid for born-global firms, since they enjoy an innovative capacity (Glaister et al., 2014), and they hold an inherent heterogeneity (Vendrell-Herrero, Gomes, Mellahi and Child, 2017) known as Foreign Market Focus orientation, that boosts the productivity gains from scale economies and enhances companies’ skills as a consequence of a learning-by-exporting process (Min and Smyth, 2014; Tse et al., 2015).

All in all, it would be fair to expect solid signals of self-selection into foreign markets, and, actually, empirical evidence seems to bear this out. For instance, a study developed by Wagner (2007) found staggering evidence of this mechanism: relatively more productive companies are consistently more prone to engage in exporting. Moreover, this result also seems to be corroborated by the studies of Bernard and Jensen (1999), Melitz (2003), Aw, Chung and Roberts (2000), and Gomes, Vendrell-Herrero, Mellahi, Angwin and Sousa (2017). So, I draw the following hypothesis:

**Hypothesis 1:** Economic activities with higher levels of productivity tend to possess a higher volume of exports.

Additional literature on the internationalization topic, like Loecker's (2007) work, evidenced that the exports volume and the number of destinations are positively associated. This result seems to be due to the fact that increased multinationality allows for wider access to foreign product innovation and technological knowledge, more varied international networks to face domestic competition, economies of scope and of scale, reduced impact of domestic economic and business fluctuations, the possibility to take advantage of differences in factor costs between countries, price discrimination, improved cross-subsidization, and arbitrage potential with wider geographic amplitude, among many other reasons (Kogut, 1985; Benvignati, 1987; Grant, 1987; Gomes and Ramaswamy, 1999; Contractor et al., 2003).

Furthermore, Herzer and Nowak-Lehmann (2006) argue that export diversification is the most efficient therapy for periods of financial crisis, uncertainty and fluctuations, since it avoids the flaws of export concentration. For example, fluctuations in sales volume, unreasonable prices, volatility of exchange rates and investment risks can be prevented by utilizing this strategy.

The Asian "Tigers" are the proof of the vital role of geographical diversification: the adoption of policies of this nature provided fruitful economic returns for these countries. Researches on this topic demonstrated that multinationality aided in reducing exposure to trade erosion and external shocks and in bolstering export performance and general economic growth (Abouellial and Dioquino, 2015). Therefore, I posit that:

**Hypothesis 2:** Higher levels of export geographical diversification lead to a higher volume of exports.



However, the works that postulate this positive relation also identify numerous reasons as to why the costs related to geographical diversification might offset potential benefits. Grant (1987), for instance, indicates that bounded rationality may hinder managers' capacity to successfully deal with greater complexity linked to multinationality. Thus, he argues that increased multinationality may negatively impact performance. Also, a study developed by Hitt et al. (1997) evidences that geographical diversification has a negative effect on performance, as a result of managerial capabilities being overly spread and of coordination problems. Following the same line of thought, Contractor, Hsu and Kundu (2003) argue that the link between the degree of geographical diversification and productivity is a quadratic one, as it can be seen in Appendix 1. And, based on similar arguments, Gomes and Ramaswamy (1999) defend that after a certain degree of multinationality, the gains from diversification are counterbalanced by informational and transactional costs.

For instance, countries from Central America, such as Costa Rica, El-Salvador, Guatemala, and Honduras, practiced diversification policies, but could not conquer economic stability (Stanley and Bunnag, 2001). In this way, it is fair to assume that the positive effect of multinationality on the amount of exports is not always verified with the same intensity (Contractor, Kundu and Hsu, 2003), and as there are also variables negatively influencing the effect of geographical diversity on performance, one could expect the magnitude of this relationship to be dependent on the number of export destinations, and so to test this I hypothesize that:

**Hypothesis 3:** There are diminishing returns in the effect of geographical diversification on the volume of exports.

To sum up, the theoretical framework contains three empirical hypotheses, which are presented in Appendix 2, a visual diagram that demonstrates all the relationships to be tested in the empirical section.

### **3. Data and methodology**

I started my thesis project at the end of December of 2017, and not on February of 2018 as I was supposed to, because I wanted to make sure I had enough time to present and prepare the best possible output. And I am glad I made that choice since data collection and its respective treatment took a copious number of months of arduous work... Please refer to Appendix 3 for a detailed track of the initial stages of this project.

#### Sample profile

To test the hypotheses mentioned in the Literature Review, the following variables were created:

- Exports (source: Instituto Nacional de Estatística): annual Portuguese exports value of goods and services, divided by destination country (197 countries were analysed) and thirty-two economic activity, from 2005 to 2017. Afterwards, I got the yearly export value for each economic activity, by summing up the value of exports for each year and economic activity for all countries. Then, because there were big differences in the distribution of the data, it was decided that it would be better to  $\ln$  this variable to reduce heteroscedasticity and hence enhance estimation accuracy, and, as there were some economic activities without exports in some years, it was added 1 euro to all figures, so that it would be possible to perform the  $\ln$  transformation. This variable is the dependent variable.

- Apparent labour productivity (source: Instituto Nacional de Estatística): annual Portuguese value of the contribution of the labour factor, measured by the added gross value generated by each worker at service, divided by economic activity, from 2005 to 2016 and measured in euros. Since the variable “exports” only possesses thirty-two economic activities, only those were kept for this variable. Also, and similarly to “exports”, the data distribution was normalized by performing a ln transformation.<sup>1</sup>
- Number of export destinations: to obtain figures for this variable I utilized excel to count the number of countries that registered an export value larger than zero concerning each economic activity and year.
- A dummy variable for years 2006 to 2016 (2017 was the excluded year). That is, each of these dummy variables is coded as 1 if the values for “exports” are registered for that year, and 0 otherwise.
- A dummy variable for economic activities EA01 to EA31 (EA32 was the excluded economic activity). That is, each of these dummy variables is coded as 1 if the values for “exports” are registered for that economic activity, and 0 otherwise. The description of each economic activity is presented in Appendix 5.

A data profile of all relevant variables included in the model is presented in Table 1.

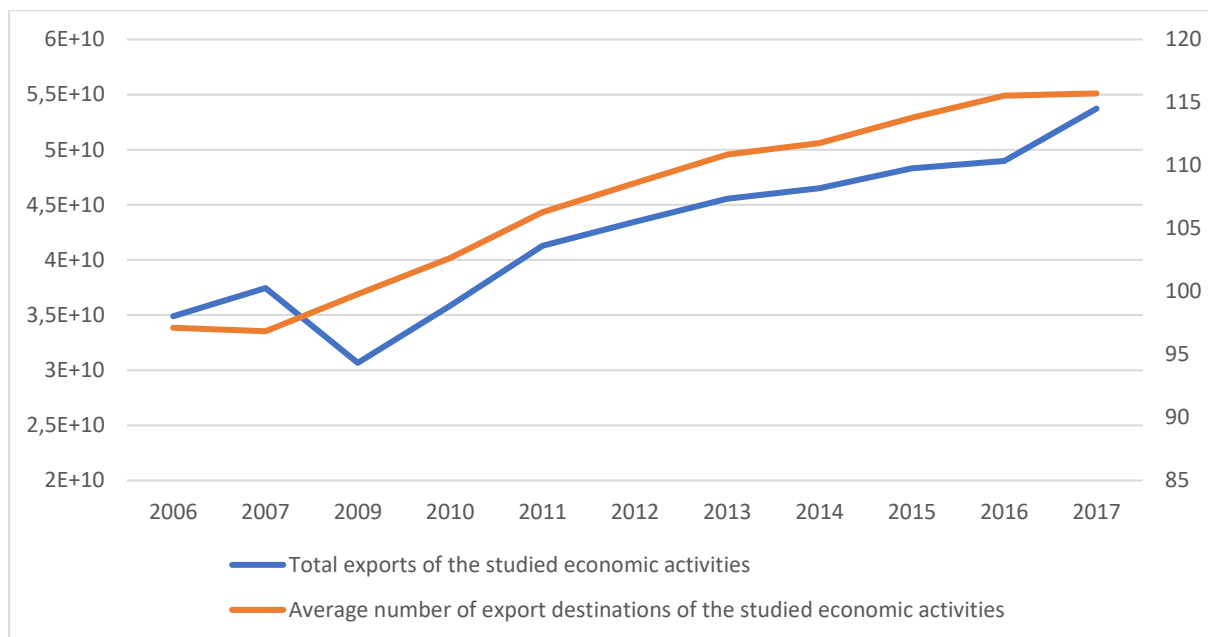
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<sup>1</sup> Even though total factor productivity would be a more suitable benchmark, it was not utilized due to lack of information on capital productivity. However, labour productivity is a widely used measure, and therefore it is fairly utilized here.

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. deviation</b>	<b>Min.</b>	<b>Max.</b>
<b>Export value</b>		1313698223,54	1247362672,04	0	6048271735
<b>Ln (export value +1)</b>		19,2571646	4,140806795	0	22,52
<b>Number of export destinations</b>		106,3958333	53,49292512	0	172,00
<b>Number of export destinations ^ 2</b>	384	14174,11458	9534,976457	0	29584,00
<b>Productivity t-1</b>		61057,38306	108927,4207	8332,05	761140,84
<b>Ln productivity t-1</b>		10,38276501	0,944241314	9,03	13,54

Table 1 - Descriptive statistics of all relevant variables included in the model.

Graph 1 shows the evolution of the total exports value and of the average number of export destinations of the studied economic activities. While in 2006 the total export value of the studied economic activities was about  $3,5 \cdot 10^{10}$  euros, by 2017 it was about  $5,4 \cdot 10^{10}$  euros, which represents an increase of approximately 54%. Performing a similar analysis to the number of export destinations, it can be seen that the figures for this variable have been constantly increasing, except for the year of 2007. There were, on average, 92 export destinations for the studied economic activities in 2016, while in 2017 there were almost 116, an increase of approximately 26%. These results seem to corroborate the increased dependence of the Portuguese economy on exports, over the last decade.



**Graph 1** - Evolution of the total exports value and of the average number of export destinations of the studied economic activities.

### Empirical model

To test Hypothesis 1 equation (1), in which the subscript  $t$  identifies the year of the observation,  $i$  the economic activity and  $\varepsilon_{ti}$  is the error term, was tested:

$$\begin{aligned} \text{Ln(Export value)}_{ti} = & \alpha + \beta_1 * \text{Ln(Productivity)}_{t-1i} + \beta_2 * (\text{Number of export} \\ & \text{destinations})_{ti} + \beta_3 * \text{Dummy}(2006)_t + \beta_4 * \text{Dummy}(2007)_t + \beta_5 * \text{Dummy}(2008)_t + \\ & (\dots) + \beta_{12} * \text{Dummy}(2015)_t + \beta_{13} * \text{Dummy}(2016)_t + \beta_{14} * \text{Dummy}(EA01)_i + \\ & \beta_{15} * \text{Dummy}(EA02)_i + (\dots) + \beta_{43} * \text{Dummy}(EA30)_i + \beta_{44} * \text{Dummy}(EA31)_i + \varepsilon_{ti} \end{aligned} \quad (1)$$

Note that  $\beta_1$  is the elasticity of “exports” with respect to “productivity $_{t-1}$ ”. Thus, we can say that, for instance, ceteris paribus, if “productivity $_{t-1}$ ” increases by one percent, then “export” value will change by  $\beta_1$  percent. As for the interpretation of the other coefficients, it can be said

that, for instance, ceteris paribus, if the year is 2015, “exports” will change by roughly  $100 * \beta_{11}$  percent when compared to 2017 (the excluded dummy).

To test Hypothesis 2 and 3 equation (2), in which the subscript  $t$  identifies the year of the observation,  $i$  the economic activity and  $\varepsilon_{ti}$  is the error term, was tested:

$$\begin{aligned} \text{Ln(Export value)}_{ti} = & \alpha + \beta_1 * \text{Ln(Productivity)}_{t-1,i} + \beta_2 * (\text{Number of export} \\ & \text{destinations}_{ti}) + \beta_3 * ((\text{Number of export destinations}_{ti})^2) + \beta_4 * \text{Dummy(2006)}_t + \\ & \beta_5 * \text{Dummy(2007)}_t + \beta_6 * \text{Dummy(2008)}_t + (\dots) + \beta_{13} * \text{Dummy(2015)}_t + \quad (2) \\ & \beta_{14} * \text{Dummy(2016)}_t + \beta_{15} * \text{Dummy(EA01)}_i + \beta_{16} * \text{Dummy(EA02)}_i + (\dots) + \\ & \beta_{44} * \text{Dummy(EA30)}_i + \beta_{45} * \text{Dummy(EA31)}_i + \varepsilon_{ti} \end{aligned}$$

Ceteris paribus, if the “number of export destinations” increases by 1 unit, “exports” will change by roughly  $100 * \beta_2 + 100 * \beta_3$  percent.

#### 4. Presentation of results

Following Vu, Holmes, Tran, and Lim (2016), Newman, Rand, Tarp and Anh (2017), and others, a model of sector random-effects and year fixed effects with robust standard errors was utilized (due to the fact that the dataset is a panel data) to test the hypotheses mentioned in the literature review section, and its results are presented in Table 2.

	Random effects 1	Random effects 2
Ln(Productivity <sub>t-1</sub> )	0.611** (0.250)	0.625*** (0.242)
Number of export destinations	0.0337*** (0.00785)	0.0711*** (0.0274)
(Number of export destinations) <sup>2</sup>		-0.000201* (0.000119)
Constant	9.784*** (3.469)	8.406** (3.784)
N	376	376
R <sup>2</sup>	0.695	0.763
<i>Year fixed effects</i>	Yes	Yes

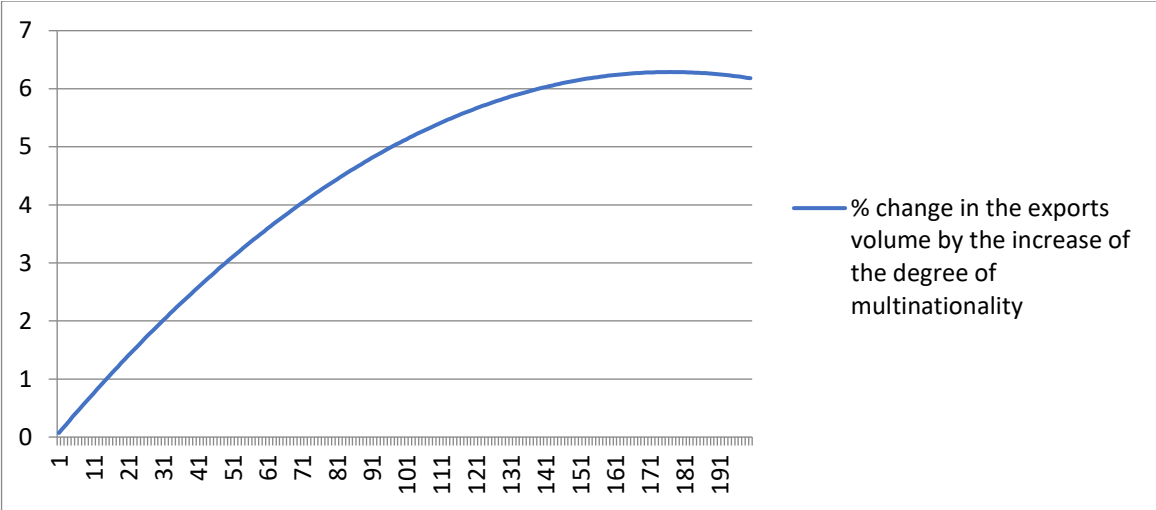
**Table 2** - Regressions based on Random Effects, with robust standard errors in parentheses. Level of statistical significance: \*\*\* 1%, \*\* 5% and \* 10%. The departing variable is Ln(Export value<sub>t</sub>)<sub>i</sub>, and only the relevant variables are presented.

Hypothesis 1 postulates that economic activities with higher levels of productivity tend to possess a higher exports volume; in this model, it implies that the coefficient of “Ln(Productivity<sub>t-1</sub>)<sub>i</sub>” is positive, and this can be confirmed in both regressions, with a level of significance of, respectively, 5% and 1%. Therefore, these results appear to validate the self-selection theory.

Furthermore, Hypothesis 2 posits that higher levels of export geographical diversification lead to a higher exports volume; in this model, it implies that the coefficient of “number of export destinations<sub>it</sub>” is positive. Based on Table 2 we can confirm Hypothesis 2 in

both regressions, with a level of significance of 1%. Hence, a larger number of export destinations seems to lead to a higher exports volume.

Finally, Hypothesis 3 theorizes that there are diminishing returns in the effect of geographical diversification on the exports volume; in this model, it implies that the coefficient of “(number of export destinations<sub>ti</sub>)<sup>2</sup>” is negative. This is confirmed in regression two (Random Effects 2), with a significance level of 10%. So, the law of diminishing returns appears to apply to this particular case. Actually, and as it can be seen through Graph 2, after exporting to 165 countries, for each new destiny exports increase by almost 0%. Moreover, it can be easily calculated that the number of export destinations that maximizes the volume of exports is, approximately, 177 destinations.



**Graph 2** - Evidence of diminishing returns: exports increase less and less with the increase of geographical diversification.

Also, it is interesting to note that, overall, the model has a good fit. For instance, the regression of “Random Effects 2” predicts correctly 76,3% of exports value.

Furthermore, “productivity<sub>t-1</sub>” has a positive and significant effect on “exports<sub>t</sub>” and the coefficients should be interpreted as percentages. In this way, and utilizing, for instance, the



regression of “Random effects 1”, ceteris paribus, if “productivity<sub>t-1</sub>” increases by one percent, then “export” value will increase by 0,611%.

Similarly, the “number of export destinations<sub>t</sub>” also has a positive and significant impact on “exports<sub>t</sub>”, but with diminishing returns, and the coefficients are also to be interpreted as percentages. Thus, and using the regression of “Random effects 2”, ceteris paribus, if the “number of export destinations<sub>t</sub>” increases by 1 unit, “exports<sub>t</sub>” will increase by roughly  $100 * 0,0711 - 100 * 0,000201 = 7,0899\%$ .

## **5. Discussion and conclusions**

As it can be concluded from section 4, results seem to corroborate previous literature on the self-selection theory: economic activities with high productivity levels systematically register higher export levels than less productive ones. This is probably due to the fact that more productive exporters are more able to overcome the fixed costs necessary to engage in trade with foreign markets. That is, solely the companies with marginal costs low enough can generate the profits necessary to compensate the fixed costs associated with exporting (Bernard and Jensen, 1999; Melitz, 2003; Aw, Chung and Roberts, 2000; Wagner, 2007; Gomes, Vendrell-Herrero, Mellahi, Angwin and Sousa, 2017). These results also seem to verify that the self-selection theory is also applicable during economic periods of financial distress.

Moreover, economic activities enlisting more export destinations tend to possess higher export volumes, but this effect is not linear since diminishing returns were also recorded as significant. This result seems to be attributable to the fact that, among many other reasons, geographical diversification allows the accumulation of diversified knowledge and experience, wider access to foreign product innovation and technologies, more varied international networks to face domestic competition, economies of scope and of scale, reduced impact of

domestic economic and business fluctuations, the possibility to take advantage of differences in factor costs between countries, price discrimination, improved cross-subsidization, and arbitrage potential with wider geographic amplitude (Kogut, 1985; Benvignati, 1987; Grant, 1987; Gomes and Ramaswamy, 1999; Contractor et al., 2003). However, a very large degree of geographical diversification may negatively affect the export volume, since bounded rationality may hinder managers' capacity to successfully deal with greater complexity linked to high levels of multinationality, managerial capabilities become overly spread and coordination problems start arising and informational and transactional costs become excessive (Grant, 1987; Hitt et al., 1997; Contractor, Kundu and Hsu, 2003; Gomes and Ramaswamy, 1999).

#### Theoretical implications

The self-selection theory also seems to be applicable to the specific case of the Portuguese conjecture, and namely to periods of financial distress.

#### Governmental implications

On the policy front, these findings suggest that export promotion policies are more effective if escorted by actions to assist firms to enhance their productivity. This will aid companies to enter foreign markets by acquiring real competitive edge.

Therefore, even though the Portuguese export orientation policy has been utilized with success to support the Portuguese economy, it should be accompanied by productivity

strengthening industrial policies, so that companies become more cost-efficient and thus more able to overcome the fixed costs necessary to engage in trade with foreign markets.

This could be achieved, for instance, through policies that reduce bureaucracy and incentive innovation and the exploration of recent technologies.

### Managerial implications

This research has direct managerial implications. The first one is that firms should try to increase productivity to augment their volume of exports, but they should do it before engaging in foreign trade because, as there are fixed costs linked with exporting, only companies with marginal costs low enough can compete in foreign trade. However, if we assume that self-selection is simultaneous with learning-by-exporting (Yang, 2003), then exporting will also allow them to increase productivity by learning from stakeholders, facing higher competition and taking advantage of economies of scale.

This productivity enhancement can be achieved by, for instance, utilizing technology to improve their operations (e.g., automatization, communication tools, e-purchasing, smart inventory control systems, etc.), betting on innovation and differentiation (Aw et al., 2007 and 2011; Lileeva and Trefler, 2010), building a positive attitude and participation of management, creating good working conditions, and incentivizing proactive employees (Kumar, Duhan, Haleem and Zhou, 2016).

Secondly, to sell more abroad, companies should diversify their export destinations. Nevertheless, there seems to exist a trade-off between augmenting the degree of multinationalization and performance, as after a certain level of geographical diversification exports start to decay.

### Limitations of the study

Commonly to previous studies, this academic work has limitations. For instance, labour productivity was utilized to draw general conclusions concerning productivity. Also, it could be asked: is the high productivity of economic activities that self-select into export markets a result of an exogenous random shock (e.g., the Portuguese crisis, or the reforms and incentives given by the Portuguese government to increase exports), or of a strategy to plan the entry into foreign markets? It can also be pointed that the Hausman test recommends the utilization of a fixed effects regression model and not a random effects one, even though this method was used in other studies. Moreover, to help control any possible variability at the economic activity level, sector fixed effects should have also been used and not just year fixed effects.

### Directions for further research

Much academic research remains to be built to mature our comprehension of the impact of productivity on international trade. For instance, it would be interesting to test if the results of this study hold with firm-level data and if exporters are indeed more productive than non-exporters, even though these information are currently classified. This micro-data would also make possible to test the learning-by-exporting theory. Similarly, while data on foreign direct investment is not currently available, if it becomes publicly accessible it will allow for additional analyses to be carried out to provide a more comprehensive picture of the relationship between exports and imports and FDI and their role on economic growth.

This study is based on data for thirty-two economic activities, and while more information is not currently available it might be that it becomes obtainable in the future. Thus, upcoming projects testing the studied relationships and using figures for other economic activities will be welcomed.

It would also be valuable to better study how, and especially considering the current American policies, tariffs affect the relationship between exports and productivity.

Moreover, to further prove that the self-selection theory also applies to periods of economic and financial distress, the case of Greece also merits academic and scholarly attention, as Greece experienced similar complications to Portugal.

Finally, it is important to underline the relevance of the vast dataset I initially constructed, to analyze, for instance, the influence of institutional, cultural and geographical distances on exports, or how imports of one period influence exports of the subsequent ones.

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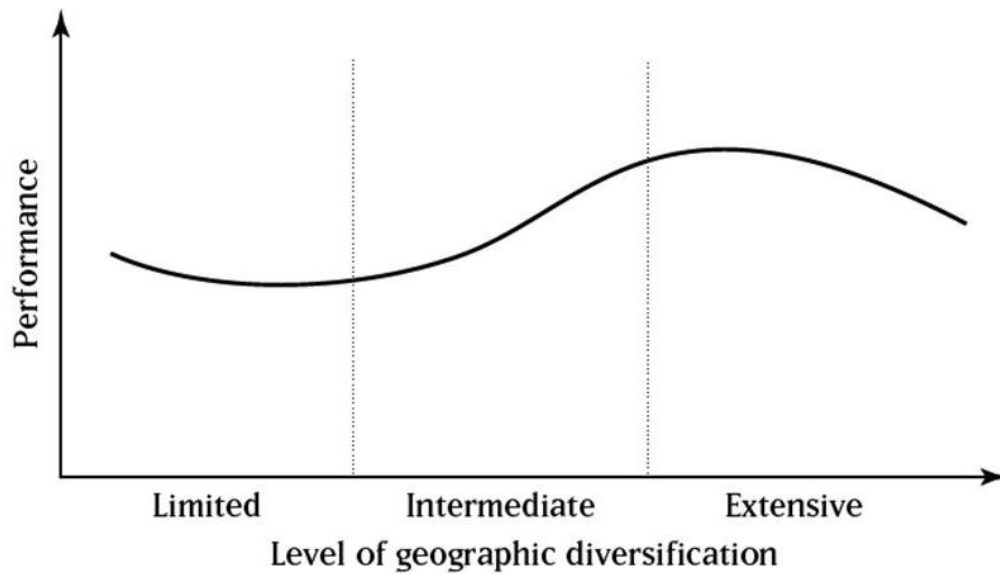
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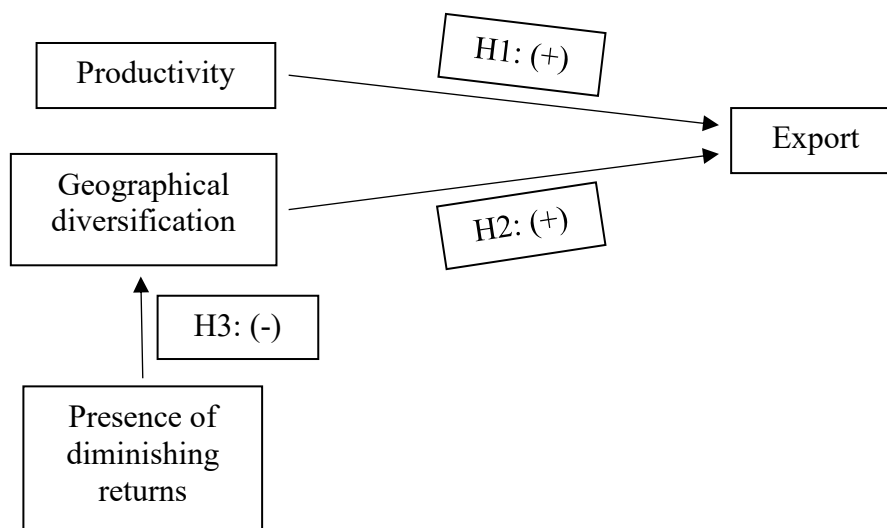
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## 7. Appendixes



**Appendix 1** - A three-stage sigmoid hypothesis. Source: F. Contractor, S. K. Kundu, and C.-C. Hsu. (2003). *A three-stage theory of international expansion: The link between multinationality and performance in the service sector*. *Journal of International Business Studies*, 34: 5–18.



**Appendix 2** - Theoretical framework and hypotheses

### Appendix 3

I had not thought about any particular subject for my thesis, so professor Emanuel Gomes proposed some topics and we agreed that it would be better to, at first, see what data was available for those areas and only afterwards narrow down the subject of the thesis, that is to follow an “inductive path”.

In this way, and at first, I started searching for data on exports and imports, by economic activity, and on foreign direct investment, productivity and geographical, cultural and institutional distance to try to assess how these last variables affect the trade pattern of each economic activity between Portugal and other foreign countries. As a result, I was able to build tables at excel for the following variables:

Variable	Source	Definition and additional information
Exports	Instituto Nacional de Estatística	Annual Portuguese exports value of goods and services, divided by destination country/region and economic activity, from 2005 to 2016. As I focused on exports, I utilized this variable to narrow down the number of studied countries. To do so, I decided to use as criteria the share of each country’s export volume on the total Portuguese export volume of 2016. To capture, approximately, 96% of the total export volume, and so to have significant data, the imposed condition was that each country’s share should be at least 0,1%. That is $\frac{\text{Portuguese exports to country x in 2016}}{\text{Total Portuguese exports in 2016}} \geq 0,1\%$ . As a result, fifty-two countries/regions were chosen.
Imports	Instituto Nacional de Estatística	Annual Portuguese imports value of goods and services, divided by destination country/region and economic activity, from 2005 to 2016.
Foreign direct investment	Portuguese Ministry of Economy	Both the foreign direct investment in Portugal and the Portuguese FDI abroad, from 1996 to 2011, by main economic activities.

Apparent labour productivity	Instituto Nacional de Estatística	Annual Portuguese value of the contribution of the labour factor, measured by the added gross value generated by each worker at service, divided by forty-two economic activities, from 2004 to 2016 and measured in euros.
Trade and development index	United Nations Conference on Trade and Development	Utilized to capture the institutional distance between countries. This index offers both an analytical framework and a quantitative suggestion to detect how well development and trade are cohesive and integrated in each studied country. It is grounded in three pillars: trade and development performance, trade policies and processes and structural and institutional context.
Cultural distance index	<a href="https://www.hofstede-insights.com/">https://www.hofstede-insights.com/</a>	Quantitative data for national culture, divided into six dimensions. This variable differentiates the “collective mental programming (...) which becomes crystallised in the institutions of a society” (Hofstede, 2010).
Number of Portuguese exporting companies	Instituto Nacional de Estatística	Annual data, from 2006 to 2016, divided by country/region trade partner.
Geographical distance	<a href="https://www.distancefromto.net/countries.php">https://www.distancefromto.net/countries.php</a>	The shortest distance, by air travel, between Lisbon and the capital of country/region trade partner.

**Appendix 4** - Description of the variables initially studied and compiled. Data for “apparent labour productivity” for the economic activities of Coal (including anthracite) and lignite, Crude oil and natural gas and Metal ores, for the “trade and development index” of Cape Verde, Gibraltar, Hong Kong, Luxembourg, Netherlands, Sao Tome and Principe and Taiwan, and for “cultural distance index” of Algeria, Gibraltar, Guinea Bissau, Sao Tome and Principe and Tunisia, is not available (even though I contacted all the suppliers of this information and asked for the missing figures), and therefore not included on the excel table.

Afterwards, I compiled and organized all the data I gathered into a single excel table, with 24 031 lines by 112 columns, and this activity took me an extensive portion of time.

Obviously, the potential of all this organized information for future researches is enormous. Please refer to Appendix 4 for some limitations of this dataset.

On a third stage, professor Emanuel and I decided that it would be interesting to focus the study on the relationship between FDI and productivity. So, and as I did not have the necessary amount of information, I contacted the Banco de Portugal, Instituto Nacional de Estatística, AICEP, European Union, Eurostat, OECD, World Bank, United Nations Conference on Trade and Development and the Portuguese Ministry of Economy, but none of these entities was able to provide me the data I needed. In the end, I only had figures from 2010 to 2017 (no information was available between 2005 and 2009), and for only twenty-five of the fifty-two chosen countries and regions (plus, for some of them there was no data for both kinds of FDI). Moreover, there were no statistics for all economic activities.

Therefore, I realized I would need to change the focus of the project and it was decided that the thesis should effort to try to explain the relationship between productivity and exports. At first, following a suggestion of professor Emanuel Gomes, I tried to gather data for exports and productivity by firm for all Portuguese companies, but, as I was informed by Banco de Portugal and Instituto Nacional de Estatística, that information is confidential and cannot be provided to the public. Consequently, it was determined that I was to do a macro-level project, utilizing figures by economic activity, instead of by firm. I already had all the data required to do so, but as a few months had passed I decided to look at Instituto Nacional de Estatística again to check if data for 2017 had been made available, and it had. In this way, I decided to re-do the table with all the relevant data, but as information for “exports” by economic activities had fewer categories I was left with figures from 2005 to 2017 and for the thirty-two economic activities presented in Appendix 5. Also, the utilized “export” data considered all the countries in the world, and exclusively countries, not regions.

<b>Economic activity designation</b>	<b>Name of the economic activity</b>
EA01	Products of agriculture, hunting and related services
EA02	Products of forestry, logging and related services
EA03	Fish and other fishing products and services incidental to fishing
EA04	Mining and quarrying <sup>2</sup>
EA05	Food products and beverages
EA06	Tobacco products
EA07	Textiles
EA08	Wearing apparel and furs
EA09	Leather and leather products
EA10	Wood and products of wood and cork (except furniture), and articles of straw and plaiting materials
EA11	Pulp, paper and paper products
EA12	Printed matter and recorded media
EA13	Coke, refined petroleum products and nuclear fuel
EA14	Chemicals, chemical products and man-made fibres
EA15	Rubber and plastic products
EA16	Other non-metallic mineral products
EA17	Basic metals
EA18	Fabricated metal products, except machinery and equipment
EA19	Machinery and equipment n.e.c.
EA20	Office machinery and computers
EA21	Electrical machinery and apparatus n.e.c.
EA22	Radio, television and communication equipment and apparatus
EA23	Medical, precision and optical instruments; watches and clocks
EA24	Motor vehicles, trailers and semi-trailers

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<sup>2</sup> Data for “apparent labour productivity” was only available as a broad economic activity of Mining and Quarrying, while in “exports” this economic activity was subdivided into the following ones: Coal and lignite, and peat; Crude petroleum and natural gas, and services incidental to oil and gas extraction, excluding surveying; Uranium and thorium ores; Metal ores; Other mining and quarrying products. To deal with this fact I added the values of exports of these five economic activities to be able to match the two aforementioned variables.

EA25	Other transport equipment
EA26	Furniture; other manufactured goods n.e.c.
EA27	Electrical energy, gas, steam and hot water
EA28	Computer and related services
EA29	Other business services
EA30	Sewage and refuse disposal services, sanitation and similar services
EA31	Recreational, cultural and sporting services
EA32	Other services

**Appendix 5** - Studied economic activities and respective designation.