

Regulatory costs and performance of Portuguese firms

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Abstract

This article studies the relations between firms' evaluation of nine domains of regulatory costs and two performance variables: labour productivity and export intensity. We use a representative micro-level database from a survey on Portuguese firms' perceptions of the regulatory framework in 2014 (Business Costs of Context Survey, IaCC) merged with balance sheet data. Although no causality is established, we find several statistically significant relations between firms' performance and their assessments of regulatory costs. For productivity, only obstacles related to "human resources" are identified as having a significant negative relation both in terms of the importance to firms' activity and the level of the barrier, while for export intensity the same result is observed for obstacles related with the "judicial system". The article examines in more detail the domain "barriers to internationalisation" showing that to consider these costs as important tends to be associated with lower productivity and higher export intensity. (JEL: D22, L51)

Introduction

The institutional setting of an economy, defined as existing legislation and its inherent costs, strongly impacts on the operation of firms in the different sectors of activity and on overall economic performance.¹ Nevertheless, regulatory costs are often neglected or misinterpreted in micro-level analysis. One reason is the relatively scarce firm-level information on the evaluation of regulatory costs. Another reason is the lack of a clear and consistent definition, as well as a practical and exhaustive typology of

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1. For a survey of the recent literature on the importance of institutions for cross-country differences in growth rates, see Lloyd and Lee (2016).

regulatory costs and their impacts. Figure 1 presents the main categories of regulatory costs, as suggested by the OECD (1997), and highlights that regulations affect virtually all agents in the economy, including the public sector and households. However, firms tend to concentrate most of the attention of the economic analysis of regulatory costs, due to their crucial role on the creation of employment and value added. The areas shaded in grey in Figure 1 correspond to different types of regulatory impacts on firms. Although specific types of regulations are not detailed in the diagram, it is straightforward to conclude that regulatory costs imposed on firms are quite diverse in nature, ranging from licensing procedures to the functioning of the judicial system, as well as labour market rules and ease of access to finance. The terminology used in the literature for the identification of such regulatory costs is diverse, including terms like “institutional costs”, “red tape costs”, “business environment” or “costs of doing business”.

The economic analysis of regulatory costs at the firm-level is typically carried out in two stages. The first step is to collect information on firms’ evaluation of the importance of the different regulatory costs. Given their diffuse nature, firms are typically unable to quantify the impacts of regulatory costs in monetary terms on their balance-sheet, but can qualitatively state their views in terms of the relative level of the different obstacles. Nevertheless, even this type of qualitative information is difficult to obtain for several reasons. Firstly, beyond the previously mentioned need for an adequate classification of regulatory costs, it is necessary to set a scale to measure their intensity. However, the responses of firms inevitably involve a subjective assessment. Two similar firms operating in the same regulatory environment may post different answers in a survey. Secondly, it might be the case that a firm evaluates the level of obstacles associated with a given regulatory cost as high but also considers that such obstacle does not interfere significantly on its performance. For example, a firm can answer in a survey that there are high obstacles in the judicial system, but it may acknowledge that this is not important to its activity because it has no pending cases in court or litigation is typically reduced in its business. Conversely, a firm may claim that a specific barrier to internationalisation is a mild regulatory obstacle but it is very important to its activity because it has a large export intensity. Therefore, it is necessary to combine these two dimensions of firms’ assessment: the *level of obstacles* in each domain and its *importance for firms’ activity*.

The second step of the analysis explores the relationship between firms’ qualitative assessments of regulatory costs and their performance. Most surveys that collect firms’ evaluations of regulatory costs do not contain information on performance indicators, such as productivity or participation in international trade. Therefore, such information must be merged from balance-sheet and income statement databases by means of a common firm identifier.

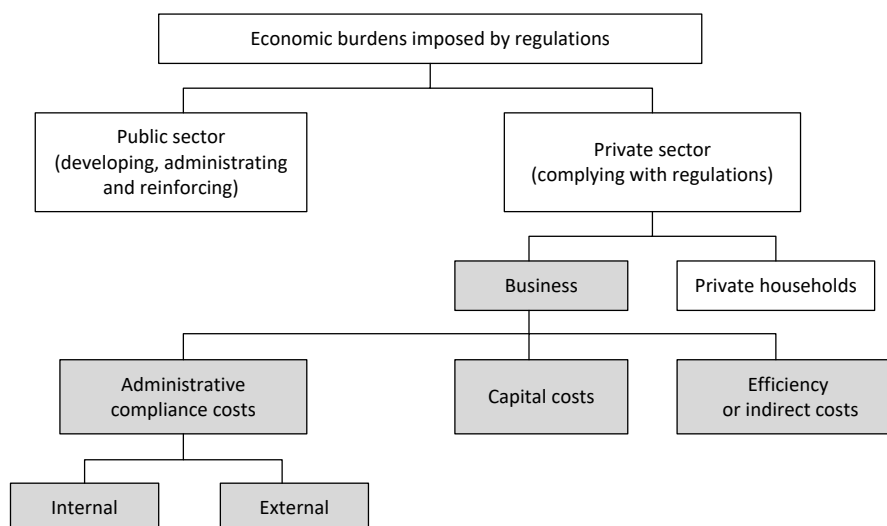


FIGURE 1: Main categories of regulatory costs

Source: OECD (1997), The OECD Report on Regulatory Reform.

In the methodological front, there are two additional points worth mentioning. Firstly, surveys often break down the assessment of a given area of regulatory costs along several questions, thus not providing a direct evaluation of each broad type of costs. In this case, it is necessary to aggregate multiple dimensions into a composite indicator. However, this procedure should go beyond a simple average of the individual answers, because each one of them can have a different information content relatively to the regulatory cost being studied. Secondly, endogeneity bias, mostly associated with simultaneous causality, makes it difficult to establish a robust causal effect of institutional constraints on firms' performance. Although it is more plausible that regulatory costs affect firms' performance than the reverse, some omitted variables may be the true drivers of both performance and assessment of regulatory costs.

In this article, we discuss the relation between several regulatory costs and two dimensions of firms' performance: labour productivity and export intensity. These two performance variables are also imperfect. Labour productivity does not account for the impact of capital, though the consideration of sector-specific effects can help reduce this problem. Nevertheless, high productivity can result from high prices emerging from low competition and not from efficiency in the utilisation of resources. In turn, export intensity does not necessarily relate with the creation of value added if the import content of production is high.

We use detailed data from the Business Costs of Context Survey (*Inquérito aos Custos de Contexto*, Portuguese acronym: IaCC) for 2014, a survey conducted by Statistics Portugal (INE), which is representative of the universe of Portuguese non-financial firms. The survey covers nine domains of regulatory costs ("starting activity", "licensing", "network industries", "financing", "judicial system", "tax system", "administrative burden", "barriers to internationalisation", "human resources") and comprises several questions on the current level of different obstacles within each domain. We apply methods of Item Response Theory (IRT) to aggregate the individual responses in each domain and obtain nine composite indicators (latent obstacle) of firms' evaluation of the level of obstacles associated with each regulatory cost. Additionally, the IaCC includes a complementary question on firms' assessment of the importance of each domain of regulatory costs to their activity.

The estimates show a negative link between firms' productivity and the perception of the importance of regulatory costs in the domains "starting activity", "administrative burden", "barriers to internationalisation", and "human resources". For export intensity, a negative relation is estimated for the importance of "starting activity", "licensing", and "judicial system". Moreover, the association of firms' labour productivity and export intensity with the level of latent obstacles tends to differ between firms that evaluate the domain of regulatory costs as important to their activity and those that do not. Finally, for productivity, only obstacles related to "human resources" are identified as having a significant and negative relation, while, for export intensity, the same result is observed for obstacles related to the "judicial system".

We also analyse in more detail the responses on the current level of obstacles comprised in the domain of "barriers to internationalisation". We find that firms evaluating this domain as important to their activity tend to have lower productivity and higher export intensity. Moreover, significant negative links of firms' export intensity with the level of obstacles are estimated mostly for firms that perceive this domain as important and for obstacles not related with international trade.

The article is organised as follows. The next section briefly overviews some of the literature on the impact of institutional quality on economic performance, presenting some results for Portugal from surveys carried out by international organisations. Afterwards, we present the databases used and the main aggregate results of the survey on regulatory costs in Portugal. The following section estimates the relations between firms' perceptions of the level of obstacles associated with each regulatory cost, the importance of respective domain to their activity and the outcome variables, detailing the domain "barriers to internationalisation". Finally, we offer some concluding remarks.

Related literature

International organisations regularly conduct surveys targeted at collecting firms' assessment of the strength of different types of regulatory costs. These surveys convey information that goes beyond that of regulatory indexes strictly based on legislation (as, for instance, OECD (2014)) as they also reflect firms' evaluation of the enforcement of such laws. However, the sample of firms surveyed is typically small and not representative of the universe of firms in the respective economy. Well-known examples of this type of surveys are those run by the World Economic Forum (e.g., World Economic Forum 2017) and the World Bank (e.g., World Bank 2018), which offer both cross-country and temporal perspectives.

The Global Competitiveness Index (GCI) of the World Economic Forum assesses the factors and institutions identified by theoretical and empirical research as drivers of productivity and sustainable growth. It tracks the performance of around 140 countries on 12 pillars of competitiveness over time.² There are a total of around 100 indicators in the index, derived from a combination of data from international organisations as well as from the World Economic Forum's Executive Opinion Survey. This survey, which is associated with the GCI, collects the opinions of business leaders on a broad range of topics for which alternative statistics are unreliable, outdated, or non-existent. Nevertheless, the number of respondents per country is limited: for Portugal, the number of business leaders that responded in 2016 and 2017 was 220 and 140, respectively. Respondents to the Executive Opinion Survey are asked every year to identify and rank the five most problematic factors for doing business in their country. The scores for Portugal, calculated on the basis of 2017 data, are presented Figure 2. The strongest obstacles identified are "government bureaucracy" and "tax rates".

The Doing Business (DB) report conducted by the World Bank since 2003 measures aspects of business regulation and their implications for firm establishment and operation, surveying areas that are of close responsibility of policy makers.³ At present, DB presents quantitative indicators on several business regulations that can be compared across 190 countries over time. The DB 2018 edition measures regulations affecting 11 broad areas and their indicators are used to analyse economic outcomes and to identify which past reforms have worked better. Figure 3 presents the distance to the frontier indicator (best practice) for some dimensions of the DB in Portugal during the last three years. The distance to the frontier is higher in terms of "access

2. See World Economic Forum (2017) for the 2017 edition of the Global Competitiveness Report and <http://reports.weforum.org/global-competitiveness-index-2017-2018/> for the historical data.

3. See World Bank (2018) for the 2018 edition of the Doing Business report and <http://www.doingbusiness.org> for the historical data.

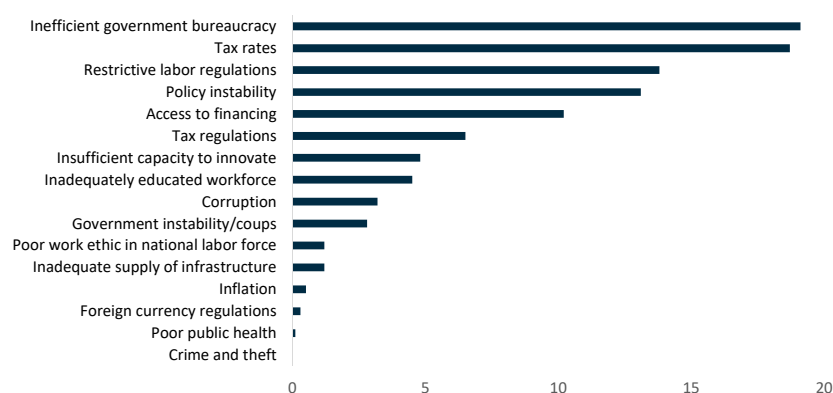


FIGURE 2: Most problematic factors for doing business, Portugal 2016-2017

Source: World Economic Forum, Executive Opinion Survey 2017.

Notes: From a list of 16 factors, respondents were asked to select the five most problematic for doing business in their country and rank them from 1 (most problematic) to 5. The results are then tabulated and weighted according to the ranking assigned by respondents. The score corresponds to the percentage of responses weighted according to their rankings.

to credit”, “protecting minority investors” and “enforcing contracts”, while Portugal is among the countries with best performance for “trading across borders”.

The Business Environment and Enterprise Performance Survey (BEEPS) is another extensive economic survey undertaken as a joint initiative of the World Bank and the European Bank for Reconstruction and Development, covering several countries of Eastern Europe and Central Asia.⁴ BEEPS surveys a sample of firms from the private sector and aims to understand firms’ perceptions of the environment in which they operate. BEEPS covers a broad range of areas including access to finance, corruption, infrastructure, crime, competition, and performance measures. Its findings can be used to help policy makers better understand the business environment that the private sector is facing and identify, prioritise and implement reforms of policies and institutions that support efficient private economic activity. This survey has been carried out in five rounds with the latest being 2012-2016.

The theoretical and empirical academic research on the role of institutions as drivers of long-run economic growth is vast and growing. There are several extensive reviews of the literature on institutions and growth, for instance Acemoglu *et al.* (2005), Porta *et al.* (2008), Leite *et al.* (2014), Ogilvie and Carus (2014) and Lloyd and Lee (2016).

4. See <https://ebrd-beeps.com> for details on the methodology and access to the data.

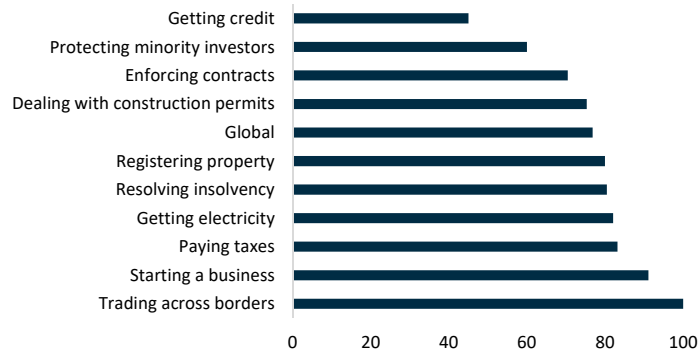


FIGURE 3: Distance to Frontier (DTF) on Doing Business (DB) topics, Portugal average 2015-2017

Source: World Bank.

Notes: The distance to frontier (DTF) measure shows the distance of each economy to the “frontier”, which represents the best performance observed on each of the indicators across all economies in the sample since 2005. An economy’s distance to frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier. For each of the 10 topics, the chart shows the simple average of each score as published in DB 2016, DB 2017, DB 2018 (scores refer to the previous year).

The micro-level empirical literature on the impact of regulatory costs on firms’ performance is more limited, mostly due to data limitations. Some works relate country-level indicators of national institutions to firms’ performance (e.g., Goedhuys and Srholec (2015) and Grosanu *et al.* (2015)), but the identification of causal effects is difficult in this framework. Other researchers examine the impact of various aspects of the business environment on firms’ performance using micro-level data on domestic institutions. Commander and Svejnar (2011) use cross-country firm-level data from the BEEPS survey to analyse the performance effects of ownership, competition, export orientation, and the institutional environment. They find little evidence of a robust link between managers’ perceived constraints on the business environment and firms’ revenues, as country fixed-effects largely absorb that impact. On the contrary, also using data from the BEEPS survey, Gorodnichenko and Schnitzer (2013) find unambiguous evidence that financial constraints negatively affect a firm’s innovation activities in non-OECD countries. Recently, the estimates of Bhaumik *et al.* (2018) show that there are large intra- and inter-country differences in the firm-level impact of institutional quality on performance, as measured by firms’ productivity. This evidence suggests that the one-size-fits-all approach to changes in legislation may not have the expected impact at the micro-level.

In the case of Portugal, Arnold and Barbosa (2015) provide empirical evidence on links between the productivity of Portuguese manufacturing

firms and a number of regulatory costs between 2006 and 2011. Their results suggest that firms' productivity is negatively affected by higher administrative requirements for starting a business, by a more extensive coverage of collective wage bargaining agreements, by higher taxes and tax compliance costs, and by the number of procedures required to enforce a contract. Branstetter *et al.* (2014) use matched employer–employee data to evaluate the effect of a regulatory reform that substantially reduced the cost of firm entry in Portugal.⁵ They find that entry deregulation had a positive effect on firm and job creation, but such impact was observed mostly among entrepreneurs who were near the margin in terms of the firm formation decision. In addition, these start-ups were smaller, headed by relatively inexperienced and poorly educated entrepreneurs, and operating primarily in low-technology sectors. In comparison to firms that entered in the absence of the reform, these marginal firms were also less likely to survive their first two years. Recently, Félix and Maggi (2019) use the same Portuguese entry deregulation reform as a natural experiment and conclude that the reform had a positive impact on firm entry and aggregate employment. They find that a substantial part of the increase in employment came from older incumbent firms expanding their size, in particular incumbents that were the most productive before the reform.

Domestic institutions can also have important effects on international trade. Nunn and Trefler (2014) review the literature on institutions as a source of comparative advantage, providing evidence that institutional sources are quantitatively as important as traditional sources of comparative advantage. In addition, they review the literature on the impact of international trade on domestic institutions, concluding that these impacts are strong.

Some of the recent empirical analysis on the link between institutions and international trade is based on the gravity model of trade. Álvarez *et al.* (2018) use a sectoral gravity equation to study the extent to which institutional quality affects aggregate and sectoral bilateral trade. They find that both the institutional conditions at destination and the institutional distance between exporting and importing countries are relevant for bilateral trade, confirming the hypothesis that it is easier to trade with partners with better institutions. A similar point is made by Gani and Scrimgeour (2016), which study exports of New Zealand to Asia. Martínez-Zarzoso and Márquez-Ramos (2019) use a gravity model of trade augmented with governance indicators to assess whether better governance facilitates the integration of the Middle East and North Africa (MENA) region into world trade. They show that improvements in five of the six governance indicators increase

5. In 2005, Portugal implemented the “On the Spot Firm” programme (*Empresa na Hora* in Portuguese) which established one-stop shops that simplified firm creation procedures. This reform significantly reduced administrative fees and the time delay of legal incorporation. See <http://www.empresanahora.mj.pt> for more details.

exports from MENA countries, whereas better governance in destination countries does not affect MENA exports. In addition, country-pair similarity in governance indicators has also a positive effect on exports of MENA countries. Söderlund and Tingvall (2014) use firm-level data on exports, combined with macro-data for countries, to investigate how institutional quality in destination countries affects Swedish exporting firms. Results show that weak institutions in recipient countries make exports to these countries less likely and characterised by relatively short duration and small volume.

Database and exploratory analysis

This article uses two firm-level databases merged through a unique firm identifier. The first database is the Integrated Enterprise Accounts System (*Sistema de Contas Integradas das Empresas*, Portuguese acronym: SCIE). This administrative database incorporates the Business Information Simplified (*Informação Empresarial Simplificada*, Portuguese acronym: IES), which includes annual balance sheet and income statement information, and is complemented with data for individual entrepreneurs and self-employed workers received from protocols established between Statistics Portugal (INE) and various bodies of the Ministry of Finance and Public Administration entities.

The second dataset corresponds to the responses of firms to the Business Costs of Context Survey (*Inquérito aos Custos de Contexto*, Portuguese acronym: IaCC) for 2014. INE (2015) provides an analysis of the main aggregate results and a detailed description of the methodology used in the survey. In 2018, INE published a second edition of the same survey (INE 2018) and the results of both vintages are very similar, as it will be shown below. In both editions of the IaCC, around five thousand non-financial firms were asked about their perceptions of the level of different regulatory obstacles. The IaCC is based on a stratified random sample by size-class (defined in terms of employment and turnover) and main sector of activity. Hence, the sample is representative of the structure of Portuguese non-financial firms. The stratification was made using 31 sectors and 4 dimension classes, resulting in 124 strata. For all firm-level regressions reported in the next section, we use weights based on ex-post sampling probabilities, in accordance with the design of the IaCC. More precisely, each firm is weighted according to the inverse of the probability that this observation was sampled using the weight of its stratum in terms of turnover.

The IaCC comprises several detailed questions on the levels of obstacles perceived by firms, which are organised into nine domains of regulatory costs: “starting activity”, “licensing”, “network industries”, “financing”, “judicial system”, “tax system”, “administrative burden”, “barriers to

internationalisation”, and “human resources”. There is also a complementary question on the importance of each of the nine domains to firms’ activity.

The questions on the current level of obstacles have a qualitative nature, expressed in a scale of response with 5 levels: 1 - not an obstacle; 2 - very reduced obstacle; 3 - reduced obstacle; 4 - high obstacle; 5 - very high obstacle. For each individual question in the survey, an aggregate indicator (the obstacle indicator) is computed as the weighted average of all firms’ responses along the 5 levels considered, thus ranging between 1 and 5. In addition, a composite indicator for each of the nine domains of regulatory costs is calculated as a simple average of the respective obstacle indicators. Finally, a global indicator is computed, taking into account the additional question that assesses the importance that firms assign to each of the nine areas of regulatory costs to their activity, as well as their weight in the corresponding stratum in terms of turnover. In fact, it can be the case that a firm assesses the *level of obstacles* in a given domain of regulatory costs as high, though, given its main activity or its characteristics, that domain is not *important for its activity*.

Figure 4 presents the composite indicators for each of the nine domains of regulatory costs in 2014 and 2017, as well as the global indicator. The latter indicator scored a value of 3.04 and 3.05 in 2014 and 2017, respectively, thus signalling an overall intermediate assessment of regulatory costs by Portuguese firms. In 2014, as for the domains of regulatory costs, the “judicial system” scores the highest composite index (3.7), followed by “licensing” and “tax system” (3.5 and 3.3, respectively).

The obstacle indicators for the 2014 and 2017 vintages of the IaCC are very similar (Figure 5). Therefore, although in the next section we use only information of the IaCC for 2014, the main results should hold for the most recent years. The linear correlation between the 2014 and 2017 obstacle indicators, measured by the Pearson correlation coefficient, is 99 per cent. This means that, from the perspective of firms, the underlying regulatory environment in Portugal has not changed in this period. However, it should be noted that a stable regulatory framework is sometimes beneficial. Firms face costs in adapting to new legislation, which may overturn the gains arising from changes in existing regulation.

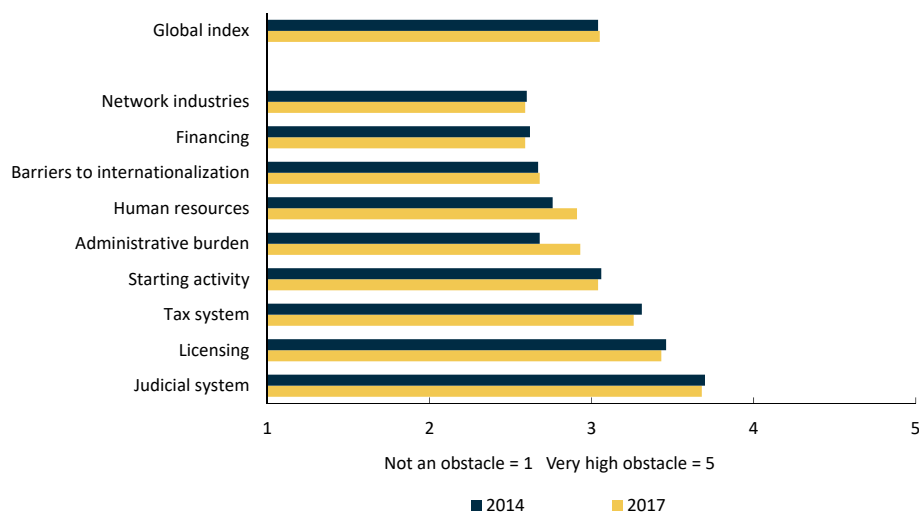


FIGURE 4: Composite indicators of the nine domains of regulatory costs in Portugal

Source: Statistics Portugal (INE).

Notes: The composite indicator for each of the nine domains of regulatory costs is computed as a simple average of the respective obstacle indicators. For more details, see INE (2015) and INE (2018).

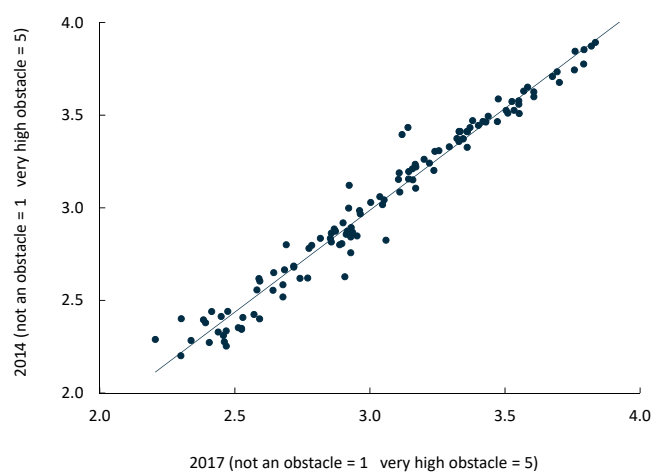


FIGURE 5: Correlation of the detailed obstacle indicators in 2014 and 2017

Source: Statistics Portugal (INE).

Notes: For each individual question in the survey, the obstacle indicator is computed as the weighted average of all firms' responses along the 5 levels considered, thus also ranging from 1 (not an obstacle) to 5 (very high obstacle). For more details, see INE (2015) and INE (2018).

Regulatory costs, labour productivity and export intensity

In this section, we move beyond the aggregate description of firms' evaluation of the regulatory environment in Portugal and link the individual responses of firms with two indicators of their performance, namely labour productivity and export intensity. Labour productivity is defined as gross value added per worker and export intensity equals the ratio of total exports of goods and services to turnover.

In the analysis, we pool information regarding firms' performance for several years (2010-2016). Although the IaCC refers to a specific moment and questions are asked in terms of firms' assessment of the obstacles in 2014, firms' performance cannot be correctly captured with information for a single year. For example, firms' turnover may not correspond to production carried out in that same year due to changes in inventories or breaks in the production process for reorganisation purposes. In addition, the relevance of exports for a firm's business is poorly assessed by data referring to a single year. For example, export intensity may be affected by specific shocks taking place in a destination market in a given year. Therefore, pooling information regarding firms' productivity and export intensity in different years offers a clearer picture of their performance. We consider the period 2010-2016, thus containing some years before and after the period that the survey refers to. Moreover, as mentioned above, in order to make the sample representative of the underlying population, for all the results reported below we use weights based on inverse sampling probabilities.

In the second part of this section, we detail a specific domain of regulatory costs, namely "barriers to internationalisation", and reassess its relation with firms' performance variables. The analysis of the several components of the regulatory costs associated with "barriers to internationalisation" is both an illustration of a more detailed analysis of the IaCC and it is important per se. In fact, it has been widely acknowledged that Portuguese growth prospects depend on an increased participation of firms in international markets. Therefore, knowing about firms' perceptions of "barriers to internationalisation" can be useful for policy purposes.

Nine domains of regulatory costs in Portugal

As previously mentioned, the structure of the IaCC comprises both several questions in each of the nine domains of regulatory costs and a complementary question on the importance of each domain to firms' activity. In order to associate the level of obstacles in each domain with firms' performance, we start by aggregating the answers of each firm in a composite variable using Item Response Theory (IRT). Most of the theoretical work on IRT originates in the fields of psychometrics and educational measurement, with seminal contributions by Rasch (1980) and Birnbaum (1968). In practice,

IRT is a method of analysing responses to tests or surveys with the goal of improving measurement accuracy and reliability. This methodology has been used extensively in the study of educational outcomes and household characteristics. The basic principle is that a composite variable can give a more reliable estimate of the quality being measured than any of the separate constituent variables. In our case, a firm's evaluation of the level of obstacles in a given domain of regulatory costs is better captured by the composite indicator (latent obstacle) than by the respective answers to each individual question in that domain. These methods improve upon the option of having, for instance, a simple average of the responses by each firm in each domain, while also accommodating cases of non-response and allowing for the weighting of observations.

We use an IRT procedure with a graded response model for ordered items and obtain the level of latent obstacle that is associated with each domain of regulatory costs for each firm. The distribution of the latent obstacle was standardised with mean zero and standard deviation equal to one. We drop observations for which all responses of a given domain are missing. In addition, in the "financing" domain, some of the questions are excluded from the IRT procedure due to the sparse number of responses.⁶

We implement also a partition of firms that corresponds to what they responded in the complementary question on the importance of each domain of regulatory costs to their activity. We group firms' responses to this question for each domain into two categories: "important", which corresponds to the two highest levels in the scale of answers (4 - important and 5 - very important); and "not important", corresponding to the remaining three levels (1 - not important, 2 - little importance and 3 - indifferent).

Figure 6 plots the kernel distributions of firms' labour productivity for each of the nine domains of regulatory costs, separating between firms whose level of latent obstacle stands above and below zero, which should be interpreted as the cases where the latent obstacle is perceived as high or low, respectively. In addition, the distributions include only firms in the category "important", hence comparing the distributions of labour productivity for firms whose latent obstacle is perceived as high and the regulatory cost is important to their activity with those for which the latent obstacle is perceived as low but the regulatory cost is also important. The reasoning for focusing the distributions on firms for which the regulatory cost is important drives from the presumption that the level of obstacles could have a higher association with performance for these firms.

6. We keep responses regarding obstacles in "short-term banking credit", "equity increase/shares issuance" and "government subsidies and support programs".

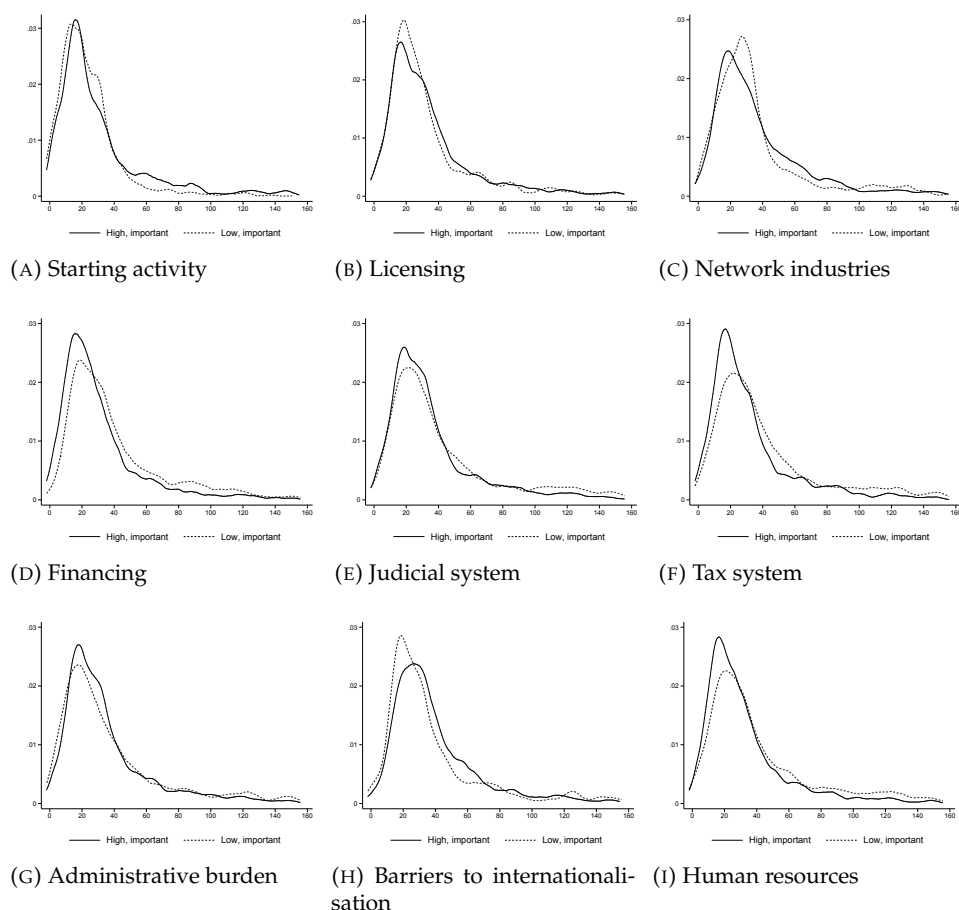


FIGURE 6: Labour productivity (2010-2016) and perception of regulatory costs (2014)

Notes: Labour productivity is gross value added over total employment in 1000 euros. The distributions exclude firms with productivity in the 5th and 95th percentiles. Kernel density estimates are weighted by inverse sampling probabilities. High refers to firms whose latent obstacle is positive, low refers to firms whose latent obstacle is negative, important refers to firms that evaluate the regulatory cost as important or very important to their activity. The latent obstacle associated with the level of obstacles in each domain of regulatory costs in 2014 is computed with an IRT graded response model.

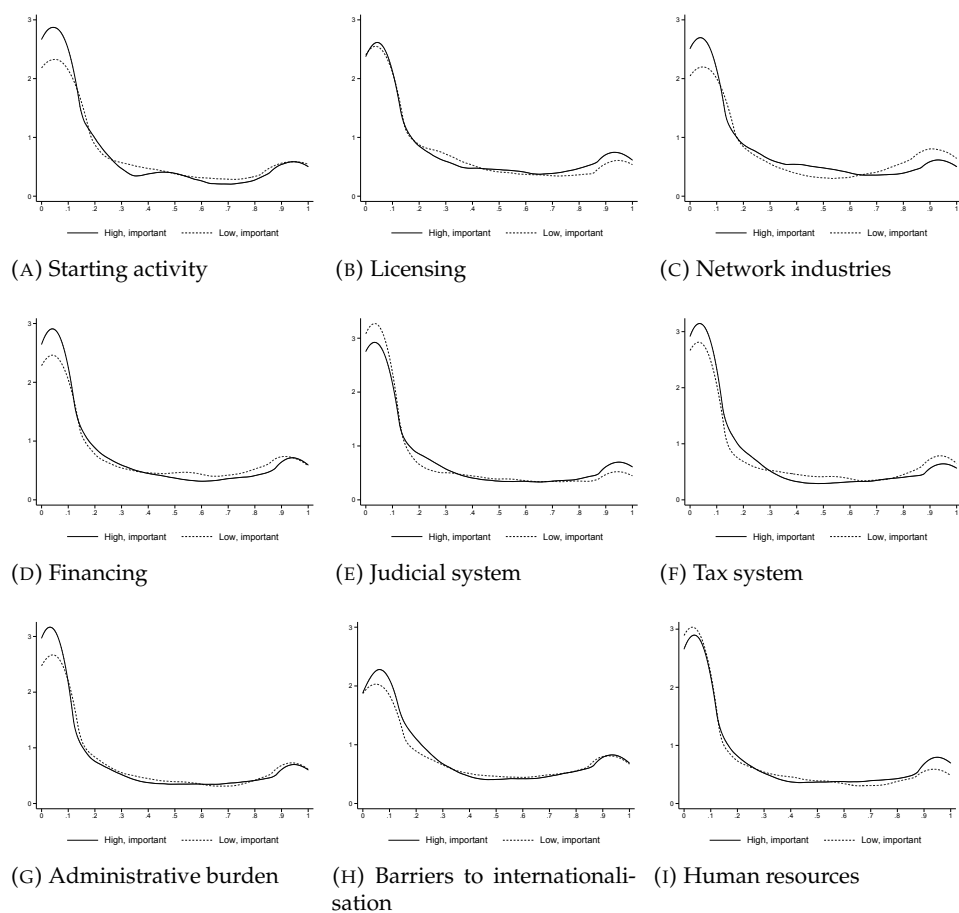


FIGURE 7: Export intensity (2010-2016) and perception of regulatory costs (2014)

Notes: Export intensity is total exports of services and goods over turnover. The distributions exclude firms with zero exports. Kernel density estimates are weighted by inverse sampling probabilities. High refers to firms whose latent obstacle is positive, low refers to firms whose latent obstacle is negative, important refers to firms that evaluate the regulatory cost as important or very important to their activity. The latent obstacle associated with the level of obstacles in each domain of regulatory costs in 2014 is computed with an IRT graded response model.

Although differences between the pairs of kernels in each panel of Figure 6 are not substantial, some facts stand out. For example, firms that assess the levels of obstacles in “judicial system” (panel E) as high and important are also those with a lower labour productivity. This could mean that more efficient firms are better equipped to deal with the judicial system. This result is clearer as regards the levels of obstacles associated with “financing” (panel D), “tax system” (panel F), and “human resources” (panel I). Conversely, for “barriers to internationalisation” (panel H), firms that consider the level of these obstacles as low are also those less productive. However, results in this domain should be read with some caution as the number of responding firms is smaller than in the other domains of regulatory costs. Around half of the firms considers this domain as “not applicable”, because they are not directly engaging nor trying to initiate international activities.

Figure 7 replicates the analysis described above for firms’ export intensity. Firms that assess “starting activity” (panel A) as a high obstacle are also those with relatively lower export intensities. This is also the case for “network industries” (panel C), “financing” (panel D), “tax system” (panel F), and “administrative burden” (panel G). On the contrary, firms that see obstacles in the “judicial system” (panel E) as low are also those with relatively lower export intensities. Finally, as regards “barriers to internationalisation” (panel H), the differences between distributions are small but there are more firms considering it a high obstacle amongst those with higher export intensities.

The simple visual comparison of pairs of kernel distributions for the different domains of regulatory costs, in the subset of firms that consider that type of regulatory costs as important for their activity, does not allow for a quantitative statistical assessment. Therefore, we run a set of descriptive regressions relating the regulatory obstacles with firms’ performance. The regression for each of the nine domains of regulatory costs is:

$$\log Y_{it} = \alpha + \beta_0 d_i + \beta_1 X_i + \beta_2 X_i * d_i + \gamma_j + \gamma_t + \varepsilon_{it}, \quad (1)$$

where Y_{it} is the dependent variable of interest (labour productivity in logs or export intensity) of firm i in year t from 2010 to 2016. d_i is a dummy variable that takes the value one for firms responding that the domain of regulatory costs is important or very important to their activity in 2014 and zero otherwise, i.e., firms in the “important” category. X_i is the IRT latent obstacle that is associated with the respective regulatory cost for firm i in 2014. The interaction term in the regression allows for the link of the latent obstacle with the performance variable to differ between firms that consider the domain as important to their activity and those that do not. Sector and time fixed effects are included in γ_j and γ_t , respectively. The control for the main sector of activity of the firm is defined at the *Classificação Portuguesa das Actividades Económicas* (CAE) 2-digit level, comprising 77 different sectors. ε_{it} is an error term robust to heteroscedasticity using the Huber-White variance estimator.

Table 1 reports the results for weighted least squares regressions of Equation (1) using sampling weights, with labour productivity as the dependent variable. The coefficients of the importance dummy variable, β_0 , measure the gap in average productivity levels between firms that consider the respective regulatory cost as important to their activity and those that do not, for a level of zero of the latent obstacle. For instance, the productivity gap between similar firms that differ only in their assessment of the importance of the regulatory cost to their activity is -18.78 per cent ($= 100 * (\exp(-0.208) - 1)$) in the case of “administrative burden” and -13.76 per cent for “barriers to internationalisation”, evaluated at zero-levels of the respective latent obstacles. For “starting activity” and “human resources”, the estimated coefficient is also negative, while the opposite happens for “network industries” and “tax system”. The coefficient of the latent obstacle, β_1 , is significant for all domains of regulatory costs except “licensing” and “barriers to internationalisation”. In all significant cases with the exception of “starting activity” and “administrative burden”, the coefficient is negative. This means that a higher level of the latent obstacle associates with lower average productivity for firms that do not consider the obstacle as important ($d_i = 0$). For example, an increase by one of the latent obstacle of “tax system” is associated with a decline of 15.63 per cent of the average productivity of firms that do not assess this regulatory cost as important.

	(1) Starting activity	(2) Licensing	(3) Network industries	(4) Financing	(5) Judicial system	(6) Tax system	(7) Administrative burden	(8) Barriers to internationalisation	(9) Human resources
Importance dummy (β_0)	-0.167*** (0.0380)	0.00892 (0.0325)	0.101*** (0.0308)	-0.0411 (0.0369)	0.0302 (0.0309)	0.227*** (0.0616)	-0.208*** (0.0447)	-0.148*** (0.0392)	-0.136*** (0.0478)
Latent obstacle (β_1)	0.0311* (0.0181)	0.00993 (0.0277)	-0.0388* (0.0227)	-0.0825*** (0.0281)	-0.0489** (0.0238)	-0.170*** (0.0402)	0.178*** (0.0281)	-0.0301 (0.0298)	-0.124*** (0.0389)
Interaction term (β_2)	0.0744** (0.0351)	0.0385 (0.0328)	0.0726** (0.0313)	-0.0663** (0.0311)	0.0142 (0.0301)	0.0526 (0.0428)	-0.171*** (0.0325)	0.0497 (0.0370)	0.000280 (0.0409)
Constant	9.728*** (0.0678)	9.676*** (0.0611)	9.579*** (0.0644)	9.614*** (0.0658)	9.691*** (0.0678)	9.472*** (0.0777)	9.838*** (0.0673)	9.872*** (0.0761)	9.757*** (0.0676)
Observations	13,507	18,047	15,012	18,831	18,211	22,888	22,724	10,888	21,925
R ²	0.385	0.444	0.458	0.380	0.412	0.368	0.404	0.355	0.386

TABLE 1. Labour productivity (2010-2016), regulatory costs and their importance (2014)

Notes: Results of weighted least squares regressions using inverse sampling probabilities as weights. The reported number of observations refers to the unweighted count. The dependent variable is labour productivity defined as gross value added over total employment, in logs, in 2010-2016. The nine domains of regulatory costs are reported in the column headings. The importance dummy takes the value one for firms responding that the domain of regulatory costs is important or very important to their activity in 2014 and zero otherwise. The latent obstacle associated with the level of obstacles in each domain of regulatory costs in 2014 is computed with an IRT graded response model. All regressions include 2-digit sector and year fixed-effects. See the main text for more details. Stars indicate significance levels of 1% (***), 5% (**) and 10% (*).

The coefficient of the interaction term, β_2 , captures the difference in the link of the level of the latent obstacle with productivity between firms that perceive the regulatory cost as important and those that do not. This coefficient is significant in four out of nine domains of regulatory costs. As for “starting activity” and “network industries” the coefficient is positive, while for “financing” and “administrative burden” it is negative. For example, in the case of “financing”, a unitary increase in the latent obstacle is associated with an decline in average productivity of 7.92 per cent for firms that do not assess this domain as important and 13.83 per cent ($= 100 * (\exp(-0.0825 - 0.0663) - 1)$) for similar firms that consider it important.

The domain “human resources” is the only one that presents negative and significant coefficients in both the importance dummy variable and the latent obstacle (coefficients β_0 and β_1). This means that, firstly, firms considering this dimension as important for their activity are comparatively less productive and that, secondly, the perception of stronger obstacles in aspects related to the labour market is also associated with lower average productivity. This result is compatible with the conclusion based on the kernels in panel I of Figure 6. Therefore, as acknowledged in the literature, regulations on hirings and firings, security and health in the workplace and firms’ access to specific competences and skills of workers seem to have a bearing on productivity. Although there have been substantial reforms in the Portuguese labour market legislation, there is still room for productivity enhancing reforms.

We replicate the analysis above using firms’ export intensity as the dependent variable and the results are included in Table 2. Overall, the number of statistically significant coefficients is lower than in the case of labour productivity.

	(1) Starting activity	(2) Licensing	(3) Network industries	(4) Financing	(5) Judicial system	(6) Tax system	(7) Administrative burden	(8) Barriers to international- alisation	(9) Human resources
Importance dummy (β_0)	-0.0311*** (0.00652)	-0.0308*** (0.00928)	0.00613 (0.00635)	0.00488 (0.00940)	-0.0186** (0.00895)	0.0304*** (0.00948)	-0.000608 (0.0112)	0.0656*** (0.0105)	-0.0171 (0.0124)
Latent obstacle (β_1)	0.0132** (0.00560)	0.0161** (0.00707)	0.00208 (0.00400)	0.00691 (0.00607)	-0.0185*** (0.00601)	-0.0414*** (0.0109)	0.00670 (0.00681)	-0.0139* (0.00739)	0.0168* (0.0102)
Interaction term (β_2)	-0.00838 (0.00696)	-0.0191** (0.00842)	-0.00751 (0.00627)	-0.00976 (0.00732)	0.0310*** (0.00781)	0.0387*** (0.0113)	-0.00340 (0.00788)	0.00158 (0.00938)	-0.0130 (0.0107)
Constant	0.0812*** (0.0128)	0.103*** (0.0141)	0.0861*** (0.0133)	0.0699*** (0.0142)	0.0863*** (0.0145)	0.0549*** (0.0140)	0.0843*** (0.0145)	0.153*** (0.0227)	0.0938*** (0.0151)
Observations	14,201	18,836	15,633	19,587	18,903	23,893	23,718	11,249	22,833
R ²	0.253	0.305	0.329	0.281	0.262	0.271	0.270	0.269	0.269

TABLE 2. Export intensity (2010-2016), regulatory costs and their importance (2014)

Notes: Results of weighted least squares regressions using inverse sampling probabilities as weights. The reported number of observations refers to the unweighted count. The dependent variable is export intensity defined as total exports of goods and services over turnover in 2010-2016. The nine domains of regulatory costs are reported in the column headings. The importance dummy takes the value one for firms responding that the domain of regulatory costs is important or very important to their activity in 2014 and zero otherwise. The latent obstacle associated with the level of obstacles in each domain of regulatory costs in 2014 is computed with an IRT graded response model. All regressions include 2-digit sector and year fixed-effects. See the main text for more details. Stars indicate significance levels of 1% (***), 5% (**) and 10% (*).

The estimated parameters for the importance dummy, β_0 , are negative for “starting activity”, “licensing”, and “judicial system”, and positive for “tax system” and “barriers to internationalisation”. For instance, in the latter domain, firms that report these barriers as important to their activity have a 6.56 percentage points (p.p.) higher average export intensity than similar firms that don’t, evaluated for the latent obstacle at a neutral level (zero).

The association between the level of the latent obstacle and the export intensity of firms that do not consider the respective regulatory cost as important is positive in three domains (“starting activity”, “licensing”, “human resources”) and negative in three other domains (“judicial system”, “tax system”, “barriers to internationalisation”). On the contrary, the estimates for the interaction term, β_2 , are positive for “judicial system” and “tax system” and negative for “licensing”. Considering the sum of the coefficients β_1 and β_2 , there are only two statistical significant relations between the level of the latent obstacle and export intensity for firms that state the regulatory domain as important to their activity. In the case of the “judicial system”, the sign of the link between the level of obstacles and export intensity differs in the two categories of firms: an unitary increase in the latent obstacle for firms that do not consider this cost as important is associated with a 1.85 p.p. decline in their average export intensity, while for similar firms that report it as important there is an increase of 1.25 p.p. ($= 100 * (-0.0185 + 0.0310)$). On the contrary for “barriers to internationalisation”, the relation is negative and significant for both categories of firms, meaning that irrespective of their assessment of the importance of this regulatory cost, a higher level of the latent obstacle is associated with lower export intensity.

As shown in Figure 4 of the previous section, among the composite indicators of the nine domains of regulatory costs, the main constraints to Portuguese firms’ are identified in the “judicial system”. The results of Table 2, with export intensity as the dependent variable, reveal that the domain “judicial system” is the only one that has significant and negative estimates for both the coefficients of the importance dummy variable, β_0 , and the level of the latent obstacle, β_1 . This suggests that judicial institutions may not only pose obstacles to firms’ domestic activities but can also be related to firms’ international operations. In fact, there is a growing body of literature that examines how judicial quality affects international trade. For instance, Levchenko (2007) and Nunn (2007) show that higher effectiveness and predictability of the judiciary system and better enforcement of contracts shift a country’s comparative advantage towards products that are more dependent on good judicial quality. Other empirical studies with firm-level data also show that judicial quality affects firms’ exports: Ma *et al.* (2010) and Wang *et al.* (2014) find that a good legal system significantly increases firms’ exports of goods for which relationship-specific investments are most important, i.e. goods that are contract-intensive.

The case of “barriers to internationalisation”

In this section, we detail the study of one of the domains of regulatory costs, “barriers to internationalisation”, as an illustration of a possible second layer of analysis within the IaCC. Moreover, the examination of this type of institutional cost is also relevant per se. In fact, it has been widely acknowledged that the internationalisation of Portuguese firms is a way of promoting the growth of the economy, while sustaining a balanced current account. Portuguese international trade in goods is regulated by the European Union (EU) Common Commercial Policy setting similar arrangements for imports from third countries, namely a customs tariff uniformly applied in all Member-States. Nevertheless, domestic regulations can affect other forms of participation of Portuguese firms in international markets and, also, the implementation of these common policies for trade in goods and services.

The questions on the current level of obstacles comprised in this domain of regulatory costs refer to the complexity of the procedures associated with eight distinct forms of internationalisation: “imports of goods - intra-EU”, “imports of goods - extra-EU”, “exports of goods - intra-EU”, “exports of goods - extra-EU”, “applications to international tenders”, “opening of establishments abroad”, “opening of subsidiaries abroad”, “applications for EU operational programs and funds”. As before, the responses to these questions are expressed in a scale from 1 to 5: 1 - not an obstacle; 2 - very reduced obstacle; 3 - reduced obstacle; 4 - high obstacle; 5 - very high obstacle.

Complementarily to what is done in the previous section, where the responses to these questions are aggregated to obtain the level of the latent obstacle associated with “barriers to internationalisation”, now the regressions consider firms’ answers to each question autonomously in the vector X_i of Equation (1). Apart from this difference, the specification of the regressions is the same, with d_i being a dummy variable that takes the value one for firms responding that the domain “barriers to internationalisation” is important or very important to their activity in 2014.

Table 3 presents the estimation results with labour productivity as the dependent variable, reporting each of the eight obstacles included in this domain in the column headings. In line with the results of the previous section, we find a negative relation between firms’ productivity and their assessment of the importance of the domain “barriers to internationalisation” to their activity for almost all questions considered. The only exception is “applications to international tenders”, where the coefficient of the importance dummy is not significant.

	(1) Imports intra-EU	(2) Imports extra-EU	(3) Exports intra-EU	(4) Exports extra-EU	(5) Applications international tenders	(6) Opening establish- ments abroad	(7) Opening subsidiaries abroad	(8) Applications EU programs and funds
Importance dummy (β_0)	-0.163* (0.0909)	-0.503*** (0.114)	-0.320*** (0.105)	-0.486*** (0.115)	-0.0941 (0.153)	-0.395** (0.154)	-0.572*** (0.139)	-0.227* (0.134)
Level of obstacle (β_1)	0.0290 (0.0319)	-0.121*** (0.0375)	-0.0850** (0.0362)	-0.111*** (0.0379)	0.123** (0.0528)	0.0653 (0.0508)	-0.0282 (0.0473)	0.0602 (0.0417)
Interaction term (β_2)	-0.00806 (0.0378)	0.118*** (0.0425)	0.0953** (0.0417)	0.148*** (0.0420)	-0.109* (0.0595)	-0.0115 (0.0565)	0.0824 (0.0535)	-0.0209 (0.0491)
Constant	9.799*** (0.101)	10.20*** (0.123)	9.995*** (0.118)	10.02*** (0.128)	9.705*** (0.174)	9.831*** (0.171)	10.02*** (0.162)	9.669*** (0.150)
Observations	9,906	8,735	9,216	8,566	4,828	4,413	4,424	6,281
R ²	0.376	0.378	0.389	0.348	0.450	0.455	0.456	0.399

TABLE 3. Labour productivity (2010-2016), level of obstacles to international activities and their importance (2014)

Notes: Results of weighted least squares regressions using inverse sampling probabilities as weights. The reported number of observations refers to the unweighted count. The dependent variable is labour productivity defined as gross value added over total employment, in logs, in 2010-2016. The eight obstacles included in the domain “barriers to internationalisation” are reported in the column headings. The importance dummy takes the value one for firms responding that the domain “barriers to internationalisation” is important or very important to their activity in 2014 and zero otherwise. The level of the obstacle refers to firms’ responses to each question in a scale from 1 (not an obstacle) to 5 (very high obstacle). All regressions include 2-digit sector and year fixed-effects. See the main text for more details. Stars indicate significance levels of 1% (***), 5% (**) and 10% (*).

In the previous section, we find no statistically significant relation between the level of the latent obstacle associated with “barriers to internationalisation” and firms’ productivity for either category of firms. However, the detailed estimates of Table 3 show significant links between productivity and some of the obstacles of this domain. Starting with firms that do not consider this domain as important to their activity, there is a negative relation between productivity and the level of obstacles in “imports extra-EU”, “exports intra-EU”, “exports extra-EU”, while for “applications to international tenders” the relation is positive. The results differ for firms that consider this domain as important: all significant coefficients associated with the interaction term have the opposite signs.

The results of a similar exercise for firms’ export intensity are presented in Table 4. Overall, the significant coefficients of the different variables are mostly concentrated in the obstacles not directly connected with international trade (columns 5 to 8). This points to some complementarity of the different forms of internationalisation of a firm, as there is a relation between firms’ export intensity and their assessment of obstacles related to foreign direct investment (FDI) and other international activities.

Starting with the estimates of the importance dummy, the significant coefficients are positive as found in the previous section, signalling that firms which consider “barriers to internationalisation” as important to their activity tend to be those with higher export intensities.

With the exception of “imports intra-EU”, there is no significant association between firms’ perception of the level of the different obstacles and their export intensity for firms that do not assess this domain as important. Looking at the estimated parameters of the interaction term, the link between average export intensity and the level of some obstacles is distinct for firms in the “important” category. In particular for the obstacles not related with international trade, namely “applications to international tenders”, “opening of establishments abroad”, “opening of subsidiaries abroad”, “applications for operational programs and EU funds”, there is a negative relationship with export intensity for firms that consider “barriers to internationalisation” as important to their activity. A plausible interpretation of this result is that firms that attribute importance to this domain of regulatory costs are those relatively more engaged in export activities, but a higher level of obstacles could possibly limit their export intensity.

	(1) Imports intra-EU	(2) Imports extra-EU	(3) Exports intra-EU	(4) Exports extra-EU	(5) Applications international tenders	(6) Opening establish- ments abroad	(7) Opening subsidiaries abroad	(8) Applications EU programs and funds
Importance dummy (β_0)	0.0255 (0.0252)	0.0544** (0.0272)	0.0367 (0.0312)	0.0658* (0.0348)	0.199*** (0.0365)	0.250*** (0.0404)	0.214*** (0.0406)	0.161*** (0.0343)
Level of obstacle (β_1)	-0.0185** (0.00903)	-0.00931 (0.00813)	-0.0137 (0.0117)	-0.00416 (0.0110)	0.00675 (0.0111)	0.0110 (0.00984)	0.0162 (0.00989)	-0.00199 (0.00851)
Interaction term (β_2)	0.0121 (0.0102)	0.00204 (0.00995)	-0.00511 (0.0128)	-0.00965 (0.0129)	-0.0419*** (0.0132)	-0.0525*** (0.0128)	-0.0446*** (0.0128)	-0.0354*** (0.0107)
Constant	0.194*** (0.0303)	0.177*** (0.0327)	0.268*** (0.0380)	0.153*** (0.0381)	0.0350 (0.0381)	0.0473 (0.0415)	0.0400 (0.0415)	0.135*** (0.0372)
Observations	10,177	8,961	9,442	8,779	4,987	4,557	4,571	6,531
R ²	0.283	0.276	0.280	0.259	0.259	0.280	0.269	0.317

TABLE 4. Export intensity (2010-2016), level of obstacles to international activities and their importance (2014)

Notes: Results of weighted least squares regressions using inverse sampling probabilities as weights. The reported number of observations refers to the unweighted count. The dependent variable is export intensity defined as total exports of goods and services over turnover in 2010-2016. The eight obstacles included in the domain “barriers to internationalisation” are reported in the column headings. The importance dummy takes the value one for firms responding that the domain “barriers to internationalisation” is important or very important to their activity in 2014 and zero otherwise. The level of the obstacle refers to firms’ responses to each question in a scale from 1 (not an obstacle) to 5 (very high obstacle). All regressions include 2-digit sector and year fixed-effects. See the main text for more details. Stars indicate significance levels of 1% (***), 5% (**) and 10% (*).

Concluding remarks

Regulatory costs exist in all economies and are perceived as a blockage to firms' performance. As regulatory costs impact on firms' decisions, policy makers should design legislation such that negative effects are minimised, while public objectives are achieved. Implementing the best international practices can be a good approach but only if they are adapted to the domestic reality. In addition, frequent changes in the institutional framework impose a burden on firms as they use resources in the adjustment process.

Micro-level studies on the relation between institutional costs and firms' performance are still relatively scarce and only rarely causal relations are established. In this article, we examine firms' responses to the Business Costs of Context Survey (IaCC) for 2014, a representative survey conducted by Statistics Portugal (INE) on nine domains of regulatory costs: "starting activity", "licensing", "network industries", "financing", "judicial system", "tax system", "administrative burden", "barriers to internationalisation" and "human resources". The survey includes several questions on the current level of different obstacles within each domain. We obtain the latent obstacle associated with the level of obstacles in a given domain of regulatory costs in 2014 applying an Item Response Theory (IRT) graded response model. In addition, the survey contains a complementary question on firms' evaluation of the importance of each of the nine domains of regulatory costs to their activity.

The IaCC complements other surveys that assess framework conditions and identifies the "judicial system", "licensing" and "tax system" as the three main regulatory barriers for Portuguese firms. The article provides a description of the relations between firms' evaluation of the different domains of regulatory costs and two performance variables, namely labour productivity and export intensity. The comparison of the kernel distributions of these two performance variables for different groups of firms classified according to their answers to the survey gives some initial indications on the association between regulatory costs and firms' performance. To complement this information, we estimate several descriptive regressions that relate both the level of latent obstacles and firms' perception of the importance of each domain with firms' labour productivity and export intensity.

We find a negative relation between firms' productivity and the evaluation of the importance of regulatory costs in the domains "starting activity", "administrative burden", "barriers to internationalisation" and "human resources". Regarding export intensity, a negative link is estimated for the importance of "starting activity", "licensing" and "judicial system". Moreover, the association of firms' labour productivity and export intensity with the level of latent obstacles tends to differ between firms that evaluate the domain of regulatory costs as important to their activity and those that do not. Finally, two domains of regulatory costs stand out in terms of the significant

negative relations estimated for both the importance for firms' activity and the level of the latent obstacle: "human resources" for labour productivity and "judicial system" for export intensity.

The article details the analysis in the domain "barriers to internationalisation", and finds that to consider these costs as important to firms' activity tends to be associated with lower productivity and higher export intensity. For export intensity, significant negative links with the level of obstacles are estimated mostly for firms that consider this domain as important and for obstacles not directly connected with international trade, namely FDI-related costs and those associated with applications to international tenders and programs.

Since the last economic and financial crisis, increased attention has been paid to productivity developments and obstacles to Portuguese potential growth. Although the accumulation and quality of inputs plays a major role in this process, the overall institutional framework is key. In this article, we show that there are aspects of regulatory costs that have a significant relation with firms' performance. However, evidence is still limited and further firm-level data and empirical research are necessary to better inform policy-decisions.

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