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Business Environment and Firm Performance in European Lagging Regions

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Abstract

This paper explores the relationship between the regional business environment, lagging regions, and firm performance in four European countries: Italy, Poland, Romania, and Spain. It combines firm-level data from Orbis measuring sales, employment, productivity, and profitability, with indicators from recently completed Subnational Doing Business studies in the four countries to examine if and how the business environment is associated with firm outcomes, and whether this is mediated by being located in a lagging region. The results indicate that firms located in regions with better business environments indeed display better performance, in employment and sales growth, as well as profitability. Moreover, the paper finds evidence that being located in a lagging region aggravates the impact of a poor business environment on firm performance. The results also highlight that it matters to distinguish between regions that are "low income" (relatively poor) and those that are "low growth" (stagnating but not necessarily poor). Firm performance, the business environment, and the relationship between the two are much stronger in the latter than in the former. Overall, the results suggest that policies that improve the business environment in lagging regions would be beneficial to the performance of firms in these regions, in growth, profitability, and investment.

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1. Introduction

European Union (EU) financial support channeled to subnational regions classified as 'lagging' economically takes various forms, including investments in physical infrastructure, addressing education and skills gaps, and institutional capacity building, as well as direct financing to promote innovation and small and medium enterprises (SMEs). EU support is designed to instigate a supply-side response. Specifically, it is intended that the private sector will increase investment and employment, enabling the regional economy to catch up with other European regions. Helping lagging regions catch up (i.e., converge to the EU average) is essential to prevent long-run structural economic fragmentation and maintain cohesion within the European Union (e.g., World Bank, 2017). Yet, spatially-targeted incentives to lagging regions have had only limited impact, at great fiscal cost (e.g., Carvalho, Lall, and Timmins 2006; Devereux, Griffith, and Simpson 2007; Deichmann et al. 2008). Even the more comprehensive support provided through Structural Funds has had a mixed record in promoting efficient and sustainable patterns of private investment and job creation (Midelfart-Knarvik and Overman, 2002; Fiaschi, Lavezzi and Parenti; 2011; Mohl and Hagen, 2011). The challenge of lagging regions is well acknowledged by the European Commission, to the extent that in June 2015 the Commissioner for Regional Policy, Corina Creţu, launched an initiative to examine the factors that hold back growth and investment in the low-income and low-growth regions of the EU (the 'lagging regions').[3]

There are many reasons why the private sector in lagging regions may be less likely to invest, grow, and create jobs. For firms serving local markets, which is still the majority of private enterprises, lagging regions may be inherently less able to sustain high-growth firms, as limitations on market size, growth, and margins, are likely to restrict the potential for firms to reap economies of scale or exploit sources of value addition. The fact that lagging regions are often less economically dense than non-lagging regions also means that firms are less likely to be able to exploit sources of agglomeration for productivity growth. And the more productive firms may in any case select to locate in core regions (Baldwin and Okubo, 2006). Lack of market scale and economic density may also result in a relatively weak competitive environment that undermines a firm's incentive to invest in building capabilities to sustain productivity growth.[4] Finally, in regions with several of the above characteristics, coordination failures may be a significant barrier to private investment. Given increasing returns to scale from access to inputs, skills, and infrastructure, individual firms may be unwilling to invest without the expectation that others, including firms, workers, and government, will also do so. Finally, the business environment may penalize firms located in lagging regions. The business environment at the *national level* is a well-documented factor of growth, and if the business environment was a significant determinant of the effectiveness of allocated funds, this may imply refined policy interventions.

But the relationship between the business environment and firm performance at the *subnational level* has received considerably less attention, in part because the subnational business climate has traditionally been viewed as having less of an impact on firms. Theoretically, firms are expected to be more mobile within a country than they are internationally, and so constraints in the business environment at the local level are likely to be less binding, at least on aggregate national outcomes. However, in practice, firms are much less footloose, particularly those serving local markets, which

[3] See http://ec.europa.eu/regional_policy/fr/policy/how/improving-investment/lagging_regions/. Also, Commissioner Corina Crețu's blog, June 2015, "Bringing Europe's 'lagging regions' up to speed."

[4] The other side of the story is that lower competition would give incumbent firms substantial market advantage, which may give them an incentive to invest and grow even in the absence of being competitive.

account for the large majority of all firms. Moreover, while many of the regulations and policies that make up the so-called 'business environment' are – from a *de jure* perspective – nationally determined and thus uniform across the country, their impact may vary significantly across regions, for several reasons. First, the implementation of national regulations may vary significantly across regions, both due to differing interpretations of laws and regulations as well as differing capacities (and incentives) of local authorities responsible for implementation. Second, even with no variation in regulations or their implementation, national regulations will affect regions differently. For example, it has been shown that product market regulations in the wholesale and retail trade sector impact productivity growth more negatively in lagging regions (European Commission, 2017).

Another reason why research on the impact of the regional business environment has received less attention is because of limited availability of data on both the regulatory environment and firm performance. That said, several authors exploit uniquely available data and, typically, unique policy situations that allow for analyzing a natural experiment at the local level. For example, Bertrand and Kramarz (2002) assess how zoning regulation on retailers impacts local employment growth in France. And Bruhn (2008) exploits a time-varying municipality-level rollout of business registration reforms in Mexico to assess their impact on firm entry and employment growth. More recently, Bianco and Bripi (2013) take a similar approach to look at the regional impact of business registration reforms in Italy.

In this paper, we explore the relationship between the regional business environment, lagging regions, and firm performance in four countries, namely Italy, Poland, Romania and Spain. In fact, the European Commission – DG REGIO defines two types of lagging regions: i) 'low income lagging regions': regions of new entrant countries with GDP per capita below 50 percent of the EU average [most of the regions in Poland and Romania]; and ii) 'low growth lagging regions': regions of long-standing members where GDP per capita is below 90 percent of EU28 average, and have not converged towards EU average over the past decade [some regions in Italy and Spain]. Arguably, only the latter regional type conforms to the generally understood definition of 'lagging.'[5] The analysis builds on an innovative data set of *Subnational Doing Business* (SDB) indicators produced by the World Bank. This paper focuses on three SDB indicators that provide an objective assessment of the quality of the business environment, namely: the number of days to start a business; the number of days to obtain construction permits; and, the number of days to settle commercial disputes through courts. The three indicators are constructed for regions in Italy, Poland, Spain, and Romania. For identification purpose, it is important that each of these countries includes both lagging and non-lagging regions. We combine SDB regional indicators with micro-firm financial data obtained from Bureau Van Dijk's *Orbis* – a comprehensive database of financial statements of companies worldwide. We focus on four firm performance measures, namely: sales growth; employment growth; return on assets; and productivity growth.

This paper aims to answer four research questions:

1. *Do firms perform worse in lagging regions?* The hypothesis is that firms underperform both at the extensive margin (entry-exit) and the intensive margin (incumbent growth), at least in low growth lagging regions. In this paper, we test only relationships at the intensive margin because we could not rely sufficiently on entry-exit information in Orbis to conduct tests of the extensive margin relationship. We construct two separate samples of firms that reflect 'lagging' definitions.

[5] The Merriam-Webster dictionary defines "to lag" as: i) to stay or fall behind; ii) to move, function, or develop with comparative slowness; to become retarded in attaining maximum value.

We find that firms located in lagging regions perform worse than those in non-lagging regions in Italy and Spain, but this is not the case in Poland and Romania. The result is consistent with the definitions of lagging regions in Poland and Romania [wealth based] and in Italy and Spain [wealth *and* growth].

2. *Is the business environment worse in lagging regions?* Again, the hypothesis of this paper is that the business environment is a bigger constraint in lagging regions, either because it is measurably worse or because constraints have a relatively bigger impact on lagging regions (see research question 4).

   We find that the distance to the best business environment within the country is substantially higher in lagging regions in Italy and Spain, showing that lagging regions have a poorer business environment. Instead variations in business environment are far smaller in Romania and Poland; and lagging regions may actually display better business environments (Poland). Regional business environments in Poland and Romania are thus more homogeneous; and there is no apparent link between lagging and business environment.

3. *Does the regional business environment have a significant impact on firm performance? And what aspects of the business environment matter most?* The hypothesis is that, overall, the regional business environment has a significant impact on firm performance; yet there are no expectations at the outset as to which of the business environment features has a higher impact on firms' performance.

   We find that firms located in regions with higher business environments indeed display better performance, in terms of employment and sales growth, as well as profitability. Therefore, like national-level business environments, enhanced business environments support the growth and profitability of firms.

4. *Are business environment constraints aggravated in a lagging-region setting?* As noted in research question 2, the hypothesis is that lagging regions may face other constraints (e.g. weaker institutions) that exacerbate the impact of business climate constraints on firm performance.

   We find that the business environment affects firm performance in general, and to various degrees further penalize firms located in lagging regions. In Italy and Spain, the business environment appears to be a better indicator of firm performance than being located in a lagging region for growth and productivity parameters, while profitability is worsened by the lagging region location. In Poland and Romania, poorer business environments worsen the impact of a lagging region on profitability and investments.

Overall the results suggest that policies that improve the business environment in lagging regions would be beneficial to the performance of firms in these regions, in terms of both growth and profitability. The results also highlight that it matters to distinguish between 'low income' and 'low growth' lagging regions. In 'low growth' defined lagging regions (Italy and Spain), firms perform clearly worse than firms outside lagging regions. In 'low income' defined lagging regions (Poland and Romania), the relationship between lagging and performance is mitigated. In fact, firms in both low- and high-income regions appear to be impacted similarly by the business environment.

By looking specifically at the regional business environment, our work contributes to the literature on the impact of the business environment on the firm ecosystem. At the national level, the business environment has been well documented as a constraint to firm performance. In fact, beyond market

and coordination failures, government failures – both of omission and commission – represent a barrier restricting firms from investing in growth and job creation. The World Bank's Doing Business Report (World Bank, 2017) highlights that "*enabling growth… requires an environment where* ***new entrants with drive and good ideas can get started in business and where good firms can invest and expand***." (emphasis added). Also, a large body of research highlights the impact of business regulation and the wider business and investment climate on firm entry, investment, and growth, and on wider economic outcomes (e.g., Djankov et al, 2002; Bastos and Nasir, 2004; Klapper et al, 2006; Sharma, 2009; Aterido and Hallward-Driemeier, 2010; Aterido, Hallward-Driemeier, and Pages, 2011; Commander and Svejnar, 2011).

The remainder of the paper is organized as follows: Section 2 describes the data used in the analysis; Sections 3-6 summarize the results of each of the four research questions outlined above; Section 7 concludes briefly and discusses potential further research.

2. Data

The analysis presented in this paper draws on two primary data sources: Bureau Van Dijk's *Orbis* firm-level data set for measures of firm performance, and the *Subnational Doing Business* (SBD) produced by the World Bank, which reports the business environment at regional (NUTS 2) level.

a. Firm-Level Data

We extract information about firms from Orbis, published by Bureau van Dijk. The Orbis database is a comprehensive database containing main accounting lines, including income statements and balance sheets, from ca. 17 million non-financial companies across Europe,[6] the vast majority of which are private. Orbis also reports the identity, type (sector), and address of the firms. Even though very rare, firms may have a country of residence that is different from the one in which they are registered. We select countries based on the country of registration of the firm.

We select all companies reporting at least 10 employees at least once in the period 2008-2013, excluding financial and insurance companies (2-digits NACE Rev. 2 sectors 64-66). We require companies to report total assets at least one time in the period of interest. Orbis provides a separate, so-called 'global format industrial template' for these companies. One concern with the firm sample is that Orbis data may skew towards larger firms since these firms are more likely to provide information to the Chambers of Commerce, from whom Bureau van Djik collects the firm data. We use the address of the company for its location, and retain all those in the regions where we have the SDB indicators.

Table 1 reports the average number of firms by country in our sample, and compares with the numbers reported in Eurostat's *Structural Business Statistics*. Our sample includes an annual average of about 123,000 firms in both Spain and Italy, about 55,000 in Poland, and nearly 50,000 in Romania (see Table 1). Orbis coverage varies by country: 58 percent in Poland: 63 percent in Italy; 83 percent in Spain; and 89 percent in Romania.[7] A bigger concern may be the fact that coverage varies significantly across regions within countries. Annex 1 provides firm coverage in each NUTS-2 region: in Spain from a low of 44 percent in Aragon to 100 percent in the Balearic Islands (although only 5 of 19 regions have coverage

[6] The Orbis data set is a global data set, but for the purposes of this paper we use the European subset of overall Orbis data set and draw on observations only from Italy, Poland, Romania, and Spain.
[7] Kalemli-Ozcan et al. (2015) also show that the Orbis data has a good coverage of firms in Italy, Romania and Spain.

below 80 percent); in Italy from a low of 47 percent in Trento to a high of 75 percent in Lombardia; in Poland from a low of 44 percent in Lodzkie to a high of 75 percent in Mazowieckie (by far the largest region); and in Romania from a low of 82 percent in Bucharest-Ilfov to a high of 95 percent in West. Notice that we did not adjust the sample four our tests. Notice that we did not find systematic differences in terms of coverage between lagging and on-lagging regions.

Table 1: Average number of firms by country in Eurostat and Orbis, period 2008-2013.

	Number of firms with at least 10 employees		
	Eurostat	Orbis	*Coverage*
Spain	148,138	123,398	*83%*
Italy	181,755	123,179	*68%*
Poland	96,834	55,832	*58%*
Romania	55,173	48,969	*89%*

Note: This table reports the average number of firms in Eurostat and in our Orbis sample, firms with at least 10 employees, years 2008-2013. Last column reports the coverage ratio of Orbis.

For the analysis, we focus only on manufacturing firms to ensure better comparability across firms, and exclude firms selling local non-tradables.[8] Our sample includes only firms with at least 10 employees at any point over the period, to exclude microenterprises. In the main specifications, we also include only firms that were established prior to 2006 to ensure comparability – i.e. all firms are incumbents. The focus on incumbents also allows us to avoid any endogeneity issue in the estimation, which can arise when good firms locate in better regions. However, it is important to recognize an important limitation in the analysis is that, whether or not we look at new or incumbent firms, with this approach we are still restricted to understanding how the business environment affects *existing, individual* firms rather than how it affects the performance of the aggregate enterprise sector. So, arguably we may be measuring the performance of the set of firms that manage to establish and survive in whatever business environment is present in the region.[9] The implication would not mean firm performance is biased upward, but that differences in performance are likely to be narrowed, potentially lowering the significance of the results.

Table 2 summarizes the main variables from Orbis used in the analysis of firm performance. The analysis focuses on measures of *growth* performance (sales and employment growth, and fixed assets investment) and of *operational* performance (productivity growth and return on assets [ROA]), which together would indicate competitiveness and sustainability (i.e. evidence that firms are expanding). We measure all performance results as the average of the prior three years, in order to smooth annual fluctuations. Fixed assets include tangible and intangible assets since firms may invest in both in order to grow.

Table 2: Firm variables from Orbis

Variable	Description
Growth Performance	
Employment Growth	Three year average of Growth in Number of Employees (%)
Sales Growth	Three year average of Growth in Sales(%)

[8] The analysis was also run with the full data set, including services firms, and show directionally similar results to what is reported for manufacturing firms in this paper. Results are available from the authors.

[9] To paraphrase Hausmann (2008) we risk being guilty of studying the camels in the desert and not the hippos.

Variable	Description
Investment Rate	Three year average of Investment Rate; Investment rate = Growth in Fixed Assets + Depreciation & Amortization; Fixed Assets = Total Fixed assets, incl. tangible and intangible assets.
Operational Performance	
ROA	Three year average of Return on Assets = Earnings Before Interests and Taxes (EBIT)/Total Assets (%)
Productivity Growth	Three year average of Growth in log(Productivity) = $\log(\text{Productivity})_t - \log(\text{Productivity})_{t-1}$; Productivity = Sales / Employment
Explanatory Variables	
Assets	Total Assets (million euros)
Capital intensive	Total Fixed assets / Employment
Year	Year of report
Nuts2_c	Firm location, region fixed effects
Age	Natural logarithm of firm's age in years
Young	Dummy that equals one if the firm is less than six years old
Industry	2 digit NACE Rev. 2 code

Notes: This table provides the definitions of the variables used in the analysis. Dependent variables are growth and operational performance indicators. Explanatory variables are independent variables.

b. The Subnational Doing Business data

Data on the regional business environment come from the World Bank's *Subnational Doing Business* (SDB) which reports in four European countries with lagging regions: Italy (2013), Spain (2015), Poland (2015), and Romania (2017).[10] In line with the national-level Doing Business reports, SDB provides an objective measure of business regulations and their enforcement through detailed gathering and analysis of qualitative information across a range of dimensions that shape the business environment faced by the firms. Each indicator covered in SDB provides a set of measures, typically on the steps (procedures), time, and cost to comply with regulations. These measures are comparable across locations,[11] allowing for ranking and assessing the distance of each location from the 'global frontier' (the top-performing location). This paper focuses only on the time measurement (number of days) associated with each variable, as it tends to have the most variation across locations for all indicators, and also because it is expected to have the biggest impact on firms' investment and expansion behavior.

While national-level Doing Business reports cover 11 indicators,[12] SDB reports are more restricted in their coverage of the business environment, in part because not all indicators have sufficient variability at the local level. The focus for SDB is on indicators that measure the complexity and cost of regulatory processes affecting three stages in the life of a small-to-medium–size domestic firm: *starting a business*, *dealing with construction permits*, and *registering property*. It also benchmarks the strength of legal institutions across the country by measuring *enforcing a commercial contract* before a local court.[13]

[10] With funding from the European Commission, *Subnational Doing Business* studies were completed in Bulgaria and Hungary in parallel with the study in Romania in 2017. However, uncertainty about the timing of the results, they were not included in this analysis. Additional studies are planned for Portugal, Czech Republic, the Slovak Republic, and Croatia in 2018-2019.

[11] At the national level, 190 countries were included in the 2017 DB report

[12] Starting a business, dealing with construction permits, getting electricity, registering property, getting credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, resolving insolvency, and labor regulation (this last one is not included in the ranking).

[13] In some Subnational DB reports, trading across borders and / or getting electricity is also covered.

Table 3 provides a summary of these measures and their availability across the countries covered in this paper. Note that while the indicator *registering a property* was available across all countries, we did not use it in the analysis due to limited variation within some countries.

Table 3: Key business environment variables from Subnational Doing Business

Concept / Indicator	Description / Motivation	Country coverage			
		Italy	Spain	Poland	Romania
Starting a business	Procedures, time, cost and paid-in minimum capital to start a limited liability company; shown to increase firm formalization, entry, and profits (Motta, Oviedo and Santini, 2010; Klapper and Love, 2010; Fritsch and Noseleit, 2013).	✓	✓	✓	✓
Dealing with construction permits	Procedures, time and cost to complete all formalities to build a warehouse and the quality control and safety mechanisms in the construction permitting system; proxy for regulations impacting investment for growth.	✓	✓	✓	✓
Registering a property	Procedures, time and cost to transfer a property and the quality of the land administration system; property owners with registered titles shown to be more likely to invest and have a higher likelihood of getting credit (Galiani and Schargrodsky, 2009).	✓	✓	✓	✓
Enforcing contracts	Time and cost to resolve a commercial dispute and the quality of judicial processes; associated with more rapid growth of small firms (Islam, 2003) higher investment and higher innovation (Esposito, Lanau and Pompe 2014), and higher participation in value chains (Cattaneo et al, 2013).	✓		✓	✓

SDB collects data at the city-level, typically covering the primary and secondary cities across the country – in Italy, the report covers 13 cities across 13 regions; in Spain, 17 autonomous communities and 2 autonomous cities across 19 regions; in Poland, 18 cities in 16 voivoideships (provinces); and in Romania, 9 cities in 8 regions. These cities were then mapped to their corresponding NUTS-2 level region for the analysis. In two regions in Poland and one region in Romania, more than one city was covered in the Subnational DB.[14] For these regions, we created new indicators based on the simple average between the two reported city results. The list of cities and mapping to regions is provided in Annex 2.

[14] In Romania, Cluj-Napoca and Oradea in North West region; in Poland Bydgoszcz and Torun in Kujawsko-Pomorskie, and Gorzów Wielkopolski and Zielona Góra in Lubuskie.

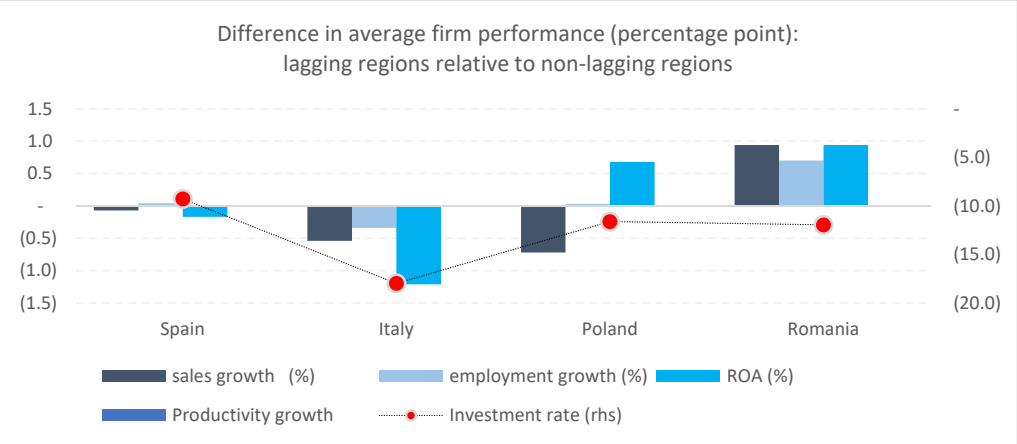
Finally, the data from SDB are available only for the single year in which they have been collected. This has important limitations for the analysis presented in this paper. First, because we run only cross-sectional regressions, the results show only correlation; we are unable to claim any causality. So, while we argue that the business environment impacts firm performance, it may also (or alternatively) be the case that firm performance impacts the business environment. This may be the case, for example, if well-performing firms were more likely to demand efficient service from their local authorities. Perhaps a more important limitation is the fact that with most of the regions we are measuring firm performance over a longer, and critically in an earlier, period than we are measuring the business environment. One might imagine that there should be some lag between the business environment a firm faces and their performance in terms of growth and investment (if not necessarily productivity). Thus, if we measured performance by looking at a 3-year average of 2013-15, we would ideally want business environment measured prior to 2013. We get around this problem somewhat by focusing the analysis only across regions *within* countries. Still, in the absence of data from earlier years (except in Italy where the data come from 2013), we are forced to make the assumption that the relative differences in the business environment across regions within each country have remained stable. Besides we are not aware of any major reforms in these countries in the period of study so that it is unlikely that the business environment variables we consider have varied substantially.

3. Do firms perform worse in lagging regions?

In this section we compare the performance of firms located in lagging regions versus those located in non-lagging regions across Italy, Spain, Poland, and Romania. At this stage we are not considering the business environment but simply assessing whether there is an association between firm location and firm performance. Annex 3 provides details of country-level results and differences between lagging and non-lagging regions across the main performance variables. Figure 1 provides an illustrative summary of how firm performance differs across region types in each country. This is a simple difference in averages of single year observations with no firm, sector, or year controls.

Two results stand out in Figure 1. First, there are differences between the 'low growth' (Italy and Spain) and the 'low income' (Poland and Romania) regions. In Spain and Italy, firms in lagging regions have lower performance across all performance variables, while in Poland and Romania, firms in lagging regions outperform those in non-lagging regions across many variables. This difference in performance of lagging region types is, perhaps, unsurprising, as 'low growth' regions by definition are operating in an environment where the regional economy of the lagging regions is growing more slowly than that of the non-lagging regions. By contrast, firms in 'low income' regions are operating in an environment where income is lower but where growth is higher.

Figure 1: Comparison of average firm performance in lagging versus non-lagging regions



Note: This table reports the difference by country in the average of each firms' performance indicators, between lagging and non-lagging regions. Sales growth, employment growth, and ROA uses the left-hand scale; Investment rate uses the right-hand scale. Authors calculations based on data from Orbis. Notice that differences in productivity growth are close to zero across all countries

Second, there is a stark underperformance of lagging regions across all countries in the investment rate of firms: 9.3 percentage points lower in Spain; 11.6 percentage points in Poland; 12.0 in Romania; and 18 percentage points lower in Italy. This may well be explained in part by differences in sectoral structure, whereby the enterprise environment of lagging regions is comprised more of smaller, less asset-intensive firms. In fact, the Orbis data indicate that this is exactly the case. Data from the sample indicate that the total asset value of firms in non-lagging regions in Spain is 68 percent larger than firms in lagging regions; in Italy, 82 percent larger; and in Romania, 124 percent larger; while in Poland, it is only 38 percent larger.

Table 4 presents the results of a regression on firm performance variables comparing firms located in lagging regions versus those in non-lagging regions. Given the findings from Figure 1 on the significant differences between 'low growth' and 'low income' regions, we split the sample to show results for the two types of regions separately. The regression uses observations that take the latest 3-year average (2011-13) across all dependent variables to smooth annual fluctuations. Control variables are lagged by 3 years – these include regional, sector (NACE Rev. 2 – 2-digit), and firm controls. The results can be read as follows (taking the example of sales growth in Italy and Spain from Table 4): sales growth in lagging regions in Italy and Spain was 1.255 percentage points lower than average across all regions in those countries.

Table 4: Regression results of firm performance in lagging regions (2013 observation, 3-year average)

	Sales Growth	Employment Growth	Investment Rate	ROA	Productivity Growth
Italy and Spain	-1.255***	-0.600***	-13.764***	-0.689***	-0.012***
	[-6.377]	[-5.372]	[-10.415]	[-7.226]	[-4.215]
Poland and Romania	0.229	0.216	-4.369**	0.562**	0.00042
	[0.621]	[1.231]	[-2.092]	[1.970]	[0.088]

Note: This table reports the estimates of the firm performance model. We report the impact of the firm being located in a lagging region only. All models include fixed effects for: country, region, sector; firm controls include: (log) age, (log) size, (log) total assets, assets per employee; and financial leverage. For homogeneity purposes, we run estimates on two separate samples: Italy and Spain on the one hand; Poland and Romania on the other hand.

The regression results strongly support the descriptive observation of underperformance in lagging regions, highlighting the significant differences in 'low growth' versus 'low income' lagging regions. In 'low growth' Spain and Italy, lagging regions underperform across all variables and the negative association is significant across all variables. By contrast, in 'low income' lagging regions, the relationships are mixed: the only significant, negative relationship is in the investment rate, while the sign of the coefficient is positive for all other variables (and significant for ROA). The substantially lower levels of investment in lagging regions, regardless of region type (the investment rate is 13.8 percentage points lower in lagging regions of Italy and Spain, 4.4 percentage points lower in lagging regions of Poland and Romania), likely captures the significant different in size and asset intensity of firms in lagging regions noted previously.[15]

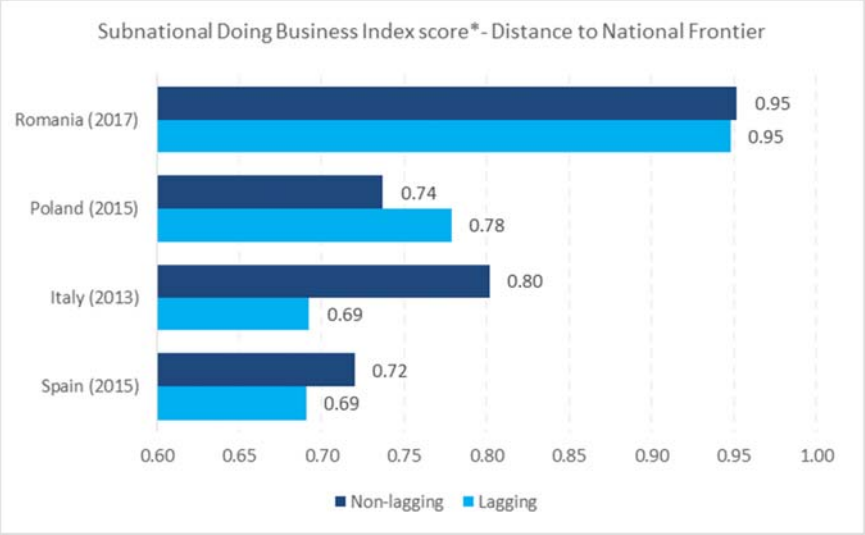
4. Is the business environment worse in lagging regions?

As a next step, in this section we compare the business environment in lagging regions versus those located in non-lagging regions across the four countries. Details for each region are included in Annex 4. They show wide variations both across countries and across regions within countries. For *registering a business*, the average across Italian regions is just 9 days versus 16 in Spain and Romania, and 29 in Poland. But the within-country variation is also significant: in Italy, from a low of 6 days in Lazio, Lombardy, and Veneto (all non-lagging) to a high of 16 in Campania (lagging); in Poland it takes just 8 days to register a business in Wielkopolskie (non-lagging) but 42 in Zachodniopomorskie (non-lagging), and 37 and 36, respectively, in Podkarpackie and Swietokrzyskie (both lagging). For *obtaining a construction permit*, the situation reverses, with Spain and Poland averaging 173 and 176 days, respectively, while Italy averages 231 days, and Romania 261 days. Again, the internal variation is even larger: in Italy, from 151 days in Lombardy (non-lagging) to 316 days in Sicily (lagging); and in Spain from 114 days in Asturias (non-lagging) to 297 days in Galicia (non-lagging). Finally, for *enforcing a contract*, it takes on average 518 days in Polish regions versus 1,400 days in Italian regions. But within Italian regions it takes just 855 days in Piedmont (non-lagging) versus more than 2,000 days in Puglia (lagging).

To summarize the differences in performance across all indicators we create a 'distance to the national frontier' (DTF) index for each subnational region. This is done by first constructing a DTF variable for each region for each individual indicator, where the 'frontier' is defined as the region with the lowest number of days required to complete the procedure and is assigned a value of 1.0; all other regions are indexed to the frontier based on the inverse of the ratio of the number of days required to complete the procedure relative to the 'frontier' region. The DTF ratios for each of the three indicators[16] are then summed up for each region, and the same procedure is used again[17] to establish an overall DTF. Figure 2 compares average DTF scores in lagging versus non-lagging regions in each of the four countries. Notable again is the difference between countries with 'low growth' and those with 'low income' lagging regions. Both Spain and Italy show weaker business environment in lagging regions, with the differences in Spain relatively minimal while the distances in Italy are very substantial. By contrast, in Romania there are virtually no differences across region types (in fact, the variation in SDB indicators across all regions is minimal), and in Poland lagging regions show slightly better SDB performance.

[15] An explanation of the findings is consistent with the standard Solow growth model, which predicts that growth rates are higher in regions that are far from their steady state; regions closer to their steady state present lower growth rates.
[16] In the case of Spain, where the Subnational Doing Business did not cover 'Enforcement of Contracts' we substitute 'Getting Electricity' in order to have three variables to include in the index.
[17] The region with the highest total DTF score is established as the 'frontier' and assigned the value 1.0; all other regions are indexed against it as the ratio of their DTF to the 'frontier' DTF.

Figure 2: Distance to the national frontier index: lagging versus non-lagging regions by country

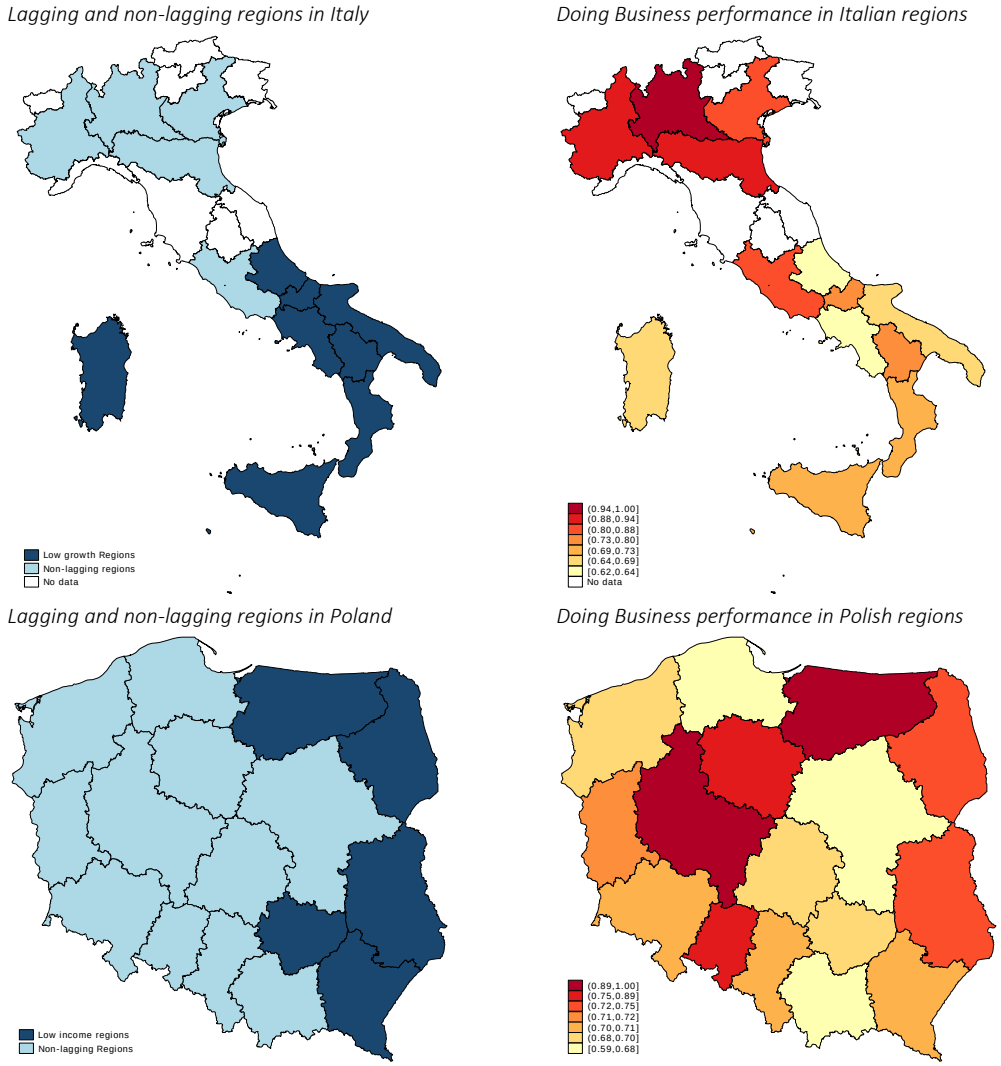


Note: This figure reports Authors' calculations based on data from Subnational Doing Business

To illustrate this even more clearly, Figure 3 maps the location of lagging regions against SDB performance in Italy and Poland – similar patterns are observed in Romania and Spain (see Annex 5). Note that in this case (and in regressions reported later in this paper) we take an inverse measure of the DTF so that a lower score indicates worse performance.[18] In the case of Italy, we see clearly that the lagging regions (shaded in darker blue) correspond well to the regions with lower SDB performance (in the lighter shades). By contrast, in Poland, several of the lagging regions (all in the eastern part of the country) are among the regions with the best SDB performance.

[18] This allows for easier comparison with the other Doing Business variables.

Figure 3: Comparison of location of lagging regions and Doing Business performance in Italy and Poland



Note: The figure reports the lagging regions (left-hand) and doing business (right-hand) in Italy and Poland. White shading indicates regions where no data is available for Doing Business variables.

Looking more specifically at the individual SDB variables Table 5 summarizes the results of simple bilateral correlations within countries, reporting the average time required, the difference in the averages of lagging and non-lagging regions, and the test of the significance of the difference (t-statistic). Note that a positive difference indicates worse SDB performance in lagging regions. The results show significant variation both across countries and across indicators. Only in Italy are the results unambiguous, with lagging regions performing worse in all three indicators and significantly so in two of them. In terms of *starting a business*, lagging regions underperform in all countries but Spain, although the difference is only significant in Italy. On *obtaining a construction permit*, lagging regions perform worse in 'low growth' regions but better in 'low income' regions; again, differences are significant only in Italy. On *enforcing a contract,* the same results apply (although Spain is not included).

Table 5: Comparison of business environment procedures (days) in lagging and non-lagging regions

		Spain	Italy	Poland	Romania
Starting a business	avg. in non-lagging	16.4	6.6	28.2	13
	avg. in lagging	14.8	9.8	30.0	17.5
	difference	**-1.55**	**3.15***	**1.78**	**4.5**
	diff. t-stat	[-1.388]	[2.179]	[0.417]	[1.407]
Obtaining a construction permit	avg. in non-lagging	169.8	195.4	179.9	274
	avg. in lagging	187.3	252.5	168.8	252.3
	difference	**17.526**	**57.1****	**-11.06**	-21.5
	diff. t-stat	[0.492]	[2.522]	[-0.935]	[-0.739]
Contract enforcement	avg. in non-lagging		1273.5	534.6	552
	avg. in lagging		1479.5	481.4	539.8
	difference		**206.04**	**-53.24**	-12.2
	diff. t-stat		[1.422]	[-1.022]	[-0.188]

Note: Authors' calculations based on data from Subnational Doing Business

5. Does the regional business environment impact firm performance?

In this section we step away from the focus on lagging and non-lagging regions and simply test whether there is an association between the regional business environment and the performance of firms. We conduct OLS estimates of the impact of each business environment indicators on five firm performance indicators. Provided that the measure is homogenous across countries, we pool all firms in the four countries and investigate the relationship between the business environment and firms' performance, regardless of the lagging features.

The dependent variables are calculated as the three-year average. The explanatory variables include the three SDB indicators and the aggregated DTF, which we present here again in an inverse form for ease of interpretation. We also include a measure of the level of regional market competition, proxied by the Herfindahl-Hirschman Index (HHI). It is calculated by summing up the squares of the market share of each firm competing in a sector and country. HHI ranges from zero (highest competition) to 10,000 (lowest competition). HHI captures another dimension of the business environment of firms; it is determined by the ease to conduct business and the costs of entry-exit. Notice that HHI varies substantially across sectors and countries. In order to avoid problems of multicollinearity, the SDB and HHI variables are introduced into the regression separately. All models include country, year, sector, and firm controls.[19]

Table 6 reports the results. Starting with the overall (DTF) variable, we find a strong and significant association with all the main performance variables. The relationship is particularly large on the investment rate, but is also strong on sales growth, employment growth, and profits. It is smaller, but still significant, with productivity. The individual indicators for starting a business and construction permits are also significant across the board, with the impact relatively higher for starting a business. This suggests that while the delays to starting a business may confer some benefits to individual incumbents, in terms of capturing market growth and exploiting profit potential, the aggregate effect

[19] Notice that the main results are unchanged should all SDB variables enter the equations jointly.

is to lower growth and performance. This is partly in line with previous research showing that where the business environment creates barriers to new business entry, incumbent firms show lower competitiveness (productivity) (Schivardi and Viviano, 2011); although their research showed incumbents benefited from higher profit margins, which we do not find to be the case in aggregate.

Table 6: Regression results – business environment on firm performance

	Sales Growth	Employment Growth	Investment Rate	ROA	Productivity Growth
SDB-Start	-0.042**	-0.010*	-0.509***	-0.047***	0.00000
	[-2.567]	[-1.774]	[-4.949]	[-3.166]	[-1.246]
SDB-Construct	-0.010***	-0.005***	-0.071***	-0.004***	-0.000***
	[-6.581]	[-5.999]	[-6.660]	[-3.974]	[-3.171]
SDB-Contract	-0.280**	-0.053	-1.289	0.000	-0.002
	[-2.293]	[-0.858]	[-1.211]	[0.004]	[-1.074]
SDB-DTF (inv)	-2.380***	-0.998***	-17.431***	-1.493***	-0.019***
	[-6.419]	[-5.923]	[-6.636]	[-5.519]	[-3.124]
HHI	-3.946***	-1.124***	-22.800***	-2.760***	-0.050***
	[-5.698]	[-3.479]	[-4.999]	[-5.220]	[-4.826]

Note: All models include fixed effects for: country, year, and sector; firm controls include: (log) age, (log) size, (log) total assets, assets per employee; and financial leverage. SDB-Start is the number of days to start a new business, SDB-Construct is the number of days to obtain a construction permit, SDB-Contract is the number of days to enforce contracts. SDB-DTF (inv) is the inverse of the distance to frontier index using all three indicators. HHI is the Herfindahl-Hirschman Index of market concentration (country-sector level) based on sales.

While results on delays in time to *enforce contracts* are weaker, they still show a negative relationship between longer delays and performance across all variables other than profitability. However, the results are significant only for the relationship with sales growth. One possible reason for the weaker finding is that stronger contract enforcement matters less to some business activities than others. For instance, sectors that mainly use commodities as inputs such as steel and oil are less likely to lead to legal disputes about the value and pricing of purchased inputs; while sectors that use complex and differentiated inputs such as microchips are more reliant on the legal environment. As a result, weaker legal contract enforcement environments will result in closer relationships between corporate customers and suppliers whenever inputs are complex and differentiated, so to build reputation and trust; we call these inputs *relationship-specific inputs* (Crawford, 1990; Nunn, 2007).

Provided the higher contractibility of relationship-specific inputs, we suspect that the performance of a firm is further affected by a weaker contract enforcement environment as the firm uses more relationship-specific inputs. To test this hypothesis, we use an index constructed by Nunn (2007); the Nunn (2007) index is a sector specific measure of the share of relationship-specific inputs used by firms in this sector. We introduce in our model a sector-level dummy *High Nunn*, which takes the value one if the Nunn (2007) index is above median. Above median sectors are relationship-specific inputs intensive sectors and are considered to have 'high contractibility'. We are specifically interested in the interaction term between the variables *SDB-Contract* and *High Nunn*, which captures the effect of the contract enforcement environment in high-contractibility sectors. Table 7 reports the results. We find that the impact of the SDB contract enforcement index (SDB-Contract) is stronger in 'high contractibility' sectors (i.e., sectors using more relationship-specific inputs). This supports our hypothesis that a weaker contract enforcement environment worsens the performance of firms using more relationship-specific inputs.

Table 7: Regression of business environment on firm performance in manufacturing based on contractibility of sectors

	Sales Growth	Employment Growth	Investment Rate	ROA	Productivity Growth
SDB-Contract	-0.136	-0.036	-0.399	0.061	-0.001
	[-1.031]	[-0.546]	[-0.355]	[0.762]	[-0.333]
High Nunn X SDB-Contract	-0.406***	-0.06	-2.447**	-0.185*	-0.004
	[-2.945]	[-0.969]	[-2.420]	[-1.831]	[-1.627]
High Nunn	1.263***	0.327	6.706**	0.774**	0.008
	[2.586]	[1.599]	[2.135]	[2.035]	[1.096]

Note: This table reports the estimates of the firm performance model. High Nunn is a dummy that takes the value one if the Nunn (2007) index of relationship-specific inputs used in a sector is above median; and SDB-Contract is the SDB number of days to enforce contracts. High Nunn X SDB-Contract is the interacted variable. All models include fixed effects for: country, region and firm controls include: (log) age, (log) size, (log) total assets, assets per employee; and financial leverage.

Finally, returning to the main results in Table 6, we look at the measure of regional competition. Like the previous discussion on incumbents versus new entrants, we again need to be careful in interpreting the relationship between market competition and individual firm performance, as the expected positive impact of a competitive market would accrue to the aggregate enterprise environment rather than to individual firms within it, at least in terms of growth and profit; productivity impacts should be observable at the firm level. In any case, the results shown in Table 6 are very clear and strong. In fact, across all performance variables, competition has an even stronger association than does the Doing Business environment.

6. Are business environment constraints aggravated in lagging regions?

As a final step in the analysis, we ask whether the relationship between firm performance and the business environment is larger and more significant in lagging regions. Here, we are looking for evidence not simply, for example, that a bad business environment in a lagging region is associated with bad performance of firms in that region, but that a similarly bad (good) environment in two regions – one lagging and the other not – will be associated with a larger negative (positive) performance of firms in the lagging region than in the non-lagging region. As discussed earlier in the paper, the logic is that the other regional factors discussed in Section 5 interact with a weak business environment to aggravate the impact on firms.

To test this, we interact the SDB-DTF measure with a lagging region dummy. The results are shown in Table 8. Because of the differences in performance between 'low growth' and 'low income' regions, we again split the results between Italy and Spain, on the one hand, and Poland and Romania, on the other. To interpret the results, we need to look first at the sign of the interaction term which tells us whether the lagging regions performs better or worse than other regions. But we also need to combine the interaction term and the original term to see the combined effect; thus, the relationship in lagging regions will be the coefficients on *SDB-DTF X Lagging* plus *SDB-DTF* (whose sign may change). The results provide weak evidence that firms in lagging regions are impacted more strongly by the business environment than firms outside lagging regions. In all cases except for productivity, the interaction variable has a negative association with performance variables, indicating that being in a lagging region amplifies the results of the business environment. However, the results are only significant for profitability (ROA). This suggests that while the main impact of the business environment is regionally agnostic, because firms in lagging regions may already be more vulnerable due in part to weaker demand-side conditions, additional costs involved in dealing with business environment constraints are

likely to hit profits. Finally, it is worth noting that the findings of the interaction term are similar in direction in both 'low growth' and 'low income' regions.

Table 8: Regressions on interaction of lagging region with business environment indicator on firm performance

Panel A: Italy and Spain

	Sales Growth	Employment Growth	Investment Rate	ROA	Productivity Growth
SDB-DTF (inv)	-1.586***	-0.851**	-10.009**	-0.162	-0.017**
	[-2.737]	[-2.469]	[-2.407]	[-0.467]	[-2.091]
SDB-DTF (inv) X Lagging	-1.091	-0.128	-8.304	-2.670***	0.004
	[-0.823]	[-0.164]	[-0.945]	[-3.856]	[0.202]
Lagging	0.729	-0.185	0.641	3.124***	-0.013
	[0.406]	[-0.173]	[0.056]	[3.321]	[-0.528]
SDB-DTF (inv) + SDB-DTF (inv) X Lagging	-2.677	-0.979	-18.313	-2.832	-0.013
F test	5.58	2.19	6.35	25.78	0.65
P-value	0.02	0.14	0.01	0.00	0.42

Panel B: Poland and Romania

	Sales Growth	Employment Growth	Investment Rate	ROA	Productivity Growth
SDB-DTF (inv)	-1.294	0.117	2.478	-1.682**	-0.009
	[-1.567]	[0.663]	[0.471]	[-2.107]	[-0.596]
SDB-DTF (inv) X Lagging	-2.305	-0.177	-34.804***	-3.595**	-0.013
	[-1.121]	[-0.213]	[-3.082]	[-2.197]	[-0.421]
Lagging	2.913	0.427	36.936***	4.736**	0.015
	[1.153]	[0.382]	[2.617]	[2.437]	[0.443]
SDB-DTF (inv) + SDB-DTF (inv) X Lagging	-3.599	-0.06	-32.326	-5.277	-0.022
F test	2.93	0.01	7.54	9.77	0.47
P-value	0.09	0.94	0.01	0.00	0.49

Note: This table reports the estimates of the firm performance model. SDB-DTF (inv) is the SDB distance to frontier (inverse); Lagging is the lagging region dummy. SDB-DTF (inv) X Lagging is the interacted variable. All models include fixed effects for: country, year, and sector; firm controls include: (log) age, (log) size, (log) total assets, assets per employee; and financial leverage. The F-test and P-value in the thre last line referest to the test of joint significance of SBD and SBD X lagging coefficients.

7. Conclusions and further research

This paper aims to provide an exploratory assessment of the relationship between the business environment and firm performance in European regions, with an emphasis on understanding if and how business environment constraints may be a factor holding back investment, employment, and growth in lagging regions. The analysis, exploiting unique firm-level data from the *Orbis* data set along with regional business environment data from the World Bank's *Subnational Doing Business* reports, provides strong support for the relationship between the business environment and several aspects of firm performance. The paper also shows that this relationship matters somewhat more for lagging regions, not only because the business environment is rather worse in these regions, but also because the impact of the business environment on firm performance is stronger.

Findings in the paper also highlight the important distinction between 'low income' and 'low growth' lagging regions. In 'low growth' regions (in Italy and Spain), firms in lagging regions perform clearly worse than firms outside lagging regions. In 'low income' regions (in Poland and Romania) the relationship is much less clear. In fact, firms in both types of regions appear to be impacted similarly by the business environment. A few things, however, help explain the differences. First is growth. 'Low growth' lagging regions, by definition, suffer from stagnation, which is likely to weaken the performance of firms in these regions. 'Low income' regions are just less wealthy, but are not necessarily stagnant – in fact, most of them are growing more rapidly than average. Thus, firms in these regions are likely to be operating in an environment with significant growth potential. A second reason, and the main point of this paper, is that the business environment in 'low growth' lagging regions tends to be clearly worse than in non-lagging regions of these countries. In 'low income' regions, by contrast, this is not the case.

From a policy perspective, the results from the paper support addressing the business regulatory environment as part of a wider strategy to facilitate investment in lagging regions. While there may be some benefits from targeting support on the business environment to lagging regions, perhaps integrated with skills development and institutional strengthening, the weak results on the interaction effect in Section 6 suggest that the biggest impact would come from region-independent impacts on the overall business environment, which means intervention for business environment reform at the national level may be most effective. This is perhaps good news, as it suggests that addressing the business environment can have a direct effect on the private sector's potential to invest, grow, and create jobs, without necessarily having to solve what may be deeper and more pervasive structural issues.

Further research should extend this analysis to additional countries that are covered under the SDB series, including Bulgaria and Hungary (recently completed). It will also be valuable to extend the analysis to wider measures of the regional business environment, for example addressing issues of infrastructure quality, access to skilled labor, access to suppliers, and additional measures of regional quality of governance. One potential source for this is the World Bank's Enterprise Surveys, which measure a wide range of business environment factors, although they are perception based and (at present) results in the EU are not representative at the regional level. Further exploration of sector-specific relationships may also provide a better understanding of the impact of the business environment on firms. Last, while we retained ten-or-more-employee firms, smaller firms may be affected in a different fashion.

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Annex 1: Comparison of Orbis and Eurostat firm coverage

NUTS 2	COUNTRY	EUROSTAT DATA (avg 2008-13)	ORBIS SAMPLE (avg over all years)	IMPLIED ORBIS COVERAGE (%)
ES11 - Galicia	ES	8,062	6,870	85%
ES12 - Principado de Asturias	ES	2,817	2,323	82%
ES13 - Cantabria	ES	1,682	1,340	80%
ES21 - País Vasco	ES	8,963	5,482	61%
ES22 - Comunidad Foral de Navarra	ES	2,497	1,785	71%
ES23 - La Rioja	ES	1,181	941	80%
ES24 - Aragón	ES	4,440	1,960	44%
ES30 - Comunidad de Madrid	ES	25,332	20,183	80%
ES41 - Castilla y León	ES	6,483	6,368	98%
ES42 - Castilla-la Mancha	ES	5,385	5,163	96%
ES43 - Extremadura	ES	2,369	1,993	84%
ES51 - Cataluña	ES	29,333	25,574	87%
ES52 - Comunidad Valenciana	ES	15,571	13,727	88%
ES53 - Illes Balears	ES	3,635	3,639	100%
ES61 - Andalucía	ES	19,522	16,690	85%
ES62 - Región de Murcia	ES	4,526	4,001	88%
ES63 - Ciudad Autónoma de Ceuta	ES	152	114	75%
ES64 - Ciudad Autónoma de Melilla	ES	136	86	63%
ES70 - Canarias	ES	6,052	5,159	85%
ITC1 - Piemonte	IT	13,065	8,606	66%
ITC2 - Valle d'Aosta	IT	381	269	71%
ITC3 - Liguria	IT	4,008	2,467	62%
ITC4 - Lombardia	IT	41,631	31,022	75%
ITH1 - Provincia Autonoma di Bolzano	IT	2,431	1,336	55%
ITH2 - Provincia Autonoma di Trento	IT	2,041	957	47%
ITH3 - Veneto	IT	20,669	13,870	67%
ITH4 - Friuli-Venezia Giulia	IT	4,163	2,485	60%
ITH5 - Emilia-Romagna	IT	17,349	11,887	69%
ITI1 - Toscana	IT	12,810	7,521	59%
ITI2 - Umbria	IT	2,827	1,786	63%
ITI3 - Marche	IT	5,967	3,804	64%
ITI4 - Lazio	IT	15,028	11,362	76%
ITF1 - Abruzzo	IT	3,570	2,198	62%
ITF2 - Molise	IT	627	418	67%
ITF3 - Campania	IT	11,747	7,900	67%
ITF4 - Puglia	IT	8,191	4,768	58%
ITF5 - Basilicata	IT	1,103	780	71%
ITF6 - Calabria	IT	2,704	1,892	70%
ITG1 - Sicilia	IT	8,042	5,495	68%
ITG2 - Sardegna	IT	3,401	2,356	69%
PL11 - Lódzkie	PL	6,520	2,887	44%

NUTS 2	COUNTRY	EUROSTAT DATA (avg 2008-13)	ORBIS SAMPLE (avg over all years)	IMPLIED ORBIS COVERAGE (%)
PL12 - Mazowieckie	PL	16,709	12,973	78%
PL21 - Malopolskie	PL	8,351	4,790	57%
PL22 - Slaskie	PL	12,442	5,541	45%
PL31 - Lubelskie	PL	3,566	1,818	51%
PL32 - Podkarpackie	PL	4,127	1,999	48%
PL33 - Swietokrzyskie	PL	2,445	1,120	46%
PL34 - Podlaskie	PL	2,192	1,247	57%
PL41 - Wielkopolskie	PL	10,555	5,657	54%
PL42 - Zachodniopomorskie	PL	3,817	2,278	60%
PL43 - Lubuskie	PL	2,509	1,125	45%
PL51 - Dolnoslaskie	PL	7,035	4,726	67%
PL52 - Opolskie	PL	2,178	1,284	59%
PL61 - Kujawsko-Pomorskie	PL	5,053	2,603	52%
PL62 - Warminsko-Mazurskie	PL	3,065	1,407	46%
PL63 - Pomorskie	PL	6,270	4,377	70%
RO11 - Nord-Vest	RO	7,811	7,239	93%
RO12 - Centru	RO	7,145	6,562	92%
RO21 - Nord-Est	RO	5,970	5,344	90%
RO22 - Sud-Est	RO	5,994	5,296	88%
RO31 - Sud - Muntenia	RO	5,942	5,436	91%
RO32 - Bucuresti - Ilfov	RO	13,445	11,084	82%
RO41 - Sud-Vest Oltenia	RO	3,691	3,087	84%
RO42 - Vest	RO	5,175	4,921	95%

Annex 2: City and regional coverage in Subnational Doing Business

Country	City	Region	Lagging region? / Type
Italy	Bari	Apulia	Low growth
	Bologna	Emilia Romagna	
	Cagliari	Sardinia	Low growth
	Campobasso	Molise	
	Catanzaro	Calabria	Low growth
	L'Aquila	Abruzzo	
	Milan	Lombardy	
	Naples	Campania	Low growth
	Padua	Veneto	
	Palermo	Sicily	Low growth
	Potenza	Basilicata	Low growth
	Rome	Lazio	
	Turin	Piedmont	
Spain	Seville	Andalusia	Low growth
	Zaragoza	Aragon	
	Las Palmas	Canary Islands	
	Santander	Cantabria	
	Albacete	Castilla - La Mancha	Low growth
	Valladolid	Castile and León	
	Barcelona	Catalonia	
	Ceuta	Ceuta	
	Madrid	Community of Madrid	
	Pamplona	Navarre	
	Valencia	Valencian Community	
	Badajoz	Extremadura	
	Vigo	Galicia	
	Palma	Balearic Islands	
	Logroño	La Rioja	
	Melilla	Melilla	
	Bilbao	Basque Country	
	Gijón	Asturias	
	Murcia	Region of Murcia	Low growth
Poland	Białystok	Podlaskie	Low income
	Bydgoszcz	Kujawsko-Pomorskie	
	Gdańsk	Pomorskie	Low income
	Gorzów Wielkopolski	Lubuskie	
	Katowice	Śląskie	
	Kielce	Świętokrzyskie	Low income
	Kraków	Małopolskie	
	Łódź	Łódzkie	
	Lublin	Lubelskie	Low income
	Olsztyn	Warmińsko-Mazurskie	Low income

	Opole	Opolskie	
	Poznań	Wielkopolskie	
	Rzeszów	Podkarpackie	Low income
	Szczecin	Zachodniopomorskie	
	Toruń	Kujawsko-Pomorskie	
	Warsaw	Mazowieckie	
	Wrocław	Dolnośląskie	
	Zielona Góra	Lubuskie	
Romania	Bucharest	Bucharest-Ilfov	
	Brasov	Centre	
	Constantia	South East	Low income
	Cluj Napoca	North West	Low income
	Craiova	South West	Low income
	Iasi	North East	Low income
	Oradea	North West	Low income
	Ploiesti	South Muntenia	Low income
	Timisoara	West	

Annex 3: Firm performance summary – descriptive statistics from Orbis dataset

		NOBS	average	sdev	min	max	_p1	_p5	_p10	_p25	_p50	_p75	_p90	_p95	_p99	non-lagging	lagging	difference	t-stat
ES	sales growth (%)	57,258	2.28	14.82	-43.71	71.63	-31.27	-19.51	-14.13	-6.34	1.08	9.27	19.92	28.76	49.03	-1.38	-1.45	-0.07	-0.49
ES	employment growth (%)	59,530	0.92	9.87	-33.33	50	-20.57	-13.83	-10.22	-4.85	0	5.56	13.33	19.15	30.83	-1.27	-1.23	0.04	0.39
ES	ROA (%)	57,890	1.73	8.78	-62.66	33.31	-31.64	-11.66	-5.59	-0.23	1.77	5.18	10.05	13.98	24.07	-0.01	-0.18	-0.17	-1.79
ES	Productivity growth	56,265	0	0.18	-6.87	4.55	-0.49	-0.22	-0.15	-0.07	0	0.06	0.14	0.21	0.44	-0.02	-0.02	-0.01	-2.51
ES	Investment rate 3yrs	61,611	70.47	103.54	-16.71	410.28	-16.71	-13.63	0	7.14	31.03	84.89	203.62	376.14	410.28	52.17	42.89	-9.28	-11.26
			average	sdev	min	max	_p1	_p5	_p10	_p25	_p50	_p75	_p90	_p95	_p99	non-lagging	lagging	difference	t-stat
IT	sales growth (%)	58,029	5.66	15.28	-37.79	94.6	-26.29	-14.24	-9.49	-2.93	3.47	11.46	23.53	34	58.52	1.9	1.36	-0.54	-3.66
IT	employment growth (%)	57,541	2.16	7.74	-24	43.9	-14.07	-8.96	-6.22	-2.38	0.93	5.77	12.19	16.86	25.95	0.94	0.6	-0.34	-4.38
IT	ROA (%)	58,966	1.14	6.03	-41.32	25.09	-20.35	-7.28	-3.6	-0.55	0.71	3.18	7.32	10.62	18.83	0.83	-0.38	-1.21	-18.61
IT	Productivity growth	55,933	0	0.2	-4.66	4.83	-0.48	-0.21	-0.14	-0.06	0	0.07	0.15	0.22	0.52	-0.01	-0.01	0	-1.27
IT	Investment rate 3yrs	59,040	126.12	171.36	-7.49	740	-7.49	-4.85	4.21	21.85	63.38	150	328.15	565	740	94.67	76.69	-17.98	-13.14
			average	sdev	min	max	_p1	_p5	_p10	_p25	_p50	_p75	_p90	_p95	_p99	non-lagging	lagging	difference	t-stat
PL	sales growth (%)	37,780	3.52	18.36	-50.24	80.9	-45.51	-25.62	-16.75	-6.22	2.52	12.42	25.17	35.65	59.04	1.52	0.8	-0.72	-2.86
PL	employment growth (%)	37,955	1.23	4.78	-9.09	22.81	-7.42	-4.55	-3.03	0	0	1.48	7.6	11.4	17.65	0.3	0.33	0.03	0.77
PL	ROA (%)	36,891	5.65	18.24	-114.18	77.48	-59.78	-19.85	-8.92	-0.02	4.69	12.71	23.64	33	60.56	3.61	4.29	0.68	2.66
PL	Productivity growth	34,771	-0.03	0.33	-5.23	5.51	-1.32	-0.45	-0.27	-0.1	0	0.09	0.2	0.31	0.68	-0.05	-0.05	0	-0.67
PL	Investment rate 3yrs	40,727	91.62	147.09	-32.16	550.7	-32.16	-32.16	-10.1	4.78	34.38	106.53	294.12	550.7	550.7	63.4	51.79	-11.61	-7.21
			average	sdev	min	max	_p1	_p5	_p10	_p25	_p50	_p75	_p90	_p95	_p99	non-lagging	lagging	difference	t-stat
RO	sales growth (%)	20,966	12.57	37.95	-77.08	267.7	-65.02	-32.75	-20.89	-7.58	5.12	23.86	56.02	88.1	152.78	3.96	4.9	0.94	2.31
RO	employment growth (%)	16,291	3.46	14.53	-37.93	100	-25.06	-16.67	-12.15	-5.26	1.26	9.79	21.81	30.88	50.76	1.27	1.97	0.7	3.77
RO	ROA (%)	16,283	4.54	15.52	-136.89	69.44	-51.41	-15.64	-7.08	0.19	3.31	10.43	20.09	27.76	46.46	1.39	2.33	0.94	3.86
RO	Productivity growth	16,038	0.03	0.22	-7.71	5.38	-0.52	-0.26	-0.17	-0.07	0.02	0.12	0.23	0.32	0.63	-0.01	-0.01	0	1.33
RO	Investment rate 3yrs	16,325	128.8	196.08	-20.78	822.22	-20.78	-19.72	-7.24	10	53.57	155	368.18	638.6	822.22	80.77	68.83	-11.95	-5.46

Annex 4: Business environment – summary of results from Subnational Doing Business

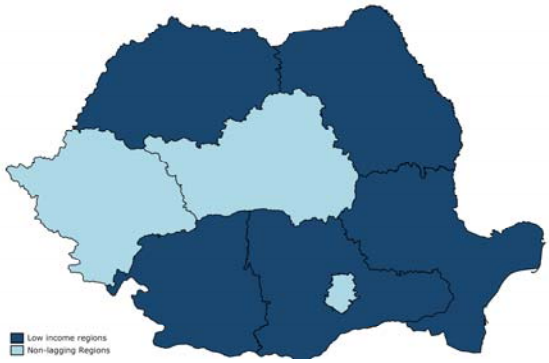
NUTS 2 code	NUTS 2 Name	Country	Starting a business (days)	Obtaining a construction permit (days)	Enforcing a contract (days)	Lagging region? / Type
ES11	Galicia	ES	19	297.5	NA	
ES12	Principado de Asturias	ES	14	114	NA	
ES13	Cantabria	ES	16	161	NA	
ES21	País Vasco	ES	17	173	NA	
ES22	Comunidad Foral de Navarra	ES	20	148.5	NA	
ES23	La Rioja	ES	16	101	NA	
ES24	Aragón	ES	17	250	NA	
ES30	Comunidad de Madrid	ES	14	205	NA	
ES41	Castilla y León	ES	17	133	NA	
ES42	Castilla-la Mancha	ES	15.5	153	NA	Low growth
ES43	Extremadura	ES	14.5	147	NA	
ES51	Cataluña	ES	14	153.5	NA	
ES52	Comunidad Valenciana	ES	14	121	NA	
ES53	Illes Balears	ES	20.5	203	NA	
ES61	Andalucía	ES	14	162	NA	Low growth
ES62	Región de Murcia	ES	15	247	NA	Low growth
ITC1	Piemonte	IT	8	198	855	
ITC4	Lombardia	IT	6	151	1,291	
ITF1	Abruzzo	IT	13	238	1,435	
ITF2	Molise	IT	8	207	1,338	
ITF3	Campania	IT	16	252	1,280	Low growth
ITF4	Puglia	IT	9	238	2,022	Low growth
ITF5	Basilicata	IT	8	208	1,461	Low growth
ITF6	Calabria	IT	7	309	1,427	Low growth
ITG1	Sicilia	IT	8	316	1,366	Low growth
ITG2	Sardegna	IT	9	252	1,507	Low growth
ITH3	Veneto	IT	6	230	1,665	
ITH5	Emilia-Romagna	IT	7	164	1,347	
ITI4	Lazio	IT	6	234	1,210	
PL11	Lódzkie	PL	30	164	599	
PL12	Mazowieckie	PL	30	212	685	
PL21	Malopolskie	PL	29	209	498	
PL22	Slaskie	PL	30	181	519	
PL31	Lubelskie	PL	29	155	595	Low income
PL32	Podkarpackie	PL	37	168	515	Low income
PL33	Swietokrzyskie	PL	36	171	529	Low income
PL34	Podlaskie	PL	26	196	440	Low income
PL41	Wielkopolskie	PL	8	206	485	
PL42	Zachodniopomorskie	PL	42	182	493	
PL43	Lubuskie	PL	35	180.5	467	
PL51	Dolnoslaskie	PL	28	175	546	

PL52	Opolskie	PL	26	137	425	
PL61	Kujawsko-Pomorskie	PL	30.5	150	449	
PL62	Warminsko-Mazurskie	PL	22	154	328	Low income
PL63	Pomorskie	PL	22	182	715	Low income
RO11	North West	RO	13.5	215.5	538	Low income
RO12	Centru	RO	15	247	689	
RO21	North East	RO	17	266	522	Low income
RO22	South East	RO	20	307	495	Low income
RO31	South Muntenia	RO	12	268	653	Low income
RO32	Bucharest	RO	12	260	512	
RO41	South West Oltenia	RO	25	206	491	Low income
RO42	West	RO	12	315	455	

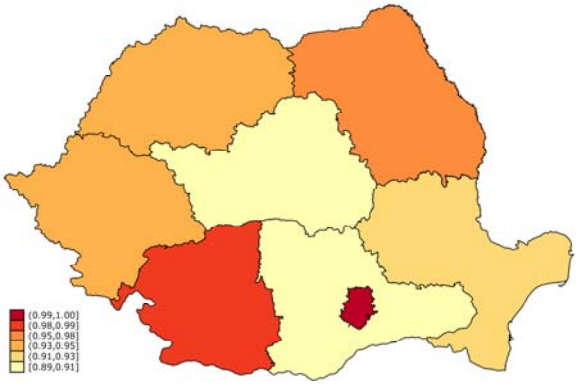
ANNEX 5: Comparison of location of lagging regions and Doing Business performance in Italy and Poland

Figure 4: Location of lagging regions and Regional Doing Business performance in Romania and Spain

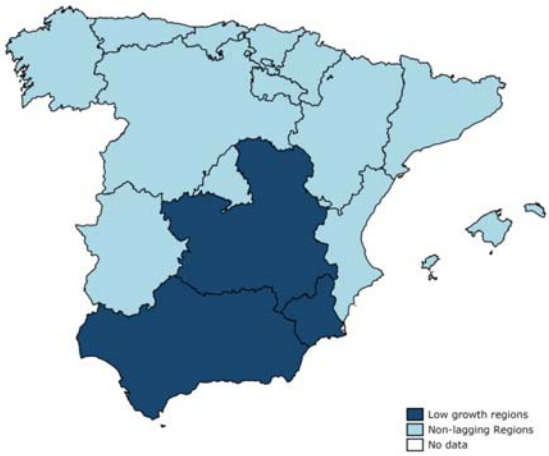
Lagging and non-lagging regions in Romania.



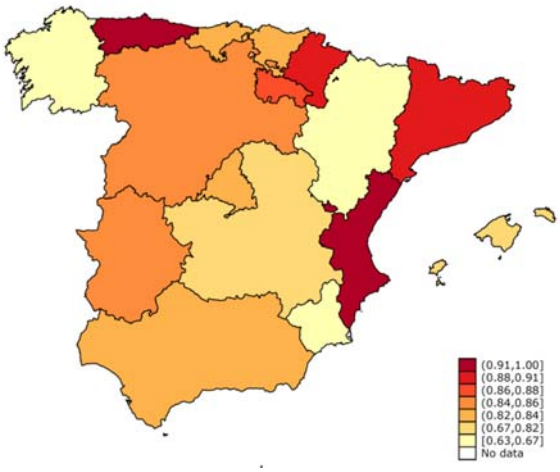
Doing Business performance in Romanian regions



Lagging and non-lagging regions in Spain.



Doing Business performance in Spanish regions



Note: The figure reports the lagging regions (left-hand) and doing business (right-hand) in Italy and Poland. White shading indicates regions where no data is available for Doing Business variables.