

**CAN SURVEY-BASED INFORMATION
HELP ASSESS INVESTMENT GAPS
IN THE EU?**

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Abstract

This study illustrates how information from micro-level and survey-based databases can be used, along with macroeconomic indicators, to provide a better understanding of corporate investment obstacles across the EU. To show this, we use a novel dataset merging firm-level data from the European Investment Bank Investment Survey (EIBIS) and hard data from corporations' balance sheet and P&L information. We show that the indicators of impediments to investment at the country level, which can be derived from aggregating qualitative answers, correlate relatively well with macro-based hard data, which are commonly considered as determinants of investments in macro-based models. After controlling for firm-specific characteristics, the perceived investment gap (the difference between desired and actual investment) remains correlated with the reported impediments. While access to finance is not the most reported obstacle, reporting it has the highest information content. Moreover, the signal intensifies when it is given by "weaker" firms, defined as those that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions. From a policy standpoint, our findings suggest that survey-based information can be a useful input to complement both macro and micro hard data and better inform the design of targeted policies to support investment.

Keywords: investment obstacles, investment gap, corporate investment, investment determinants, survey-based information, access to finance.

JEL classification: D22, D25, G30, G38.

Resumen

Este documento muestra cómo se puede utilizar la información obtenida de bases de datos a nivel individual y de encuestas, junto con indicadores macroeconómicos, para mejorar la comprensión de los obstáculos a la inversión a los que las empresas de la UE se enfrentan. Para ello, utilizamos un conjunto de datos novedoso que combina datos a escala de empresa, provenientes de la Encuesta sobre Inversión y Financiación de la Inversión del Banco Europeo de Inversiones (EIBIS, por sus siglas en inglés), con la información de balance y de pérdidas y ganancias de las empresas. Mostramos que los indicadores de impedimentos a la inversión a nivel país, que se derivan de la agregación de respuestas cualitativas, se correlacionan relativamente bien con los datos macroeconómicos comúnmente considerados como determinantes de la inversión en muchos modelos. Después de controlar por características específicas a escala de empresa, la brecha de inversión percibida (la diferencia entre la inversión deseada y la real) permanece correlacionada con las barreras declaradas. Aunque el acceso a la financiación no es el obstáculo más reportado, es el que provee mayor información. La señal de este impedimento se intensifica cuando es proporcionada por empresas «más débiles», que se definen como aquellas que son más pequeñas, y/o más endeudadas, y/o menos rentables y/o con una menor liquidez. Desde el punto de vista de políticas públicas, nuestros hallazgos sugieren que la información basada en encuestas supone un aporte útil para complementar otras fuentes cuantitativas, tanto individuales como agregadas, proporcionando una información muy útil para el diseño de mejores políticas específicas encaminadas a apoyar la inversión.

Palabras clave: obstáculos a la inversión, brecha de inversión, inversión empresarial, determinantes de la inversión, información basada en encuestas, acceso a la financiación.

Códigos JEL: D22, D25, G30, G38.

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1 Introduction

Investment is a key factor for sustaining long-run economic growth and a major contributor to business cycle fluctuations. The collapse of corporate investment in 2008 and its relatively weak recovery in the aftermath of the crisis has renewed interest among academics and policy-makers to improve understanding of the drivers and obstacles to investment. After years of underinvestment (with this variable far below its long-term trend), with potentially long-lasting negative consequences for potential growth and firms' productivity, it has become crucial to have a clearer picture of the obstacles that corporations face in their investment decisions. In this paper, we use a recent survey conducted by the European Investment Bank (EIB). Based on granular data matching both hard and survey data at the level of each firm, we illustrate how barriers to investment actually correlate with investment needs and how they result in perceived investment gaps, i.e. the difference between desired investment and that actually undertaken by the corporation.

Investment drivers and obstacles have been widely discussed in the literature, both from a theoretical and an empirical perspective. At its core, the decision to invest is a profit-maximization problem where the optimal capital stock is determined by factors both internal and external to the firm. Traditional neoclassical models emphasize the role played by growth opportunities and the user cost of capital in shaping investment decisions (Jorgenson, 1971), channels which have been widely backed by empirical evidence (Bond and Van Reenen, 2003). Furthermore, numerous studies have corroborated that financial constraints have a significant negative effect on investment beyond the cost of raising external finance (Fazzari *et al.*, 1988; Hennessy *et al.*, 2007). In addition to financial frictions, whenever investment decisions suffer some degree of irreversibility, policy and economic uncertainty are shown to delay investment projects (Abel and Eberly, 1994). This is the so-called "wait-and-see" effect of uncertainty, which can affect both the timing and level of investment. Finally, another branch of the literature highlights that regulation, taxation and the efficacy of the judicial system also affect investment decisions (Alesina *et al.*, 2005; Acemoglu and Johnson, 2005).

Determining the relative importance of these factors in explaining investment decisions is a difficult task, and especially so using macroeconomic indicators, as the impact is likely to depend on companies' characteristics. Moreover, it is challenging to gather both information about a wide range of different investment obstacles and detailed information regarding investment decisions. Hence, some have studied barriers to investment using survey data (Beck *et al.*, 2005; Ferrando and Mulier, 2015; European Commission, 2017).

In this paper, we exploit the European Investment Bank Investment Survey (EIBIS) to shed light on this issue. The EIBIS provides a way to illustrate each of these channels, as firms report impediments to investment resulting from lack of demand, uncertainty, finance, regulation (both business and labor) and others. The EIBIS is a granular dataset collecting information on around 12,500 non-financial corporations.¹ The survey has been conducted over two years,

¹ In the rest of the paper, firms, companies, enterprises or corporates always refer to non-financial corporations.

2016 and 2017.² Besides being granular, representative and enabling micro-analysis, the survey offers qualitative information not available in hard data and it is unique in terms of the wide coverage of obstacles considered. Our analysis exploits information about impediments to investment and the perceived investment gap.

We match firm-level data from EIBIS with balance sheet and profit and loss (P&L) information as collected by ORBIS. We then link firms' investment gap with firms' impediments to investment, while controlling for firms' characteristics. This allows us to investigate the relative role of obstacles in explaining the perceived investment gap while controlling at the same time for firm-specific characteristics such as size, age, sector and financial position. We provide novel evidence on the relative importance that different obstacles may have in explaining the investment gap that firms report experiencing in their recent activity.

The main findings of the paper are threefold. First, we show that survey-based measures of impediments provide a reliable source of the channels explaining investment as they correlate rather well with macro-based hard data compiled at the country level. Hence, signals for corporate investment can be extracted from the survey, especially for cross-country comparisons. Second, we show that "weaker" firms, defined as smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more impediments. Whether this reflects the endogeneity of the firm to its environment or some bias in the perceptions is left to further research. Third, we show that, controlling for the firms' characteristics, reporting an impediment provides a signal for investment. Firms reporting impediments are more likely to report an investment gap, with a stronger magnitude when the impediment is reported as major. The signal intensifies when it is given by firms that are smaller, and/or less profitable and/or more indebted. As we do not find such dependency on the region, our results do not support the notion that corporations located in the periphery continue to be discriminated for systemic reasons years after the end of the crisis.

The rest of the paper comprises four sections, concluding remarks and two annexes. In the second section, we provide an overview of the barriers to investment as reported in the EIBIS. In the third section, we elaborate on the literature on investment determinants and show that five of them are explicitly covered in the survey, namely: growth opportunities, financial frictions, uncertainty, and business and labor market regulation. We show that their survey-based measures correlate relatively well with macro-based measures traditionally used to gauge them. In the fourth section, we show that factors internal to the firm are also related to the perception of barriers to investment. In the fifth section, we evaluate the relative role of these obstacles in explaining the investment gap that firms perceive in their activity. Then, we focus on possible asymmetric impacts across types of firms or regions. Annex I describes the EIBIS survey and Annex II presents the matching with the ORBIS database.

² A third wave was under development at the time of preparing this paper. See Annex I for a detailed description of the survey.

2 Long-term impediments to investment: evidence from the EIBIS

To better understand the barriers that a firm might face in its investment activities, the EIBIS asks European corporations about nine potential obstacles, whether each is a major, minor or no impediment at all to investment.³ The question provides the view of the firms regarding the factors limiting their investment activity over an undefined time horizon and their intensity. The possible limiting factors reflect some classical determinants of the level of investment, such as demand, uncertainty (Abel and Eberly, 1994), access to finance (Fazzari *et al.*, 1988; Hennessy *et al.*, 2007) and business regulation (Alesina *et al.*, 2005; Acemoglu and Johnson, 2005). But there are other impediments that are covered with less frequency in the literature, such as energy costs and access to digital infrastructure. Given that they do not refer to a specific time period, the questions offer a broad view of the long-term impediments to investment for European companies.⁴

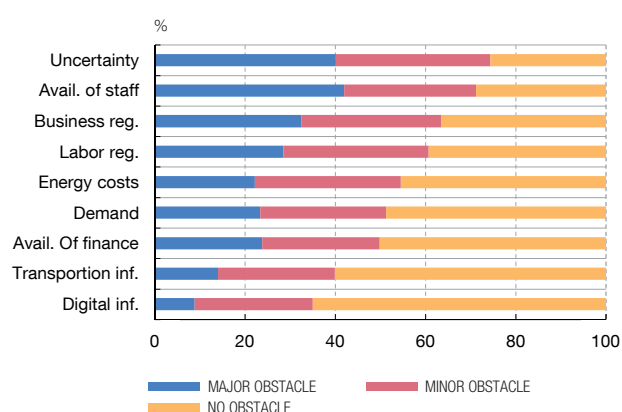
Chart 1.1 shows the percentage of European Union firms that perceive each of the long-term obstacles to investment, alongside the relative importance attributed to them. As in the rest of the paper, this figure takes into account the companies' responses to the first two waves of the survey available until now (2016 and 2017).

Combining obstacles that are reported as minor or major, Chart 1.1 shows that uncertainty about the future is clearly the most important limiting impediment, being mentioned by close to 80% of the companies. Then, in descending order, are the availability of staff with the right skills, business regulation (e.g. licenses, permits, bankruptcy), and labor regulation; each of those is reported by more than 60% of the European firms. Energy costs and lack of demand for products and services appear in fifth and sixth position, respectively. They are followed by the availability of finance, which relates to both internal and external

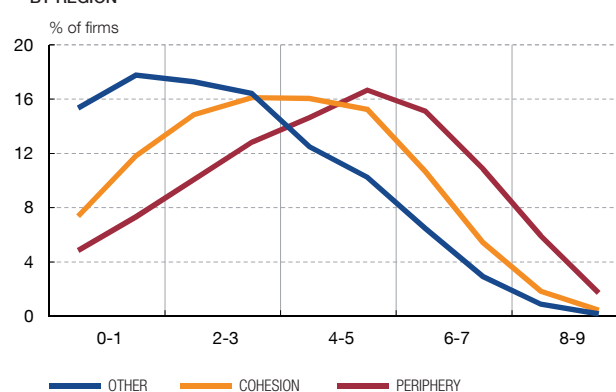
REPORTED OBSTACLES TO LONG-TERM INVESTMENT

CHART 1

1 OBSTACLES TO LONG-TERM INVESTMENT. DETAILED RESPONSE



2 HISTOGRAM OF THE NUMBER OF REPORTED OBSTACLES. BREAKDOWN BY REGION



SOURCES: EIBIS-16 and EIBIS-17.

³ See question 38 of the general module questionnaire.

⁴ Firms' responses will, nonetheless, vary from wave to wave depending on their perceptions in each moment, as well as on the business cycle position of the economy. Besides, part of the population surveyed change across waves.

financing. Lastly, the factors mentioned by a smaller number of corporations are availability of adequate transport infrastructure and access to digital infrastructure.

If we focus only on the share of companies that mention each obstacle as being a major one to investment, the order in relevance remains very similar to the previous one, but with three exceptions: the availability of staff with the right skills becomes the obstacle reported by the highest number of firms, the availability of finance becomes the fifth most important factor and lack of demand takes the sixth spot.

Over time, the results change marginally in the two waves. However, in the latest wave, the share of corporations reporting most of the obstacles is slightly lower. Given the improvement in the general economic situation recorded over the two waves, this could indicate that firms' perceptions are somewhat influenced by the business cycle.

Given that some factors, such as demand, availability of staff and uncertainty, are substantially tied to the position in the business cycle, we therefore analyze the answer across countries. For the sake of simplicity, the 28 EU economies are grouped into three sets: Cohesion, comprising the countries that joined the EU after the enlargement in 2004 and later; Periphery, which is made up by the countries that have experienced a downgrade of, at least, two notches in their rating during the sovereign debt crisis; and Other economies.⁵ Over the recent past, these groups of economies have experienced different headwinds. Chart 1.2 shows the distribution of the sum of obstacles by region. In this figure, when a company reports an obstacle as being a major one to investment, it is given a weight of 1, whereas if the impediment is considered to be a minor one the weight assigned is 0.5. Hence, the sum of obstacles varies in the range of zero to nine.

Periphery is clearly tilted to the right compared to Other economies and the Cohesion region. This means that the countries that have been most hit by the economic crisis tend to report a higher number of obstacles (more firms report several impediments), even several years after the end of the sovereign debt crisis. In Periphery, the mode of the distribution is located between five and six obstacles, with this range reported by about 16% of the corporations. Differently, for Other economies, the mode value is located between one and two barriers to investment. Cohesion countries are somewhere in the middle, with the higher proportion of companies reporting between three to five obstacles. Overall, half of the corporations report more than five obstacles in Periphery, compared with four in Cohesion and three in Other economies.

One would expect some degree of correlation among the impediments reported, as some obstacles may be linked by nature. For instance, business regulation tends to develop with labor regulation. Also, if a corporation perceives a lack of demand, then it is quite possible that the same firm will also report a high level of uncertainty about the future, given the link

⁵ **Cohesion countries include:** Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia. **Periphery countries include:** Cyprus, Greece, Ireland, Italy, Portugal and Spain. **Other economies include:** Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden and the United Kingdom. In 2017, Cohesion, Periphery and Other economies accounted respectively for 8%, 23% and 69% of EU GDP.

CORRELATION BETWEEN REPORTED LONG-TERM OBSTACLES TO INVESTMENT (a) (b)
Percentages (%)

TABLE 1

	Uncertainty	Skills	Business	Labor	Demand	Energy	Finance	Transport	Digital
Uncertainty		17.8	35.3	32.9	37.2	32.2	37.1	28.7	27.8
Skills	17.8		26.2	32.9	26.8	30.3	19.3	27.3	31.6
Business	35.3	26.2		53.2	25.5	37.7	30.0	38.0	33.2
Labor	32.9	32.9	53.2		24.2	38.0	28.0	36.2	37.5
Demand	37.2	26.8	25.5	24.2		30.4	35.8	32.5	30.2
Energy	32.2	30.3	37.7	38.0	30.4		30.5	38.9	39.5
Finance	37.1	19.3	30.0	28.0	35.8	30.5		33.3	30.8
Transport	28.7	27.3	38.0	36.2	32.5	38.9	33.3		41.4
Digital	27.8	31.6	33.2	37.5	30.2	39.5	30.8	41.4	

SOURCES: EIBIS-16 and EIBIS-17.

a EU-wide results.

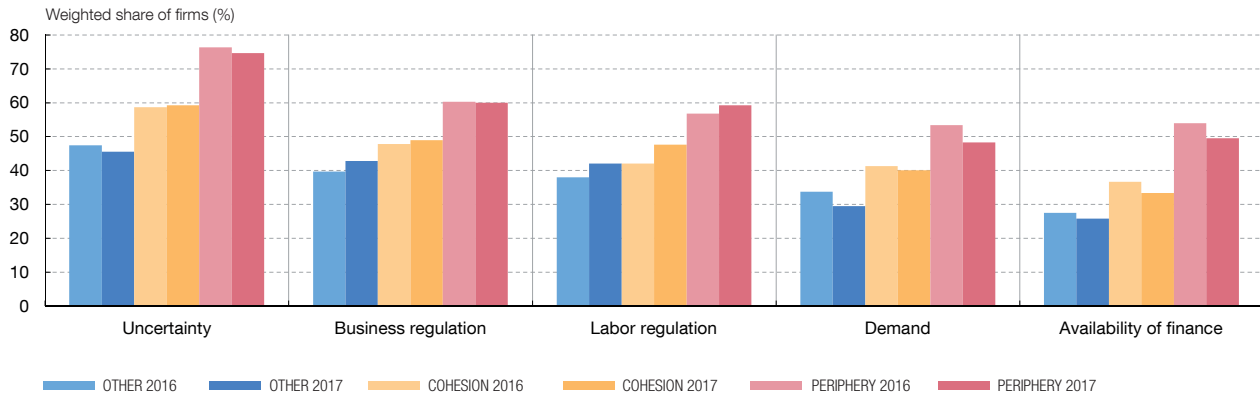
b The color of the cells indicate the magnitude of the correlation. Dark green, green and light green reflect correlation above 50%, 35% and 20%, respectively.

between demand and uncertainty (Bloom, 2009). Besides, the company profile will clearly affect the impediments observed: a firm that is labor-intensive is more likely to report lack of staff with the right skills and at the same time claim that labor market regulation is an obstacle to investment.

Table 1 reports the correlation matrix among the nine obstacles. It shows that correlation is always positive and, in general, relatively high. The relationship is the strongest between labor and business regulation (53%), given that both obstacles capture dimensions of the regulatory framework of a country and hence co-move. Conversely, correlation is weakest between uncertainty and availability of staff with the right skills (18%).

By definition, some factors seen as potential obstacles to investment are very specific, and presumably do not affect all firms. For instance, availability of transport and digital infrastructure, energy costs and staff with adequate skills are likely to matter differently across sectors: energy costs may be more of a source of concern for industrial corporations than in services. Adequate transport is less relevant in the services industry, apart from the transportation sub-sector, while digital infrastructure will matter more, especially compared to the construction sector. According to Table 1, transport, digital and energy obstacles are quite intercorrelated: correlation between transport and digital infrastructure amount to 41% and correlation between energy costs and digital infrastructure to 40%. These high correlations may reflect the level of development of the country or the social choices towards public goods, as more developed economies tend to have better infrastructure. Staff with the right skills is the impediment that shows the lowest relationship to any other.

Alleviating investment impediments arising from skills, energy, transport and digital infrastructure requires specific or sectorial policies and targeted interventions, as they do not reflect the macroeconomic environment and are likely to be perceived asymmetrically among



SOURCES: EIBIS-16 and EIBIS-17.

a The weighted proportion of firms reporting each obstacle is constructed as follows: if an obstacle is reported as a major it is given a weight of 1, whereas if it is reported as a minor, its weight is 0.5.

corporations. Conversely, access to financing, lack of demand, the level of uncertainty and the regulatory framework (both for business and labor) are economy-wide and are likely to affect all the corporations, albeit to a different extent. In the rest of this study, we focus on these five obstacles, as they can be addressed with the macroeconomic or competition policy toolkit. Chart 2 breaks down the EU sample among the three regions already considered to show the proportion of firms reporting each obstacle, one by one.

The conclusions obtained for each obstacle separately are similar to those reached for the sum of obstacles: each impediment, irrespective of its nature, is reported by a higher proportion of firms in Periphery than in Cohesion. In all cases, the proportion is above that recorded in Other economies. Interestingly, the ranking of impediments is similar across regions and over the two waves: uncertainty is the most reported impediment, with a noticeable difference also between Periphery, where it is reported by around 75% of corporations, and less in Other economies, where it is reported by less than 50% of firms. Business and labor regulations are next, in a very narrow range. They are reported in each region and each year with a very similar proportion. Then follows demand. Availability of finance is the least reported, but with a wide gap between Other economies (around 27% on average) and Periphery (about 52% on average).

For most impediments and each region, the proportion decreases from 2016 to 2017. The improvement is relatively modest overall, but somewhat stronger for the availability of finance and demand, especially in Periphery. Indeed, differences across time are much less pronounced than differences across regions.

We have drawn some stylized facts regarding the impediments to investment over time and across regions. Now, we illustrate how each of the five impediments is tied to an investment channel, traditionally captured through macroeconomic indicators. We show that, across countries, the survey-based indicator correlates rather well with the macroeconomic indicators traditionally used.

3 Illustrating the main investment channels

The use of granular data to provide information on impediments to investment is an interesting feature of the EIBIS, especially since these can be associated with firms' characteristics at the individual level. Each of the impediments considered in the paper illustrates a channel developed in the literature on investment, the intensity of which can be then estimated at the granular level assuming that the survey-based measures reflects the macroeconomic counterpart. In turn, macroeconomic proxies have been constructed to provide information on the intensity of the channel. Taking each impediment one after the other, we show what the channel illustrates and how it compares with its macroeconomic counterpart. For each impediment, we correlate a measure obtained by aggregating across corporations of each country, with an objective economy-wide measure. We thereby show that the questions related to impediments provide a granular counterpart to more traditional measures based on hard data. This supports the use of the survey answers as an alternative measure upon which cross-sectional analysis can be conducted.

3.1 Economic activity and growth opportunities

The role of economic activity and growth opportunities in determining investment has been corroborated by numerous theoretical and empirical studies.⁶ In a standard neoclassical model with perfectly competitive markets and no informational frictions, investment will only be a function of Tobin's q ,⁷ adjusted for the relative prices of investment goods and tax rates. In turn, Tobin's q highlights the role played by growth opportunities and the user cost of capital.⁸ The Keynesian approach to investment puts more emphasis on the role of demand expectations and the way agents form these expectations. Investment decisions are driven by firms' expectations about future profitability (Keynes, 1936). Tobin's q has been extensively used to predict investment spending and to control for firms' current and future profitability in empirical studies of corporate behavior (Tobin, 1969; Hayashi, 1982; Erickson and Whited, 2000).

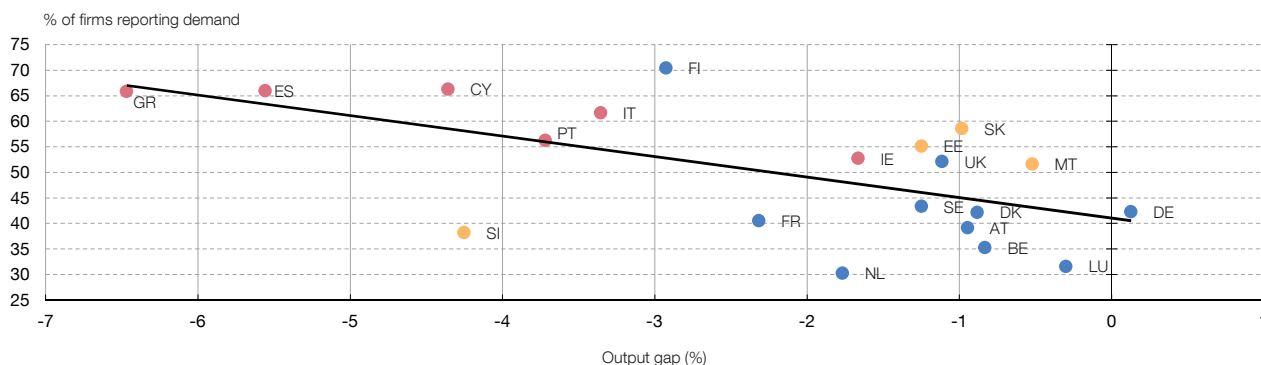
Chart 3 shows that, across countries, the share of firms reporting the lack of demand as an obstacle (either major or minor) to investment correlates negatively quite well (reaching -35%) with the average output gap recorded in the years prior to the survey (period 2013-2016). A smaller output gap, which reflects less slack and stronger demand in the economy, is accompanied by a smaller proportion of corporations reporting demand as an impediment to their investment plans. Chart 3 also shows that there are important differences across groups of countries. Countries in Periphery, Cohesion and Other economies are plotted in light red, yellow and blue, respectively.⁹ Most of the countries included in Periphery are located in the upper left-hand part of the chart, which means that they tend to have a more negative output gap as well as more firms perceiving a lack of demand. Conversely, countries from the Other region are located in the lower right-hand part of the figure.

⁶ See Oliner *et al.* (1995) for an empirical survey of the literature.

⁷ Tobin's q is defined as the ratio between the market value of a firm and the replacement cost of its assets. This statistic depends on the firm's profitability and the financial market's required rate of return.

⁸ See Caballero (1999) for an excellent survey of the theoretical literature.

⁹ The same signalling colors are used in the Charts: 4, 5, 6, 8 and 9.



SOURCES: EIBIS-16, EIBIS-17 and IMF.

a Output gap calculated as actual GDP minus potential GDP, reported as a percentage of potential GDP.

3.2 Uncertainty

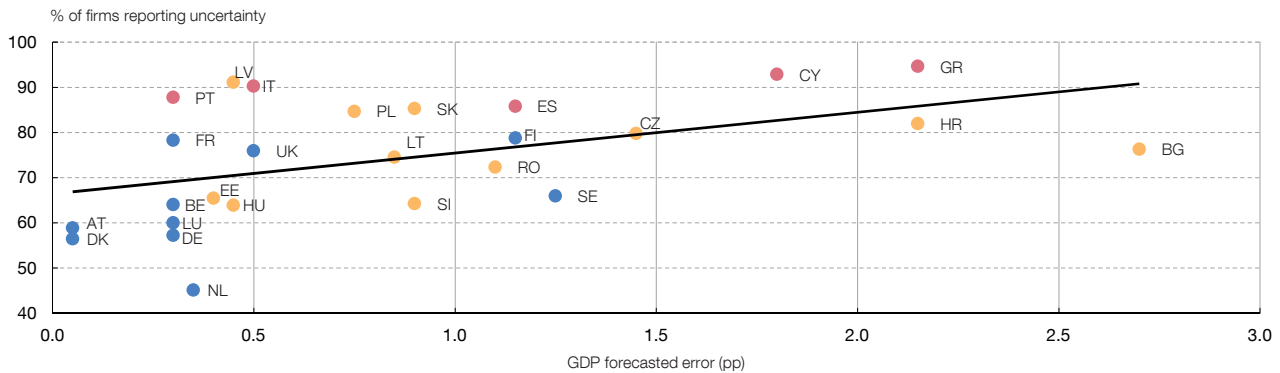
Another branch of the literature highlights the role of uncertainty as an additional relevant determinant of investment. Uncertainty may affect investment through different channels. According to the real option theory, as long as investment projects are (even partially) irreversible, uncertainty shocks may increase firms' incentives to delay investment until some of the uncertainty resolves. This generates the so-called "wait-and-see" effect, which affects both the timing and the level of investment.¹⁰ On the other hand, some authors highlight the role of financial distortions as the most relevant mechanism through which uncertainty materializes. Arguably, periods of higher uncertainty may exacerbate the consequences of financial frictions and credit tightness.¹¹

An empirical validation of the adverse effects of uncertainty appears challenging, as there is no consensual measure of uncertainty. Different authors propose different ways to measure uncertainty with the aim of studying the impact of aggregate uncertainty on macroeconomic dynamics.¹² Only a few studies consider the impact of uncertainty on investment using firm-level data. Julio and Yook (2012) find a negative effect of political uncertainty on corporate investment for a large panel of countries considering election dates as a source of exogenous variation of uncertainty. Using the Economic Policy Uncertainty Index developed by Baker *et al.* (2016), Gulen and Ion (2016) assess the impact of policy uncertainty on US corporate investment. They find a negative average effect which is further amplified for firms undertaking investment projects which are more irreversible, as one would expect according to the "wait-and-see" effect. In a similar vein, the work of Dejuán and Guirelli (2018) investigates the role of policy aggregate uncertainty on investment for the case of Spain using firm-level data. The authors find evidence that policy uncertainty reduces the corporate investment rate. In addition, they show that firms with in a worse financial situation are more affected by uncertainty. Their results are consistent with the financial friction channel developed below.

¹⁰ See, among others, Bernanke (1983), Pindyck (1991), Bertola and Caballero (1994) and Abel and Eberly (1994).

¹¹ See Gilchrist *et al.* (2014), Christiano *et al.* (2014) and Arellano *et al.* (2016).

¹² See Bloom (2009), Bachmann *et al.* (2013), Jurado *et al.* (2015), Basu and Bundick (2017).



SOURCES: EIBIS-16, EIBIS-17 and European Commission.

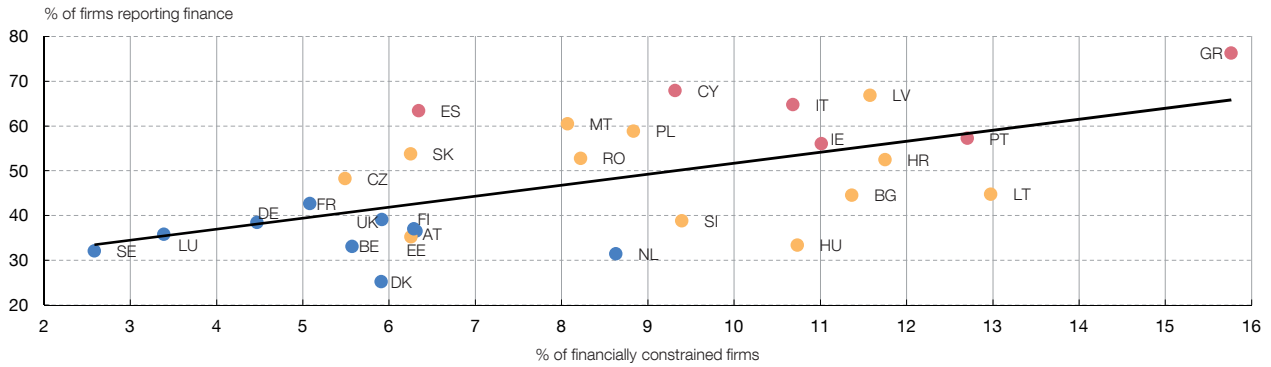
a The GDP forecasted error based on European Commission forecasts. See the main text for more details.

As a measure of uncertainty, we use the forecast error on GDP in 2016 and 2017, based on the European Commission economic projections released in autumn of the preceding year. For each year, we take the absolute difference between forecasts made in autumn of the previous year and the actual GDP growth rate. The results are shown in Chart 4. There is indeed a positive correlation between the macroeconomic measure of uncertainty and the survey-based measure, amounting to 23%. Across countries, the higher the share of firms reporting uncertainty as an impediment, the lower the ability to forecast. The positive correlation gives credit to the survey-based measure of uncertainty.

3.3 Financial frictions

Modigliani-Miller's theorem (1958) established the basis of modern thinking about the capital structure of a firm. The theorem states that in an efficient market, and in the absence of taxes, bankruptcy costs, agency costs, and asymmetric information, the value of a firm is unaffected by how that firm is financed, so that its liability structure is irrelevant. Since then, scholars have recognized that frictions in capital markets make the financing structure an important determinant of corporate investment. Firms make investment decisions subject not only to expected profit determinants (demand and prices) but also to a full range of choices regarding their capital structure (internal funds, debt and equity financing), where external funds are costly owing to agency problems in financial markets. Indeed, the conditions through which they access external funds matter for their investment decisions.

Empirical evidence suggests a significant role of financial frictions in explaining investment dynamics. At the macroeconomic level, different methodologies have been proposed to estimate financial conditions and provide a structural identification to analyze the drivers behind their variations (Gilchrist *et al.*, 2014, Darracq-Parriès *et al.*, 2014, Maurin *et al.* 2018). At the microeconomic level, the seminal work of Fazzari *et al.* (1988) provides evidence that financial constraints have a significant effect on investment through the cost of raising external finance. Since then, a large body of the literature has been looking at the sensitivity



SOURCES: EIBIS-16, EIBIS-17 and IMF.

a The proportion of financially constrained firms is derived from the EIBIS survey. See the main text for a detailed explanation on how this indicator is built.

of investment to firms' internal funds while controlling for investment opportunities as proxied by Tobin's q .¹³ In spite of the widely accepted motivation of these studies, disentangling causality remains controversial and unresolved. Furthermore, the work of Kaplan and Zingales (2000) opened a debate on whether the sensitivity of investment to cash flows is a reliable measure of the severity of financing constraints. Cash flows may appear to be associated with investment because of measurement errors in average Tobin's q , which is an imperfect proxy of marginal q .

Other papers rely on survey data to assess the effect of financial constraints on real variables.¹⁴ The key advantage here is that, even if financial frictions are not observable, questions to firms about their problems when accessing credit provide a way to construct direct measures of financial constraints.

We compile a finance constraint indicator based on the EIBIS. A firm is financially constrained if any of the following situations occur: its loan applications have been rejected; it has only been granted a portion of the funds requested; the loan was extended but at a cost that it considers to be too high; and the company did not apply for external financing because it thought it would be turned down. The indicator, constructed for each firm, can be aggregated to provide a proportion of financially constrained firms. This gives an objective measure of the degree of finance constraints at the country level.

In Chart 5, we correlate this measure, by country, with the share of firms reporting finance as a long-term impediment to investment, a more subjective measure. The two indicators correlate positively, with a correlation amounting to 34%. Therefore, the less financially constrained a company is, the less likely it is to report availability of finance as an obstacle. By region, as expected, Other economies are concentrated in a low percentage of financially constrained firms

¹³ In a similar vein, other authors study whether firms' specific characteristics that determine creditworthiness and access to finance, namely the firm's balance sheet structure, debt burden and profitability ratio, will affect investment decisions through the credit channel. See, among others, the work of Bond and Meguir (1994), Estrada and Vallés (1998), Hennessy *et al.* (2007) and Herranz and Martínez-Carrascal (2017).

¹⁴ See Beck *et al.* (2005), Campello *et al.* (2010), Ferrando and Mulier (2015), Coluzzi *et al.* (2009), García-Posada (2018).

and low levels of corporations claiming finance as an impediment, while the rest of the countries are distributed along this relationship.

3.4 Regulation, taxation and judicial system efficiency

Regulation, taxation and judicial system efficacy may also affect investment decisions. Policy-makers highlight that structural policies aimed at improving the regulatory environment, reducing barriers of entry for firms and increasing the overall flexibility of labor and product markets are investment-enhancing measures (ECB, 2016).

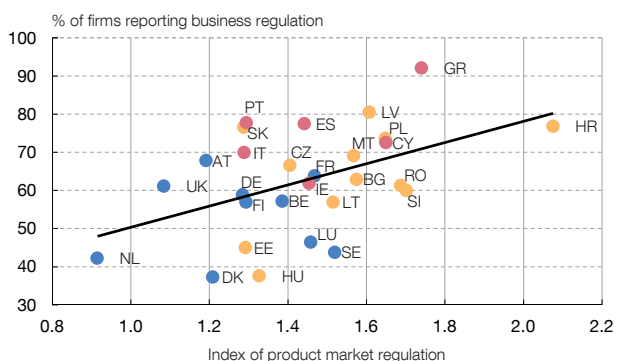
The regulatory environment may affect investment decisions in different ways. First, it may have a direct effect on capital adjustment costs. As suggested by Alesina *et al.* (2005), red tape costs and other administrative impediments imply costs of doing business. Their stylized theoretical framework provides an underpinning for a positive effect of a decrease in the cost of firms to adjust their capacity on investment. Second, barriers to entry will affect the number of firms in a given market, which may in turn impact the optimal capital stock and consequent investment flows. Using an indicator of entry barriers which comprises legal restrictions and vertical integration, Alesina *et al.* (2005) estimate a dynamic model of investment. Their findings suggest a negative relationship between barriers to entry and investment. In addition to this, Beck *et al.* (2005) analyze the impact of financial, legal and corruption obstacles on firms' growth using a cross-sectional survey conducted by the World Bank.¹⁵ They find a negative correlation between the obstacles considered and firms' growth. Furthermore, the magnitude of the effect is found to be higher for smaller firms.

Finally, investment is sensitive to the quality of the institutional framework, which comprises both regulations and enforcement institutions. More specifically, investment contracts may be subject to default risks due to hold-up problems arising from the potential irreversibility and specificity of investment decisions. Therefore, a stable framework of relationships between companies needs mechanisms that guarantee the enforcement of contracts, such as the judicial system. The seminal paper of Acemoglu and Johnson (2005) evaluates the importance of "property rights institutions" and "contracting institutions" in affecting economic growth, investment and financial development. Their findings point to an important role of different proxies of property rights institutions and contracting institutions on the investment-to-GDP ratio for a large panel of developed and developing countries. In addition, García-Posada and Mora-Sanguinetti (2014) focus on the role of the design and efficacy of enforcement institutions (judicial system) on firms' entry and exit rates. They find that higher judicial efficacy increases firms' entry rate, whereas no effect seems to be present for the case of the exit rate. Overall, the existing evidence seems to suggest that a well-functioning judicial system is essential to create the appropriate environment for investment decisions to be made.

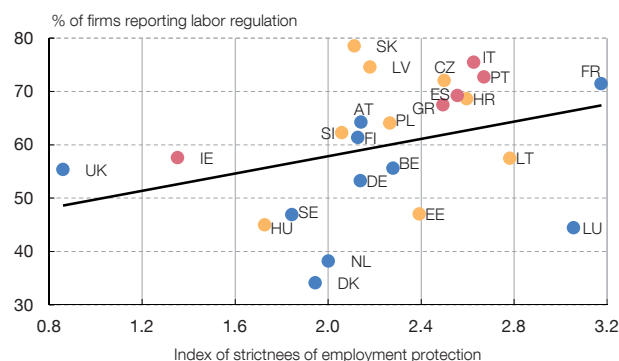
Chart 6 shows the relationship between measures of the intensity of the regulatory framework elaborated by the OECD and the share of firms in each country that report regulation

¹⁵ World Business Environment Survey.

1 BUSINESS REGULATION AS AN OBSTACLE AND PRODUCT MARKET REGULATION (a)



2 LABOR REGULATION AS AN OBSTACLE AND STRICTNESS OF EMPLOYMENT PROTECTION (b)



SOURCES: EIBIS-16, EIBIS-17 and OECD.

- a A higher value of the index indicates a more stringent product market regulation.
- b A higher value of the index indicates a stronger employment protection.

as an impediment. On the one hand, in Chart 6.1, business regulation is correlated with the Product Market Regulation Index. The latter is a comprehensive and internationally comparable indicator that measures the degree to which policies promote or inhibit competition in areas of the product market. On the other hand, in Chart 6.2, labor market regulation from the survey is correlated with the Strictness of Employment Protection Index, which measures the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts.

In both figures, the correlation is positive, as the trend line is upward-sloping. It is somewhat steeper and more intense (R-squared 22%) in the case of the business obstacle than in that of the labor market (R-squared 11%). Therefore, as firms pursue their activities in an environment where the regulatory pressure is high, then they are more likely to feel that regulation (either relating to the labor market or to businesses in general) is an obstacle to their investment. Both figures also illustrate that, in the case of regulation, there are no clear differences by groups of countries, as occurred in the obstacles of demand and finance.

4 Characterizing the firms that report obstacles to investment

In the previous section, we have provided evidence that the survey answers received from corporations are indeed linked to a more objective measure of what the question intends to reflect. At the aggregated level, across countries, this association between hard data, based on measurements, and soft data, based on survey answers, suggests that the latter also provide an objective signal. We now turn to the subjective part of the individual answers. We show that, to some extent, firms' perceptions reflect or are also influenced by their own characteristics.

In the first step, we estimate a cross-sectional regression, equation (1). We project the sum of the obstacles reported by each firm onto a set of characteristics. Each firm can report between 0 and 5 obstacles. The two vintages of the EIBIS are stacked so that firms and years are compacted. They are treated as one observation i , reflecting both a firm and a reporting year.

$$\sum \text{impediment}_i = \alpha_c + \alpha_t + \beta_1 \text{prof}_i + \beta_2 \text{indebt}_i + \beta_3 \text{liquid}_i + \beta_4 \text{size}_i + \text{sector and age dummies} + \varepsilon_i \quad (1)$$

where α_c and α_t denote country and time dummies; *prof* refers to profitability ratio, measured as profits before interest and taxes relative to total assets; *indebt* is the indebtedness ratio, measured as interest-bearing debt relative to total assets; *liquid* is the liquidity ratio, measured as cash equivalents relative to total assets; and *size* is defined as the log of total assets. The equation also incorporates *sector* and *age* dummies. *Age* is a binary variable that takes the value of one if the firm has been operating for less than ten years and zero otherwise.

The distribution of the variables derived from the balance sheet or P&L is plotted in Annex II. Substantial differences can be observed across regions: over the period, based on the EIBIS-ORBIS matched sample, firms in Cohesion countries are smaller and tend to be less leveraged. Reflecting the worse economic environment at that time, firms in Periphery tend to have a lower cash ratio and lower returns on assets. To tackle the difference across regions, equation (1) is estimated on EU corporations on the whole as well as distinguishing them by Periphery, Cohesion and Other economies separately. Table 2 presents the results.

In all the cases, larger firms report fewer obstacles, a relationship significant at 99% in the EU and Cohesion, at 95% in Periphery and at 90% in Other economies. Young firms tend to report more obstacles, but the difference is not significant at the 90% threshold. Age is likely to be correlated with size, which is measured as a continuous variable in the regression. Therefore, size may capture the effect better, thereby explaining why age does not appear significantly in the regressions. Corporations that are more profitable tend to report less impediments, as the sign of the coefficient on the profitability ratio is negative. The effect is significant at 99% for the EU as a whole and for Cohesion. Similarly, firms with a higher liquidity ratio tend to report fewer obstacles. The effect is significant at 99% in the EU, and 90% in Cohesion and in Other economies. Conversely, firms that are more indebted tend to report more obstacles. The effect is significant at above 95% everywhere except in Periphery. Across sectors, firms operating in the construction sector tend to report more obstacles. The effect is significant at 99% in the

	EU	Periphery	Cohesion	Other
Profitability ratio _{t-1}	-0.490***	-0.678	-0.586***	-0.211
Indebtedness ratio _{t-1}	0.158***	0.205	0.110***	0.284**
Liquidity ratio _{t-1}	-0.387***	-0.191	-0.293*	-0.520*
Size (log of assets)	-0.053***	-0.038**	-0.068***	-0.047*
Young firm (<10 years)	0.016	0.041	-0.009	0.025
Construction sector	0.204***	0.317***	0.267**	0.044
Services sector	0.036	0.058	0.052	-0.001
Infrastructure sector	-0.069	-0.104	-0.137	0.003
Observations	8,402	1,808	3,420	3,174
R-squared	0.178	0.069	0.084	0.095

SOURCES: EIBIS-16, EIBIS-17 and ORBIS.

a The coefficients are obtained from a linear regression model with country and year fixed effects.

b The standard errors are corrected and clustered at country level. *, ** and *** indicate significance at confidence levels of 90%, 95% and 99%, respectively.

EU and in Periphery, at 95% in Cohesion, and not significant in Other economies. The fact that some coefficients are not significant in some regions might reflect the relatively small sample size rather than a weak relationship, this happens particularly in the Periphery and, to a lesser extent, in Other economics. With more waves of EIBIS coming up each year, this issue should fade over time.

Overall, this simple exercise shows that “weaker” firms – defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions – tend to report more obstacles. Also, all other things being equal, firms in the construction sector tend to report more impediments. The relationships may be interpreted in two different ways. First, they may show degree of endogeneity, as firms tend to be weaker where the economic environment is less favorable. In this sense, weaker firms are precisely the product of lower demand, more uncertainty and more difficulty in accessing finance, which is why they might tend to report more impediments. Second, the relationships could also reflect some bias in their assessment of the barriers they actually face.

To analyze further this possibility, we turn in a second step to estimating a probit regression for reporting each impediment separately. In equation (2), reporting an impediment *type* by firm *i* is explained by a probit model which includes the same dependent variables as in equation (1): profitability, indebtedness, liquidity, size and, sector and age dummies. As before, the model includes country and year fixed effects.

$$\text{impediment}_i^{\text{type}} = \text{probit} (\alpha + \beta_1 \text{prof}_i + \beta_2 \text{indebt}_i + \beta_3 \text{liquid}_i + \beta_4 \text{size}_i + \text{sector and age dummies}) + \varepsilon_i^{\text{type}} \quad (2)$$

Table 3 reports the average marginal effect of each variable for each of the reported impediments. This corresponds to the change in the probability of reporting an obstacle associated with a unit increase in the explanatory variable when all the variables are at their mean values.

PROBIT REGRESSION MODEL OF THE PROBABILITY OF REPORTING A GIVEN OBSTACLE (a) (b)
Average marginal effect in percentage points (pp)

TABLE 3

	Uncertainty	Demand	Business reg.	Labor reg.	Availab. Finance
Profitability ratio _{t-1}	-0.114***	-0.115***	-0.041	-0.054	-0.225***
Indebtedness ratio _{t-1}	0.010	-0.019	0.019	0.002	0.206***
Liquidity ratio _{t-1}	-0.065*	-0.042	-0.084*	-0.081*	-0.224***
Size (log of assets)	-0.004	0.004	-0.005	-0.013***	-0.019***
Young firm (<10 years)	-0.020	-0.025	0.013	0.013	0.022
Construction sector	0.025	0.018	0.076***	0.030**	0.066***
Services sector	-0.009	-0.002	0.056***	0.013	-0.001
Infrastructure sector	-0.028*	-0.057***	0.016	-0.033*	-0.005
Observations	8,210	8,186	8,258	8,235	8,282
Pseudo R-squared	0.065	0.039	0.060	0.053	0.081

SOURCES: EIBIS-16, EIBIS-17 and ORBIS.

- a** The coefficients are obtained from a probit regression model with country and year fixed effects.
b The standard errors are corrected and clustered at country level. *, ** and *** indicate significance at confidence levels of 90%, 95% and 99%, respectively.

The results are broadly consistent with the conclusions found for the sum of the impediments at the EU level. Higher profitability or liquidity ratios and a lower indebtedness ratio tend to reduce the probability of a corporation reporting an obstacle to investment irrespective of its nature. However, the magnitude of the effect varies across types of impediment and it is not always significant even at 90%. In several cases, the differences appear relatively intuitive when looking at the nature of the explanatory variable and the associated type of impediment.

For instance, in absolute terms, the impact of the profitability ratio on the probability of reporting an impediment is higher (and significant at the 99%) for uncertainty, demand and availability of finance for which the sensitivity is highest. Those are impediments of a more cyclical nature, such as the profitability indicator. Given their similar nature, it is therefore not surprising that they tend to share a more intense relationship. Conversely, the probability of reporting regulation as an impediment is not significantly affected by the profitability ratio. While in specific cases, at the sectoral level and after the change is implemented, a change in regulation is associated with a variation in the profitability ratio, in general and over time, variations in the profitability ratio scarcely reflect regulatory changes.

A stronger liquidity ratio also reduces the likelihood of reporting an impediment, especially for the availability of finance and, to a lesser extent for regulation (both business and labor) and uncertainty. In fact, liquidity or cash position are likely to act as buffers in uncertain times, so this reduces the likelihood of perceiving uncertainty as an impediment. The relatively stronger relationship between labor regulation and the liquidity ratio also appears relatively intuitive. Labor regulation tends to prevent the capacity for corporations to adjust labor demand in the face of an adverse shock in activity. Hence, stronger labor market regulation raises the need to hoard liquidity buffers to cover for the wage bill in the event of a temporary slowdown. This channel may explain why, other things being equal, a lower liquidity ratio increases the likelihood of reporting

labor regulation as an obstacle more than that of uncertainty and demand. Besides, a higher cash position reassures the lender, as it is associated with reduced liquidity risk. Hence, finance is less of a problem for firms with higher liquidity ratios.

Finally, the indebtedness ratio appears to have a significant impact at more than 90% only on the availability of finance, in fact at the 99%. Indeed, a firm's indebtedness is one of the first signals looked at by the lender when a loan is requested in order to assess the company's solvency and, therefore, its credit risk. A higher indebtedness ratio reduces the remaining amount of unencumbered assets that the lender can request as collateral, while it increases the risk of non-payment by raising the interest rate burden.

For most of the impediments, *ceteris paribus*, larger corporations tend to report fewer obstacles. The effect is significant for labor regulation, which large corporations can tackle more easily, and availability of finance, as larger companies can have access to intra-group funding. Finally, looking at sectors, uncertainty, labor regulation and demand tend to be less reported as an impediment by the infrastructure sector. All other things being equal, firms in the construction sector tend to report more often impediments from the regulatory (business and labor alike) side. They also tend to report more barriers from the financial side. This probably reflects some legacy stigmas of the most recent economic crisis, resulting partly from a construction boom in some countries. Finally, firms in the services industry tend to report more often business regulation as a barrier.

The results developed in this section show that “weaker” firms – defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions – tend to report more impediments and to report each obstacle more often. At the same time, differences in the frequency of reporting an impediment can be rationalized by the nature of the impediment and what the related variable measures. The role of profitability is higher for reporting finance, uncertainty or demand as impediments. Liquidity matters most for the perception of uncertainty and availability of finance, whereas regulation is a more prevalent impediment for firms in the construction sector.

5 Do reported investment barriers explain investment gaps?

5.1 Interpreting the reported investment gap

The EIBIS poses a question related to the investment gap perceived by the firms in the three years prior to the survey. Corporations are asked if their level of investment over that period was enough to ensure the success of the company going forward (question 24 of the general module questionnaire) To this question, the firms can answer “too much”, “about the right amount”, “too little” or “don’t know/refused to answer”. In the following exercise, we exclude the firms that refused to answer, score the firms reporting having invested too little with a one and all the others (those which report having invested the right amount or too much and those which don’t know) with a zero. Summing up the answers, we can obtain the proportion of firms reporting an investment gap. In the analysis, we make this proportion conditional upon firms’ characteristics.

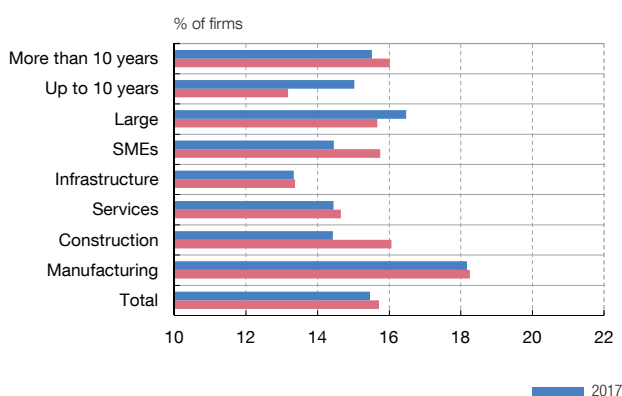
In Chart 7.1, the proportion of firms reporting having invested too little is shown for the entire EU and the two years spanning 2016 and 2017. The sample of corporations is broken down and the proportion is conditional upon the sector of activity, size and age of the firm.

Over the two years, there is a very moderate decline in the proportion of firms reporting an investment gap, having invested less than what they think they should have done, from 16% in 2016 to 15% in 2017. Looking across sectors, a higher proportion of firms report an investment gap in the manufacturing sector and a lower proportion in the infrastructure sector. With the proportion ranging from 18% to 13%, the differences remain relatively minor in absolute terms, but not in relative terms. From 2016 to 2017, the biggest improvement is recorded in the construction sector, where the share of firms reporting a gap declined from 16% to 14%. Looking across size, starting with the same proportion in 2016 (16%), SMEs tend to report a lower investment gap than large corporations in 2017, a 2 pp difference. Finally, “older” firms, those that have been operating for more than 10 years, consistently report a higher investment gap.

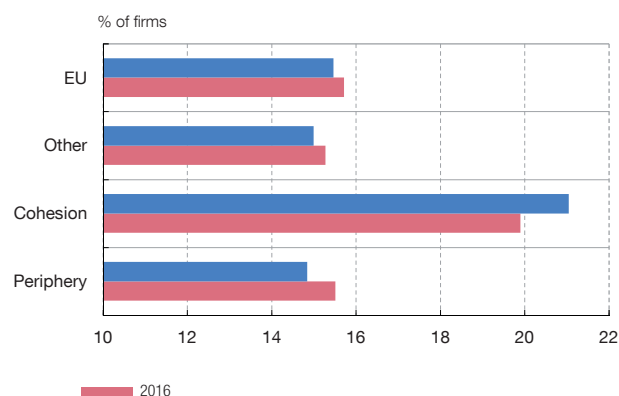
REPORTED INVESTMENT GAP (a)

CHART 7

1 COMPARISON ACROSS CORPORATIONS AND WAVE



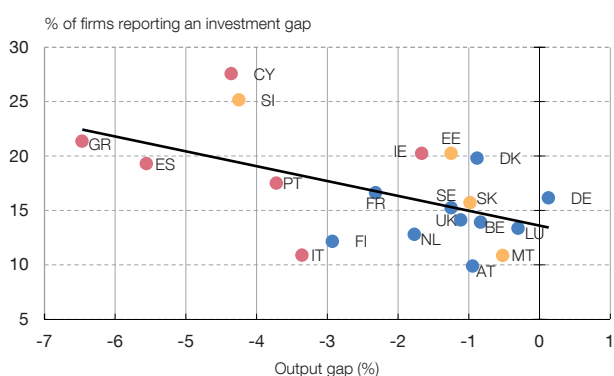
2 COMPARISON ACROSS REGIONS AND WAVE



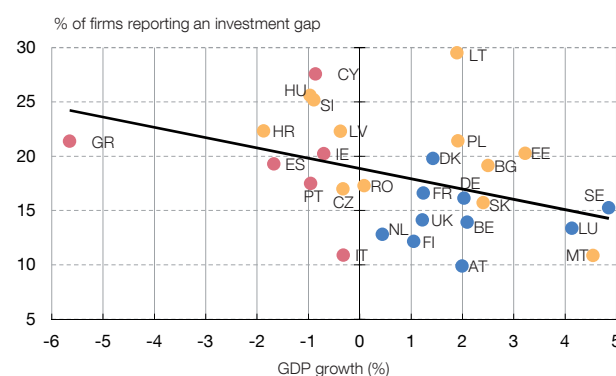
SOURCES: EIBIS-16 and EIBIS-17.

a These figures are based on question 24 of the survey.

1 INVESTMENT GAP AND OUTPUT GAP (a) (b)



2 INVESTMENT GAP AND REAL ECONOMIC GROWTH (a) (c)



SOURCES: EIBIS-16, EIBIS-17, IMF and Eurostat.

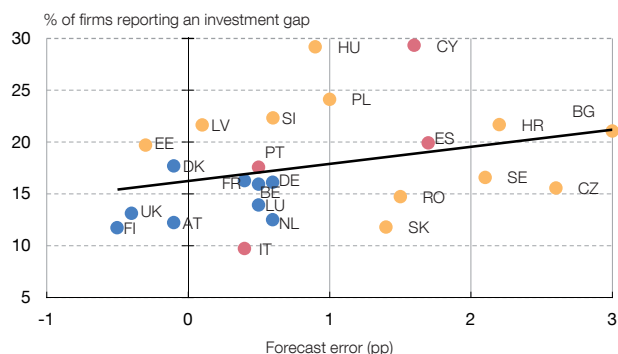
- a Investment gap averaged across EIBIS-16 and EIBIS-17.
- b Output gap as a percentage of GDP.
- c Average yearly real GDP growth over the period 2008-2013.

Chart 7.2 reports the breakdown across regions, for the three country groups. It can be seen that the investment gap is largest in Cohesion, reaching 21% in 2017, above the EU average of 15%. Moreover, in this region, the gap widens from 2016 to 2017, albeit marginally, by just 1 pp. Conversely, in Periphery, the gap narrows in 2017 and also in Other economies, but slightly. To conclude, along with the recovery in the EU, the gap is reported to have narrowed marginally, affecting 15% of firms in 2017. There are some differences at the aggregated level, but most of them appear relatively contained, with the exception of the investment gap in the Cohesion economies.

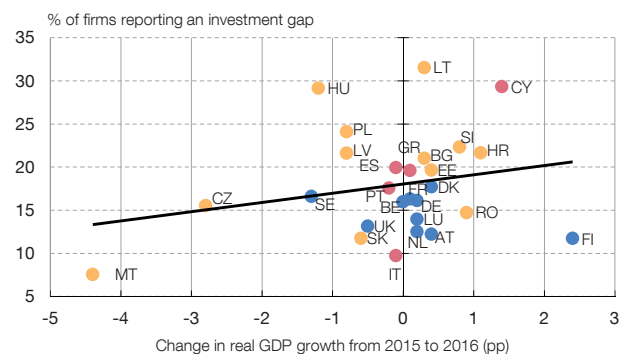
It is possible to correlate the country bottom-up perceived investment gap and macroeconomic aggregates of slack in the economy. We do so using on the one hand output gap estimates (Chart 8.1), and on the other hand real GDP growth (Chart 8.2). It appears that the reported investment gap correlates relatively well with both the output gap and GDP growth. The correlation amounts respectively to -28% and -17% . Weaker economic activity is associated with a higher investment gap and in a country facing a deeper recession (higher output gap), relatively more firms tend to report an investment gap.

Interpreting the investment gap can be somewhat difficult and misleading. The appearance of a gap can result from two very different mechanisms and understanding its nature is a pre-requisite to its normative interpretation. On the one hand, a widening can reflect an unexpected acceleration in activity. Ex-post, this results in a gap as the targeted level of investment was underestimated. In this case, the investment gap is positively correlated with a surprise in activity and does not reflect impediments/tensions. The targeted level of investment was simply not in line with the economic activity ex-post. As such, an investment gap reflects the sluggishness of expectations and the cautious attitude of corporates as much as positive unexpected shocks hitting the economy. On the other hand, an investment gap can reflect the impact of factors preventing investment. Firms are not able to reach

1 INVESTMENT GAP AND UNANTICIPATED CHANGES IN ECONOMIC ACTIVITY (a) (b)



2 INVESTMENT GAP AND ACCELERATION IN ECONOMIC ACTIVITY (a)



SOURCES: EIBIS-16, EIBIS-17, Eurostat and European Commission.

- a Investment gap averaged across EIBIS-16 and EIBIS-17.
- b For each economy, the forecasting error is computed as the difference between actual GDP growth in 2015 and the GDP forecast in the European Economic Forecast Autumn 2014 of the European Commission.

the level of investment targeted for various reasons reported as impediments. The EIBIS can contribute to dissociating these two components.

Chart 9 provides an illustration of the first channel at the macroeconomic level: inadequate investment planning in the face of changes in the pace of economic activity. Both figures provide some support for the sluggishness hypothesis, that firms need time to adjust their investment plans to changes in the demand environment. Chart 9.1 shows that when growth is higher than expected, firms are more likely to report an investment gap. Chart 9.2 also provides evidence of this relationship with actual GDP growth: when growth accelerates (slows down), firms tend to report a higher (lower) investment gap. With an R-squared of 5%, the intensity of the relationship is weaker than with the unanticipated change in economic activity (for which the R-squared reaches 9%). This lower intensity suggests that firms are not myopic; they forecast activity and adjust their investment plan accordingly. Overall, the intensity of the relationship between an unanticipated change in activity and the investment gap remains weak, explaining up to 9% of the cross-country dispersion. This leaves room for the second channel, exogenous to the firm and linked to its economic, financial and regulatory environment. Nonetheless, it is likely that the relationship intensifies when taking into account forecasts of market activity closer to the firms' actual market, such as sectorial forecast. Unfortunately, such forecasts are not publicly available.

5.2 Investment gaps and factors limiting investment: an EU-wide analysis

The question on impediments reported in the EIBIS provides an opportunity to assess the relevance of this mechanism: the extent to which investment gaps arise from the incapacity of corporations to reach their optimal investment level.¹⁶ In what follows, we estimate a probit

¹⁶ Considering perceived investment gaps instead of actual investment growth enables us to leave aside the issue of determining the optimal investment level. Impediments can also affect the optimal investment level, but this is unobserved.

model for the investment gap using information obtained from the question on impediments. The relationship between the investment gap and the impediment is tested successively for each type of impediment using the same equation.

As before, the dependent variable takes the value one if the firm reports having invested too little, and zero otherwise (the firms having refused to answer are omitted). The model is similar to that used in the previous section to explain the investment impediments, namely a static probit model in which the two years of the survey are stacked:

$$\text{gap}_i = \text{probit} (\alpha + \beta_1 \text{prof}_i + \beta_2 \text{indebt}_i + \beta_3 \text{liquid}_i + \beta_4 \text{size}_i + \text{sector and age dummies} + \delta_{\text{min}} \text{dum}^{\text{min}} + \delta_{\text{maj}} \text{dum}^{\text{maj}}) + \varepsilon_i \quad (3)$$

where *prof* is the profitability ratio, *indebt* is the indebtedness ratio, *liquid* is the liquidity ratio, and *size* is the size expressed as the logarithm of total assets. Part of the regression structure incorporates the firm's characteristics, balance sheet, P&L as well as qualitative information, such as age and sector. The latter is especially relevant given the asymmetric situation of the construction sector in the Periphery economies, as well as more generally the different degree of cyclicity across sectors. This part is common to all the equations. Besides, another part of the structure accounts for the reported impediments. These enter as a dummy and are considered separately depending on their intensity: separate dummies are created for major impediment and minor impediment, respectively *dum^{maj}* and *dum^{min}* in the equation. Hence, we interpret the differences in the results with respect to the omitted category: not reporting an obstacle. Two cases are also considered, the case where only the firm's specific characteristics are used, and the case where all the impediments are considered jointly in the same equation.

The results are reported in Table 4. The coefficients in the table indicate the average marginal sensitivity, the change in the probability resulting from a one-unit change in the explanatory variable, when the others stand at their sample-mean.

In all the estimations, firms' specific hard data have the expected sign. First, an increase in profitability is associated with a lower investment gap, a relationship which illustrates the relevance of the internal finance channel and it is significant at the 99% in any specification of the equation. Indeed, a large part of investment is financed internally without recourse to external finance (Chart 10). When corporations have more internal financing capabilities, they are in a better position to finance investment and therefore tend to have a lower investment gap. In the corporate finance literature, this is called the pecking order. Second, more cash holdings are associated with lower gaps, though the effect is not significant. Third, more leveraged companies tend to show higher gaps. A 10 pp increase in the indebtedness ratio is associated with an increase in the probability of reporting an investment gap by between 2.8 pp and 5.1 pp. This can be associated with the debt overhang impact on investment: more leveraged firms tend to invest less, especially in times of financial crisis or following a boom cycle (Kalemli-Ozcan *et al.*, 2018). Interestingly, larger firms tend to report lower investment gaps. After conditioning on the balance sheet variables, for the same profitability and balance sheet ratios, a firm which is twice as large has a lower probability of reporting an investment

PROBIT REGRESSION MODEL OF THE PROBABILITY OF REPORTING AN INVESTMENT GAP (a) (b) (c) (d)
Average marginal effect in percentage points (pp)

TABLE 4

		Without impediments		Impediments one by one			All impediments together	
Profitability ratio _{t-1}		-22.0***	-24.4***	-25.3***	-24.9***	-24.9***	-22.3***	-22.0***
Indebtedness ratio _{t-1}		3.0**	5.0***	4.9***	5.1***	5.1***	2.8**	3.0**
Liquidity ratio _{t-1}		-1.6	-4.8	4.8	-4.6	-4.9	-1.4	-1.6
Size (log of assets)		-0.5**	-0.7***	-0.8***	-0.8***	-0.9***	-0.6**	-0.5**
Young firm (<10 years)		-2.7**	-2.2*	-2.4*	-2.4*	-2.3*	-2.8**	-2.7**
Construction sector		-2.4	-2.0	-2.0	-1.9	-1.7	-2.3	-2.4
Services sector		-3.4**	-3.4**	-3.6***	-3.5**	-3.4**	-3.3**	-3.4**
Infrastructure sector		-5.1***	-5.1***	-5.3***	-5.2***	-5.1***	-5.2***	-5.1***
Uncertainty	Minor		1.9*					0.7
	Major		6.8***					3.2*
Business regulation	Minor			2.2**				-0.4
	Major			4.2***				-0.5
Labor regulation	Minor				2.4***			1.0
	Major				5.0***			2.2**
Demand	Minor					1.7*		-0.9
	Major					4.0***		-0.5
Finance	Minor						4.1***	3.6***
	Major						16.2***	15.1***
Observations		8,204	8,220	8,221	8,220	8,217	8,219	8,204
Pseudo-R squared		0.043	0.049	0.046	0.046	0.045	0.068	0.070

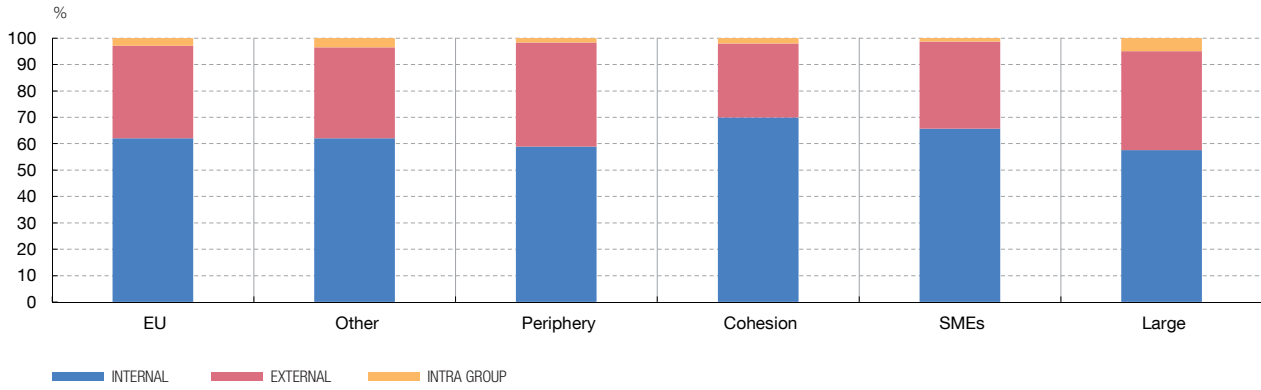
SOURCES: EIBIS-16, EIBIS-17 and ORBIS.

- a The coefficients are obtained from a probit regression model with country and year fixed effects.
b The standard errors are corrected and clustered at country level. *, ** and *** indicate significance at confidence levels of 90%, 95% and 99%, respectively.
c The constant is omitted in these regressions.
d We separate the effect of minor and major obstacles by including two different dummies. The omitted category is "no obstacle" and thus, results must be interpreted according to this baseline. For example, reporting finance as a major obstacle increases the probability of reporting an investment gap by more than 16 pp.

gap, by between 0.5 pp and 0.9 pp, a small but significant effect.¹⁷ It is worth noting that the average marginal effect calculated for the variables common to all the regressions remain robust to the inclusion of the impediment: they remain of the same sign across all the regressions and quite similar magnitude.

Turning to the second part of Table 4, that relating to the impediments, it appears that, in all the cases, even after taking into account their characteristics, the firms that report an impediment to investment have a higher probability of recording an investment gap. Each of the five impediments considered is significant and correctly signed in the regression. Moreover, an impediment reported as minor increases the probability of reporting a gap, but by less than one reported as major, from twice higher in the case of business or labor regulation, to four times higher in the case of finance. Across impediments, the effect varies widely, from 1.7 to 4.1 pp for minor impediments and from 4 to 16.2 pp in the case of major ones. In both cases, reporting finance as an impediment has the highest impact on the gap. When it is major,

¹⁷ In the estimation, size is accounted for a continuous variable, the logarithm of total assets. In other results shown before, two groups are considered: SMEs, defined as having between 5 and 250 employees, and large corporations, having more than 250 employees.



SOURCES: EIBIS-16 and EIBIS-17.

it increases the probability by 16.2 pp. The relationship remains significant and of a very similar magnitude even after considering all the impediments jointly.

Hence, even after controlling for their balance sheet and firms' characteristics, corporations reporting obstacles are more likely to report an investment gap. The most prominent impact is obtained when a corporation reports finance as an obstacle. It reaches 16.2 pp when it is claimed to be a major obstacle. Reporting uncertainty, business regulation, labor regulation and demand as major impediments increases the probability of recording a gap by 6.8, 4.2, 5 and 4 pp, respectively.

5.3 Heterogeneous effects

We now turn to the estimation of the marginal increase in the probability of having an investment gap related to the obstacle faced on different samples. We allow for a differential impact of each obstacle depending, respectively, on the region the corporation belong to, the size of the firm, its profitability and its indebtedness. In this estimation, we do not consider separately obstacles being reported as minor or major (they are given equal weight):

$$gap_i = \text{probit} (\alpha + \beta_1 prof_i + \beta_2 indebt_i + \beta_3 liquid_i + \beta_4 size_i + \text{sector and age dummies} + \delta_{group} dum^{group} + \delta_{obs} dum^{obs} + \delta_{inter} dum^{group} dum^{obs}) + \varepsilon_i \tag{4}$$

where:

$dum^{group} = 1$ if firm belongs to the group considered, 0 otherwise

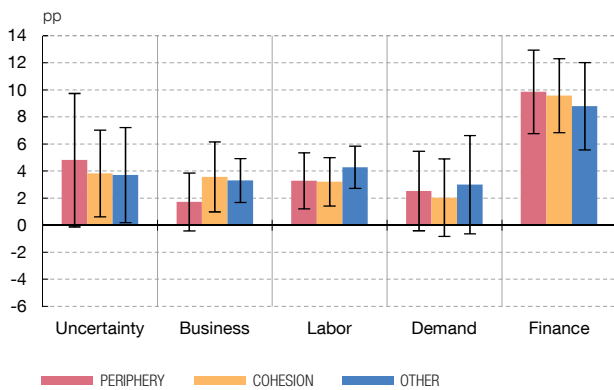
$dum^{obs} = 1$ if firm reports a minor or major obstacle, 0 otherwise

The group dummy (dum^{group}) reflects if the firm belongs to the group considered or not, for instance, whether they are highly indebted or not. The obstacle dummy (dum^{obs}) is defined as before: it takes value one if the firm reports a minor or major obstacle, and zero otherwise. Finally, the inclusion of the interaction term means that we are allowing for differential effects of the different obstacles on the score function depending on the group considered.

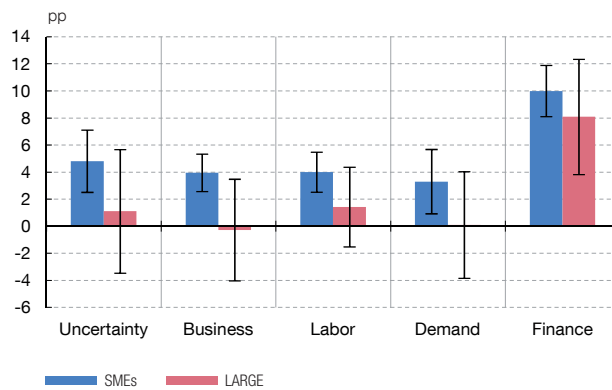
AVERAGE MARGINAL EFFECT FOR EACH OBSTACLE (a)

CHART 11

1 BREAKDOWN ACROSS REGIONS



2 CONDITIONAL UPON FIRMS' SIZE (b)



SOURCES: EIBIS-16 and EIBIS-17.

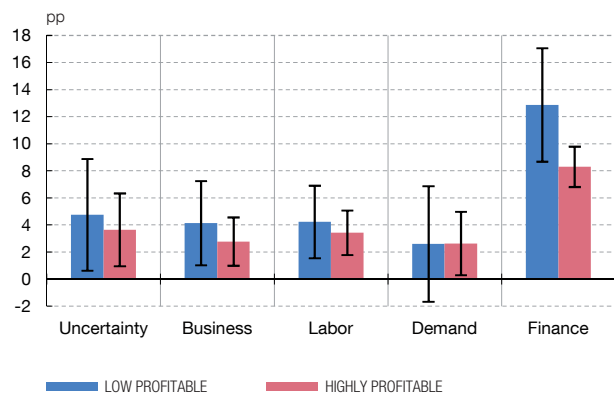
a Estimations based on equation (4).

b Consistent with the literature, SMEs are defined as companies having from 5 to 250 employees. Large corporations are the ones with more than 250 employees.

AVERAGE MARGINAL EFFECT FOR EACH OBSTACLE (a)

CHART 12

1 CONDITIONAL UPON FIRMS' PROFITABILITY (b)



2 CONDITIONAL UPON FIRMS' INDEBTEDNESS (c)



SOURCES: EIBIS-16 and EIBIS-17.

a Estimations based on equation (4).

b Highly (low) profitable enterprises are those with a profit ratio in the last (first) quartile of the distribution.

c Highly (lowly) indebted enterprises are those with a debt ratio in the last (first) quartile of the distribution.

The groupings and related estimations are conducted for the regions, size, profitability and indebtedness. The results are reported in Chart 11 and Chart 12. In each figure, for each impediment, the bar indicates the average marginal effect of reporting an obstacle for each of the groups considered. The vertical range indicates the confidence interval at 95%.

For example, consider the column “Uncertainty” in Chart 11.2. The blue bar depicts the average marginal effect of reporting the uncertainty obstacle on the investment gap for SMEs. The light red bar represents the effect for the case of large corporations. The vertical line reports the confidence interval at 95%. If a confidence interval includes the zero then we can conclude that the effect for the group considered is not significant at the 95% level.

Looking across regions, when reporting uncertainty or finance as an obstacle, firms in the Periphery group are more likely to record an investment gap than firms in the Cohesion or Other economies groups. However, the differences across regions in the average marginal effect remain very small and not statistically significant. This indicates that the geographic dimension is not, over the period considered, the most discriminatory for the relationship between uncertainty and the investment gap. Reporting uncertainty as an impediment has an effect on recording an investment gap which is relatively symmetric across regions. This is true for all the impediments: when reported, they are associated with a higher investment gap. The intensity of the relationship varies very little across regions.

Conversely, the probability of reporting an investment gap increases significantly and irrespective of the nature of the impediment, for small compared to large corporations (Chart 11.2), the least profitable ones (Chart 12.1) and for the most indebted enterprises (Chart 12.2). The average effects are aligned with those found when using the variable in the regression, but they differ widely across groups. They are more pronounced when the explanatory variable reaches the higher part of the distribution. On average, firms reporting an obstacle to investment are likely to report an investment gap. The smaller, less profitable or more indebted they are, the stronger the intensity of the signal received.

Looking across the impediments, reporting finance as an obstacle has the strongest signal, well above the other four types of obstacles considered. It is significant in all the cases for the two groups considered in isolation and stronger for the “weakest” firms.

Interestingly, focusing on size only, when smaller enterprises report an impediment they are also more likely to have an investment gap; but for larger ones, this is not the case. Large firms reporting an impediment do not have a significantly higher probability of having an investment gap. This is true for each impediment, except finance (Chart 12.1). This may suggest that large enterprises are able to cope with the impediments reported, while conversely, SMEs are in a weaker position and more likely to suffer from the gap they report.

Taken together, these results indicate that, beyond the balance sheet and P&L characteristics of the company, the size of an enterprise is the most discriminatory dimension affecting the relationship between the perceived obstacle and the investment gap. The smaller the corporation, the larger the effect of an obstacle on investment.

6 Do reported investment barriers explain investment gaps?

In this paper, we have exploited a database matching the EIBIS with hard data from balance sheet and P&L information. The EIBIS provides a way to illustrate the major investment channels, as firms report impediments to investment resulting from demand, uncertainty, finance and both business and labor regulation. Our analysis has exploited information about firms' characteristics and impediments to investment to analyze the investment gap. Linking firms' investment gap with firms' impediments to investment, while controlling for firms' characteristics, we have provided novel evidence on the relative importance different obstacles may have in explaining the investment gap that firms report experiencing in their recent activity.

The main findings of the paper are threefold. First, we show that survey-based measures provide a reliable source of the channels mentioned as they correlate rather well with macro-based hard data compiled at the country level. Hence, signals for non-financial corporate investment received from the survey can be extracted. Second, we show that "weaker" firms defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more impediments. Whether this reflects the endogeneity of the firm to its environment or some bias in the perceptions is left to further research. Third, we show that, controlling for the firms' characteristics, reporting an impediment provides a signal for investment. Firms reporting impediments are more likely to report an investment gap, with a stronger magnitude when the impediment is reported as major. The signal intensifies when it is given by "weaker" firms. As we do not find such dependency on the region, our results do not support the notion that corporations located in the periphery continue to be discriminated against for systemic reasons years after the end of the financial crisis.

From a policy standpoint, our findings suggest that survey-based information can be a useful input to complement both macro and micro hard data, and to better inform the design of targeted policies to support investment.

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Annex I. The European Investment Bank Investment Survey (EIBIS)

The EIB Group Survey on Investment and Investment Finance (EIBIS) is an annual survey of around 12,500 European non-financial corporations conducted since 2016. Corporations of each European country are asked to answer around 55 questions with the aim of better understanding the drivers and constraints of investment decisions. The sample is drawn to provide a good representation of the non-financial corporate sector of the European economy in terms of country, sector, size and age.¹⁸ It is designed to build a panel of enterprise data so as to follow firms over time. Overall, in each EU country, between 300 and 600 corporations are surveyed each year, among which around 60% are new and 40% belong to the panel group. The analysis developed in this paper is based on the results from the first two waves of this survey (2016 and 2017), as the third wave had not yet been released at the time of the work conducted in the paper.

The EIBIS recoups four main blocks of both qualitative and quantitative questions:

1. The survey collects data on firm characteristics and investment performance, specifying, among other things, the firms' sector group (manufacturing, services, construction and infrastructure) and size classes (micro, small, medium and large).
2. The survey offers detailed information about past investment activities and future plans. *On the one hand, firms are asked about their past decision to invest and the intensity of investment. Several questions relate to the composition of investment in use/nature/purpose. It is worth noting that these questions allow for a good characterization of investment in intangible assets, well beyond the limited definition that can be typically derived from balance sheet firm-level data. On the other hand, firms are asked about their investment plans and needs.* In particular, firms report the presence or absence of a perceived investment gap, defined as a relationship between the investment level and the investment that ensures the success of their business going forward.¹⁹ This information set provides novel evidence about the existence of suboptimal investment decisions and can potentially indicate the need for policy actions.
3. The survey contains a block related to the perception of potential obstacles to investment. This block is widely exploited in the main text.
4. The survey provides relevant information about investment finance, covering aspects such as the source of finance (external, internal and intra-group), the type

¹⁸ The questionnaire is available at http://www.eib.org/attachments/eibis_general_module_questionnaire_2016_en.pdf. Minor changes were made to it in the 2017 wave, but the structure remains the same. The methodology of the EIBIS survey is available at http://www.eib.org/attachments/eibis_methodology_report_2017_en.pdf.

¹⁹ This information is based on question 24 of the EIBIS survey. Firms are asked: "Looking back at your investment over the last three years, was it too much, too little, or about the right amount to ensure the success of your business going forward?"

of external finance used for investment activities and a range of questions that allows for characterization as to whether firms are finance-constrained.

Overall, our data compile novel qualitative information and provide a unique and suitable framework to gain a better understanding of the drivers and constraints of investment decisions in European countries. Furthermore, their granularity allows for the inspection of potential heterogeneous effects of such drivers and constraints among corporations with different characteristics.

Annex II. Matching EIBIS and ORBIS

DESCRIPTIVE STATICS OF THE FIRMS IN THE SAMPLE

TABLE A2

		Indebtedness ratio	Profitability ratio	Liquidity ratio	Share SME (%)	Share Young (%)	Share Finance- constrained (%)
EU	Mean	0.63	0.06	0.11	50	11	6
	St. Dev.	0.34	0.18	0.15			
Periphery	Mean	0.64	0.05	0.09	60	9	10
	St. Dev.	0.28	0.10	0.12			
Cohesion	Mean	0.53	0.07	0.10	49	13	8
	St. Dev.	0.46	0.15	0.13			
Other	Mean	0.63	0.06	0.12	47	11	5
	St. Dev.	0.34	0.20	0.16			

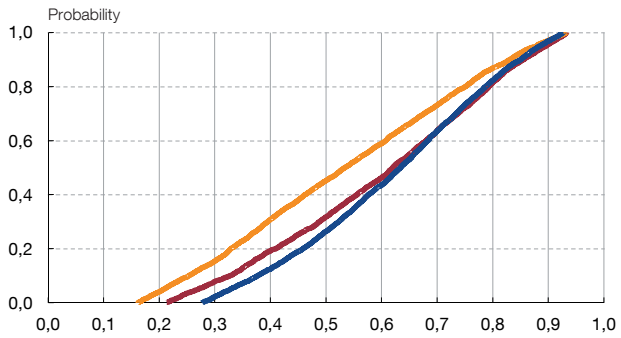
SOURCES: EIBIS-16, EIBIS-17 and ORBIS.

In the analysis, data from the EIBIS survey are matched with balance sheet and profit and loss data collected by ORBIS. For each firm, specific qualitative and quantitative information is associated. This enables the perceptions on the barriers to investment to be analyzed in conjunction with hard data on investment, controlling for traditional investment determinants such as the financial and profitability position of a firm.

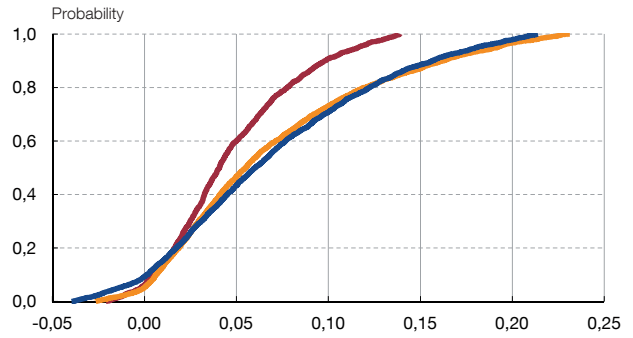
Table A2 presents some basic summary statistics related to the explanatory variables used in the regressions used in the main text, namely the debt-to-assets ratio, the return on assets and the cash ratio. The statistics are reported both at the EU level and for the three regions considered: Periphery, Cohesion and Other economies. Chart A2 depicts the distribution of these variable across the three economic regions considered. Table A2 also reports the proportion of SMEs, young firms and finance-constrained firms as derived from the information of the EIBIS.

Several stylized facts are worth noting. First, firms in the Cohesion countries seem to exhibit a relatively lower leverage level whereas firms in the Periphery countries present a lower return on assets level. Second, we do not find significant differences in the cash ratio distribution across regions. Also, the Periphery countries seem to be characterized by a higher proportion of SMEs and firms which are finance-constrained, while the Cohesion countries concentrate a higher proportion of young firms.

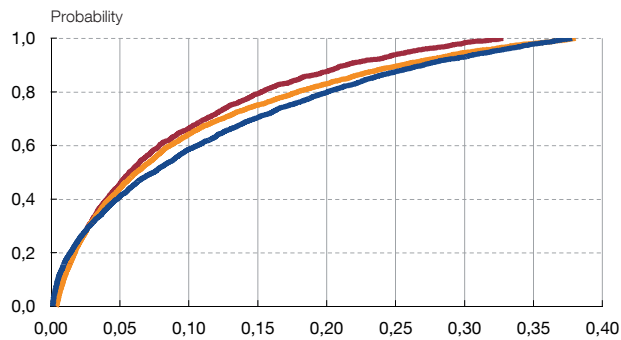
1 INDEBTEDNESS RATIO



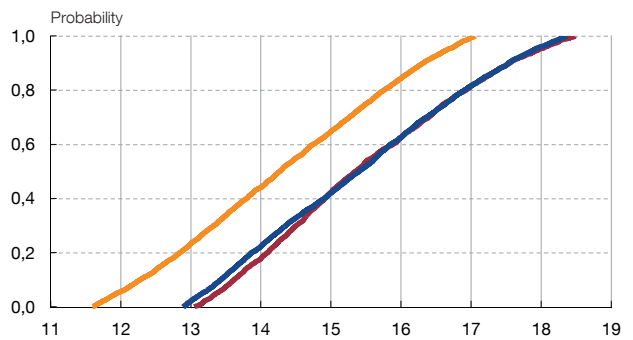
2 PROFITABILITY RATIO



3 LIQUIDITY RATIO



4 SIZE (LOG OF ASSETS)



COHESION PERIPHERY OTHER

SOURCES: EIBIS-16, EIBIS-17 and ORBIS.

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