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SME INVESTMENT REPORT 2019

DEVELOPMENTS BETWEEN 2016 AND 2018

MARTINA LAWLESS, MARIA MARTINEZ-CILLERO, CONOR O'TOOLE, ERIC GARGAN, LEONA CANTILLON AND PETER MCGOLDRICK

ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

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ABBREVIATIONS

CDS	Credit Demand Survey
CSO	Central Statistics Office
DoF	Department of Finance
EIB	European Investment Bank
EIBIS	European Investment Bank Investment Survey
ESRI	Economic and Social Research Institute
EU	European Union
RoW	Rest of the World
SME	Small and Medium Enterprise

EXECUTIVE SUMMARY

This report provides a statistical review of the data collected in a specific SME investment module on the Department of Finance Credit Demand Survey. The report presents survey data for the year 2018, with reference to 2016 and 2017 for context and comparison. From a macroeconomic perspective, 2018 was characterised by a robust performance in the domestic economy with strong growth in household spending and in labour market participation. These factors should have provided a supportive context for SMEs, the majority of whom sell to the domestic economy. In contrast to the domestic buoyancy, towards the end of 2018, uncertainty around Brexit began to pick up and this is likely to have been considered by many firms in formulating investment plans towards the end of the year. These conflicting factors contextualise the trends across SMEs in 2018 and should be kept in mind when reviewing the results.

Finally, this report also provides a comparative benchmark for Irish SME investment activity relative to other countries. In order to achieve this, we will draw on the European Investment Bank's Investment Survey (EIBIS). This survey measures investment activity in all EU Member States and by selecting questions that are comparable to the information in the CDS, we are able to put investment of Irish SMEs in an EU context. Conclusions arising from this review will be useful to inform the policy environment. The main findings in each of the analytical chapters are provided below.

SME investment patterns

To review SME investment, we draw on several metrics. First, we look at how many Irish SMEs invest by presenting the *percentage of firms investing*. Second, we gauge the magnitude of investment by looking at a) the typical value of investment and b) how large investments are relative to the firms' existing assets. These indicators are presented across different types of assets namely; fixed assets including buildings, transport equipment, machinery, intangible assets and staff investment. A number of key findings emerge:

- Over 80 per cent of SMEs invested in 2018 and the median investment amounted to €30,000. Investment accounted for 23 per cent of existing assets (investment rate of 23 per cent). These figures were stable relative to 2017.
- Using the EIBIS data, we find the share of firms investing in Ireland is in line with other North-Western European countries but above the EU as a whole.

- Staff investment was the most common investment type with nearly 70 per cent of companies investing. The size of investment in staff was lower than other assets with a median of €5,000.

- Focusing on fixed capital assets, around 20 per cent of firms invested in buildings, 29 per cent invested in transport assets and 43 per cent invested in machinery and equipment. Relatively few firms, 7 per cent, invest in intangible assets. The largest investments occurred for buildings (€50,000), followed by transport (€38,000) and non-transport machinery (€20,000).

- While trends over time in specific investment categories can display considerable volatility due to the lumpy and infrequent nature of investment, a noteworthy increase in the median investment in transport and other machinery is evident between 2017 and 2018.

In addition, we also explore investment patterns across different groups of firms in more detail. Namely we document developments in investment across firms of different size, age, sector and exporting status. A number of findings emerge:

- Structural patterns are very evident in the investment activities across firms. Micro firms (i.e. firms that employ between one and nine people) are less likely to invest than larger firms. However, when micro firms do undertake investment, it accounts for a higher share of their existing assets.

- Micro firms are nearly 50 per cent less likely to invest in staff. However, such firms have fewer employees (median of 3) which explain some of the divergence. However, given the importance of labour skills improvements for productivity growth, this may be one avenue that could be explored to bridge productivity gaps.

- There was a noticeable slowdown amongst older firms (more than ten years in operation) in investment in non-transport equipment.

Investment activity was stronger in services and other firms than for industrial enterprises (those in manufacturing and construction). Over 80 per cent of Irish SMEs invested yearly between 2016 and 2018. Higher percentages of firms invested in small fixed assets, as opposed to buildings. In 2018, only 7 per cent of firms invested in intangible assets, while almost 70 per cent of firms invested in staff.

Mean total investment level increased in 2018, but median investment remained constant, and the mean investment rate declined. Variation across types of assets is observed. Intangible assets and staff were the categories with the lowest

investment level. The highest average investment rates correspond to transport assets.

- Overall, heterogeneous investment patterns across firms are observed depending on their size, age, sector and location.

- There were very noticeable declines in the percentage of Irish SMEs exporting to the UK which invested in 2018. This may reflect the emerging uncertainties around Brexit. This pull-back is concentrated in fixed assets, which is unsurprising given the largely irreversible nature of fixed capital spending.

Investment constraints and adequacy

Having reviewed the trends in investment activity over time and across firms, we turn to the question of whether this investment is sufficient or whether constraints are limiting firm activity. Our measurement focuses on exploring whether investing firms felt their investment was adequate and whether non-investors were happy with their existing capacity. We define firms who face a *capital gap* as those who are either dissatisfied with the level of investment they undertook or those who feel their existing capacity is insufficient. A number of findings emerge in relation to these indicators:

- Firms are generally happy with their investment and capacity with over 75 per cent of investors indicating contentment and over 80 per cent of non-investors indicating they have adequate capacity.

- However, the percentage of firms facing a capital gap rose to just under 16 per cent between 2017 and 2018. It has fallen from a high of 21 per cent in 2016. The capital gap is highest amongst micro firms at over one-in-five.

- Underinvestment in Ireland is higher than in other EU countries and is nearly double the average of countries in North-West Europe.

- Understanding the factors limiting investment activity for underinvesting firms is critical. Recent research on Ireland has highlighted a continuing and ongoing use of internal funds as the main financing mechanism. This survey continues to find that the most important factor cited as an investment constraint is lack of internal funds.

- However, the issue of uncertainly has increased in significance amongst firms with 24.2 per cent of dissatisfied investing firms indicating uncertainty as the main reason, up from 15.3 in 2017. Access to external finance concerns also increased marginally.

- New questions on willingness to expand and willingness to borrow indicate a majority of firms, 60 per cent, are neither willing to borrow nor make large investments. This continually points to a hesitancy or reluctance of Irish firms

to commit capital. This is understandable given the considerable uncertainties in the international economies and from the Brexit negotiations.

Investment financing and credit developments

We finally provide a deeper dive into investment financing by considering how firms fund their expansions and by exploring the cash holding activity of the firms. A number of findings emerge:

- Internal funds continue to be the main financing source for Irish firms across all asset types. Over 85 per cent of investing firms used internal funds, and they used these funds to finance over 93 per cent of the level of the investment. Ireland has a higher share of internal financing usage than in other European countries.

- For those using external funds, we find evidence of a slight but important shift from bank to non-bank financing. This evidence is much stronger in the EIBIS European comparison which highlights a shift from bank to leasing finance. For building investment, the share of bank financing fell and other non-bank financing sources increased markedly. It is particularly noteworthy that the use of leasing and hire purchase finance more than doubled for non-building fixed capital assets.

- SMEs continue to have considerable liquid assets on their books indicating a continuation of the strategy of high corporate savings.

SECTION 1

Introduction

To have adequate scope to grow and develop, firms need to continually invest in fixed and other assets to boost output. Despite the critical importance of understanding trends in capital investment, few data sources specifically collect information on SME investment, therefore our current understanding of SME investment patterns is limited. Throughout this report, SMEs are defined as firms that have less than 250 employees, and turnover lower than €50 million.

To address these investment information and data gaps, the Department of Finance SME Credit Demand Survey (CDS) has included, since 2017, a new '*Investment activity and company assets'* module which contained a series of questions specifically asking about firms' investment and assets. In addition, the module also contained questions regarding investment financing sources, barriers and firms' attitudes. Moreover, firms were asked to provide a numeric figure of the value of their total assets, as well as declaring the percentages of assets that were in fixed or liquid form.[1] These data therefore fill in the information gaps outlined above. For details regarding the composition of the sample and the data imputation and cleaning process, please see Appendices 1 and 2, respectively. After cleaning the data, the final sample sizes are 1,419, 1,388 and 1,389 for the years 2016, 2017 and 2018, respectively.

These data allowed an empirical picture to be built up explaining investment across Irish firms with insight into the following questions:

- Which type of assets are SMEs investing in and is investment activity relatively larger when scaled against the level of existing total assets (data which have been missing to date)?
- Do firms consider their investment activity to be optimal and, if not, what are the barriers to investment?
- How are firms financing this investment?

The first results of this survey were presented in Gargan et al. (2018). The aim of this report is to provide an annual statistical update on the indicators presented in this article and to review trends in investment across SMEs over time. Our main objective is to provide up-to-date profiling of investment that can be used to monitor the sector and to feed into the development of SME support policies.

1 Liquid assets include cash, stocks or other liquid assets such as accounts receivable.

In addition, new and more detailed information regarding firms' risk attitudes, investment uncertainty and investment funding sources is also included in this report. In addition, we draw on data from the European Investment Bank's Investment Survey (EIBIS) to provide a rich comparative context for Ireland.

The structure of the report is as follows: Section 2 presents the patterns in SME investment over time and across firms. Section 3 considers developments in investment barriers and explores investment adequacy. Section 4 covers developments in investment financing while Section 5 concludes.

SECTION 2

SME investment patterns

This section provides an overview of the extent to which Irish SMEs are investing in different types of assets, both tangible and intangible,[2] and in staff. We use two indicators to monitor each type of investment. First, we look at how many firms are investing by tracking *the percentage of investing firms*. Second, we use a number of metrics to measure the extent of investment in level terms. We provide numerical values for the *mean and median investment level* as well as measuring the scale of the investment relative to the firm size. For this last purpose, investment rates are computed which are defined as the percentage of the *value of investment to total assets* in the previous year. We present descriptive statistics for these indicators between 2016 and 2018.

This section will also explore if investment activities vary across different firm categories defined in terms of age, size and sector of operation, and firm location. Finally, this section will provide a more in-depth review of investment activities, patterns and trends for the sub-sample of exporting SMEs in Ireland.

2.1 INVESTMENT TRENDS BY TYPE OF ASSET

How many firms are investing?

We begin by providing a comparison of the investing activity of firms between 2016 and 2018, overall and by type of asset (Figure 1). The percentage of investing firms per year has remained high and quite stable. Over 80 per cent of firms invested in either fixed assets, intangible assets or staff every year since 2016. Relative to 2017, there was a marginal decline in the share of investing firms in 2018 (2.5 percentage points).

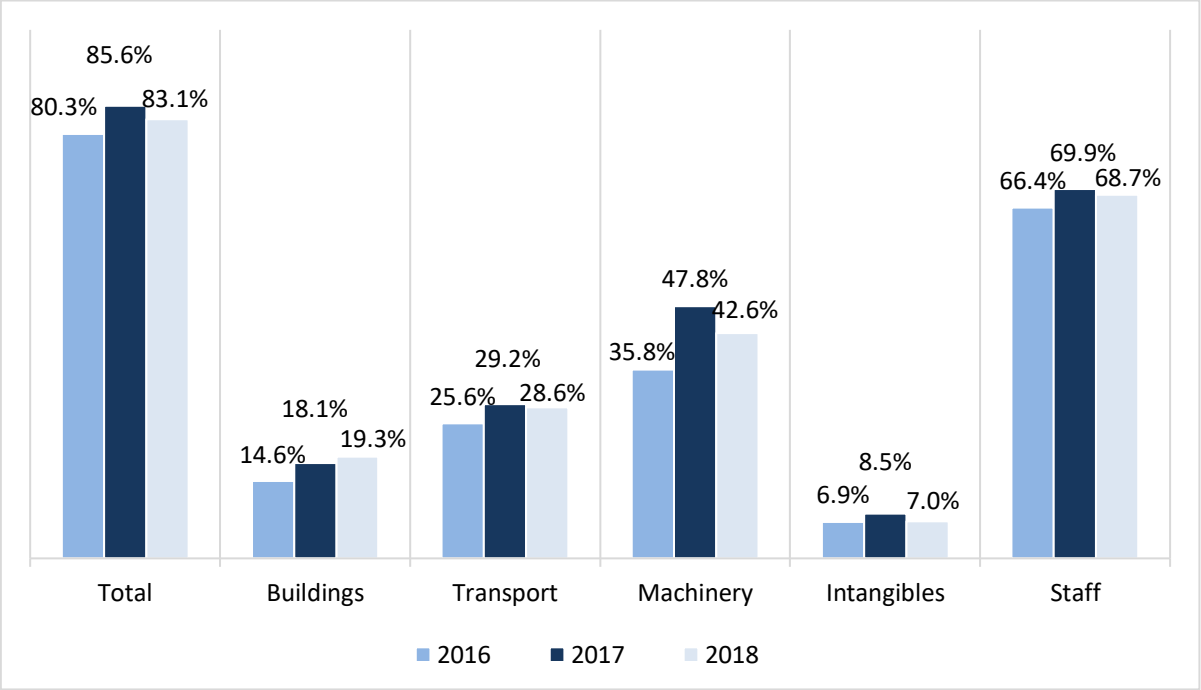
Aggregate percentages however hide important variation in the share of investing firms in different types of assets and staff. The relative importance of investment activity by type of asset has remained consistent across years, with most firms investing in staff and smaller fixed assets (i.e. machinery and transport), as opposed to larger fixed assets such as buildings.

Over 65 per cent of firms invested in staff each year, although this percentage displayed a small decrease in 2018. In 2018, investment activity in machinery also

[2] Intangible assets include research and development, patents, trademarks and copyrights, branding, etc.

fell by 5.2 percentage points, which represented the largest decline out of all asset types. The percentage of firms investing in intangible assets is low, with less than 10 per cent of firms investing each year. Investment activity in intangibles also decreased by 1.5 percentage points in 2018.

FIGURE 1 PERCENTAGE OF INVESTING FIRMS



Source: Authors' calculations based on *Credit Demand Survey* data.

Level of investment

Focusing on investing SMEs, Table 1 provides a comparison of several investment statistics between 2016 and 2018. Total investment includes investment in fixed assets, intangibles and staff. We focus first on the average or mean investment level. When considering the investment level statistics, and year-to-year change rates, it should be noted that investment is usually quite volatile over time. This is due to some investment activities being characterised by large one-time sums of money, which particularly affects certain asset categories such as buildings. Mean total investment level increased in 2018 by 8.6 per cent to over €90,000. The largest average investment was in buildings at circa €130,000. Investment levels in intangibles and staff are of much lower value. Another characteristic of investment is that the distribution is highly skewed with a small number of firms undertaking large investments. This can be seen by the fact that the median investment levels are much lower than the mean, at €30,000 for all assets. The histograms displayed in Figure 2 highlight the spread in the data, confirming the skewed nature of the investment distribution. The distribution of investment level has remained stable

between 2016 and 2018; therefore, for brevity, only the 2018 distribution is provided.

To provide some insight into the scale of investment level relative to firm size, we draw on the indicator of the investment rate. The average investment rate stood at 23 per cent, a decline of 13.5 percentage points in 2018. Since investment rates facilitate the comparison of investment across firms relative to their size, this result is indicative of investment level statistics being affected by larger firms making larger volume investments which, when scaled by their size, reduces the average rate.

As with the case with the percentage of investing firms, total investment figures presented in Table 1 mask variation across different types of assets.

Although according to Figure 1 a larger share of firms invested in machinery relative to other fixed assets, machinery was the category of fixed capital assets in which the investment level was the lowest between 2016 and 2018. This is indicated by both the median investment level and the mean investment rate. Of all types of fixed assets, the investment rate was the highest for transport assets. Moreover, both the mean investment level and the mean investment rate on transport saw the largest increases in 2018. Average investment in buildings declined in 2018.

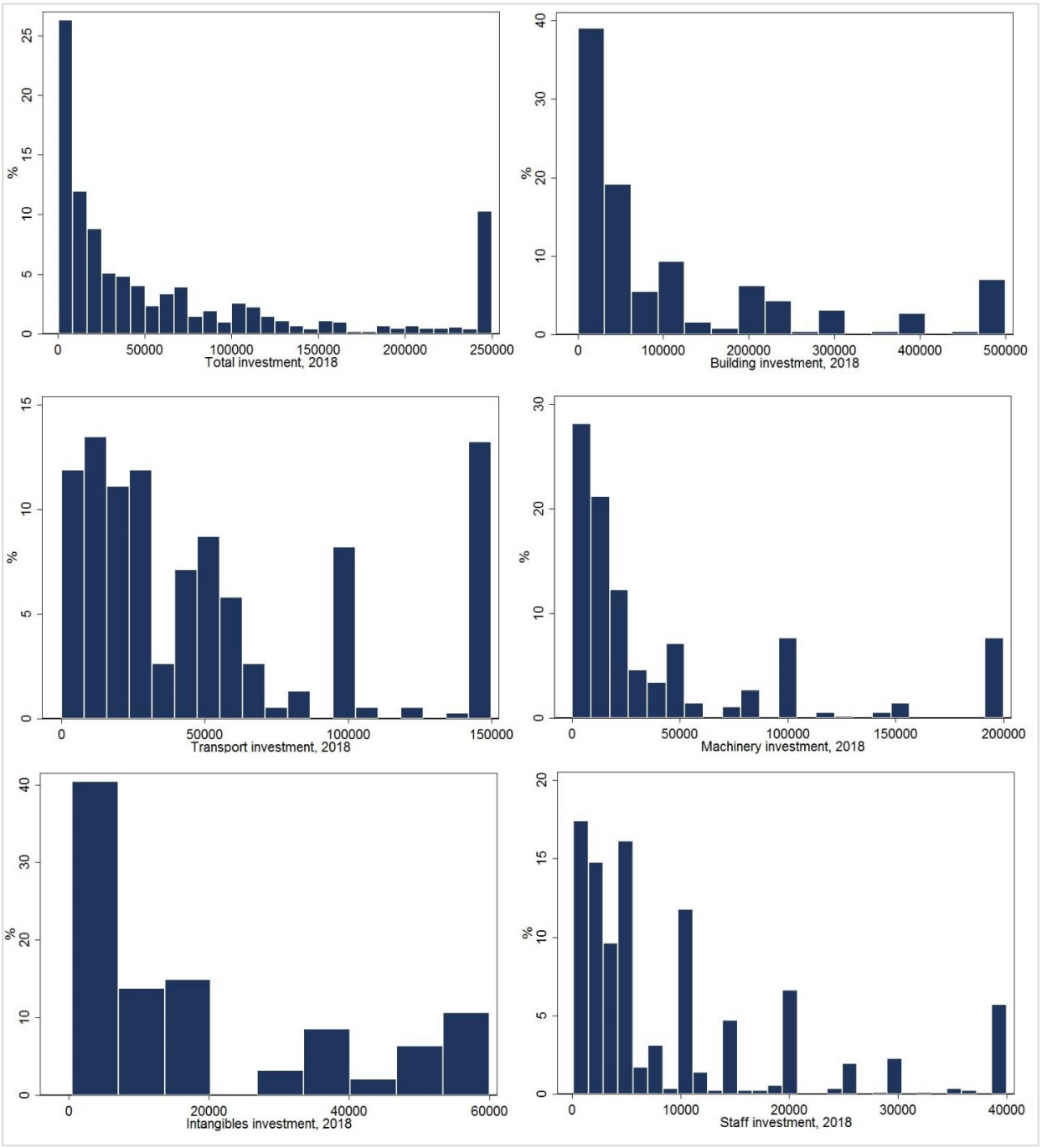
As noted, the lowest investment levels and rates correspond to intangible assets and staff. For the case of intangible assets, although investment activity declined in 2017, both the average investment level and rate recovered in 2018, with 8.3 per cent and 36.6 percentage point increases respectively. Despite these improvements, investment in intangibles remained very low between 2016 and 2018, which is in contrast with the importance of intangible assets in the National Accounts (ESRI, 2019). The average investment level in staff decreased between 2017 and 2018, although the average investment rate increased slightly. The median investment level for both categories was constant for the period analysed.

TABLE 1 INVESTMENT LEVEL

		Total	Buildings	Transport	Machinery	Intangibles	Staff
Mean investment	2016	79,243	123,584	51,854	58,365	21,966	11,463
	2017	85,219	129,156	52,071	46,910	21,703	10,871
	2018	92,588	128,034	63,271	54,701	23,511	10,630
	% change 17/18	8.6%	-0.9%	21.5%	16.6%	8.3%	-2.2%
Median investment	2016	22,000	40,000	30,000	20,000	10,000	5,000
	2017	30,000	50,000	32,000	15,000	10,000	5,000
	2018	30,000	50,000	38,000	20,000	10,000	5,000
	% change 17/18	0.0%	0.0%	18.8%	33.3%	0.0%	0.0%
Mean investment rate	2016	0.19	0.14	0.17	0.10	0.05	0.02
	2017	0.27	0.14	0.14	0.10	0.04	0.02
	2018	0.23	0.14	0.19	0.10	0.06	0.02
	% change 17/18	-13.5%	0.2%	28.5%	4.4%	36.6%	3.8%

Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: These descriptive statistics are calculated using the sub-sample of firms which invested in each year only.

FIGURE 2 INVESTMENT LEVEL DISTRIBUTION BY ASSET, 2018



Source: Authors' calculations based on *Credit Demand Survey* data.

Note: Upper values of each distribution have been capped at the level displayed in each histogram.

2.2 TRENDS IN INVESTMENT IN A EUROPEAN CONTEXT

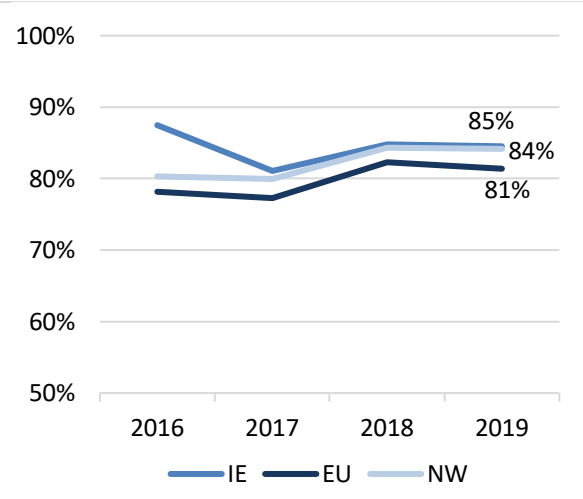
To provide a comparative benchmark for Irish SMEs' investment activity relative to other EU countries, we draw on the European Investment Bank's Investment Survey (EIBIS). The EIB survey provides a number of indicators that are complementary to those in the CDS module, which allow us to compare how Irish SMEs' investment levels are developing relative to other Member States. The

summary statistics in this section represent firms located across three regions: Irish firms, those in EU Member States other than Ireland, and those located in North-Western Member States.[3] For details regarding the EIBIS data, and differences in the samples between EIBIS and the CDS we refer the reader to Appendix 4. Note that, although we attempted to mitigate some of these differences (where possible), they might still explain differences in descriptive statistics for similar variables across the two surveys (particularly for the case of the Irish firms' sample using EIBIS).

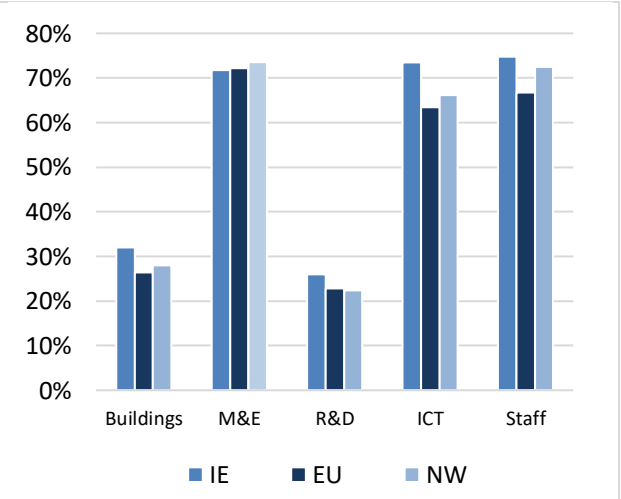
Figure 3 (a) and (b) shows the shares of investing firms over time and by asset class, respectively. In 2017, the share of Irish firms investing dropped from very high levels in 2016, to levels more in line with Member States in the North-West of the EU. However, this share persistently exceeded that of the average for the rest of EU countries. In terms of asset class invested, Irish firms tend to invest relatively more frequently than EU counterparts in buildings, and in intangibles (notably ICT and staff, and research and development to a lesser extent). The only asset category in which Irish SMEs invested less with respect to the EU and the NW comparison groups is machinery and equipment.

FIGURE 3 SHARE OF INVESTING FIRMS, EU COMPARISON

(a) % of investing firms, 2016-2019



(b) % of investing firms by asset type, 2019



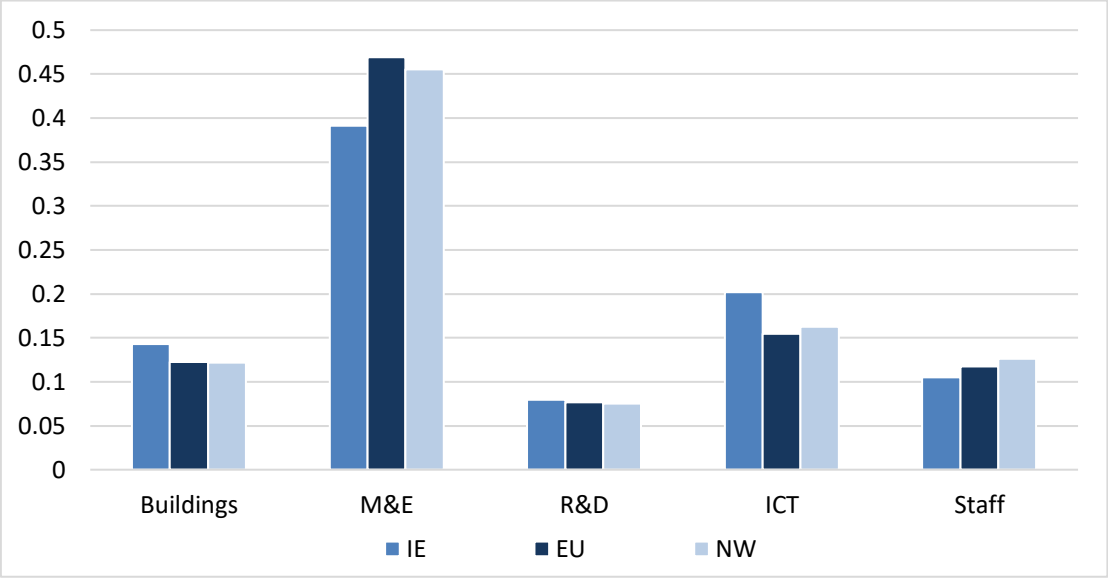
Source: EIBIS data.
Note: The share of firms who have invested in the last financial year. A firm is considered to have invested if it spent more than €500 per employee on investment activities. Firms were asked regarding the last financial year *'How much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings?'*

A similar picture emerges when considering the relative share of different asset classes in firms' investment portfolios for the year 2019, as shown in Figure 4. For

[3] In this context, North-Western Member States include France, BeNeLux, Germany, Austria, Denmark, Sweden, Finland, and the UK.

Irish SMEs, buildings represent a relatively large share of investment, followed by ICT and research and development, when compared to SMEs in the rest of the EU and in the NW category.

FIGURE 4 COMPOSITION OF INVESTMENT BY VALUE, EU COMPARISON



Source: EIBIS 2019 data.
Note: Firms were asked regarding the last financial year *'How much did your business invest in each of the following with the intention of maintaining or increasing your company's future earnings?'*.

Again, note that differences in the percentages of investing Irish SMEs across time and assets in Figures 3 and 4, and in Figure 1 and Table 1 in the previous section might be due to sample differences between the CDS and EIBIS.

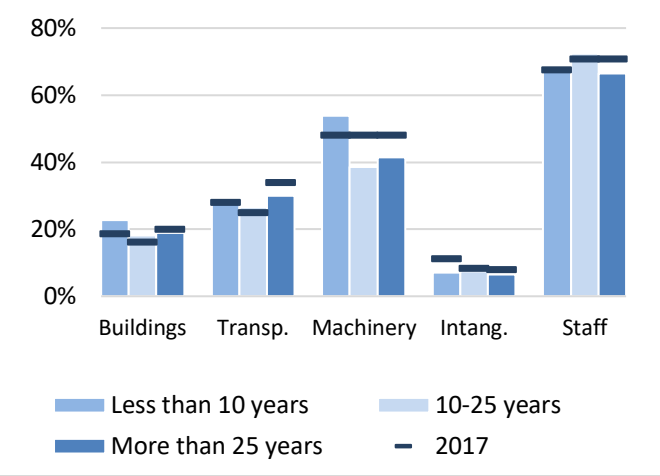
2.3 INVESTMENT TRENDS BY SELECTED FIRM CHARACTERISTICS

In order to explore whether investment differs across types of firms, Figures 5 to 7 display: (a) the average percentage of investing firms in 2017 and 2018, (b) the mean investment rates in 2018, and (c) the mean investment level and average annual growth rate in 2018,[4] by selected firm categories. These categories are defined in terms of firm age, size, sector in which firms operate, and their geographical location.

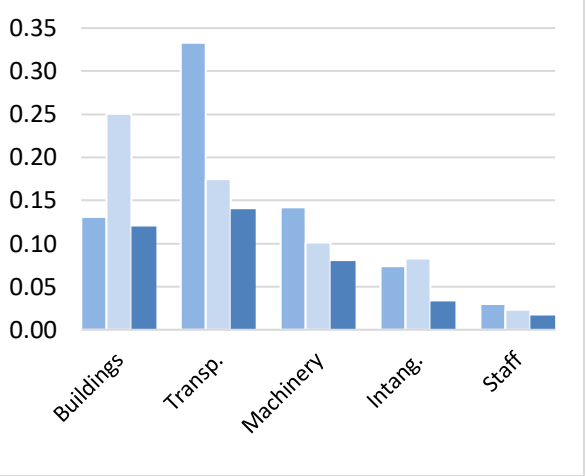
[4] Investment statistics on which Figures 4 to 6 are based are provided in Tables A.3(a) to A.3(c) in Appendix 3.

FIGURE 5 INVESTMENT BY TYPE OF ASSET AND AGE CATEGORY

(a) % of investing firms, 2017-2018



(b) Mean investment rates, 2018



(c) Investment level

		Buildings	Transp.	Machinery	Intangibles	Staff
Less than 10 years	2018	104,773	49,819	30,944	14,064	8,994
	2017/2018	-9.1%	38.8%	-31.3%	12.0%	8.6%
10 to 25 years	2018	149,084	56,884	49,966	25,433	9,516
	2017/2018	9.9%	2.2%	-12.7%	-13.0%	-24.5%
More than 25 years	2018	122,891	72,551	69,718	25,643	12,341
	2017/2018	-3.0%	25.5%	18.9%	-13.0%	-0.8%

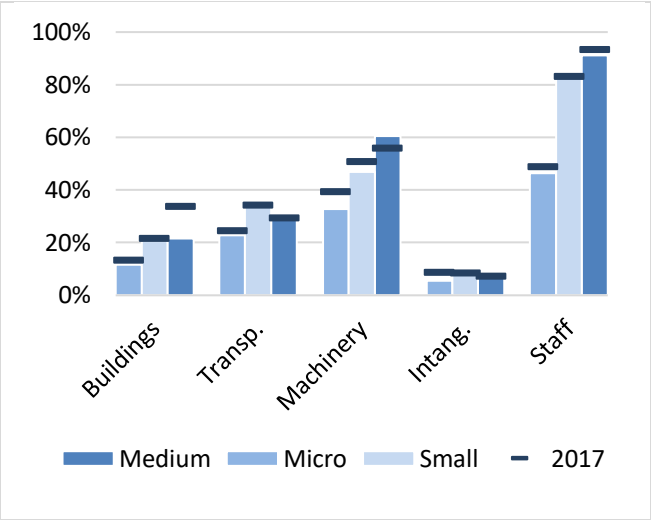
Source: Authors' calculations based on *Credit Demand Survey* data.

Three different age categories are defined throughout this report according to the number of years a firm has been operating. The percentage of investing firms by age category remained relatively stable in 2018 when compared to 2017. The percentages of firms investing in buildings and machinery increased in 2018 in the category of firms operating for less than ten years.

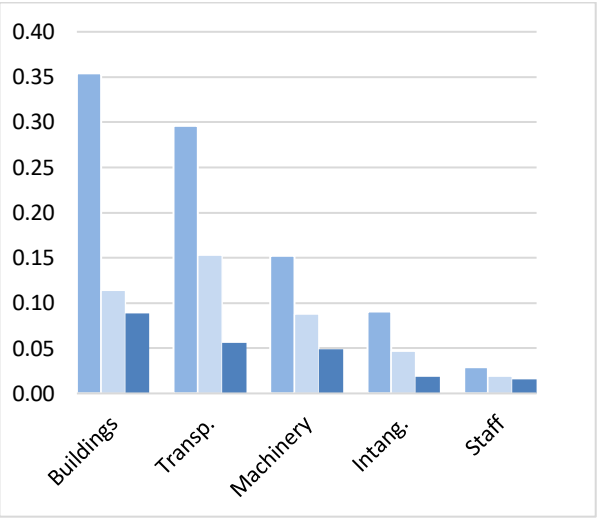
Mean investment levels were higher for firms older than 25 years for all assets except buildings. Firms operating for less than ten years had the lowest average investment level in all asset categories. However, mean investment rates indicate that firms operating for more than 25 years invested less than younger firms, relative to their size. Investment levels in intangibles and staff grew for young firms in 2018 but declined for the other two age categories. Investment levels in transport increased in all age categories in 2018, but particularly for young firms.

FIGURE 6 INVESTMENT BY TYPE OF ASSET AND SIZE CATEGORY

(a) % of investing firms, 2017-2018



(b) Mean investment rate, 2018



(c) Investment level

		Buildings	Transp.	Machinery	Intangibles	Staff
Micro	2018	57,213	28,515	21,377	12,875	3,715
	2017/2018	17.5%	-3.8%	17.1%	15.3%	0.1%
Small	2018	113,943	72,980	55,501	27,519	10,254
	2017/2018	-3.8%	34.8%	21.0%	-4.6%	7.4%
Medium	2018	202,604	101,117	97,904	32,759	20,039
	2017/2018	-29.5%	27.0%	2.1%	11.9%	-14.7%

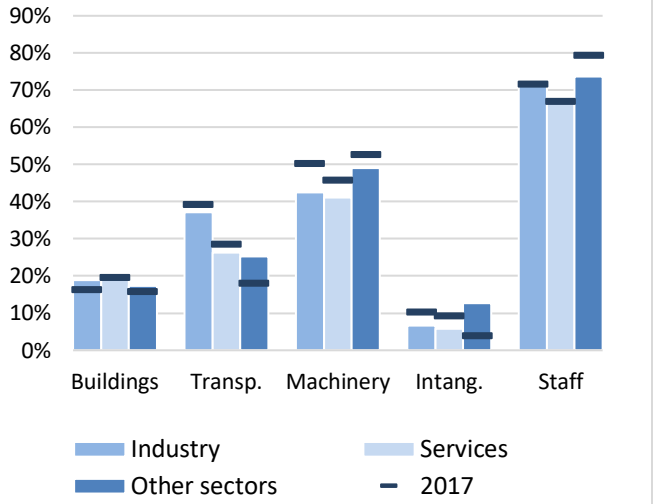
Source: Authors' calculations based on *Credit Demand Survey* data.

Size categories are defined with respect of the number of employees in each firm. The *Micro* category includes firms that employ between one and nine people, *Small* firms have between ten and 49 employees, and *Medium* firms employ between 50 and 249 people. The percentage of investing firms by size category in 2018 is again comparable to that of 2017, for most asset types and size categories. An exception to this appears to be medium firms, since a higher percentage of medium firms invested in machinery in 2018, while there was a drop in the percentage of medium-sized firms investing in buildings.

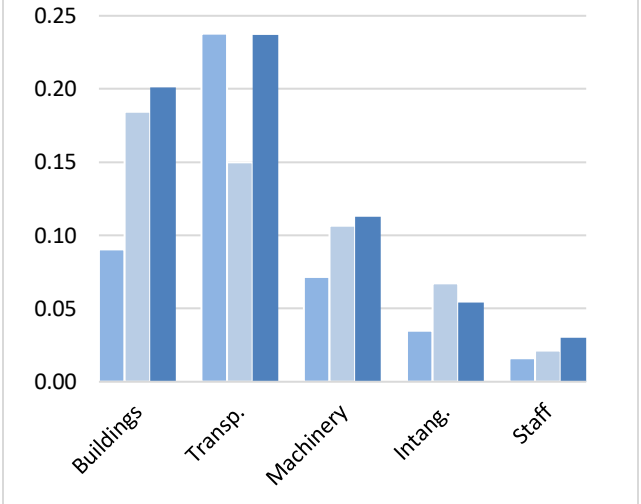
Firm size appears to be positively correlated to the level of investment in 2018, regardless of the type of asset. However, relative to firm size, mean investment rates indicate that micro firms invested more in all asset types. This is typical of the firm lifecycle where investment rates are higher when firms are setting up and starting production activities. The annual change in the investment level in machinery was positive in all size categories, but mixed results are observed for the other asset types and categories.

FIGURE 7 INVESTMENT BY TYPE OF ASSET AND SECTOR

(a) % of investing firms, 2017-2018



(b) Mean investment rate, 2018



(c) Investment level

		Buildings	Transp.	Machinery	Intangibles	Staff
Industry	2018	106,234	64,739	63,257	24,440	11,237
	2017/2018	-31.3%	41.4%	-10.1%	-5.5%	-5.8%
Services	2018	141,057	61,386	52,408	22,979	10,220
	2017/2018	-1.0%	16.8%	22.0%	13.7%	-3.4%
Other sectors	2018	100,849	68,342	51,368	23,789	11,752
	2017/2018	25.9%	24.5%	39.9%	42.1%	-1.9%

Source: Authors' calculations based on *Credit Demand Survey* data.

In order to explore differences across sectors in which firms operate, we define three broad categories. The *Industry* category groups the construction and manufacturing sectors; wholesale and retail, hotels and restaurants and professional and scientific sectors have been grouped in the *Services* category, with remaining sectors grouped into *Other*. Investment activity appears to have declined in the majority of sector categories in 2018, with the exceptions of investment in buildings for firms in the Industry sector, and investment in transport and intangibles for firms in Other sectors.

The mean investment level in machinery, intangibles and staff was the highest for firms in Industry sectors in 2018. Mean investment rates indicate however that, relative to their size, firms in the Services and Other sectors invested more than industry firms in all asset categories, except transport. In general, mean investment levels declined in 2018 for firms in the Industry sector (except for transport assets), however they increased for firms in the other two sector categories (except for investment in staff and investment in buildings in the Services sector).

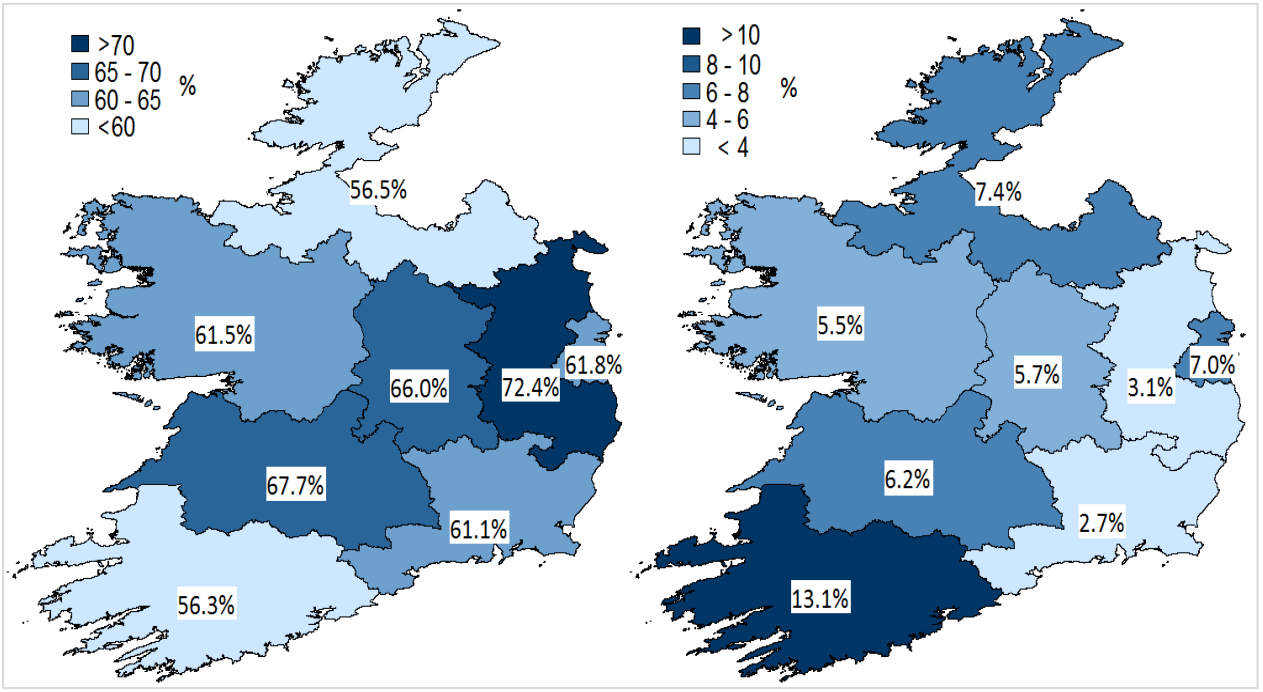
Geographical variation of investment

Another important factor that might determine firm level investment patterns is the geographical location of the firm as local economic performance can differ across the country. The maps presented in Figures 6 and 8 contain annual average NUTS 3[5] region data for each of the statistics displayed.

Panel (a) in Figure 8 displays the regional variation in the percentage of firms investing in fixed capital assets. The percentage of investing firms was high regardless of the region, with over half of firms in every region investing in 2018. Over 70 per cent of firms located in the Greater Dublin Area, which groups the counties of Kildare, Meath and Wicklow, undertook investment in some type of asset in 2018. The lowest percentages were observed in the Border and South-West regions, where just under 60 per cent of firms invested. In panel (b) in Figure 8, the percentage of firms investing in intangible assets is displayed. The highest percentage corresponds to the South-West region, followed by Dublin, the Mid-West and Border regions.

FIGURE 8 INVESTMENT ACTIVITY BY NUTS 3 REGIONS, 2018

(a) Fixed capital assets investment *(b) Intangibles investment*

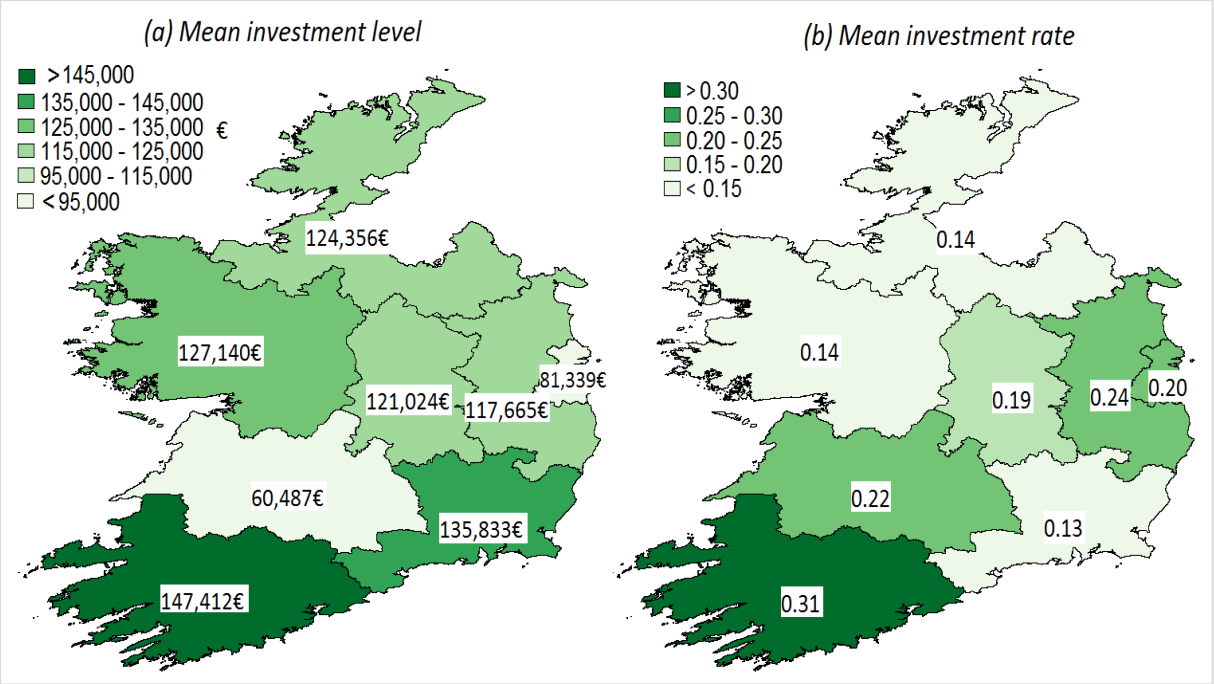


Source: Authors' calculations based on *Credit Demand Survey* data.
Note: In this figure total investment excludes investment in staff.

5 The NUTS (Nomenclature of Territorial Units for Statistics) classification was established on the *Regulation (EC) No 1059/2003 of the European Parliament and of the Council of 26 May 2003 on the establishment of a common classification of territorial units for statistics*. This classification is a hierarchical system for dividing the territory of the EU for statistical and socio-economic analysis purposes, among others (Eurostat, 2018). NUTS 3 corresponds to the smallest regional dimension of the NUTS classification.

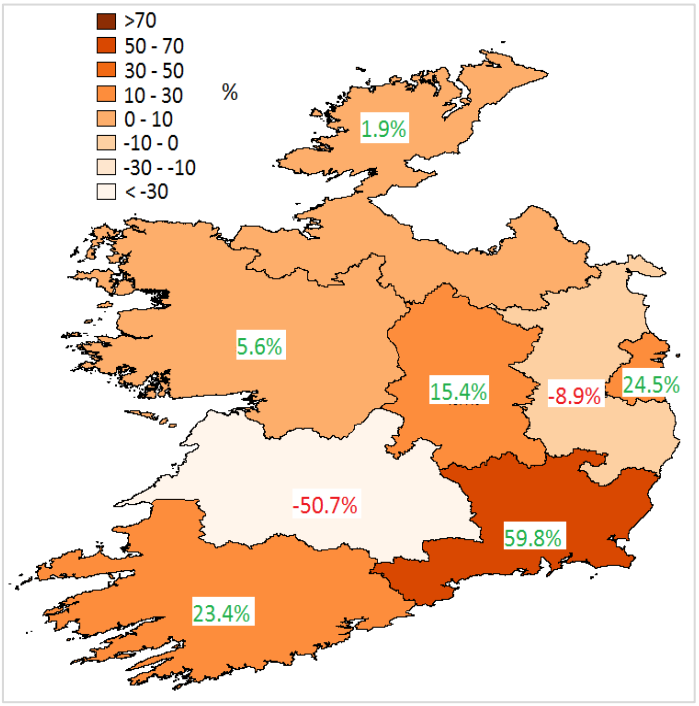
Figure 9 displays the mean level of investment and the mean investment rate per NUTS 3 region in 2018, while Figure 10 shows the regional average investment level change between 2017 and 2018. Despite being one of the regions with the lowest investment activity in 2018, the South-West region had the highest average level of investment and highest mean investment rate. Moreover, investment level in the South-West region experienced substantial growth in 2018. The highest increase in the mean investment level was observed in the South-East region, which in turn had the lowest average investment rate. Investment in the South-West and Dublin regions also increased, albeit at a lower rate. The region with the lowest investment level in 2018 was the Mid-West (which experienced the highest decline in mean investment in 2018), followed by the Dublin region.

FIGURE 9 MEAN INVESTMENT BY NUTS 3 REGIONS, 2018



Source: Authors' calculations based on *Credit Demand Survey* data.

FIGURE 10 ANNUAL INVESTMENT LEVEL CHANGE BY NUTS 3 REGIONS, 2018



Source: Authors' calculations based on *Credit Demand Survey* data.

2.4 FURTHER LOOK AT EXPORTERS

In this section we compare the investment patterns and trends of exporting SMEs in the years 2017 and 2018. The objective is to provide some insight as to whether the Brexit decision after the referendum in 2016, and subsequent exit negotiation process in the following years, has had an impact on this particularly exposed sub-sample of SMEs.

Two sub-samples of exporting SMEs are defined, depending on the percentage of output exported to different destinations. The first group includes firms which export only to UK markets (*UK* in the Figures and Tables below), and the second group includes firms which export most of their output to countries other than the UK (*RoW* in Figures and Tables below). Note that, although some UK exports may be present in this second category, they do not account for a notable share of sales for these firms. Table 2 shows descriptive statistics for selected firm categories of both types of exporting firms in 2017 and 2018.

TABLE 2 INVESTMENT OF EXPORTING FIRMS BY DESTINATION AND ASSET

% exporting firms				
UK	2017	42.7		
	2018	38.5		
RoW	2017	57.3		
	2018	61.5		
Size				
		Micro	Small	Medium
UK	2017	34.3	42.3	23.4
	2018	36.5	47.4	16.1
RoW	2017	27.8	49.6	22.6
	2018	25.7	53.4	20.9
Age				
		< 10 years	10-25 years	> 25 years
UK	2017	14.8	29.9	55.3
	2018	17.0	27.1	55.9
RoW	2017	17.9	33.5	48.6
	2018	15.1	33.1	51.8
Sector				
		Industry	Services	Other
UK	2017	29.6	58.2	12.3
	2018	32.4	60.8	6.9
RoW	2017	45.1	43.6	11.3
	2018	37.2	49.7	13.1
Region				
		Border	Dublin	Rest
UK	2017	21.0	38.8	48.1
	2018	21.2	42.6	40.9
RoW	2017	15.5	33.3	62.4
	2018	12.9	40.3	57.5

Source: Authors' calculations based on *Credit Demand Survey* data.

Between 2017 and 2018, the percentage of Irish SMEs exporting to the UK declined by 4.2 percentage points, while the percentage of SMEs exporting to the *RoW* increased by 4.2 percentage points.

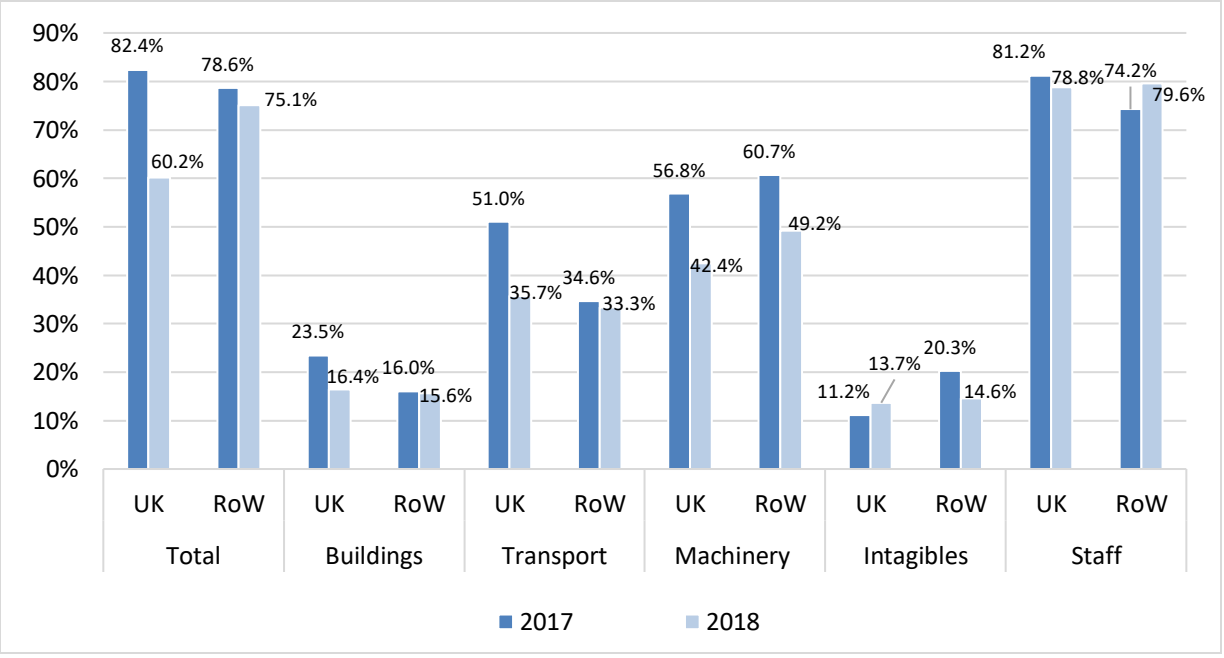
Overall, between 42 and 53.5 per cent of exporting SMEs are classified into the *Small* firm category, which constitutes the category that groups the most exporting firms regardless of the destination. Most exporting SMEs are aged over 25 years which may reflect their ability to form long-term, established trading links. The percentage of mature firms exporting to the UK is marginally higher, when compared with firms exporting to the *RoW*. Most exporting SMEs operate in services sectors. When compared to firms exporting to the *RoW*, a larger share of

firms exporting to the UK are in the Border region (although this may still understate the degree of sales to Northern Ireland).

Figure 11 compares the percentage of investing firms, by type of asset and destination of exports in 2017 and 2018. The percentage of investing UK exporting firms in 2017 was in line with the aggregate investment activity figures displayed in Figure 1, while the percentage of investing firms exporting to other destinations was lower at 78.6 per cent.

However, the average percentage of investing firms declined in 2018 compared to 2017 for almost all assets and both exporting destinations. The decline in the percentage of investing firms was much larger for UK exporting firms than the rest of exporters, for all types of assets. The fall in investment activity by firms exporting to the UK was roughly six times larger than for other exporters. The decline in the percentage of exporting investing firms was also observed for most types of assets, with two exceptions. First, the percentage of firms exporting to the UK which invested in intangibles increased by 2.5 percentage points. And second, the percentage of firms exporting to the *RoW* which invested in staff increased by 5.4 percentage points.

FIGURE 11 INVESTMENT ACTIVITY OF EXPORTING FIRMS BY ASSET



Source: Authors' calculations based on *Credit Demand Survey* data.

Table 3 provides insight into the evolution of mean total investment and mean total investment rate of the two categories of exporting firms, as well as their

respective breakdown by type of asset. Despite the large decline in the investment activity of UK exporting firms in 2018, Table 3 shows an increase in the mean investment level for these firms in the same year. The total average investment level of UK exporting firms increased by 45 per cent in 2018. Substantial increases in mean investment level for this category of exporting firms were also observed for every type of asset, except staff.

A possible explanation for the increase in the investment level of UK exporting firms, even though less firms were investing in 2018, might be that smaller UK exporting firms were the ones that stopped investing between 2017 and 2018. Therefore, if larger UK exporting firms continued investing in 2018, the average size of the investment would be larger. This finding could also be indicative of some UK exporting firms making larger investments to prepare and adapt for the increasing possibility of a No-Deal Brexit as the year 2018 progressed.

The mean total investment level declined for investing firms which exported to other destinations by 5.6 per cent in 2018. In terms of type of assets, average investment level also declined for all assets except transport.

The average investment rate of both groups of exporting firms increased significantly in 2018. The increase was of a larger magnitude for UK exporting firms overall, although some variation across assets can be observed.

TABLE 3 INVESTMENT OF EXPORTING FIRMS BY DESTINATION AND ASSET

	Mean investment level			Mean investment rate		
	2017	2018	% change	2017	2018	% change
Total						
UK	97,759	141,331	44.6	0.14	0.29	99.0
RoW	134,619	127,050	-5.6	0.13	0.23	72.5
Buildings						
UK	100,036	141,839	41.8	0.06	0.12	86.5
RoW	152,528	141,600	-7.2	0.16	0.18	15.2
Transport						
UK	57,385	79,901	39.2	0.10	0.31	212.1
RoW	53,967	73,902	36.9	0.08	0.19	124.2
Machinery						
UK	44,844	70,222	56.6	0.08	0.10	19.1
RoW	88,420	85,125	-3.7	0.06	0.10	79.9
Intangibles						
UK	25,115	30,427	21.2	0.04	0.05	28.0
RoW	36,109	33,177	-8.1	0.05	0.08	67.8
Staff						
UK	11,831	11,651	-1.5	0.01	0.02	51.8
RoW	17,711	15,778	-10.9	0.02	0.02	30.1

Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: These descriptive statistics are calculated using the sub-sample of firms which invested and exported in each category and year only.

SECTION 3

Investment constraints and adequacy

3.1 FIRMS' ATTITUDES TOWARDS INVESTMENT

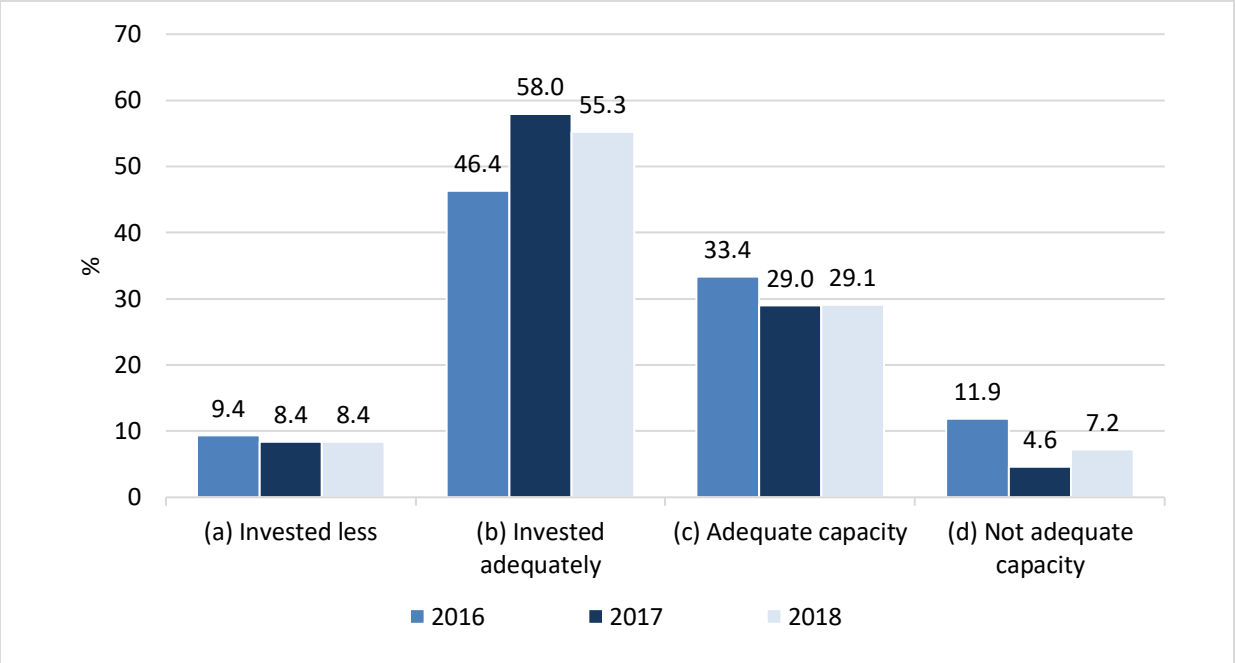
In this section, firms' perceptions regarding their own investment activity are explored. For investing firms, the focus is placed on whether they considered their level of investment on different types of assets to be adequate or insufficient; while for non-investing firms, the possible reasons behind the lack of investment activities are explored. The purpose of this analysis is to identify potential investment constraints faced by Irish SMEs which may need to be addressed or targeted with investment policy supports.

Figure 12 displays firms' reported perceptions regarding the adequacy of their investment activity (for those investing, in panels (a) and (b)), or of their current capacity (for those firms which did not invest, displayed in panels (c) and (d)).

Overall, Irish SMEs reported to be satisfied with their investment decisions and activities between 2016 and 2018. In 2016, 46.4 per cent of firms reported satisfaction with the investment they had undertaken that year, while further 33.4 per cent of firms reported being satisfied with their capacity. In 2018 however, the percentage of firms reporting to have invested adequately had increased by 8.9 percentage points since 2016, while the percentage of firms with adequate capacity had decreased by 4.3 percentage points.

The percentage of non-investing firms which reported inadequate capacity increased in 2018 by 2.6 percentage points. The percentage of firms which invested less than they wished remained constant. These two firm categories are examined in more detail in Table 4.

FIGURE 12 FIRMS' PERCEPTIONS



Source: Authors' calculations based on *Credit Demand Survey* data.

Table 4 displays the information in Figure 12 by selected firm categories, using only 2018 data. Some variation across firm categories can be observed. Exporting and small- to medium-sized firms were the categories with the highest percentage of firms reporting investment satisfaction, while micro firms and firms older than 20 years were the categories with the highest percentages of firms reporting to be satisfied with their capacity.

TABLE 4 FIRMS' PERCEPTIONS BY CATEGORY, 2018

	Investing firms		Non-investing firms	
	(a) Invested less	(b) Investment adequately	(c) Adequate capacity	(d) No adequate capacity
Less than 20 years	9.9	57.2	24.5	8.5
More than 20 years	7.4	53.8	32.6	6.2
Export – Yes	7.1	61.9	26.5	4.5
Export – No	8.8	53.4	29.8	8.0
Industry	6.7	58.5	28.1	6.8
Services	9.9	52.6	30.2	7.3
Other sectors	5.1	62.3	25.0	7.6
Micro	10.3	40.9	37.3	11.5
Small/Medium	7.1	65.9	23.0	4.0

Source: Authors' calculations based on *Credit Demand Survey* data.
Note: Rows add up to 100 per cent.

The measure displayed in Table 5 is calculated by adding up the percentages of firms that reported having inadequate capacity and those that were dissatisfied with the investment levels (i.e. categories (a) and (d) in Figure 12 and Table 4). We interpret this measure as a proxy of firms' '*capital gap',* as it gives an indication of the extent to which firms would have liked to invest (or invest more) but did not.

The capital gap has decreased since 2016, from 21.2 to 15.7 per cent of firms in 2018. This finding indicates that in 2018, roughly one-in-six SMEs in Ireland were not satisfied with their investment decisions. Looking at the most recent 2018 data, a decreasing trend in the capital gap measure can be observed regardless of the firm category. The capital gap was highest for micro firms and firms operating for less than 20 years. Indeed, the capital gap was nearly twice as high for micro firms relative to other firms which may point towards structural challenges for these firms.

TABLE 5 CAPITAL GAP

	2016	2017	2018
Total	**21.2**	**13.1**	**15.7**
Less than 20 years	21.0	19.5	18.3
More than 20 years	21.4	14.2	13.6
Export – Yes	20.6	16.2	11.6
Export – No	21.5	16.6	16.8
Industry	20.8	17.6	13.5
Services	19.8	17.2	17.2
Other sectors	19.8	11.8	12.7
Micro	22.6	22.0	21.8
Small/Medium	20.3	12.2	11.1

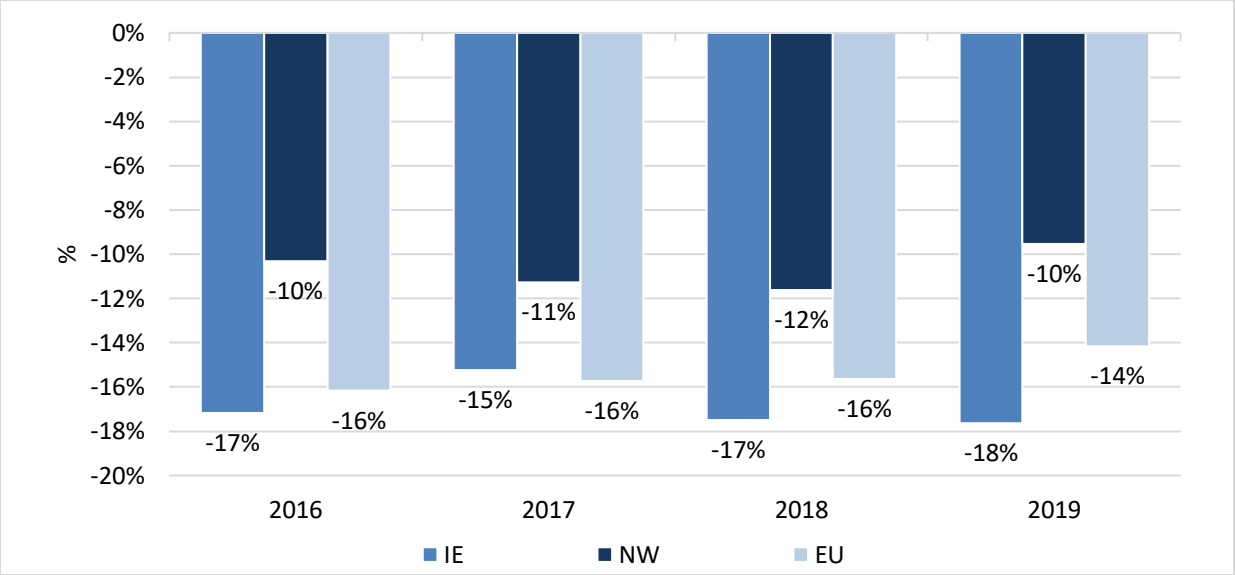
Source: Authors' calculations based on *Credit Demand Survey* data.

To provide a comparison of the capital gap in Ireland relative to other EU countries, we again draw on the EIBIS survey data. Figure 13 presents a measure of underinvestment from EIBIS. It shows the net balance of firms that perceive to have invested too little versus those that perceive to have invested too much over the last three years. The capital gap is larger in Ireland than in other countries, and this gap has grown starkly over recent years when compared to the other two comparison groups.

Between 18 and 15 per cent of SMEs in Ireland reported a capital gap in the 2016-2019 period. In contrast, roughly 16 per cent of firms reported a capital gap across the rest of EU countries, and significantly smaller percentages of firms

(between 10 and 12 per cent) reported a capital gap in the North-Western Member States category.

FIGURE 13 UNDERINVESTMENT, IRELAND VS. EU



Source: EIBIS data.
Note: Q: *Looking back at your investment over the last three years, was it too much, too little, or about the right amount?*

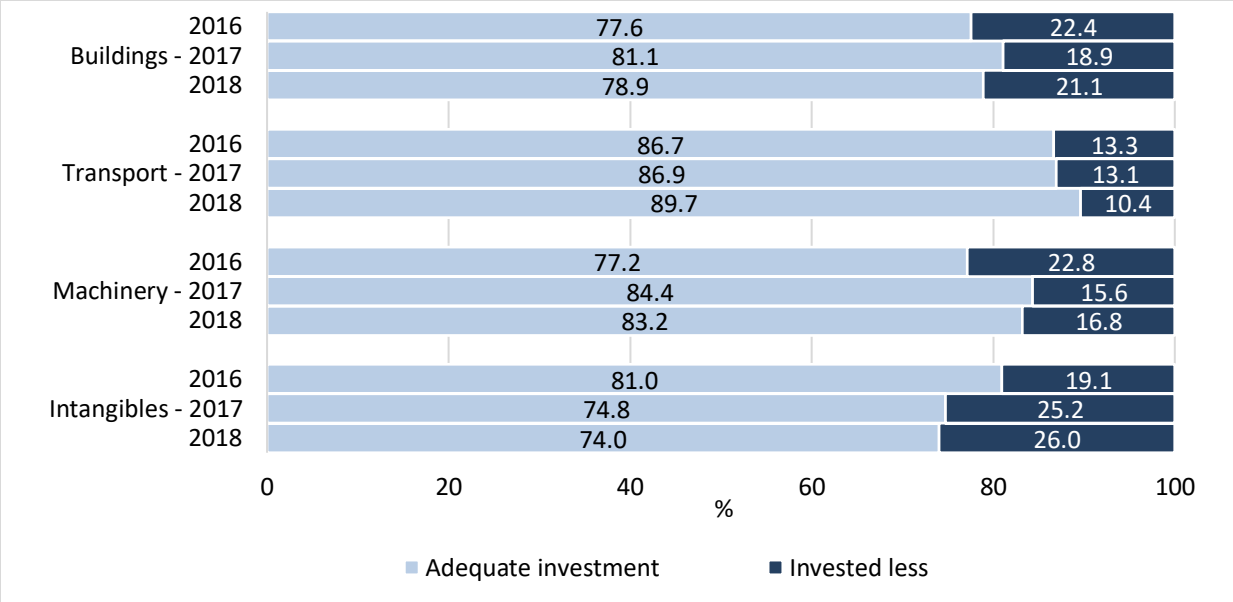
3.2 BARRIERS AND CHALLENGES TO INVESTMENT

In order to identify potential investment constraints that might be affecting the growth and development of domestic enterprises in Ireland, this section explores the attitudes of both investing and non-investing firms towards their investment activities.

Figure 14 compares the attitudes of investing firms by type of asset between 2016 and 2018. Roughly one-in-four investing firms reported being unhappy with their investment levels, and the variation is small across the different types of asset they invested in.

The percentage of firms that reported to have invested less than they wanted in intangible assets increased from 19.1 in 2016 to 26 per cent in 2018. Regarding investment in buildings and machinery, the percentage of dissatisfied firms declined from 22.4 and 22.8 per cent to 21.1 and 16.8 per cent, respectively. Finally, the percentage of dissatisfied firms decreased by roughly 3 percentage points in 2018 for transport assets.

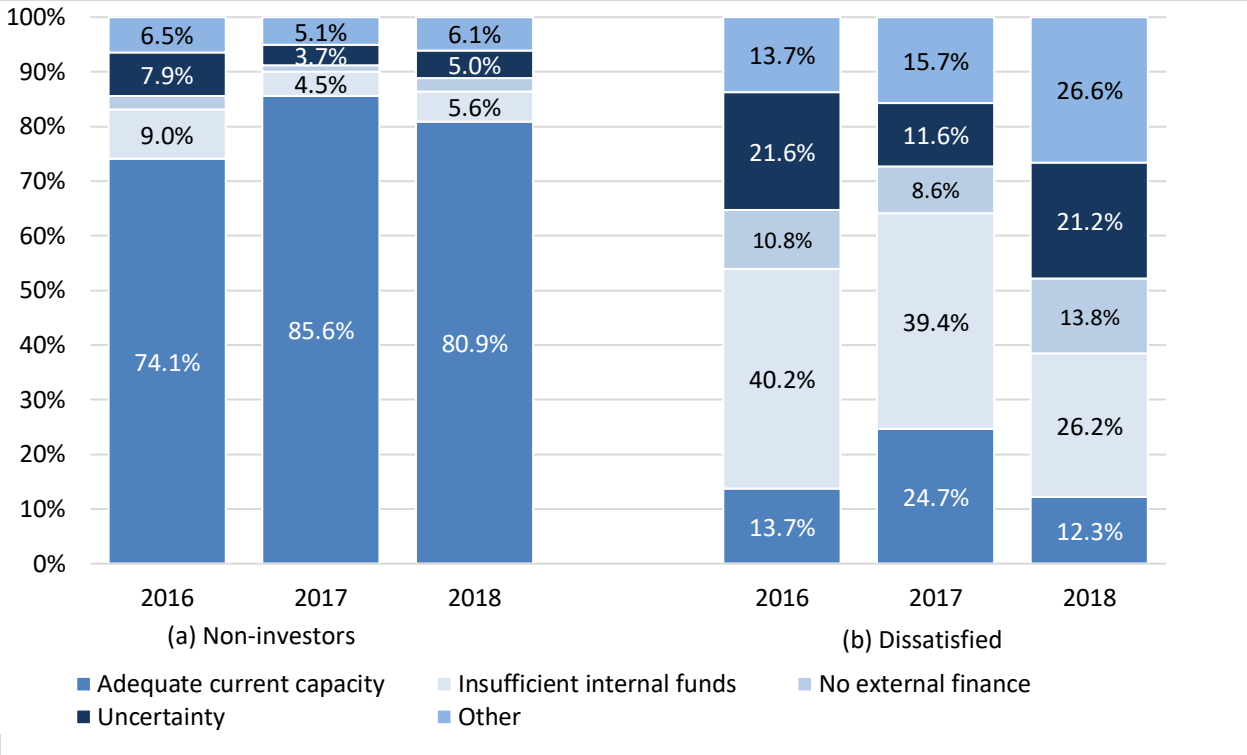
FIGURE 14 INVESTING FIRMS' ATTITUDES BY ASSET



Source: Authors' calculations based on *Credit Demand Survey* data.

Figure 15 compares the responses from non-investing (and dissatisfied investing) firms regarding their reasons for the lack of (or insufficient) investment. The non-investing firms sub-sample corresponds with those firms in columns (c) and (d) in Figure 12 and Table 4. The dissatisfied investing firms' category corresponds with those firms which reported to invest less than they would like to (i.e. firms in column (a) in Figure 12 and Table 4). Additionally, the Table below the bar chart in Figure 15 displays the attitudes reported by those firms that reported not having adequate capacity in each of the two categories previously defined.

FIGURE 15 NON-INVESTING AND DISSATISFIED INVESTING FIRMS' ATTITUDES



% of non-adequate capacity firms	(a) Non-investing firms			(b) Dissatisfied investing firms		
	2016	2017	2018	2016	2017	2018
Insufficient internal funds	34.7	30.3	28.7	46.6	52.8	29.7
No external finance	9.7	9.1	12.8	12.5	11.1	15.4
Uncertainty	30.6	25.8	26.6	25.0	15.3	24.2
Other	25.0	34.8	31.9	15.9	20.8	30.8

Source: Authors' calculations based on *Credit Demand Survey* data.
Note: Columns add up to 100 per cent.

In 2018, roughly four-in-five non-investing firms reported having adequate capacity (panel (a) in Figure 15). For the remaining one-in-five firms, the main reasons for not investing despite not having adequate capacity were insufficient internal funds and uncertainty. The percentage of firms reporting the lack of external finance as the reason for not investing also increased in 2018 by 3.7 percentage points.

For the case of dissatisfied investing firms (panel (b) in Figure 15), the percentage of firms that reported insufficient internal funds as the reason behind their dissatisfaction experienced a large decline in 2018, although this remains the most important reason. In addition, the percentage of firms reporting uncertainty increased remarkably, by roughly 9 percentage points, in 2018. The percentage of firms stating that they had a lack of external finance also increased, although to a lesser extent than uncertainty (by 4.3 percentage points).

Overall, the lack of sufficient internal finance emerges as the most important factor behind both the lack of investment and the investment dissatisfaction. However, 2018 saw an increase in the percentage of firms reporting uncertainty as an issue, particularly for the firms which invested but were not satisfied with their investment activities.

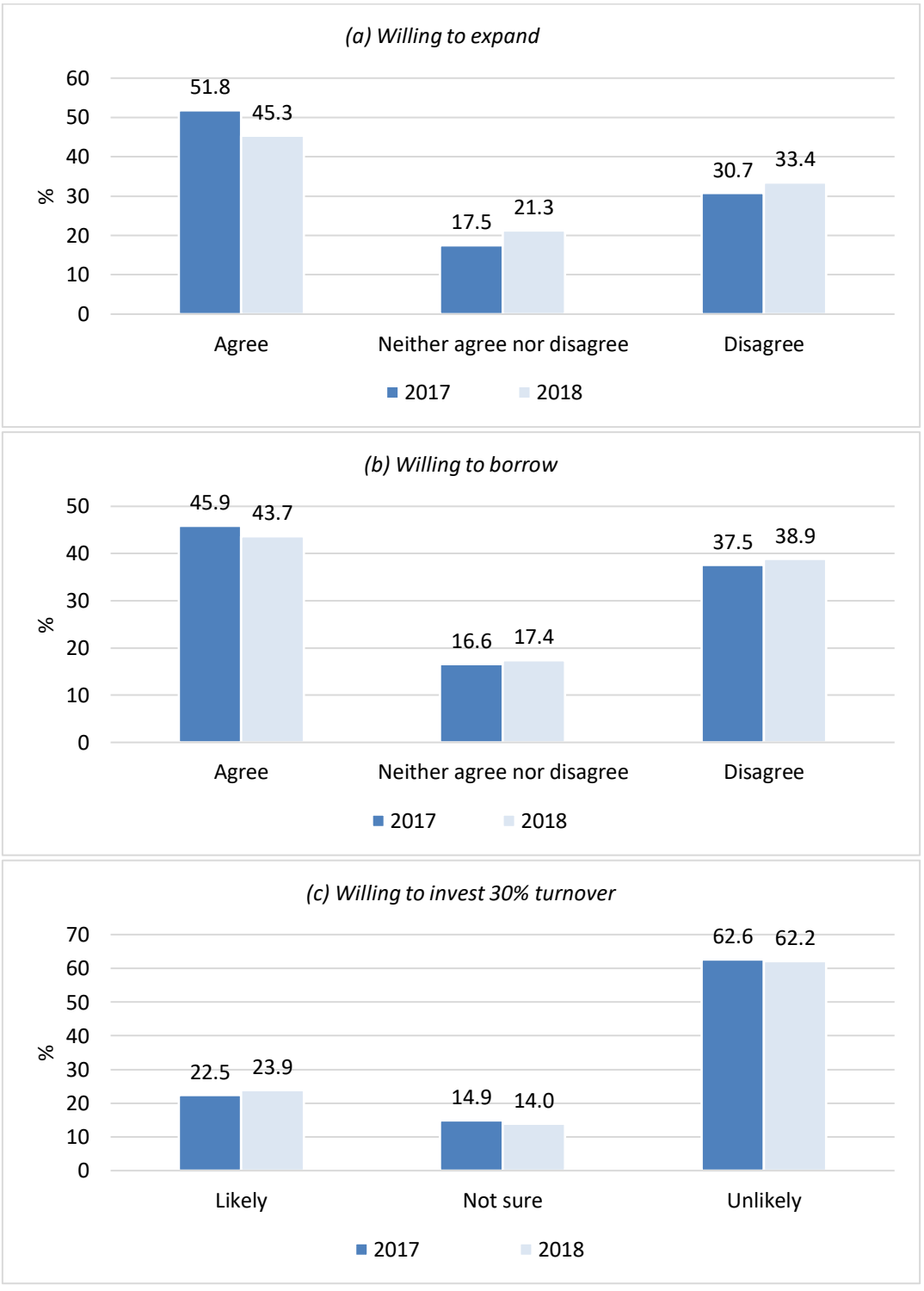
To attempt to provide more insight into the attitudes of firms towards their investment activities, we included specific questions on firms' attitudes to expansion and taking on debt. The specific questions we included were as follows:

1. On a scale from 1 to 5 (where 1 is strongly agree and 5 is strongly disagree), please indicate whether you agree or disagree with the statement: *'I am willing to expand my business even if it brings more risk/challenge'*.
2. On a scale from 1 to 5 (where 1 is strongly agree and 5 is strongly disagree), please indicate whether you agree or disagree with the statement: *'I am willing to borrow from banks to fund an expansion of my business'*.
3. On a scale of 1 to 7 (where 1 is extremely likely and 7 is extremely unlikely), please indicate whether you agree or disagree with the question: *'How likely or unlikely would you be to invest 30% of your business's annual turnover in a new business venture?'*

The targeting of these questions is aimed at attempting to provide insight into whether firms are willing to expand, an issue which has been noted as a potential limiting factor since the onset of the crisis.

Figure 16 displays 2017 and 2018 data regarding self-reported firm willingness to undertake expansion of business activities, despite the increased risk resulting from doing so. The responses are grouped in three categories and the average percentage of firms in each is displayed in panel (a) in Figure 16. In addition, firms were also asked to report whether they would be willing to borrow or use their own resources to fund expansion, with responses displayed in panels (b) and (c) in Figure 16, respectively. The responses to these questions could be interpreted as a proxy for firms' risk attitudes.

FIGURE 16 RISK ATTITUDES



Source: Authors' calculations based on *Credit Demand Survey* data.

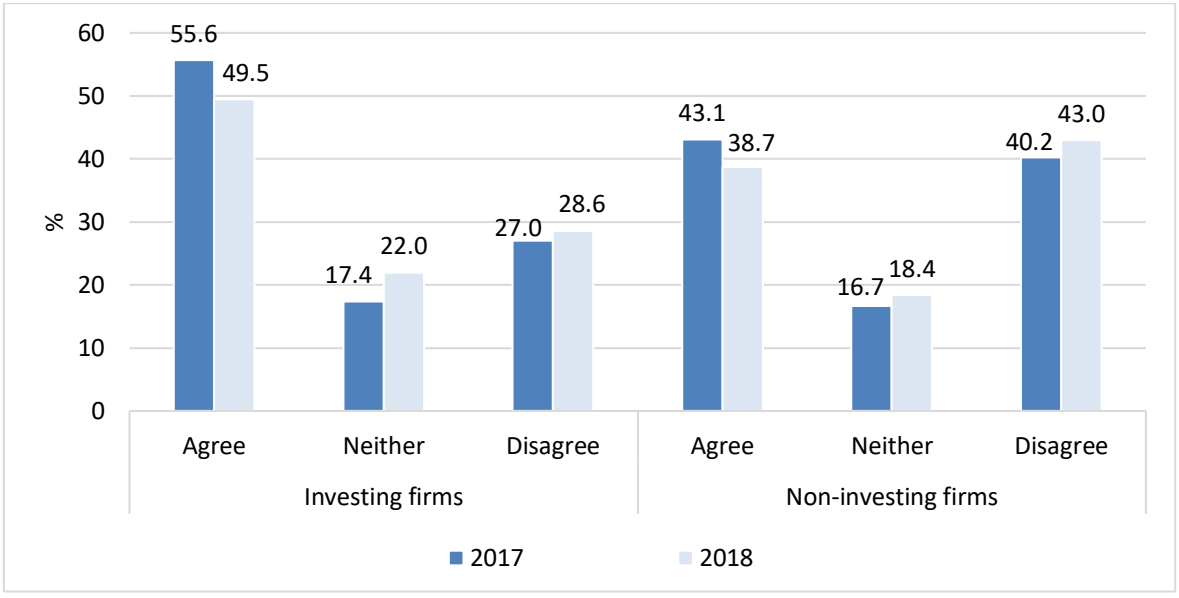
Roughly half of firms reported to be willing to expand their business' activities at the expense of increased risk, but the percentage of firms willing to expand experienced a 6.5 percentage point decrease in 2018.

When asked about their willingness to borrow external financing from banks in order to fund business expansion, almost 44 per cent of firms in 2018 also reported to be willing to do so. However, the percentage of firms which expressed disagreement with the statement came quite close, at 39 per cent in 2018. Finally, SMEs were asked to report how likely they would be to use a percentage of their own turnover to fund a new business venture. In contrast with previous answers, over 60 per cent of firms reported this to be unlikely, regardless of the year, and only one-in-four firms reported to be likely to use one-third of firm turnover.

Focusing on willingness to expand and risk question (i.e. panel (a) in Figure 16), Figure 17 displays the answers separately for investing and non-investing firms. The purpose of this separated analysis is to relate the stated risk attitudes with the actual realised investment activity of SMEs in 2017 and 2018.

In 2018, 49.5 per cent of investing firms reported they would be willing to expand their business activities further. This percentage is roughly 11 percentage points higher than the corresponding figure for non-investing firms. Conversely, the percentage of investing firms which reported to disagree with expansion was 28.6 per cent (with 43 per cent for non-investing firms disagreeing with expansion). These findings suggest that investing firms were more willing to continue expanding their business activities further regardless of the added risk (i.e. higher risk taking), while non-investing firms displayed the opposite behaviour, as they did not invest and also were less willing to expand (i.e. higher risk aversion).

FIGURE 17 TOTAL INVESTMENT ACTIVITY AND RISK ATTITUDES



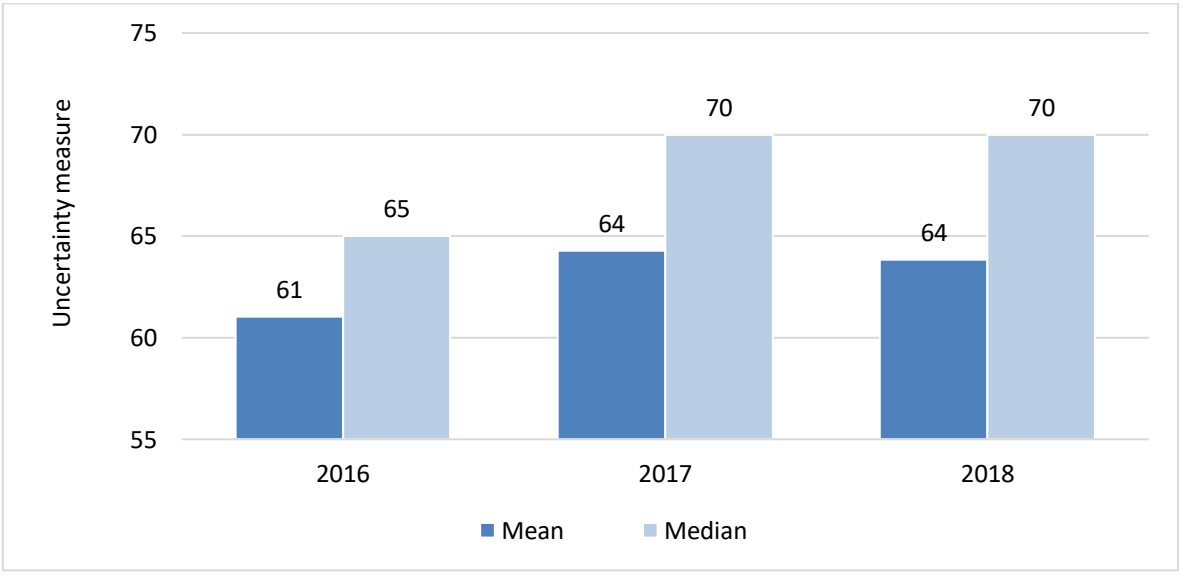
Source: Authors' calculations based on *Credit Demand Survey* data.
Note: For investing firms, total investment in this figure excludes investment in staff.

3.3 INVESTMENT UNCERTAINTY

In this section we will explore the level of uncertainty that firms had regarding their investment decisions between 2016 and 2018. Firms were asked in the CDS to report their perceived level of uncertainty regarding investment. This measure can range from 1 to 100, with a value closer to 100 indicating greater certainty, and vice versa.

Figure 18 compares mean and median values of reported investment uncertainty per year. The means have remained remarkably stable, with only a three-point increase between 2016 and 2018. Median investment uncertainty increased by five points in the same period and remained reasonably stable.

FIGURE 18 INVESTMENT UNCERTAINTY EVOLUTION



Source: Authors' calculations based on *Credit Demand Survey* data.

Table 6 explores whether there is variation in the mean investment uncertainty measure depending on selected firm characteristics, as done with other investment statistics in Section 2. On average, small and medium SMEs reported higher levels of uncertainty when compared to micro enterprises. Average uncertainty was also higher for firms in the services sectors.

Using again the classification of exporting firms outlined in Section 2.3, the last two columns in Table 6 report average uncertainty for UK and *RoW* exporters. Average investment uncertainty increased by only one point for UK exporters to 71 in 2018. In contrast, average uncertainty reported by firms which export production to other destinations decreased by 5 points in 2018 to 66 points. In this year, uncertainty of UK exporting firms was on average 5 points higher when compared

to the rest of exporting firms. This difference is much larger than the one-point difference observed in 2017, which might be reflecting increased Brexit uncertainty.

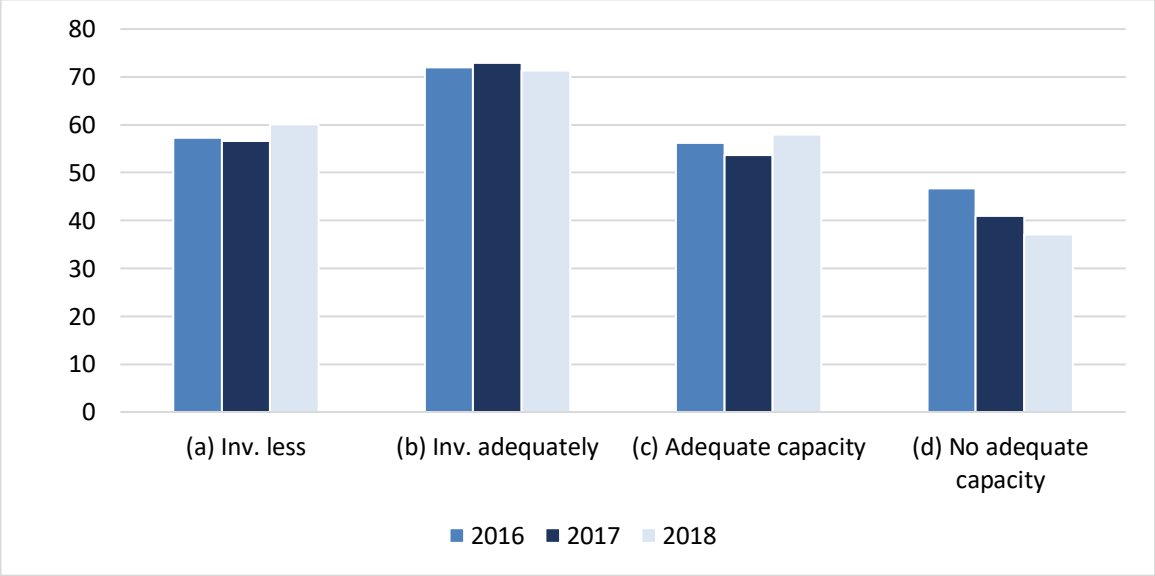
TABLE 6 UNCERTAINTY MEASURE BY FIRM CHARACTERISTICS

	Total	Less than 20 years	More than 20 years	Micro	Small-Med.	Industry	Services	Exporter – UK	Exporter – RoW
2017	64	67	63	60	67	61	66	70	71
2018	64	63	64	58	68	63	64	71	66

Source: Authors' calculations based on *Credit Demand Survey* data.

Finally, we explore the relationship between uncertainty and firms' investment attitudes. Figure 19 displays average uncertainty by each of the categories defined in Figure 12. The average uncertainty level was higher for firms with no capital gap, and particularly for investing firms which reported to invest adequately. Among the dissatisfied firm categories ((a) and (d) in Figure 19) average uncertainty was also higher for investing firms which reported to have invested less than they wanted to.

FIGURE 19 INVESTMENT UNCERTAINTY AND FIRM PERCEPTIONS

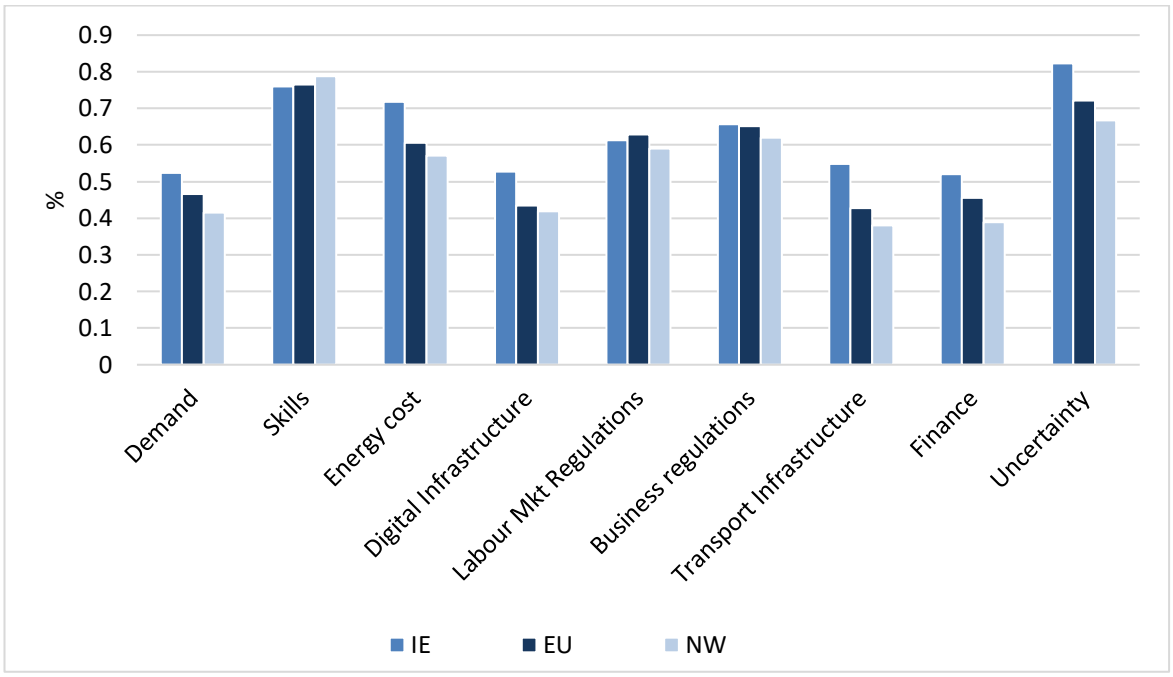


Source: Authors' calculations based on *Credit Demand Survey* data.

EIBIS 2019 data confirm the importance of uncertainty for Irish firms. Figure 20 shows that Irish firms' investment decisions are frequently constrained by uncertainty. While uncertainty is also an issue for firms operating in the rest of the EU Member States, the incidence of this barrier is of smaller importance when compared to Irish firms. Across other Member States, availability of adequate skills

is the most frequently reported barrier to investment. This barrier is the second most important one reported by Irish firms. Investment barriers that are particularly frequent in Ireland when compared to EU peers are energy cost, access to infrastructure (both digital and transport) and access to finance.

FIGURE 20 STRUCTURAL INVESTMENT BARRIERS, EU COMPARISON



Source: EIBIS 2019 data.

Note: Firms were asked; *'Thinking about your investment activities in Ireland, to what extent is each of the following an obstacle? Is it a major obstacle, a minor obstacle or not an obstacle at all?'.* This graph shows the share of firms that responded with yes to a barrier being either major or minor.

SECTION 4

Investment financing and credit developments

4.1 INVESTMENT FUNDING SOURCES

After identifying the investment patterns, attitudes and constraints of Irish SMEs in the previous sections, this section is concerned with the sources being used in order to fund investment. The main objective is to identify whether factors such as the accessibility of the different funding sources might be preventing investment. The information reported through this section fills important knowledge gaps regarding SMEs funding sources and liquidity. A novelty of the statistics reported is that they provide separated information on the financing sources by type of assets, from large (i.e. buildings) to smaller fixed assets. This section also reports detailed statistics on extensive and intensive margins of investment funding by several financing sources. Finally, this section will also offer a detailed overview of the evolution of liquidity levels of Irish SMEs.

Figure 21 outlines patterns in the use of different funding sources depending on whether investment was undertaken for buildings or for other smaller fixed assets, in 2017 and 2018. Two different measures are displayed:

- The *extensive margin* is defined as the percentage of firms which used each type of funding source.
- The *intensive margin* corresponds to the percentage of the total value of investment that was financed by each type of funding source, calculated including firms that used each specific source only.

Looking first at the extensive margins (in panel (a), Figure 21), a very high proportion of firms (between 85 and 90 per cent) used internal funds to finance investment, regardless of the type of asset. The percentage of firms using this source declined by roughly 5 percentage points in 2018 for both types of assets as well. The percentage of firms using external finance provided by banks decreased in 2018, with 11 per cent of SMEs reporting to use this source to fund building investment. Only 5 per cent of firms reported using bank finance to fund investment in smaller fixed assets. For this category of assets, 2018 saw a remarkable increase in the importance of leasing and hire purchase as a source of investment finance. The percentage of firms using this source was three times higher in 2018, increasing from 3.9 to 12 per cent. The importance of leasing to fund investment in buildings was negligible.

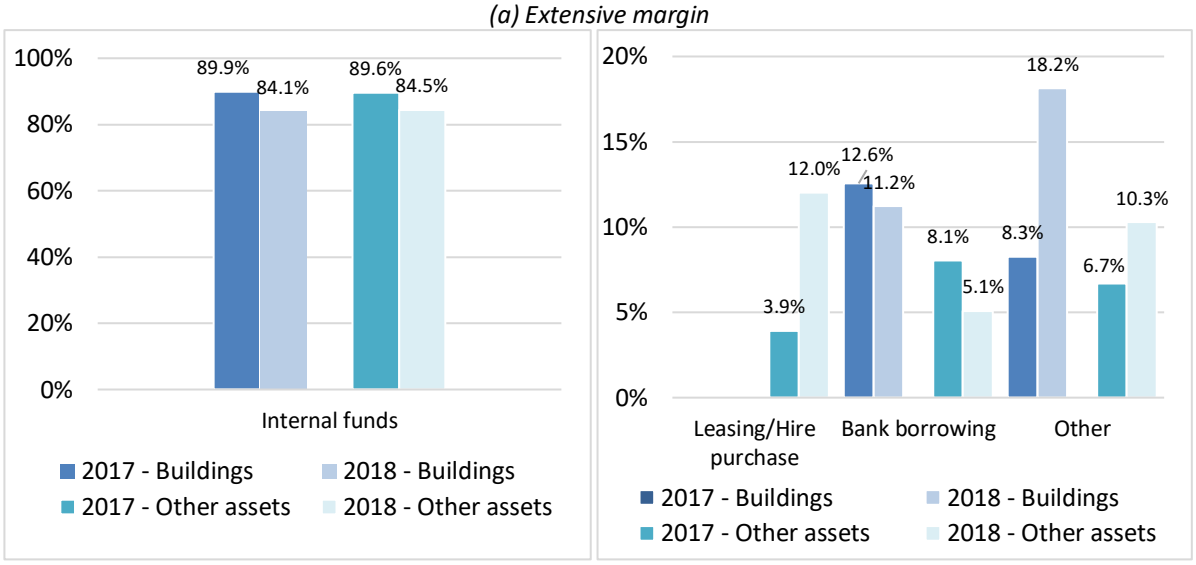
The extensive margins show quite a lot of variation in the percentages of firms using each type of source, both depending on the category of asset and year considered. However, the intensive margin statistics (in panel (b), Figure 21) appear to be more stable. In general, they indicate that for those firms which used a given financing source, that source funded a very high percentage of the investment value (over 70 per cent in all cases).

Between 94 and 96 per cent of the value of the investment in both buildings and smaller fixed assets was financed with internal funds in 2017, and only a small decrease to 92 and 93 per cent in 2018 is observed. The percentage of the value of investment finance borrowing from banks was higher for buildings than for smaller assets in 2018, with an average of 82.6 and 75.5 per cent respectively. The percentage of investment on buildings financed though bank borrowing increased by 11 percentage points when compared to 2017. The increased importance of leasing and hire purchase to fund investment in small fixed assets is also reflected in the intensive margin. The percentage of investment on small assets funded using leasing and hire purchase increased by 8.5 percentage points in 2018.

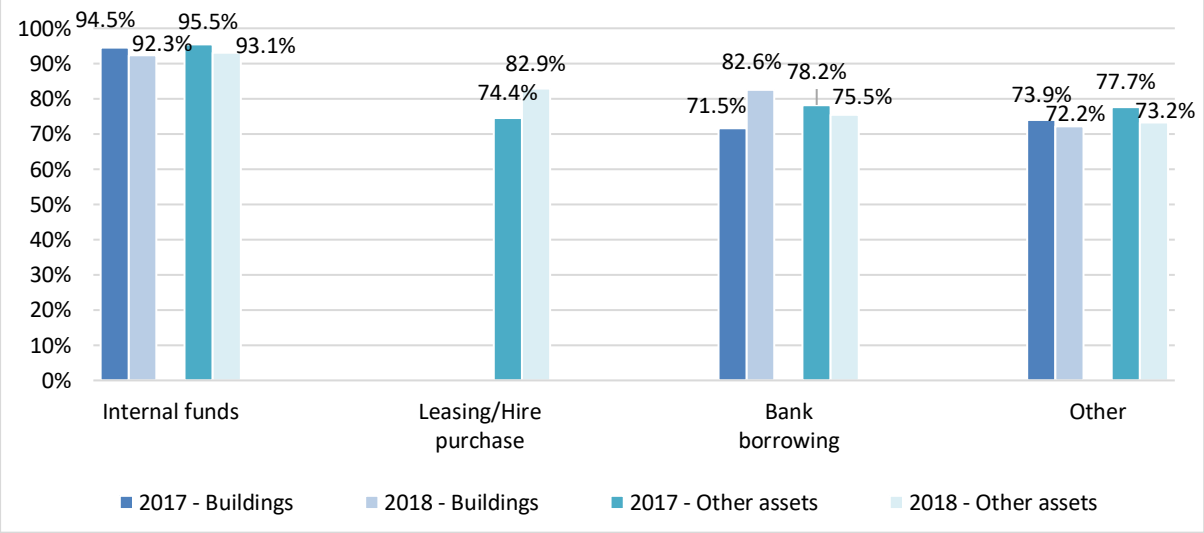
Finally, panel (c) in Figure 21 displays the average yearly percentage of the value of investment financed by each funding source, considering the full sample of investing firms (i.e. not just firms using a specific source of funding). Despite being quite different from the intensive margin percentages, they also indicate the overall importance of internal funds, and also the increased use of hire purchase and leasing to fund investment in small fixed assets.

FIGURE 21 FUNDING SOURCES BY FIXED ASSETS CATEGORY

(a) Extensive margin



(b) Intensive margin



(c) Sources of investment funding, total sample

Buildings	Internal	Banks	Leasing	Other
2017	85.1	8.9	-	6
2018	77.6	9.3	-	13.1
Other assets	**Internal**	**Banks**	**Leasing**	**Other**
2017	85.6	2.9	6.3	5.2
2018	78.7	3.8	10	7.5

Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: For buildings, *Other* category includes leasing and hire purchases, owner's contributions, supplier credit, external equity and other sources. For other fixed assets, *Other* category includes owner's contributions, supplier credit, external equity and other sources. In panel (c) total sample refers to the total amount of firms that answered the question regarding funding sources.

Irish firms' reliance on internal finance persistently ranks ahead of that of peers in the EU. Figure 22 shows that the size of the gap in the share of internal financing relied on has remained relatively large over recent years for Irish firms when

compared to the other two reference groups. Several reasons behind this behaviour can be pointed out, which could be worth further exploration:

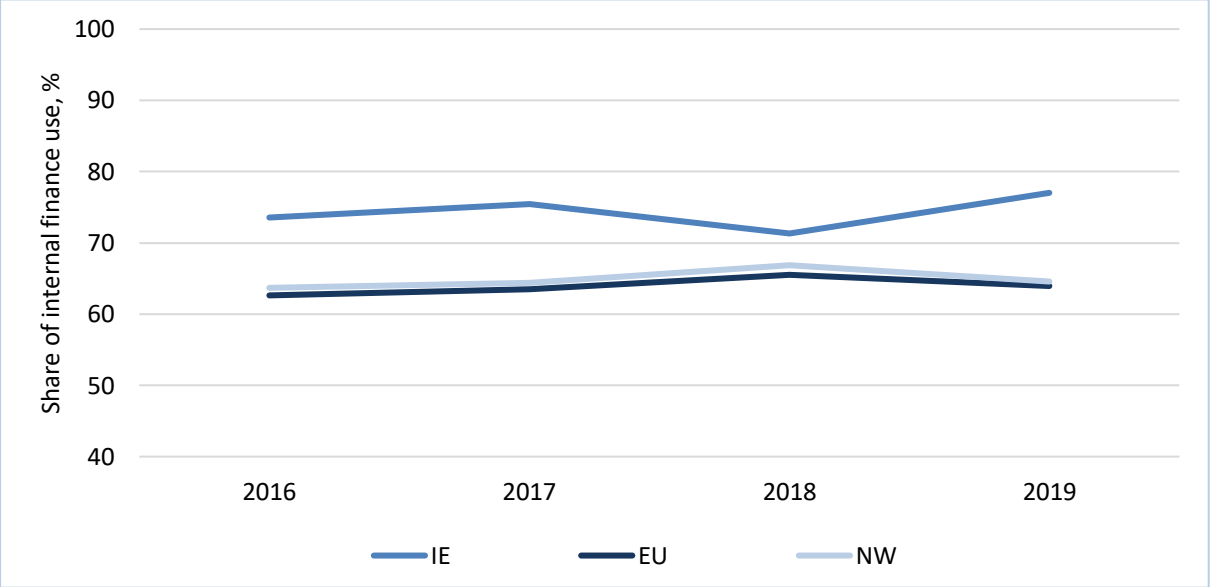
a) the higher internal finance usage could be explained by a relatively high share of firms being highly profitable (the evidence from EIBIS does not lend much support to this hypothesis as Irish data do not report a higher share of profitable firms);

b) a residual debt overhang;

c) a change in attitude to external financing as a result of the financial crisis;

d) a more risk averse approach in the wake of the Brexit referendum. The relative relevance of this hypothesis may change as the scheduled date for Brexit approaches.

FIGURE 22 INTERNAL FINANCE USAGE, EU COMPARISON

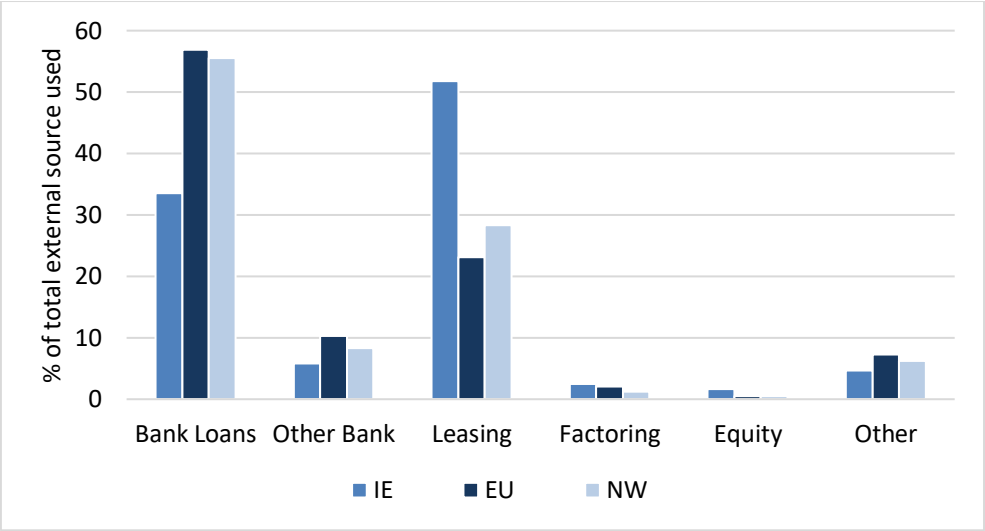


Source: EIBIS data.
Notes: Firms were asked: *'What proportion of your investment was financed by each of the following: internal; external?'*

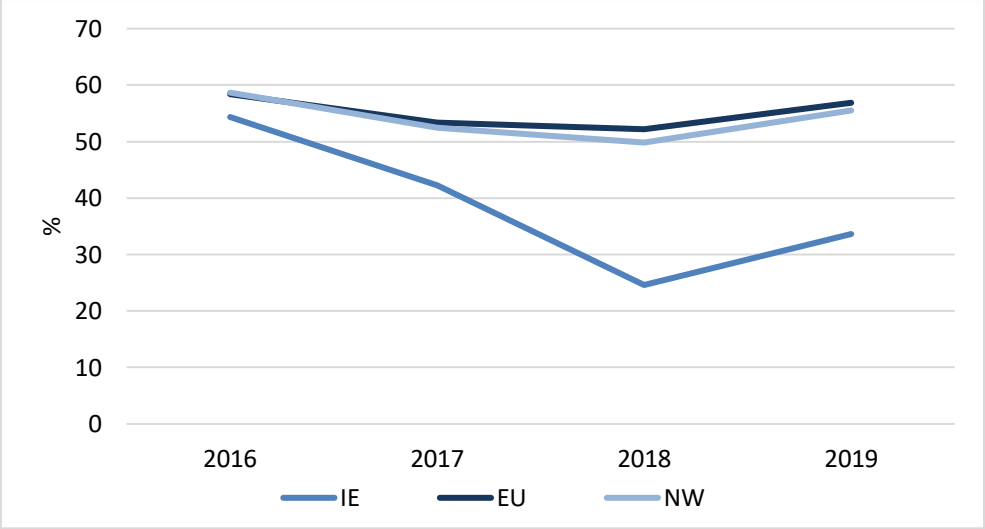
The CDS data displayed in Figure 21 showed a remarkable increase in the reliance of Irish firms on leasing at the expense of bank loans in 2018. Figure 23 (a) shows that Irish firms rely disproportionately on leasing arrangements for external financing when compared to EU peers. In line with findings in the CDS data, the reliance on leasing has grown significantly (Figure 23 (c)), while the use of bank loans has declined (Figure 23 (b)). EIBIS data have shown that a relatively high share of Irish firms relying on external finance consider collateral requirements burdensome. This might help explaining the steady decline in bank loans as a source of external finance. Moreover, many leasing products in Ireland are provided by banks, which could also explain this declining trend. Finally, Figure 23 (a) shows that in line with peers across the EU, market-based finance remains limited.

FIGURE 23 EXTERNAL FINANCE, EU COMPARISON

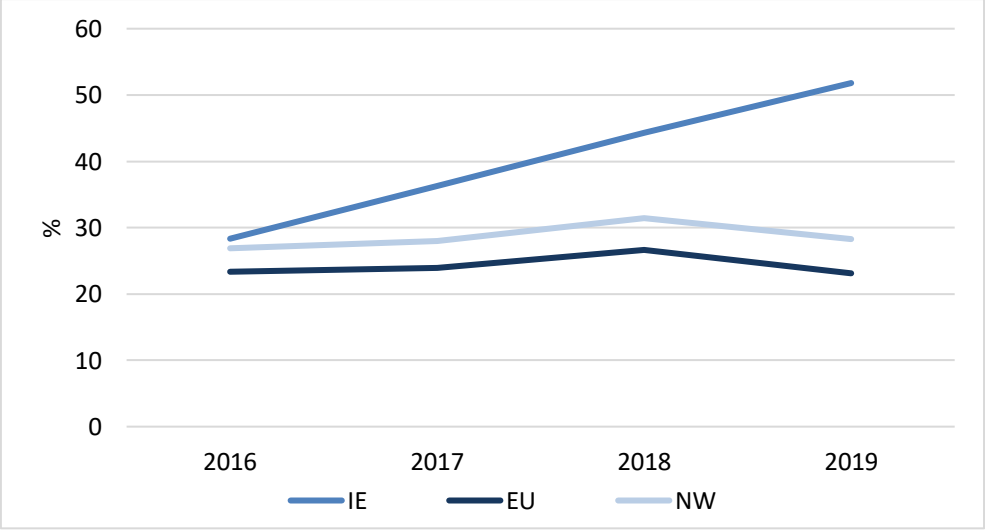
(a) Intensity of usage of external sources, 2019



(b) Intensity of bank loan usage



(c) Intensity of leasing usage



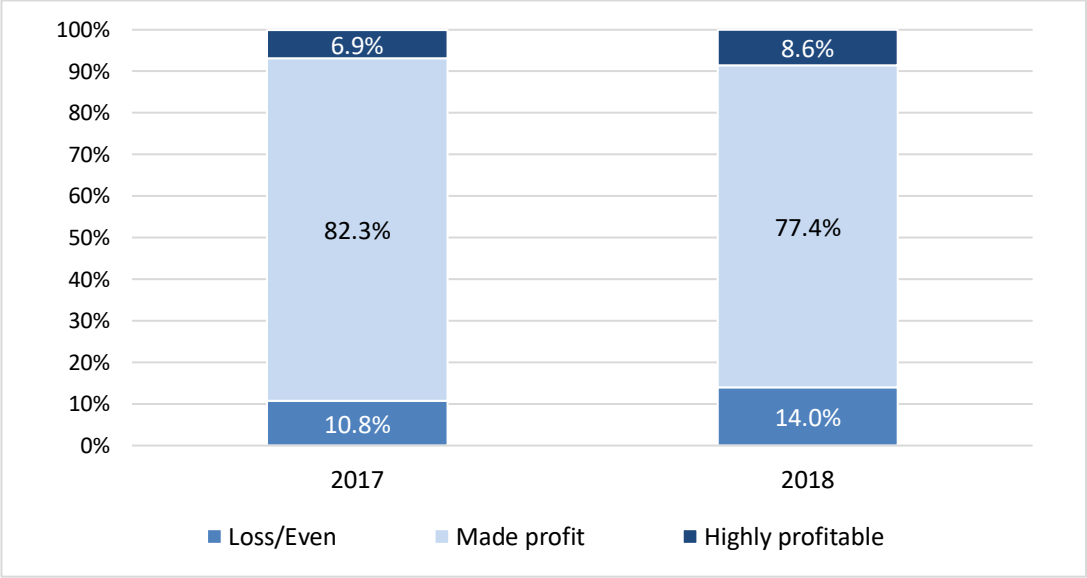
Source: EIBIS data.

Notes: Firms were asked, *approximately what proportion of your external finance does each of the following represent?*

4.2 FIRM LIQUIDITY AND PROFITABILITY

Given the importance of internal funds to investment financing identified in the previous section, this section examines the relation between investment and turnover, profit and liquidity levels of Irish SMEs between 2016 and 2018.

FIGURE 24 FIRM PROFITABILITY



Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: Highly profitable firms are defined as those with a profit/turnover ratio above 90 per cent. Note that the percentages reported for each of the three categories add to 100 per cent.

Figure 24 shows the evolution of firm profitability of Irish SMEs between 2017 and 2018. Over 85 per cent of firms in the sample reported making a profit in 2017 and 2018. The percentage of firms which made a loss or broke even in 2018 increased by 3.2 percentage points when compared to 2017. However, the percentage of highly profitable firms also increased in 2018 to 8.6 per cent. Given the high profitability found among Irish SMEs, it is worth exploring their liquidity levels further.

According to Table 7, nearly 95 per cent of SMEs reported availability of liquid assets in 2016. This figure has grown to 98 per cent in 2018. In 2016, the average level of liquid assets was quite high, at just below €765,500. The level of liquid assets increased by 2 per cent in 2017, however it suffered a decline of about 18 per cent in 2018. Average liquidity levels followed the same trend for investing firms, however the level of liquid assets was much higher for these firms in all years. The level also declined in 2018, by a lower 10 per cent.

Despite the variation observed in the mean level of liquid assets, median liquidity levels display a more stable trend, and are also much lower. The decline in liquidity levels shown by the mean values for the total sample is not mirrored by the median level. However, for the case of investing firms, median liquidity levels also declined, although at a lower rate.

TABLE 7 FIRM LIQUIDITY

	Total	Investing firms
% firms with liquid assets (mean)		
2016	94.82	97.50
2017	97.43	98.25
2018	98.18	97.91
Liquidity level (mean)		
2016	765,493	897,498
2017	782,642	907,810
2018	641,173	815,531
Liquidity level (median)		
2016	225,000	269,000
2017	200,000	286,765
2018	200,000	270,000
Investment/Liquid assets (mean)		
2016	-	0.40
2017	-	0.43
2018	-	0.49
Liquid assets/Turnover (mean)		
2016	0.35	0.32
2017	0.35	0.34
2018	0.34	0.34

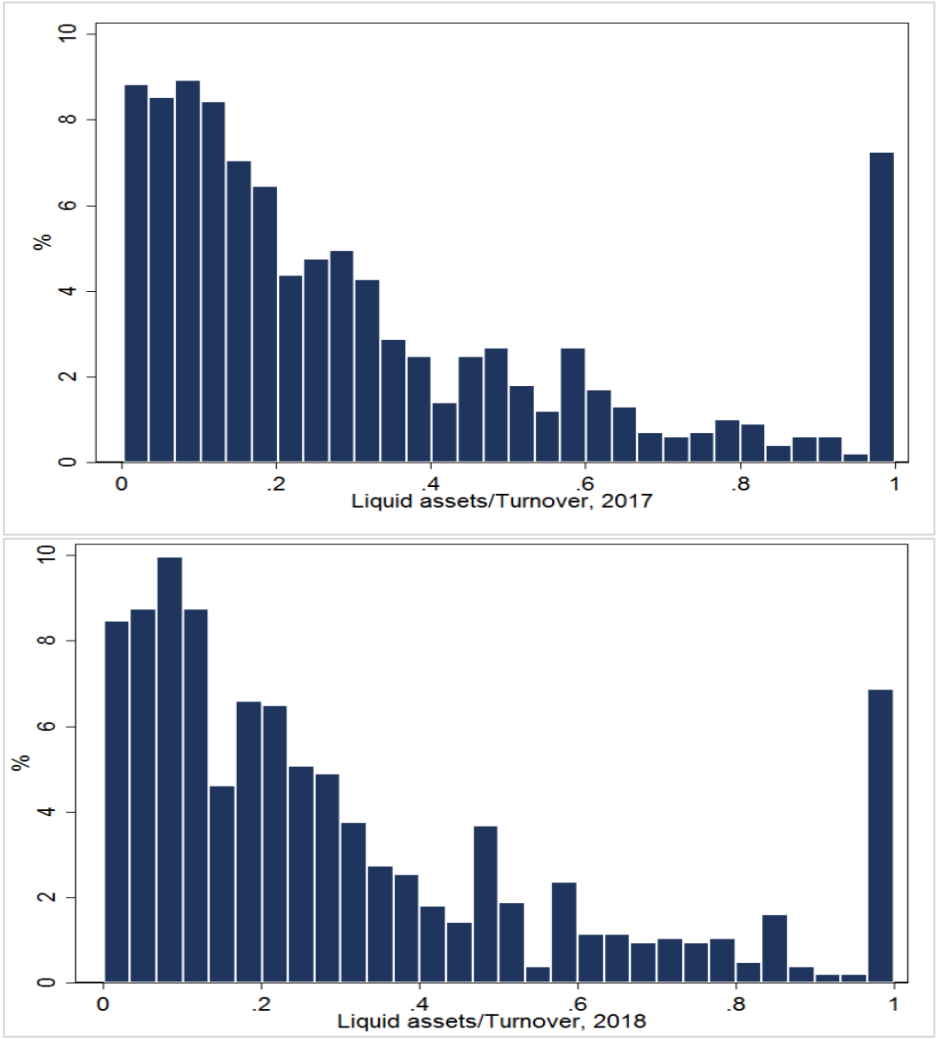
Source: Authors' calculations based on *Credit Demand Survey* data.

The average values of two different ratios are also reported in Table 7. The first one is the investment-to-liquid assets ratio, which gives an indication of the size of the investments made by investing firms relative to the availability of liquid assets. On average, the value of investments represented roughly 40 per cent of the liquid asset level of investing firms in 2016, which increased to nearly 50 per cent in 2018.

The second ratio presented in Table 7 is the level of liquid assets over the level of firm turnover. This can be interpreted as the 'saving' capacity of firms. The average value of this ratio for all firms was 0.35 in 2016 and 2017, although it slightly declined to 0.34 in 2018. This indicates that liquid assets represented on average about one-third of total turnover through the three-year period considered here, with virtually no variation. The average ratio was slightly lower for investing firms in 2016 and 2017, although it converged with the total sample average in 2018. Figure 25 displays the distribution of the ratio of liquid assets over turnover in 2017

and in 2018. A small increase in skewness in 2018 can be observed, which is reflective of the small decline in the average value observed in 2018.

FIGURE 25 LIQUID ASSETS-TO-TURNOVER RATIO DISTRIBUTION



Source: Authors' calculations based on *Credit Demand Survey* data.
Note: Ratio capped at 1.

The average liquid assets-to-turnover ratio is reported by firm category in Table 8. Looking at the total sample statistics displayed in the first three columns, firms operating for less than ten years had higher 'saving' capacity in 2017 and 2018, when compared to other age categories. Micro firms and firms operating in services sectors also had a higher average ratio. Firms exporting to the UK had higher savings in 2016 and 2017, however in 2018 non-exporting firms had the highest average ratio.

For the sub-sample of investing firms displayed in the last three columns of Table 8, average values of the ratio were largely in line with those of the total sample. Micro

firms and firms operating in the services sectors also had higher 'saving' capacity. A decline in the 'savings' of investing UK exporting firms is also observed. In contrast with the total sample statistics, investing firms operating for more than 25 years had higher levels of liquid assets relative to their turnover.

TABLE 8 AVERAGE LIQUID ASSETS/TURNOVER RATIO BY CATEGORY

	Liquid assets/Turnover					
	Total			Inv. firms		
	2016	2017	2018	2016	2017	2018
Less than 10 years	0.28	0.37	0.38	0.26	0.35	0.34
10 to 25 years	0.35	0.32	0.29	0.30	0.32	0.27
More than 25 years	0.38	0.36	0.37	0.35	0.36	0.39
Export – UK	0.39	0.40	0.27	0.46	0.35	0.27
Export – Other	0.37	0.36	0.34	0.34	0.38	0.35
Export – No	0.34	0.34	0.35	0.28	0.34	0.34
Micro	0.38	0.43	0.41	0.34	0.44	0.41
Small	0.32	0.28	0.29	0.30	0.29	0.29
Medium	0.36	0.33	0.31	0.33	0.30	0.32
Industry	0.31	0.32	0.31	0.29	0.33	0.28
Services	0.37	0.36	0.35	0.33	0.35	0.35
Other sectors	0.34	0.36	0.36	0.28	0.35	0.37

Source: Authors' calculations based on *Credit Demand Survey* data.

The ratio of total investment value to the level of liquid assets is also explored in more detail in Table 9. It displays the percentage of firms classified above or below 0.5 ratio value, and the percentage of observations for which the value of the ratio is 1 or above. For roughly three-in-four firms, the value of the investment-to-liquid assets ratio was below 0.5. This is indicative that for the majority of SMEs the value of investment was at least half of the value of liquid assets, or less. Out of the remaining 25 per cent of firms, only 13 per cent of firms invested a value above their available liquid assets (i.e. ratio value above or equal to 1), indicating potential need for external finance. These percentages have remained quite stable between 2016 and 2018.

Table 9 also provides the evolution of the percentage of firms classified in each ratio value band by selected firm characteristics. A higher percentage of firms operating for less than ten years, non-exporters, micro firms and firms in industry sectors had a ratio value above or equal to 1.

TABLE 9 INVESTMENT-TO-LIQUID ASSETS RATIO

	0 < Ratio < 0.50			0.50 ≤ Ratio < 1			Ratio ≥ 1		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Total	**75.3**	**78.0**	**76.4**	**13.0**	**10.8**	**11.0**	**11.7**	**11.3**	**12.6**
Less than 10 years	64.8	70.1	68.8	19.7	10.6	12.5	15.5	19.3	18.7
10 to 25 years	72.5	76.3	73.3	14.8	13.2	13.4	12.6	10.5	13.4
More than 25 years	81.1	82.8	82.1	9.2	8.7	8.5	9.7	8.5	9.4
Export – UK	80.0	87.8	78.7	11.7	5.7	8.1	8.3	6.6	13.2
Export – Other	82.1	83.6	78.8	4.8	10.0	8.4	13.1	6.4	12.8
Export – No	72.7	76.0	75.7	15.3	11.4	11.8	12.0	12.6	12.5
Micro	64.9	73.7	69.4	18.2	12.6	14.2	17.0	13.8	16.4
Small	81.0	79.8	80.1	11.3	9.7	10.0	7.7	10.5	9.9
Medium	81.0	82.0	80.0	7.1	9.7	7.9	11.9	8.4	12.1
Industry	68.3	77.3	72.8	14.9	11.2	10.6	16.8	11.5	16.6
Services	76.5	77.7	77.2	12.6	10.5	12.6	10.9	11.7	10.2
Other sectors	80.3	79.9	78.0	11.8	10.8	5.2	7.9	9.2	16.8

Source: Authors' calculations based on *Credit Demand Survey* data.

The potentially limited need for external funds uncovered in Table 9 is also reflected in the low long-term debt uptake (i.e. defined as debt with a term of three or more years) for SMEs between 2016 and 2018. In 2016, 74 per cent of firms did not have any long-term debt (Table 10). This figure went up in 2017 to 76 per cent and declined in 2018 to 69 per cent. Table 10 provides an overview of the average length of the long-term debt for the remaining roughly one-quarter of SMEs which incurred long-term debt.

Table 10 also provides a breakdown of the 2018 debt descriptive statistics by age category of the firm. It shows that the percentage of firms without long-term debt was higher (73.7 per cent) for firms operating for less than ten years. It is likely that these firms were established predominantly after the financial crisis, and therefore they would not have had debt overhang which originated before the crisis.

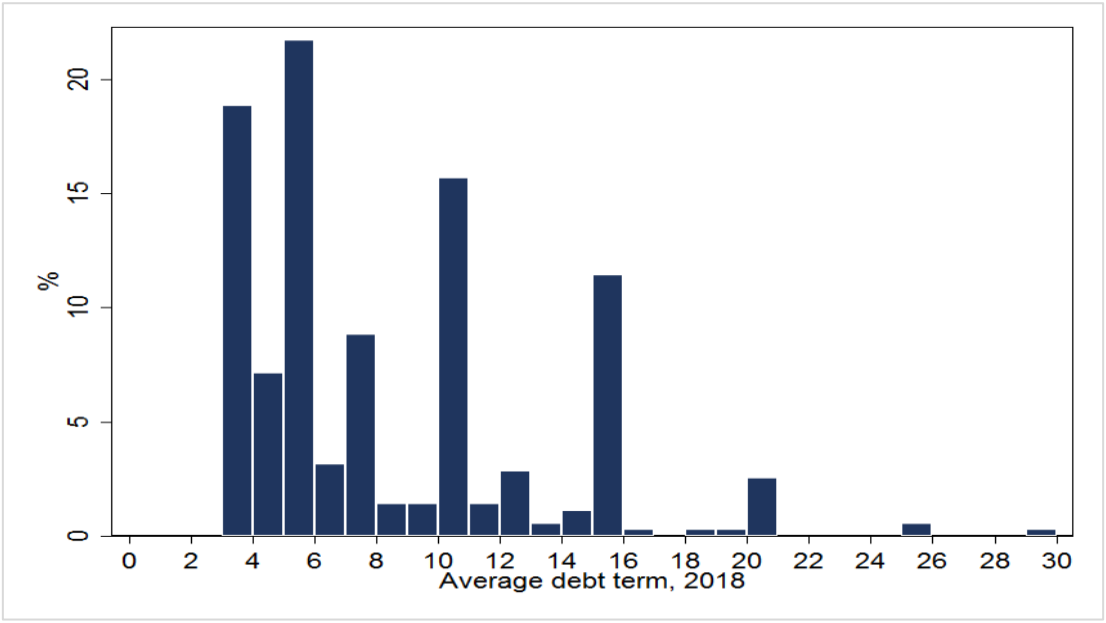
TABLE 10 LONG-TERM DEBT EVOLUTION

		% firms, no debt	Mean term	Max. term	Min. term
2016	Total	74.0	8.6	60	3
2017	Total	76.0	8.2	30	3
2018	Total	69.0	7.9	36	3
	Less than 10 years	73.7	7.2	20	3
	10 to 25 years	72.9	8.0	36	3
	More than 25 years	64.7	8.1	25	3

Source: Authors' calculations based on *Credit Demand Survey* data.

Figure 26 shows the distribution of the average debt term for firms which had long-term debt in 2018. Since the distribution of the average debt term of long-term debt has not varied much when compared to 2016 or 2017 data, these figures are not presented here. Higher concentrations of firms can be observed at the 4, 6, 11 and 16 average debt terms.

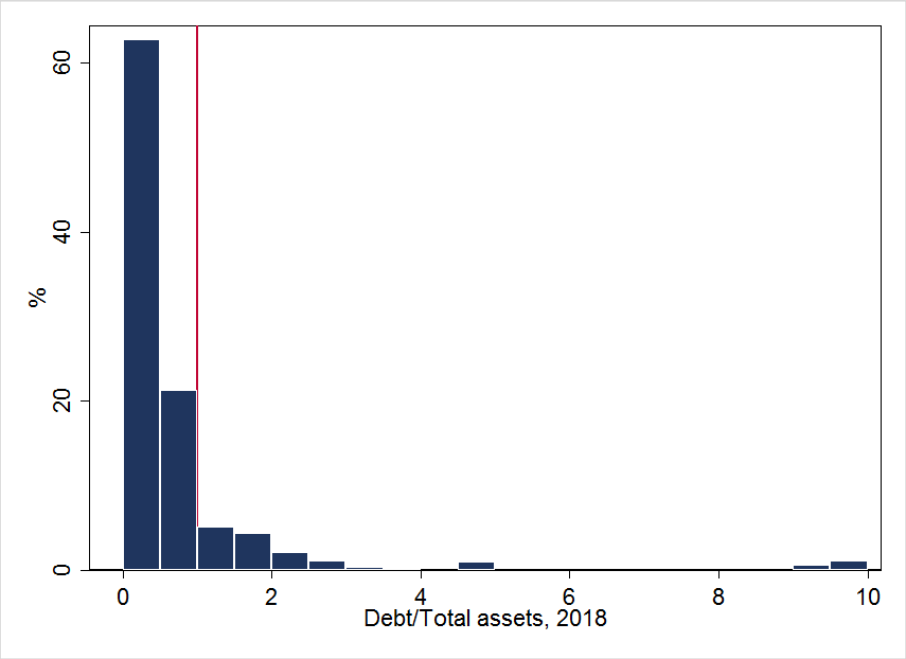
FIGURE 26 LONG-TERM DEBT DISTRIBUTION, 2018



Source: Authors' calculations based on *Credit Demand Survey* data.

Figure 27 displays the distribution of the ratio of total firm debt to total assets in the year 2018 (again the distribution has remained stable when compared to 2016 or 2017 data, therefore only 2018 is presented). The red line indicates the value 1, therefore it is clear that for the majority of firms (roughly 80 per cent) the value of debt is lower than the value of assets. This finding suggests that for the reduced percentage of firms that do have debt, the indebtedness levels are low in general.

FIGURE 27 DEBT-TO-TOTAL ASSETS RATIO DISTRIBUTION, 2018



Source: Authors' calculations based on *Credit Demand Survey* data.

SECTION 5

Conclusions and policy implications

The statistics presented in this statistical report are intended to provide a better understanding of investment patterns of Irish domestic small and medium enterprises. This information is of critical importance to assess and understand the growth possibilities and productive capacity of Irish indigenous enterprises.

Despite its importance, until recently little was known about SME investment activity other than at an aggregate level with considerable data gaps in relation to composition and distribution across firms. In order to fill these gaps, the CDS run by the Department of Finance includes a specific investment and assets module since 2017. Using these data, this report tries to answer important questions that will provide valuable insight for policymakers. In addition to the CDS, we have included data from the European Investment Bank's Investment Survey (EIBIS) to provide a comparative benchmark for Irish firms relative to other countries. This is an excellent addition to the domestic analysis.

Annual CDS data show that in excess of 80 per cent of SMEs invested in some form of asset or in their staff between 2016 and 2018. For investing firms, continued domestic investment growth was also observed. Besides total investment figures, it is also crucial to understand the type of assets that SMEs are predominantly investing in. Clear differences by type of asset were identified. For example, while over 65 per cent of SMEs have been investing in staff each year, the percentage of firms investing in buildings was under 20 per cent in all years. In terms of firm capital assets, investment in machinery and transport appear to be of greater importance when compared to intangibles. A mere 7 per cent of SMEs invested in intangibles, with a median investment value of only €10,000. This report also explores SME investment activity relative to firms' total assets. Until now, data on firm size had also been missing. For this purpose, the report compared the investment rates across different types of assets. Relative to firm size, in 2018 investment in transport assets was roughly 1.4 and 1.9 times higher than in buildings and machinery, respectively. Drawing on the European comparison, the share of Irish firms investing appears in line with other Northern European countries but is above that in the EU as a whole. Some differences compositionally are evident relative to other European countries. Irish firms dedicate a lower share of their investment to machinery and equipment and a rather higher share to property and other structures, as well as training and ICT.

Given the increasing uncertainty resulting from the evolution of the Brexit negotiation process, this report provided further insights into investment activity of exporting SMEs. Overall, important reductions in the percentages of investing UK exporting firms were observed, regardless of the type of asset. The total investment activity decline for UK exporting firms relative to firms that export to other destinations was roughly six times larger. This will be an important aspect of SME activity to monitor as the outcome of Brexit negotiations becomes clearer.

Another aspect of crucial importance to inform policy is whether or not SMEs are investing sufficiently. The CDS data suggested that between 2016 and 2018 just above 80 per cent of Irish SMEs reported satisfaction either with the level of investment undertaken or the capacity they currently have (if they did not invest). In terms of barriers to investment, uncertainty and insufficient internal funds were identified as the two most important factors. Uncertainty was of particular importance in 2018 for firms which invested less than they would like. The CDS data indicated that roughly 16 per cent of firms faced a capital gap in 2018, which represents a reduction since 2016. However, the capital gap continues to be highest for micro and younger firms with moderate reductions in the size of the gap for these firms compared to 2016. Benchmarking Ireland to EU Member States indicated that Irish firms reported much higher capital gaps, especially when compared to the North Western Member States category.

Another important topic on which the CDS provided novel information was firms' risk attitudes and investment uncertainty levels. Roughly half of firms reported they would be willing to expand their business activities at the expense of increased risk, but when asked about their willingness to borrow external financing from banks in order to fund business expansion, almost 39 per cent of firms in 2018 reported they were unwilling to do so. Moreover, only one-in-four firms reported to be likely to use a third of firm turnover to fund expansion. Firms were asked to report their uncertainty levels on a scale from 1 to 100. Mean and median uncertainty remained stable between 2016 and 2018. The mean uncertainty in 2018 was 64. In the European context uncertainty is a concern for Irish firms and this has grown in the wake of the Brexit referendum, since the share of Irish firms investing has dropped to levels in line with peers. Perhaps reflecting the growing chasm between actual economic conditions and growing risk aversions ahead of Brexit, a larger share of firms considered themselves to have invested too little compared to the number that considered the opposite. Uncertainty aside, lack of skills is also important, as in other Member States, though other areas such as cost of energy as well as access to infrastructure and finance feature more frequently in Ireland than with peers.

The CDS investment module also provides a detailed insight in the sources of investment finance for buildings and other fixed assets separately. For both

building and non-building assets, nearly 90 per cent of firms reported the use of internal funds to fund investment regardless of the asset type. Between 92 and 93 per cent of the value of the investment in both buildings and smaller fixed assets was financed with internal funds in 2018. Although external funding provided by banks was found to be used by more firms to fund investment in buildings as opposed to smaller fixed assets, the reliance on internal funds is widespread. Despite this, the percentage of the value of investment financed by borrowing from banks was higher for buildings than for smaller assets in 2018. A very noticeable increase in the importance of leasing and hire purchase to fund investment in small fixed assets occurred in 2018. The percentage of investment on small assets funded using leasing and hire purchase increased by 8.5 percentage points in 2018. From the European comparison, in terms of financing, the frequency of this constraint has diminished but remains important relative to other Member States, notably those in North Western Europe. Particularly noteworthy is the reliance on own funds for investment as well as the rise of leasing at the expense of bank loans for those firms availing of external finance.

Finally, another novelty of the CDS data is that they collect information on liquid assets. The continued use of internal funds since 2016 outlined above is paired with high liquidity levels. We found a high level of liquid asset holdings amongst Irish SMEs with a median of €200,000. A small decline in liquidity levels was observed for investing SMEs between 2016 and 2018. We found that liquid assets represented 34 per cent of firm turnover on average in 2018. Furthermore, we found that taking the average level of investment by firms as a share of liquid assets, roughly only 13 per cent of investing SMEs did not have sufficient liquid assets to cover their investments. This might be indicative of a low borrowing appetite, which appears to have translated in low debt uptake between 2016 and 2018. Only 31 per cent of SMEs reported to have long-term debt in 2018.

To sum up, several important findings emerge in this report. First, very different patterns of investment exist across types of assets, with SMEs being more focused on investments in fixed assets as opposed to intangibles. Therefore, although intangible assets are a very important component of the Irish economy, they are of much less importance to the small indigenous companies. Where suitable for their business type and sector, targeted policy initiatives such as amendments to the R&D tax credit as announced in Budget 2020 could have a positive impact on the level of investment by smaller firms in this area.

Second, data for UK exporting firms between 2017 and 2018 suggest Brexit uncertainty began to change investment patterns, with comparatively larger reductions in the percentage of investing UK exporting firms.

Third, Irish SMEs display a large reliance on internal funds to finance their investment activities. In the context of past trends of the Irish economic cycle, this perceived lack of borrowing appetite may be due to legacy crisis effects including an unwillingness to become indebted or risk aversion. Further research into why SMEs rely on internal funding for investment in all asset classes is warranted.

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APPENDIX 1 DATA DESCRIPTION

The CDS contains firm level data on a random sample of Irish SMEs and is carried out on a biannual basis (although the investment module is only carried out once a year). It was designed to include a good representation of micro, small and medium-sized firms and a proportional representation of selected key sectors of the economy. The sampling of the CDS is based on firms listed in the Company Registration Office records. All statistics presented in the tables and figures throughout this report are weighted using probability weights provided in the dataset. As is standard in treating extreme observations in microdata studies, outliers have been removed from the sample, and were defined as observations situated above and below the 99 and 1 percentiles, respectively.

Table A.1(a) describes of the sample composition of the CDS data between 2016 and 2018, and it reports the percentage of firms in each category and each year.

TABLE A.1(a) SAMPLE COMPOSITION

Size categories			
	Micro	**Small**	**Medium**
2016	41.6	37.9	20.6
2017	43.6	37.0	19.5
2018	42.8	36.4	18.9
Age categories			
	<10 years	**10-25 years**	**>25 years**
2016	17.7	38.2	44.2
2017	18.7	37.4	43.9
2018	18.2	35.4	46.5
Exporting status			
	Export – UK	**Export – Other countries**	**No exports**
2016	9.3	13	77.7
2017	5.7	9.8	84.5
2018	6.4	13.7	80

NUTS 3								
	Border	**West**	**Midlands**	**Mid-East**	**Dublin**	**South-East**	**South-West**	**Mid-West**
2016	10.9	9.0	4.0	10.0	29.8	9.4	16.4	10.6
2017	10.6	9.4	5.2	10.1	29.7	10.9	14.8	9.3
2018	10	9.3	5.4	9.8	30.4	9.7	15.4	10.0

Sectors						
	Construction	**Manufacturing**	**W&R**	**H&R**	**P&S**	**Other**
2016	11.0	9.9	34.2	11.0	18.1	15.9
2017	12.2	9.5	32.5	10.9	20.7	14.2
2018	12.3	11.1	32.9	9.4	18.4	16.0

Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: Wholesale and retail (W&R), hotels and restaurants (H&R), professional and scientific (P&S).

Sector overview

Most SMEs included in the sample operated in the Wholesale and retail sector, followed by the Professional and scientific sector. The sample includes a large proportion of micro and small sized firms, as opposed to medium sized firms. According to 2017 CSO data, most active enterprises in Ireland fall into the micro firm category (92 per cent), while small and medium firms represent 6.5 and 1.2 per cent respectively (CSO, 2019). Therefore, although medium and small firms are overrepresented in the sample, which is a common occurrence in SME microdata, we also include a very high proportion of micro firms. The data include a small share of firms with less than ten years of operation, with almost half of the firms operating for over 25 years. Although the sample included several companies who had been in business for less than two years, these companies usually are not listed in Company Registration Office records and therefore are not in the database on which sampling is based. For this reason, this analysis excludes a certain cohort of very young high growing firms for which credit constraints may be quite a

significant issue. Finally, just over three-quarters of firms included did not export their products outside Ireland.

Table A.1(b) provides information on the characteristics of the sample by sector between 2016 and 2018.

TABLE A.1(b) PERCENTAGE OF OBSERVATIONS

2016	Construction	Manufacturing	W&R	H&R	P&S	Other
Less than 10 years	10.5	4.2	28.0	18.8	22.6	15.9
10 to 25 years	10.7	9.5	34.3	10.3	16.3	19.0
More than 25 years	11.6	12.6	36.5	8.4	17.8	13.2
Micro	12.5	3.6	49.3	4.6	20.6	9.4
Small	11.0	15.8	22.3	13.9	16.2	20.9
Medium	8.3	11.9	25.5	18.4	16.2	19.8
Export – UK	4.0	18.4	44.8	-	20.0	12.8
Export – Other	5.2	27.0	22.4	0.6	26.4	18.4
Export – No	13.0	5.9	34.9	14.1	16.4	15.7
2017	**Construction**	**Manufacturing**	**W&R**	**H&R**	**P&S**	**Other**
Less than 10 years	11.8	9.1	24.8	18.1	22.1	14.2
10 to 25 years	13.2	8.9	30	10.5	21.5	15.8
More than 25 years	11.6	10.4	37.7	8.1	19.4	12.8
Micro	11.5	3.9	44.3	5.4	29	5.8
Small	13.9	15.7	22.9	13	14.7	19.7
Medium	10.7	10.7	24	19	13.3	22.4
Export – UK	6.5	18.7	44.9	-	17.8	12.2
Export – Other	4.6	38.6	21.2	0.8	26.5	8.3
Export – No	13.6	5.3	32.4	13.2	20.4	15.1
2018	**Construction**	**Manufacturing**	**W&R**	**H&R**	**P&S**	**Other**
Less than 10 years	14.1	7.5	27.8	17.3	18.4	14.9
10 to 25 years	15.2	8.4	30.1	8	20.8	17.4
More than 25 years	9.4	14.4	37.3	7.4	16.4	15.2
Micro	13.7	5.2	48.7	1.3	20.2	11
Small	13	18	19.5	10.4	18.6	20.5
Medium	7.8	10.1	25	25.4	13.8	17.9
Export – UK	10.6	20.3	43.1	0.8	16.3	8.9
Export – Other	3.7	32.3	23.4	-	26.6	14.1
Export – No	14	6.2	33.6	12	17.1	17.1

Source: Authors' calculations based on *Credit Demand Survey* data.
Notes: Wholesale and retail (W&R), hotels and restaurants (H&R), professional and scientific (P&S).

APPENDIX 2 DATA IMPUTATION

Some of the value variables obtained through this set of questions (debt, turnover and value of total assets) had a noticeable share of missing observations. The last column of Table A.2(a) shows the percentage of firms that did not report a value on the 2018 dataset (missing observations in 2017 and 2016 follow similar proportions). However, as an alternative question to providing the actual values, firms were given the option to state this information through pre-defined ranges of values. For firms which provided a range, a value of these variables was generated using multiple imputation. This process consists of the following. An Ordinary Least Squares regression was performed in each sub-sample of firms classified in each range, and after the regression range specific predicted values were calculated for each firm. If the predicted value was within the range, it was assigned as the value of total assets for that firm. If the value was not within range the value was left as missing.

After this procedure, the percentage of firms with a missing total assets value was reduced significantly. Table A2(a) also displays the descriptive statistics of these variables pre and post imputation (again, for the year 2018, with similar results in 2017 and 2016), which do not suffer important variation despite the increased number of values, preserving the composition of the sample.

TABLE A.2(a) IMPUTATION – DESCRIPTIVE STATISTICS, 2018

	Obs.	Mean	SD	Min.	Max.	% missing
Pre-imputation						
Total assets	726	3,434,000	12,490,000	0	200,000,000	51.63
Turnover	853	4,102,000	8,582,000	0	97,000,000	43.17
Debt	1,236	357,695	1,802,000	0	30,000,000	17.65
Post-imputation						
Total assets	1,328	2,723,000	10,040,000	0	200,000,000	11.5
Turnover	1,411	3,603,000	7,891,000	0	97,000,000	5.99
Debt	1,416	432,391	1,905,000	0	30,000,000	5.66

Source: Authors' calculations based on *Credit Demand Survey* data.
Note: SD indicates standard deviation.

APPENDIX 3 INVESTMENT STATISTICS BY CATEGORY AND YEAR

TABLE A.3(a) PERCENTAGE OF INVESTING FIRMS BY CATEGORY

2018	Buildings	Transport	Machinery	Intangibles	Staff
Less than 10 years	22.7	28.9	53.9	7.1	67.6
10 to 25 years	18.2	26.6	38.6	7.4	72.4
More than 25 years	18.8	30.1	41.5	6.5	66.4
Micro	11.7	22.8	32.8	5.6	46.4
Small	20.7	34.5	46.9	8.3	82.9
Medium	33.7	29.2	55.7	7.1	93.3
Industry	18.9	37.1	42.5	6.7	71.2
Services	19.9	26.3	41.1	5.7	66.8
Other sectors	17.3	25.3	49.0	12.6	73.7
2017	**Buildings**	**Transport**	**Machinery**	**Intangibles**	**Staff**
Less than 10 years	18.4	27.7	47.8	11.0	67.2
10 to 25 years	16.0	24.7	47.7	8.2	70.5
More than 25 years	19.7	33.7	47.8	7.7	70.5
Micro	13.1	24.3	39.2	8.7	48.7
Small	21.5	34.1	50.7	8.4	82.9
Medium	21.6	29.5	60.5	8.5	91.1
Industry	16.3	39.2	50.1	10.1	71.5
Services	19.4	28.4	45.6	9.2	66.8
Other sectors	15.7	18.0	52.5	3.8	79.2

Source: Authors' calculations based on *Credit Demand Survey* data.

TABLE A.3(b) MEAN INVESTMENT RATE BY CATEGORY

2018	Buildings	Transport	Machinery	Intangibles	Staff
Less than 10 years	0.13	0.33	0.14	0.07	0.03
10 to 25 years	0.18	0.18	0.10	0.08	0.02
More than 25 years	0.12	0.14	0.08	0.03	0.02
Micro	0.26	0.30	0.15	0.09	0.03
Small	0.11	0.15	0.09	0.05	0.02
Medium	0.09	0.05	0.05	0.02	0.02
Industry	0.09	0.24	0.07	0.03	0.02
Services	0.15	0.15	0.11	0.07	0.02
Other sectors	0.20	0.24	0.11	0.05	0.03
2017	**Buildings**	**Transport**	**Machinery**	**Intangibles**	**Staff**
Less than 10 years	0.18	0.28	0.47	0.12	0.65
10 to 25 years	0.16	0.25	0.47	0.08	0.69
More than 25 years	0.20	0.34	0.47	0.07	0.70
Micro	0.14	0.24	0.39	0.08	0.48
Small	0.22	0.36	0.50	0.08	0.82
Medium	0.21	0.31	0.59	0.08	0.91
Industry	0.15	0.40	0.49	0.10	0.71
Services	0.19	0.28	0.45	0.09	0.65
Other sectors	0.17	0.19	0.52	0.04	0.82

Source: Authors' calculations based on *Credit Demand Survey* data.

TABLE A.3(c) MEAN INVESTMENT LEVEL BY CATEGORY

2018	Buildings	Transport	Machinery	Intangibles	Staff
Less than 10 years	104,773	49,819	30,944	14,064	8,994
10 to 25 years	149,084	56,884	49,966	25,433	9,353
More than 25 years	122,891	72,551	69,718	25,643	12,341
Micro	57,213	28,515	21,377	12,875	3,715
Small	113,943	72,980	55,501	27,519	10,254
Medium	202,604	101,117	97,904	32,759	19,915
Industry	106,234	64,739	63,257	24,440	11,237
Services	141,057	61,386	52,408	22,979	10,124
Other sectors	100,849	68,342	51,368	23,789	11,752
2017	**Buildings**	**Transport**	**Machinery**	**Intangibles**	**Staff**
Less than 10 years	98,251	38,098	37,272	14,836	7,318
10 to 25 years	149,139	50,542	37,546	18,662	10,627
More than 25 years	126,673	57,813	58,652	29,475	12,446
Micro	44,747	28,882	17,884	11,357	3,737
Small	121,449	57,157	45,129	30,435	9,759
Medium	275,640	82,147	95,448	28,550	22,671
Industry	157,605	48,044	68,513	22,046	12,306
Services	132,876	53,339	39,558	20,548	9,928
Other sectors	68,417	57,000	44,469	32,000	12,502

Source: Authors' calculations based on *Credit Demand Survey* data.

APPENDIX 4 BRIEF DESCRIPTION OF THE EIB SURVEY (EIBIS) ON INVESTMENT

To provide a comparative benchmark for Irish SME investment activity relative to other European Countries, this report draws on the European Investment Bank's Survey on Investment (EIBIS). This appendix provides a short explanation of the EIBIS survey in the context of this research report.

EIBIS annually surveys some 12,000 non-financial firms across Member States about their investment and financing situation; of these, about 400 firms reside in Ireland. The EIB survey provides several indicators that are complementary to the CDS survey module. Despite these similarities, certain differences between the two surveys should be noted:

- The set of firms surveyed in EIBIS is chosen to reflect value-added shares at the levels of country, sector, and firm size. Accordingly, relevant statistics are weighted by value added. All the analysis performed by EIB relies on the value-added weights, thus giving more weight to firms with larger economic importance (based on their sector/size membership). In particular, EIBIS data are calibrated to the total Eurostat SBS population size within each country on two separate ranking criteria – size (Micro, Small, Medium, Large) and sector (Manufacturing, Services, Construction, Infrastructure). Basing the weighting on SBS figures was intended to adjust for any differences in the covered/uncovered firm profiles.

- In order to ensure a good comparative benchmark for the CDS, we consider only SMEs in EIBIS. As opposed to the CDS, EIBIS also includes large firms in their sample; however the statistics presented using EIBIS data in this report only include SMEs (i.e. firms with less than 250 employees, and turnover lower than €50 million).

- In comparison with the CDS, EIBIS contains a low share of firms with less than five employees.

- Under EIBIS, firms are considered to have invested if their investment level exceeds €500 per employee. This threshold does not exist in the CDS investment data.

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