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# Starving the Golden Goose? Access to Finance for Innovators in the Creative Industries

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# Starving the Golden Goose? Access to Finance for Innovators in the Creative Industries

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## Abstract

This paper extends research on innovating firms' access to finance in the creative industries. While we know that entrepreneurial firms experience barriers to applying for funding and difficulties in securing positive outcomes, prior studies have shown that firms may use patents to signal innovative quality to potential investors. Yet these studies typically focus on R&D-oriented innovation in 'traditional' technological sectors. Creative industries firms have different innovation characteristics that may influence the funding process, including the uncertainty of content-based product markets, the highly-imbalanced information asymmetries between creative entrepreneurs and conservative investors, and the symbolic and intangible nature of their innovations. Using the UK's Creative Industries Council's unique cross-sectional survey data of 575 firms we analyse the extent to which innovating firms seek to apply to and achieve funding from a wide range of potential sources. We find little evidence that prior innovative activities provide a meaningful signal, positive or negative, to potential funders for creative industries firms. This suggests that the highly intangible and symbolic nature of innovation in creative industries businesses is unreliable as an indicator of quality. The reliance of owners on personal capital is congruent with recent literature on the high levels of social and personal capital among workers in the creative industries. We suggest that the specific challenges creative firms face may be addressed through new financial and policy instruments to feed and sustain these high-growth, innovating industries.

JEL Classification: 031 Innovation and Invention: Processes and Incentives; G2 Financial Institutions and Services

Keywords: innovation, access to finance, creative industries, innovation policy

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# 1 Introduction

Do creative industries firms face unique challenges in accessing capital? In other sectors, we do know that being innovative does not guarantee that a business will be able to access appropriate external funds. Despite the many benefits that come from innovative activities, innovative businesses may struggle to access finance (Hall 1992, O’Sullivan 2005, Hall and Lerner 2010, Mina et al 2013, Mazzucato 2013, Hall et al 2016). Some of these issues are due to the nature of any capital investments, such as adverse selection and moral hazard (Fazzari et al 1987, Hall 2010), which under financial constraints may force firms to seek internal capital (Myers and Majluf 1984). But other issues are particularly relevant for investments in innovative, and particularly R&D activities. Uncertainty of outcomes, information asymmetry and opaqueness between lenders and borrowers mean that companies seeking to fund R&D may not be able to access appropriate funding (Hall 2010, Cowling et al 2018). Consequently, some innovative businesses are able to ‘signal’ the quality of their technologies to investors as a means of overcoming these barriers (Engel and Keilbach 2007; Francis et al 2012; Ebbers and Wijnberg 2012; Colombo 2021). Yet while the existing literature has explored these financial constraints in some detail, implicit in this assumption is that the R&D funding being sought is for capital investment. Intriguingly, the implications of innovation in more service and content-based settings, as it is typically the case for the creative industries, have not been explored in as much depth.

This paper, therefore, explores the extent to which creative industries firms that engage in innovative activities apply for and are able to access finance when they seek it. The creative industries, which according to the definition we use (DCMS 2017) includes cultural businesses such as arts organisations, museums and publishing, content developers for TV, film and video games as well as creative services businesses such as advertising, marketing and architecture (see Cunningham and Higgs, 2008 for history of definitions), are different in several respects from other sectors that have been studied in this context. While creative industries businesses engage in innovation activities (Bird et al 2020), the nature of these innovation activities is not necessarily consistent with those in conventional “high-tech” sectors. Innovation in creative industries is often reliant on changes to symbolic value (Townley and Gullede, 2015) rather than functionality, what has been called “soft innovation” (Stoneman 2010), which relies on aesthetics and subjective preferences rather than pure technological advances. Creative industries firms’ innovative activities may not be captured by traditional definitions of R&D (Bakhshi et al 2013; Bakhshi and Lomas 2017), as they may rely more on design and service-oriented development rather than “traditional” and “lab-based” research. Moreover, it is well-known that the creative industries are characterised by a large number of nano, micro, small and medium-sized businesses and few large firms (Piergiovanni et al 2011). Therefore, while on one side firms in the creative industries may be, on average, more able to innovate because of lower fixed costs to innovation (compared, for instance, to biotechnology companies), they may also lack features, such as the tangibility of their assets, the patentability of innovative outputs, or the size and

scalability of operations, that could provide a signal of quality to lenders and investors.<sup>1</sup>

An extensive literature has investigated the barriers to accessing finance and those to innovation in general. However, there is relatively limited literature exploring whether innovators are successful when they seek external finance (see for instance Cowling et al 2016, Gregori et al 2021; Santos and Cincera 2021). Even less is known about this issue with regard to creative industries businesses, given the specificities of these sectors. The main research question of this paper, therefore, asks specifically for the creative industries firms, whether having innovated acts as a (negative or positive) signal to lenders, investors and funders, i.e., is innovation an enabler or a barrier to the creative industries firms' ability to access finance? Specifically, we address the above question using a representative survey of UK creative industries businesses and exploring whether, after seeking different forms of finance (i.e., informal, bank/debt, public and venture capital sources), creative companies that report having innovated are more likely to obtain that type of finance compared to those that have not innovated. This is achieved by estimating two-equations models (à-la-Heckman) for the probability of obtaining funding, conditional on firms applying for that specific funding source in the first place. The first equation allows inference on what determines the choice of firms to apply for a specific form of finance (the firm perspective) and the second reports on the factors which have resulted in a successful application (the funder perspective).

In anticipation of some of the key results, we find that creative innovators are not more likely to apply for mainstream debt-based finance and, when they do, they are either less or equally likely to be successful than the non-innovators. Secondly, they are more likely to apply for venture capital, but they are not more likely to receive this type of funding than non-innovators. There is no evidence that public funding sources take prior innovation as a signal when addressing this shortage of funds. Instead, innovative creative industries businesses are more likely to rely on internal and informal capital. These results are confirmed as we consider 'combined' innovators who have realised both product and business improvements. The paper, then, makes two main contributions to the existing empirical literature in the area, First, it provides novel evidence that suggests prior innovation behaviour does not provide a meaningful signal, positive or negative, to funders for businesses in the creative industries. Second, it highlights the role of informal and personal capital as a source of funding for innovative (and non-innovative) businesses in the creative industries. In this way, it highlights issues of social and personal wealth that have recently been identified as determining participation in creative sectors (O'Brien et al 2018; Brook et al 2020). Like Aesop's fabled 'golden goose', which met a messy end, these results raise the question as to whether the creative industries' shiny outputs are endangered because of a misunderstanding of how they work and what they need to thrive.

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<sup>1</sup>This list should not be considered exhaustive. For a more thorough discussion, please refer to the 2016 "Good Practice Report. Towards more efficient financial ecosystems: innovative instruments to facilitate; Access to Finance for the cultural and creative sectors" <https://op.europa.eu/en/publication-detail/-/publication/f433d9df-deaf-11e5-8fea-01aa75ed71a1>. Also, there is a great deal of heterogeneity within the creative industries themselves, where some firms are large and not all innovations are "soft". In our empirical analysis we try to take into account as much of such heterogeneity as possible.

The rest of the paper is organised as follows. Section 2 provides a review of the literature. Sections 3 and 4 describe the data and empirical strategy employed to answer the above questions. Sections 5 and 6 present the results and discuss the main conclusions from the paper.

## 2 Literature Review

### 2.1 Are Innovative Companies Able to Access Finance?

Innovation and finance have long been closely linked, dating back most famously to the works of Schumpeter (O’Sullivan 2005, Mazzucato 2013). But a large body of evidence suggests that innovative companies may not be able to access the finance that they require. For instance, Freel (2007) and Lee et al (2015) both find that innovative firms are less likely to obtain finance than their less innovative peers. There are several reasons for possible bias against innovative firms: Innovation returns are highly uncertain, with a highly skewed return distribution, meaning that most innovation projects will yield little, while only a few will generate high levels of return (Carpenter and Peterson 2002; Coad and Rao 2008). Therefore, those firms investing in innovation, particularly if they are SMEs (Small and Medium Enterprises), focus on one or two projects, resulting in a higher risk, “all eggs in one basket”, approach (Freel 2007, p. 23). This translates into a greater chance of failure and hence may give investors pause. Indeed some companies that are innovative may instead face higher interest rates, or, as Cowling et al (2018) describe, a “debt penalty”. This leads to a phenomenon documented in Santos and Cincera (2021), who show that being an innovative firm is associated with increased probability of being financially constrained. They find this is particularly important if the firm is a “complex innovator”, defined as combining different types of innovation outputs. Likewise, Gregori et al (2021) find that certain combinations of innovation activities are associated with greater challenges in accessing finance.

At the same time, there is also evidence that, despite credit scoring algorithms that may not fully capture innovative activities (Berger and Udell 2006), innovative businesses can use their innovations to effectively signal their quality to funders, as a means of addressing the problems of information asymmetries faced by innovative companies (Bhattacharya and Ritter 1983; Santarelli 1991; Mina et al, 2013). While innovative companies may not wish to disclose information that may be commercially valuable (Magri, 2009), signals of innovative activity may be important for these firms to access external capital. Of the ways that companies may signal innovative quality, patents and prototypes are among the most common (Audretsch et al 2009). Patents as public forms of disclosure are particularly effective as signals of quality, especially when there are complementary knowledge and IP underlying the codified patent (Long 2002; Anton and Yao 2004). These signals can then be observed by financial institutions; indeed, a growing body of literature finds that patents are effective signals of quality and that patenting is associated with greater success in raising external funding, particularly from venture capital

(Engel and Keilbach 2007; Haeussler et al 2014; Farre-Mensa et al 2017), debt (Francis et al 2012) or crowdfunding<sup>2</sup> (Davis et al 2017; Scheaf et al 2018) .

Signals to funders are particularly important for smaller companies as shown by the “pecking order hypothesis” (Myers and Majluf 1984, Manigart and Vanacker 2012; Mina et al 2013; Bellavitis et al, 2017), which suggests that companies, given structural challenges in accessing capital, instead prefer to seek internal financing to debt, and then equity, finance (although, as indicated in Vanzyte and Andries 2019, firms with higher levels of entrepreneurial orientation may be particularly inclined toward seeking equity from the outset). Companies seeking finance (particularly those that are nascent or particularly innovative) are therefore incentivised to signal quality to potential investors (Audrestch et al 2009; Gartner et al 2012, Schwienbacher 2013) via the quality of their innovative activity.

Asymmetric information is especially acute when investors are approached by firms with such intangible assets, and where this is revealed through greater numbers of protection mechanisms- for instance, copyrights, trademarks, registered designs etc.- this reduces the likelihood of obtaining finance (Mina et al 2013). But what happens when firms that are innovative but not likely to use patent protection mechanisms seek finance? To our knowledge, the literature on innovation as a signal to investors has largely focused on the role of registered, formal IP associated with technological R&D-oriented industries, such as biotechnology.

Our paper extends the above literature by considering whether innovative activities in creative industries sectors, where patenting is uncommon, provide a similar signal.

## 2.2 Innovation and Finance in Creative Industries

The creative industries represent a portion of the global economy that has grown substantially in the past twenty years. Despite its global economic importance, there remain a substantial number of evidence gaps about issues facing creative industries more broadly, as well as its various subsectors. Key among those are issues around innovation and access to finance.

### *Innovation in creative industries*

Within the innovation and finance literature, one assumption that is widely made is that innovative firms are high-tech businesses that are investing in traditional R&D for new product development. Creative industries, however, operate quite differently from these traditional approaches to R&D. Whilst there is a great deal of interest in *innovation* in creative and cultural industries (See for instance Potts and Cunningham 2008; Bakhshi and McVittie 2009; Petruzzelli and Lerro 2020; Li 2020; Woronkowicz 2021; Snowball et al 2021; Dalle Nogare

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<sup>2</sup>Crowdfunding is becoming an increasingly important means by which businesses, artists and organisations can raise funds (e.g. Mollick 2013; Mendes-Da-Silva et al 2016; Regner 2021), but the role of signalling is rather different in the context of crowdfunding than in conventional interactions with financial institutions. For instance, Colombo (2021) reviews signals in new venture financing and highlights the range of signals that apply in crowdfunding (e.g. social capital) that might not be considered by financial institutions conventionally. For this reason, and also due to the data we have (where only a small proportion of respondents had used crowdfunding), we do not consider crowdfunding in this analysis.

and Murzyn-Kupisz 2021; Tether 2021) there is less conceptualisation of what R&D might look like in creative sectors and what the boundary between innovation and R&D might be. Recent evidence (see Bird et al 2020) suggests that 61% of creative industries businesses meet the Community Innovation Survey definition of “innovators”, compared to 38% of the general population (ibid p. 7-8).

Because creative industries businesses are often reliant on their intellectual capital and products comprising symbolic - rather than functional - value (Jones et al, 2015), they are potentially at a further disadvantage compared to innovative businesses in other sectors, or else less innovative firms.<sup>3</sup> Moreover, the nature of the innovation processes, and the innovations themselves, are very different from formal R&D “as we know it”. Novelty and new combinations arise from manipulating semiotic codes - motifs, ideas, intellectual properties, content - in relation to the material base of the industry - production tools, distribution and the media through which audiences experience the products (Jones et al, 2015). These innovations are therefore services and content rather than artefacts, and consequently, the innovations produced in creative industries are less likely to be eligible for patent protection. In the Bird et al (2020) study, only 4% of creative industries businesses reported using patents. This patenting rate is appreciably lower than any of the sectors cited in the papers reviewed by Hall’s (2019) review of the literature on patents and finance. For this reason, companies in the creative industries are a good example of a case where prior innovative behaviour would not be a clear signal in the way that patenting or R&D spending might otherwise be.

#### *Financing firms in the creative industries*

In addition to the differences within innovation behaviours, there are a number of other sector-specific factors in which creative industries are distinct in ways that may affect financing but which have only been partially addressed in the relatively limited literature on access to finance for creative industries (see for instance Fraser 2010; Mendes-Da-Silva et al 2016; Li et al 2020; Elkins and Fry 2021). Among the most important factors distinguishing creative industries businesses are the following.

First, the creative industries are largely dominated by nano, micro firms and SMEs (Piergiovanni et al 2011).<sup>4</sup> This has several implications. First, the smaller average size means companies in the creative industries are unlikely to have the benefits found by larger innovative businesses (where signalling effects are clearer but also where scale economies to innovation are greater). Moreover, on average, the small size of these businesses makes them susceptible to failure, regardless of their innovation performance.

Second, providing information to appropriately address information asymmetries is particularly challenging for businesses in services and content sectors, in general, as financial and other metrics of success may vary. This is even more the case for project-based business mod-

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<sup>3</sup>While this is a general consideration, symbolic value may vary across sub-sectors and firms of the creative industries. To account for such heterogeneity, our empirical analysis controls for sectoral and firm-specific characteristics.

<sup>4</sup>This evidence is confirmed also from our representative sample of UK firms, as can be seen from Figure A2

els, which, as reported in the literature, are common in creative sectors (DeFillippi and Arthur, 1998; DeFillippi, 2015). This makes difficult the typical stages of prototyping, demonstration and testing that usually form the basis for a funding application. Given that creative firms respond to specific commissions or tenders for project work, for which the scope is already defined, innovative pitching instead raises concerns over the assessing clients’ “knowledge” and “feel” for the proposed work. Since creative innovations may draw on ‘infinite variety’ (Caves, 2000) it is likely that proposals may veer into areas that the seller knows far better than the prospective buyer, introducing classic asymmetries between them and undermining the case for funding real innovation. From the perspective of finance, evaluation criteria are generally conservative and path-dependent (Garud and Rappa, 1994) and filter out the more creative proposals at the edge of accepted norms (Sapsed et al, 2007).

### **2.3 Innovation as a Signal for Finance in Creative Industries**

Given these factors discussed above, we seek to understand whether engaging in innovation makes a difference in signalling to providers of finance about a company’s potential. Our main research question, therefore, asks whether companies in the creative industries that have previously engaged in innovative activities are more or less likely to receive internal or external funding (as in Gartner et al 2012, although our data allows for a more variegated approach). Our approach is predicated on the quite low prevalence of patenting within creative industries businesses, alongside higher levels of innovative activity, particularly the “complex” innovative activities (Cincera and Santos 2021) that combine multiple types of innovation (that is, for instance, introducing both product and process innovations). In tackling the above question, we also investigate what factors are associated with the application for external funding compared to the reliance on internal funding.

On this basis, we first consider external funding. For the reasons we have discussed above, creative industries businesses that engage in innovative activity are less likely to produce innovations that easily fit into the patents or prototypes model that could be attractive to funders (per Engel and Keilbach 2007 and Audretsch et al 2009). Hence, it makes sense that funders would find it more difficult to ascertain which businesses might truly be more innovative and which might have novel components but might not reward investment. The signals associated with Intellectual Property Rights protection would therefore be weaker, if not completely absent in these cases. On that basis, we ask the following research questions: RQ1a: Is past innovation a signal to funders in the creative industries? in other words, are companies in the creative industries that have previously successfully innovated more, less or equally likely to receive funding compared to those that have not? RQ1b: Further to the above question, does it matter whether innovators are simple or complex innovators? RQ1c: If they apply for external funding, is the innovation signal picked up differently by different types of funders?

From the perspective of the pecking order hypothesis, the baseline for many businesses is money from the founder/owner, or informal sources of capital, that is, capital that does

not come from formal financial institutions. Often referred to as “friends, family, and fools” (e.g., Kotha and George 2012), this is a very common means of funding businesses, particularly new ones. But despite the common view that informal sources of capital are less rigorous than that capital which may come from financial institutions, reliance on informal sources of capital requires substantial amounts of social, professional, and interpersonal capital (Jonsson and Lindbergh, 2013). In particular, this type of funding is common with sectors or businesses that may not be fully “understood” by established finance providers (ibid, which for instance refers to businesses in the fashion sector). Deng et al (2019) argue that social capital addresses information asymmetries, increases trust between parties and facilitates contracting, therefore helping businesses to access informal sources of finance. In the context of creative industries, a growing literature (e.g., Friedman et al 2017; O’Brien et al 2018; Brook et al 2020) points to the relatively high levels of privilege in workers within the creative industries, which suggests that business owners in creative sectors may have the higher levels of social capital that would enable them to access informal capital if needed. Given higher levels of funding and the evidence around levels of social and financial capital within creative industries, we further ask: RQ2a: Are innovative companies in the creative industries more likely to use internal funding than apply for external funding? RQ2b: Further to the above question, are they likely to apply from specific or more than one external funding source?

In light of these above, we aim to explore if and how the desire and ability of firms in the creative industries to access different types of finance are related to their innovative activity.

### 3 Data and background

We empirically assess our research questions using novel cross-sectional survey data of creative industries businesses. The survey was conducted on behalf of the UK Creative Industries Council in 2017 by the market research company BDRC Continental.<sup>5</sup> Companies within the creative industries were identified on the basis of SIC codes within the UK DCMS creative industries definition.<sup>6</sup> Our dataset consists of 575 firms, which make a nationally representative sample of the UK creative industries with survey weights calculated based on the firm’s DCMS creative sector, region and size.<sup>7</sup> The survey contains a rich set of information regarding creative firms operations - including funding, demand characteristics, business characteristics - and expectations on prospective business and economic developments. They also allow us to observe various owner/manager characteristics, like age, gender and managerial background.

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<sup>5</sup>The company also produces the SME Finance Monitor. See <https://www.bva-bdrc.com/products/sme-finance-monitor/>

<sup>6</sup>What falls within the creative industries is part of an extensive international debate. In the UK, this debate was settled with the aforementioned definition and SIC codes adopted by DCMS. Please refer to Maioli et al (2021) for a detailed description of the UK approach and for a discussion on alternative international approaches to defining and measuring the creative industries.

<sup>7</sup>Further description of the data can be found at <https://www.thecreativeindustries.co.uk/media/471225/cic-access-to-finance-research-report-june-2018.pdf>.

We can use this information to first give a general overview of innovators and non-innovators. The survey instrument asks companies i) whether they have developed a new product or service in the past three years, and ii) whether it has carried out organisational improvements over the same period (see Table A1 for further details on the definitions of these variables). These questions, which are similar to those widely-used European Community Innovation Survey, allow us to proxy product innovation and organisational innovation. Table 1 shows that half of creative firms reported having carried out both product and organizational innovations, with about 30% of firms reporting innovation in one or the other of the two dimensions, values that closely correspond to the findings for innovation in creative industries in the separate UK survey reported in Bird et al (2020). These findings are, however subject to some caveats. First, they represent self-report data and are subject to respondents’ individual perceptions of what is and is not a ‘new product or service’ (although we are comforted by the similarity between responses in this survey and the Bird et al (2020)). Second, we do not have information about the intensity of innovation, e.g., the expenditure in R&D, or the novelty of the innovation, e.g. whether it is radical. However with these variables we can proxy complex, combined innovation strategies, as used with similar survey data in Santos and Cincera (2021) to identify whether companies innovated in more than one dimension, i.e., whether they have achieved complex or combined product/service and organisational innovations at the same time. Indeed, complex, combined innovation strategies are often associated in the literature with higher productivity and profitability (see Aldieri et al, 2021; Tavassoli and Karlsson, 2016).

Table 1: Self-reported innovation activities

		Business improvement	
		No	Yes
Product/service innovation	No	0.20	0.09
	Yes	0.22	0.50

Note: Share of innovative firms by innovation type. Each innovation measure refers to the past three years. See Table A1 for further details. All figures are weighted.

Table A2 and Figure A1 of the Appendix give evidence on the sectoral and geographical distribution of firms according to their innovation status.<sup>8</sup> From these, it is possible to see how “IT, software and computer services” accounts for nearly half of creative firms. IT firms also report the highest share of product/service innovation, followed by “Publishing” and “Crafts”. Overall, more than 50% of respondents in seven out of nine subsectors reports having carried out some product/service innovation.<sup>9</sup> In terms of geographical distribution of firms, irrespective of their innovation status, London is the region with the largest share of firms followed by the

<sup>8</sup>We refer interchangeably to sectors and sub-sectors. Also, regions correspond to UK NUTS-1 regions.

<sup>9</sup>Given the heterogeneity in these sectors, it follows that the nature of these new products or services may be different, as discussed in Stoneman (2010). For instance in IT/software new products and additional

South East, the East of England, and the Southwest. This evidence of concentration is broadly in line with the well-known spatial clustering of the creative industries.<sup>10</sup> However, when we look at the geographical distribution of innovators, we can see how over 80% of firms from Northern Ireland, South East, and Wales respond that they have innovated over the last three years. Overall, there is a large portion of firms - over 40% at least in each region - self-reporting themselves as Innovators.

Innovators and non-innovators may differ in terms of their use of funding instruments. In Table A3, we report background information regarding firms' access to the different financing sources considered by the survey, distinguishing between banking-oriented and non-banking instruments, also inclusive of funding from public bodies and informal sources. For instance, while 23% of innovating businesses currently have access to business overdrafts, the corresponding share for non-innovating businesses drops to about 14%. Also, innovating firms turn out to have injected the entrepreneur's own funds in the business to keep it going twice as much as non-innovators. On the contrary, the share of non-innovating businesses currently accessing business loans is about four times larger than for innovating counterparts.<sup>11</sup>

The data also allows us to explore several other characteristics of firms in relation to their innovation status (see Appendix A). In terms of proxies for the firm's size (number of employees and last year turnover), Figure A2 shows that the share of single-operator businesses is almost twice as large for non-innovators than for innovators. However, a larger fraction of non-innovating firms report higher turnover figures. This information is also useful to understand how to control for the relevant business characteristics when it comes to empirical modelling. However, in terms of growth, innovators are more likely to be in the high turnover growth category (greater than or equal to 20%). Figure A2 also highlights that innovative firms tend to be mostly in the 2 to 5 years of age category, i.e., they are neither new-born firms nor firms with several years of experience.

## 4 Empirical Strategy

In this section, we explain the empirical strategy used to investigate our key research question. We first group the several funding sources detailed in Table A3 into the following categories: informal, bank/debt, public and venture capital. Further detail on how each of these is defined is provided below.

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functionality are virtually a necessity given the pace of technological advances. By contrast, in architecture the core service provided is relatively stable, with innovation coming from provision of complementary services to customers. In content-based sectors such as film/TV and music, new products may be developed to facilitate the development of content, rather than the content being innovative itself, which is of course subjective. For example, in the visual effects sector companies compete to develop new products that are then used in a film; whether the content of the film is innovative, its production may have used any number of new innovative products.

<sup>10</sup>See Tether (2009) and DCMS Estimates at <https://www.gov.uk/government/publications/dcms-sectors-economic-estimates-2018-business-demographics/dcms-sectors-economic-estimates-2018-provisional-business-demographics>.

<sup>11</sup>By current access to any financial instrument, we refer to that at the time the survey was administered.

From an empirical strategy perspective, the starting point is to consider that firms may decide not to formally seek external funding in the first place and/or have access to other sources of informal funding. This can be in the form of personal ‘own’ internal funds or funds from family and friends.

Therefore, we model separately the access to formal external finance as a two-step process. In the first step, firms decide whether to apply for funding or not (i.e., “self-select” into a funding application) and, in the second step, they can either be successful or not in their application. The first step will reflect the subjective or objective conditions of the firm when making the decision to apply. The second step is more likely to reflect how the funder sees the same set of conditions, hence reflecting some credit-scoring mechanism. Therefore, the second step only includes factors that may be considered deserving of consideration by the funder.

In terms of econometric methodology, the difference between the sets of variables included in the first and in the second equation represents the “exclusion” restrictions needed to identify the determinants of access to finance by creative firms, discounting the choice to apply in the first place. For all the reasons discussed previously, being an innovator may be a negligible or even negative signal in the eyes of the funder. In order to test for the potential role of innovation as a factor in the choice to apply and as a signal picked up by the funders, we include in the model binary indicators of product and business innovation. As mentioned above, a large body of literature on complementary or complex innovation claims that complexity improves firms’ performance (see Tavassoli and Karlsson, 2016). Also in reflection of this literature, in their work, Cicera and Santos (2021) also consider that firms may realise more than one innovation. As mentioned above, along these lines, here, we also consider that firms could be simple innovators, realising only one of either product and business innovation, or combined innovators, realising both at the same time.

Finally, we also add the largest possible set of control, or confounding, variables to account for firm-level heterogeneity beyond innovation status. These are grouped under three broad categories: other funding applications, business characteristics, and personal owner characteristics. While we primarily direct our attention to the innovation indicators, the set of controls also returns interesting information on the decision to apply and the likelihood to obtain funding.

#### 4.1 Dependent variables: funding sources

For the first step, we define indicators denoting whether a firm did apply for funding or not. For each type of funding, we define the decision to apply as:

$$\text{Apply for funding} = \begin{cases} 1, & \text{if } (\sum_{f \in F} \text{Apply for funding from source}_f = \text{Yes}) \geq 1 \\ 0, & \text{otherwise} \end{cases} \quad (1)$$

where  $F$  represents the number of financial instruments considered within each funding group.

Similarly, we define the following binary variables regarding the current use of funding sources (i.e., denoting having obtained):

$$\text{Own funding} = \begin{cases} 1, & \text{if } (\sum_{o \in O} \text{Access funding from own source}_o = \text{Yes}) \geq 1 \\ 0, & \text{otherwise} \end{cases} \quad (2)$$

$$\text{Informal funding} = \begin{cases} 1, & \text{if Access funding from informal source} = \text{Yes} \\ 0, & \text{otherwise} \end{cases} \quad (3)$$

$$\text{Bank/debt funding} = \begin{cases} 1, & \text{if } (\sum_{c \in C} \text{Access funding from bank/debt source}_c = \text{Yes}) \geq 1 \\ 0, & \text{otherwise} \end{cases} \quad (4)$$

$$\text{Public funding} = \begin{cases} 1, & \text{if } (\sum_{p \in P} \text{Access funding from public source}_p = \text{Yes}) \geq 1 \\ 0, & \text{otherwise} \end{cases} \quad (5)$$

$$\text{Venture capital} = \begin{cases} 1, & \text{if Access funding from venture capital} = \text{Yes} \\ 0, & \text{otherwise} \end{cases} \quad (6)$$

In particular, in expression (2), we consider the benchmark definition of own funding based on whether personal injections of funds took place in the last 12 months, either as a strategic decision to develop the business (i.e., by choice) or as a necessity to keep the business running (i.e., by constraint). Funding from Informal sources is directly measured in the data, as is the case also for Venture capital-related funding. Instead, we consider bridging loans, business loans and overdrafts to define the “Bank/debt funding” indicator, while “Public funding” is defined considering all public funding sources reported in the lower panel of Table A3.<sup>12</sup> Table 2 summarises information on the share of businesses applying/obtaining funding by funding type. From this table, we can observe how 34% of firms apply for funding from Bank/debt sources, 34% from Public sources and less (19%) from Venture capital.<sup>13</sup> Conditional on applying, traditional funding sources, like Bank/debt, are the most successful, while we observe only 13% of business access to funding from informal sources and three out of five businesses rely on managers/owners personal injections.

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<sup>12</sup>For a description of the funding variables, see Table A1.

<sup>13</sup>Further detail regarding each funding source observed in the data are reported in Table A4 of the Appendix.

Table 2: Apply for funding, obtain funding by source

	Fraction	Count
<u>Apply for funding:</u>		
Bank/debt	0.34	571
Public	0.34	557
Venture capital	0.19	525
<u>Obtain funding:</u>		
Bank/debt	0.78	197
Public	0.41	188
Venture capital	0.44	98
Informal	0.13	575
Own	0.58	575

Notes: Apply and Obtain funding variables are defined as in eqs. (1) and (3)-(6), respectively. Funding from informal and own sources do not feature any "apply for funding" equation. For each funding source, "Fraction" presents the share of firms applying/obtaining funding, while "Count" represents the count of non-missing observations over which shares are computed. All figures weighted.

## 4.2 Control variables

As mentioned above, beyond the innovation indicators, we try to control for the largest possible set of variables that could account for heterogeneity in the choice to apply and in the success in obtaining funds. We use data reduction techniques that allow us to identify a smaller set of "latent" factors from the large set of business characteristics, owner managerial experience, and sectoral-regional dimensions. This allows us to estimate parsimonious models, avoid multicollinearity that would likely result by including highly correlated variables, while, at the same time, achieving a set of controls that captures most of the variance in the data, residual to the variables of interest.

We also include a set of demand-side factors that describe whether firms mostly sell to other businesses, to consumers or both. The reason for not including these indicators within the shrinkage procedure applied to other business characteristics lies in the non-ordinal nature of these variables (i.e. there is no ranking between demand sources). Finally, for each funding source, we also control for whether businesses applied for other sources of funding and whether the owner injected personal funds into the business over the last year.

### 4.2.1 Data reduction for business and owner characteristics

Table A7 and A8 report the results of the data reduction obtained via principal component analysis (PCA) methods for the business characteristics and for the business owner involvement. The first set of variables includes: Turnover, Employees, Turnover Growth, Earnings, Export status, Having a formally written business plan, Produce regular monthly or quarterly management accounts, Firm's age. The second set of variables includes variables that should

capture the managerial experience of the owner: whether they have invested in other businesses/organisations, whether they have been in the past, or are currently, involved in running another business/organisation.

The analysis in Table A7 shows that, using the conventional rules of thumb, the first two components are sufficient to summarise the data and explain the largest part of the variance in the data. Indeed, two eigenvalues are greater than one and explain 65% of the cumulative variance of the data. We can stretch the analysis to add a further component and achieve 76% of the explained variance.

The PCA allows reducing the number of parameters to be estimated whilst at the same time controlling for most of the variability in the data, in our case of the above business characteristics. However, the factors are, indeed, latent and, hence, a “black box”. To uncover the information hidden in the latent factors, it is possible to look at the eigenvectors. In our case, this information shows that the variables most associated with the first component (e1 in Table A7) are Turnover, Employees, the presence of regular managed accounts, and the firm age. All these variables enter the first component with concordant signs: higher values of the variables denote higher values of the component. Based on this, we interpret this component as capturing differences across firms related to their “size”. The second component is mostly associated (positively) with the firm’s Earnings and age and (negatively) with the presence of a business plan and regularly managed accounts. Hence, the second component seems to identify smaller profitable organisations that are experienced but do not necessarily have a business plan. Finally, the third component is mostly associated (positively) with Turnover growth and (negatively) with Export status, i.e., fast-growing domestic firms.

Table A8 reports the PCA for the variables reflecting the managerial experience of the owner (having run in the past, running currently, investing in other businesses). In this case, we identify the first component as the one that explains most of the variance. Also, this component reflects the positive concordance of all three underlying variables included.

#### 4.2.2 Sectoral and regional components

Considerable heterogeneity may be due to the firm’s sub-sector and its location. Following the sample stratification, businesses are classified according to the 9 DCMS creative sectors classification and they are located in 12 different NUTS1 regions. Fixed effects would allow controlling for idiosyncratic differences across both dimensions but would be quite costly in terms of degrees of freedom and computational costs, given the large set of additional parameters to be estimated. To limit this problem, we rely again on factors reduction techniques in order to identify a reduced number of dimensions/factors accounting for the majority of the joint variation in sectoral and regional characteristics. Since these variables do not embed any ranking criteria, we cannot apply a PCA, and we have to rely on an “ad-hoc” mapping reduction technique termed Multiple Component Analysis (MCA) <sup>14</sup>. In line with the same criteria used

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<sup>14</sup>See, for instance, Greenacre (2006)

above, the first three components account for about 78% of the overall variation in the sectoral and regional dimensions (see Table A9 for detail).

### 4.3 Econometric modelling of access to finance

We first look at funding from informal sources (including own funds). In this case, there is no selection step and the estimating equation for the probability of obtaining funding reduces to:

$$Pr(\text{Funding}_i = 1) = Pr(\mathbf{z}_i\beta + \xi_i > 0) \quad (7)$$

As mentioned above, however, successful external funding applications must be modelled conditional on the decision to apply. Hence, irrespective of whether the funding could come from Bank/debt, Public or Venture Capital sources, we consider the following system of equations:

$$\begin{cases} Pr(\text{Funding}_i = 1) = Pr(\mathbf{x}_i\beta + e_i > 0 \mid \text{Apply}_i = 1) \\ Pr(\text{Apply}_i = 1) = Pr(\mathbf{z}_i\gamma + v_i > 0) \end{cases} \quad (8)$$

In the above model, when the cross-equations error correlation is significantly different from zero,  $corr(e_i, v_i) \neq 0$ , the observed funding outcome probability depends not only on observed factors  $\mathbf{X}$  but also on unobserved factors that explain the application stage. Therefore, for the coefficient vectors  $\beta$  to be identified,  $\mathbf{Z}$  needs to include variables which are not in  $\mathbf{X}$ , so that we can write  $\mathbf{Z}=[\mathbf{X}, \mathbf{S}]$ . In particular, the vector  $\mathbf{X}$  includes the innovation variables, i.e., our variables of interest, and the set of control variables discussed above.

The vector  $\mathbf{S}$  instead consists of an additional set of indicators tracking the legal status of businesses alongside an indicator variable flagging whether businesses have searched for information before deciding whether to apply for funding or not.

## 5 Results

Tables 3 and 4 report the results from estimating, respectively, equation (7) and equation (8). In the first case, we have a single equation probit model that estimates the probability of having injected or obtained informal funding. In the second case, estimation is carried out using a Heckman probit model that has in the first-step an ‘‘Apply’’ equation, to correct for the self-selection of firms into applying for funding, and in the second step an ‘‘Outcome’’ equation, to estimate the probability of having been successful in obtaining funding.

For each of the specifications adopted, we include the innovation indicators, i.e., the realisation of product innovation or business improvement in the past 3 years, and the rich set of controls. As discussed above, these are grouped under the headlines of ‘‘Other funding

controls”, “Business characteristics”, “Owner characteristics”, “Legal Status” and “Finance enquiries”. All specifications also control for the mentioned sector–region factors. While we also briefly comment on the interesting results emerging from the controls, here we mainly focus on the innovation variables.

## 5.1 Do Creative Industries Innovators Access Informal Funding?

Table 3 reports results for the probability of having injected or obtained informal funding. According to the pecking order hypothesis, the entrepreneur may have to inject their own funds or direct funding requests towards family and friends. Hence, in table 3, we look at different alternative forms of informal funding as detailed in table A1. Overall, there is little evidence that having innovated matters in obtaining informal funding. Having introduced product innovation is positively associated (at the 10% significance level) with having obtained some combination of own and informal funding. There is also some moderately supportive evidence (again, at 10% significance level) that having introduced a business improvement is associated with having injected own funding by personal choice and obtained some external informal funding from family and friends. Interestingly, the introduction of a business improvement is negatively and significantly associated with having injected own personal funds because one is forced to do it. This type of innovation seems to be less associated with the company running into financial troubles.

As for the remaining controls, firms that apply for Bank/debt funding are less likely to have also informal funding. The opposite is true for firms that apply for Public funds. There is also some evidence that those that have injected personal funds by constraint have applied for venture capital also and have obtained informal funds from family and friends, resonating with the literature on the social positioning of creative entrepreneurs and their privileged access to resources.

In terms of business characteristics (reflecting, broadly speaking, size, profitability, and growth), these are predominantly associated with smaller probabilities of having injected own funds or having obtained informal external funding, with most variables that are statistically significant at the conventional 5% level also negatively signed. On balance, the evidence reported suggests that businesses with strong demand (B2B or B2C), female entrepreneurs and older entrepreneurs, compared with the less than 35 years old baseline, are all less likely to use informal funding sources. Firms with more experienced managers are, however, more likely to inject their own funds or ask family and friends, unless this is because of constraints. Partnerships are more likely to have injected their own funds and less likely to have asked externally for informal funds. Charities are, overall, less likely to use internal or external informal finance. Finally, firms making financial enquiries are more likely to have asked family and friends for financial support and have injected personal funds by constraint.

## 5.2 Do Creative Industries Innovators Access Bank/debt, Public and Venture Capital Funding?

After having observed the characteristics of firms that have injected personal or informal external funding, we now turn our attention to those of firms seeking external formal or institutional funding. Table 4 reports, for each type of funding source, the results of the joint estimation of the “Apply” and “Outcome” equations.

In the first two rows, we can see how being an innovator is not associated with a significantly higher probability of applying for Bank/debt funding. However, it seems that product innovators are (albeit at 10% significance level) less likely to be successful at obtaining Bank/debt funding after applying, which seems to suggest that this type of innovation leads to negative discrimination. In the Bank/debt funding equations, those that apply for Public funds and Venture capital are also more likely to apply for Bank funding. Those that inject personal funds by choice are less likely to apply but, interestingly, also to obtain Bank/debt funding. While the first result was also observed (in the other direction) in Table 3, it may be the case that companies seek and fail to access debt capital, but then choose to invest personal funds to achieve their growth ambitions (rather than because they require additional capital). Bigger firms (i.e. Business Characteristics Factor 1), those with strong B2B and B2C demand, as well as Charities are all less likely to apply for bank/debt funding. Firms making financial enquiries are, expectedly, more likely to apply.

When we look at the Public funding equations, innovation does not matter either for the probability to apply or to obtain funding from public sources. Firms that apply for Bank/debt funding and Venture capital are also more likely to apply for Public funds.

Overall, there seems to emerge generalised evidence that creative firms are eager for funds and apply to multiple sources. The personal choice to inject personal funds is marginally associated with applying Public funds, but our data does not allow us to directly discern the order of these two funding rounds (e.g., personal injection of funds then seeking public funding, or vice versa). In either case, there is no evidence that past innovation represents a clear enough signal of quality to public funders, regardless of whether the owner had previously injected funds. The range of public sector interventions (which could include anything from small business grants to training schemes to R&D tax credits) means that, on aggregate, innovative activity does not appear to be a sufficiently strong signal to reduce information asymmetries on the part of funders.

No specific business characteristic is significantly associated with the Apply for Public funds equation but Factor 1 (size) is associated with a higher probability of success and Factor 2 (profitability but lack of managed accounts and business plans) is associated with less probability of success. Those with strong B2B demand are less likely to apply for public funds, and so are also older business owners, managers and charities. In contrast, middle-aged entrepreneurs in the 45–54 bracket, are more likely to be successful if they apply, while the opposite holds true for female entrepreneurs.

Finally, the Venture capital equations suggest that product innovators are more likely to apply for this type of funding but, nevertheless, not more likely to obtain it. There are the same concurrences of funding applications noted above with Bank/debt funding and Public funding. It is interesting to note, in light of the access to finance debate discussed above, that firms that apply for Bank/debt funding are also more likely to obtain Venture capital. This is against the backdrop noted above that firms applying for Venture capital were more likely to apply for Bank/debt funding but not more likely to obtain it. Overall, we can interpret this as evidence that Venture capital funding is likely to be positively associated with discrimination in favour of firms that also apply for Bank/debt funding. A similar positive discrimination occurs for those who are constrained to inject personal funds. Again, recall that those that were injecting their own funds by choice were negatively discriminated by Bank/debt funders.

In the rest of the controls in these last two equations, among the business characteristics, firms high in Factor 2 (profitable but not managing accounts or business plan) are less likely to apply and obtain funds from VCs. Strong B2B and B2C are associated with higher probability to apply but not obtain. Female entrepreneurs (at 10% significance level) and experience managers (at the 5% significance level) are more likely to apply but not to obtain funds from VCs. Overall, older entrepreneurs are less likely to apply and obtain funds from VCs.

### 5.3 “Combined” innovators

In extension to the above results, we also construct measures of innovation taking into account that firms may be ‘combined’ innovators in that they realise more than one innovation type. As mentioned above, the literature has praised complex or combined innovation strategies as performance-enhancing. Also, Cincera and Santos (2021) find that combined innovators are more likely to be financially constrained.

Table B1 and B2 report results where the two innovation indicators are replaced by one indicator equal to one for firms innovating both in terms of product and business improvement. Results are not reported for the VC equations because the model did not converge, probably because of over-parameterisation. Given our focus on the comparison with the baseline results discussed above, we did not pursue this exercise further by using more parsimonious specifications.

The set of regressions in Table B1 shows that being a combined innovator is associated with a higher probability of injecting personal funds by choice and obtaining informal external funds from family and friends. It is also associated with a negative probability of success in obtaining external Bank/debt funding and a (marginally significant) higher probability of applying for public funds. For brevity, we omit from the discussion the rest of the control variables.

Table B2 reports results contrasting combined innovators and simple innovators, i.e., those innovating in either product or business improvement, against the base category of the non-innovators. In this case, we can see how, indeed, the combined innovators are more likely to be

associated with the choice of injecting their own funding and accessing informal funding; also, they are more likely to apply for Public funding. However, they are not more likely to succeed in obtaining it. Compared to the non-innovators, being a simple or combined innovator is not associated with a higher probability to apply nor succeed in the bank/debt funding equations. Hence, our evidence is overall in line with Cincera and Santos (2021) but extends it to the creative industries and for different funding sources.

Again, for brevity, we omit from the discussion the rest of the controls.

Table 3: Informal funding

	Own funding	Own funding (choice)	Own funding (constraint)	Informal funding	Informal & Own (1)	Informal & Own (2)	informal & Own (3)
Product innovation (past 3 years)	0.288 (0.223)	0.180 (0.171)	0.218 (0.203)	0.020 (0.236)	0.341* (0.207)	0.315* (0.165)	0.092 (0.134)
Business improvement (past 3 years)	0.008 (0.147)	0.345* (0.181)	-0.395** (0.196)	0.547* (0.285)	0.033 (0.162)	0.324 (0.220)	-0.252 (0.250)
<u>Other funding controls</u>							
Bank/debt funding apply	-0.723*** (0.167)	-0.457** (0.220)	-0.299 (0.192)	0.091 (0.334)	-0.685*** (0.159)	-0.448** (0.229)	-0.165 (0.162)
Public funding apply	0.532* (0.292)	-0.060 (0.256)	0.610*** (0.207)	0.015 (0.323)	0.592** (0.286)	0.052 (0.310)	0.533*** (0.153)
Venture capital apply	0.429 (0.427)	-0.124 (0.400)	0.599** (0.281)	0.245 (0.367)	0.543 (0.370)	0.045 (0.312)	0.537 (0.342)
Informal funding	-0.001 (0.283)	0.252 (0.304)	0.443*** (0.138)				
Own funding				0.157 (0.230)			
Business characteristics (F1)	-0.255*** (0.099)	-0.235** (0.096)	-0.021 (0.095)	-0.050 (0.106)	-0.238*** (0.082)	-0.186** (0.088)	0.030 (0.067)
Business characteristics (F2)	-0.295*** (0.095)	-0.471*** (0.071)	0.142* (0.076)	-0.018 (0.129)	-0.269** (0.118)	-0.420*** (0.099)	0.099 (0.120)
Business characteristics (F3)	0.050 (0.124)	0.206* (0.119)	-0.062 (0.115)	-0.641*** (0.167)	-0.099 (0.117)	0.002 (0.117)	-0.319*** (0.084)
<u>Demand source: (Ref. category: Both)</u>							
Businesses	-0.233 (0.257)	-0.076 (0.218)	-0.458** (0.212)	-0.235 (0.154)	-0.245 (0.269)	-0.214 (0.241)	-0.448** (0.186)
Consumers	-0.074 (0.263)	0.271 (0.335)	-0.427** (0.194)	-0.038 (0.319)	0.004 (0.312)	0.216 (0.388)	-0.304 (0.204)
<u>Owner characteristics</u>							
Female owner	-0.343* (0.197)	0.153 (0.159)	-0.309 (0.192)	-0.616** (0.277)	-0.380 (0.246)	0.069 (0.163)	-0.584** (0.281)
Owner age: 35-44	-0.675*** (0.253)	-0.242 (0.408)	-0.480*** (0.169)	-0.092 (0.259)	-0.673*** (0.163)	-0.257 (0.345)	-0.470*** (0.170)
Owner age: 45-54	-0.653** (0.333)	-0.311 (0.249)	-0.334 (0.252)	0.110 (0.316)	-0.471** (0.214)	-0.098 (0.193)	-0.108 (0.199)
Owner age: 55-64	-0.026 (0.259)	-0.082 (0.208)	0.037 (0.360)	-0.975** (0.480)	-0.156 (0.199)	-0.256 (0.272)	-0.203 (0.261)
Managerial background (F1)	0.341*** (0.100)	0.476*** (0.078)	-0.211* (0.127)	0.175* (0.095)	0.344*** (0.092)	0.485*** (0.088)	-0.166* (0.095)
<u>Legal status: (Ref. category: Sole proprietorship)</u>							
Partnership	-0.146 (0.308)	0.734** (0.302)	-0.236 (0.145)	-0.214 (0.226)	-0.272 (0.315)	0.383 (0.264)	-0.479*** (0.153)
Ltd. Liability Company	-0.119 (0.265)	0.070 (0.259)	-0.421 (0.266)	-0.283 (0.257)	-0.152 (0.267)	-0.168 (0.276)	-0.358* (0.197)
Charity/CIC	-1.159*** (0.359)	-0.134 (0.352)	-1.967*** (0.574)	-0.127 (0.478)	-0.853*** (0.324)	-0.125 (0.360)	-1.179*** (0.428)
Finance enquiries	0.561 (0.353)	0.038 (0.373)	0.467** (0.184)	0.551*** (0.193)	0.594* (0.324)	0.189 (0.336)	0.645*** (0.176)
Sector-region factors	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-lik.	-241.26	-243.12	-210.06	-111.54	-231.26	-251.82	-229.31
AIC	530.5	534.2	468.1	271.1	508.5	549.6	504.6
BIC	632.0	635.7	569.6	372.6	605.8	646.9	601.9

Notes: Results from probit estimation for the likelihood of current funding from own/informal sources. The dependent variables in columns (5)-(7) result from combining Informal funding" and any of "Own funding" variables considered in columns (1)-(3). For details on "Own funding and "Informal funding" variables, see Table A1. Sector-region factors selected=3 (See Table A9 for further details). All figures weighted.

Table 4: Bank/debt funding, Public funding and Venture capital

	Bank/debt funding		Public funding		Venture capital	
	Outcome	Apply	Outcome	Apply	Outcome	Apply
Product innovation (past 3 years)	-1.159*	-0.083	-0.285	0.269	-0.756	0.667**
	(0.655)	(0.209)	(0.412)	(0.202)	(2.675)	(0.269)
Business improvement (past 3 years)	0.290	0.189	-0.296	0.232	1.114	-0.390
	(0.462)	(0.194)	(0.452)	(0.220)	(0.723)	(0.302)
<u>Other funding controls</u>						
Bank/debt funding apply			-0.159	0.428**	0.995**	1.167***
			(0.316)	(0.180)	(0.446)	(0.313)
Venture capital apply	-0.444	0.773***	0.147	0.840**		
	(0.605)	(0.270)	(0.479)	(0.369)		
Public funding apply	0.531	0.375*			-3.475	1.066**
	(0.461)	(0.207)			(2.791)	(0.436)
Informal funding	-1.002	0.133	0.696	-0.176	-4.565	0.476
	(0.687)	(0.377)	(0.468)	(0.389)	(2.840)	(0.384)
Own funding (choice)	-1.712***	-0.481**	0.771*	0.124	-0.780	0.291
	(0.552)	(0.218)	(0.425)	(0.202)	(0.884)	(0.477)
Own funding (constraint)	-0.539	-0.333	-0.700	0.645***	3.023**	0.754**
	(0.335)	(0.217)	(0.751)	(0.190)	(1.232)	(0.348)
Business characteristics (F1)	0.228	0.206**	0.605**	0.016	0.962	0.081
	(0.147)	(0.094)	(0.258)	(0.126)	(1.532)	(0.222)
Business characteristics (F2)	-0.333	-0.028	-0.658***	-0.036	-1.359***	-0.660***
	(0.266)	(0.082)	(0.223)	(0.095)	(0.496)	(0.097)
Business characteristics (F3)	-0.676	-0.057	0.131	-0.011	-0.079	-0.055
	(0.417)	(0.114)	(0.217)	(0.110)	(0.263)	(0.115)
<u>Demand source:</u> (Ref. category: Both)						
Businesses	-0.206	-0.603***	-0.240	-0.786***	1.530	0.813***
	(0.470)	(0.178)	(0.358)	(0.114)	(1.925)	(0.232)
Consumers	0.429	-1.030***	-0.176	-0.150	-0.250	1.227***
	(0.840)	(0.322)	(0.359)	(0.308)	(0.966)	(0.387)
<u>Owner characteristics:</u>						
Female owner	-0.219	0.326	-1.151***	-0.168	-2.322	0.437*
	(0.422)	(0.243)	(0.406)	(0.189)	(1.893)	(0.253)
Owner age: 35-44	0.651	-0.200	-0.078	0.305	-0.321	-0.150
	(0.573)	(0.355)	(0.398)	(0.262)	(0.683)	(0.401)
Owner age: 45-54	0.477	0.345	1.256**	-0.303	-3.763***	-0.442
	(0.350)	(0.248)	(0.573)	(0.187)	(1.360)	(0.579)
Owner age: 55-64	0.903	0.434*	0.616	-0.852***	-4.359***	-0.931*
	(0.776)	(0.257)	(0.524)	(0.319)	(1.664)	(0.495)
Managerial background (F1)	0.445	-0.117	-0.036	-0.327***	-0.516	0.682***
	(0.292)	(0.105)	(0.165)	(0.119)	(0.876)	(0.205)
<u>Legal status:</u> (Ref. category: Sole proprietorship)						
Partnership		-0.484		0.448		1.947**
		(0.477)		(0.434)		(0.943)
Ltd. Liability Company		-0.231		0.377		1.063
		(0.260)		(0.298)		(1.187)
Charity/CIC		-1.661***		2.161***		1.181
		(0.526)		(0.372)		(1.419)
Finance enquiries		1.067***		1.180**		2.175
		(0.402)		(0.486)		(1.358)
Sector-region factors	Yes	Yes	Yes	Yes	Yes	Yes
Log-lik.	-287.27		-220.31		-134.67	
AIC	652.5		518.6		347.3	
BIC	817.4		683.5		512.3	
Wald Test	3.98		3.10		0.08	
Wald test (p-value)	0.05		0.08		0.78	

Notes: Results from bivariate probit estimation for the likelihood to have current funding from Bank/debt/Public/Venture capital sources conditional on applying to each type of funding. Bank/debt funding is defined based on business loans, business overdrafts and bridging loans. Public funding is defined based on all types of funding from Creative Industries (CI) bodies and Other public bodies. For further detail on funding sets, see Table A1. Sector-region factors selected=3 (See Table A9 for further details). All figures based on survey-weights.

## 6 Discussion and conclusions

This paper aims to extend previous debates and literature around the financing of innovative businesses into the context of the creative industries. Whilst there is a longstanding literature showing that innovative businesses may struggle to access sufficient external capital (e.g., Carpenter and Peterson 2002; Freel 2007; Lee et al 2015; Cowling et al 2018; Cincera and Santos 2021), there is also evidence that innovative businesses, particularly smaller firms and start-ups, may be able to signal their innovative ability to funders, and in the process receive the capital they require (Engel and Keilbach 2007; Audretsch et al 2009; Gartner et al 2012). However not all forms of innovation provide the same signals - the existing literature emphasises the signalling power of patents, which are formal, registered and publicly available, and hence make clear signals (Anton and Yao 2004) that funders can recognise (Engel and Keilbach 2007). Our paper explores whether innovation activity in creative sectors that are not characterised by widespread patenting, but instead innovations like copyrights, design improvements to on-line interfaces, branding that depends on symbolic value, or new audience experience, prove to be positive signals for investors. We, therefore, explore the context of the creative industries, which are highly likely to engage in innovative activities, but where patents, which provide a clear signal of innovation, are not commonly used (Bird et al 2020).

Using data from a representative sample of 575 UK creative industries firms (using the UK government definition, which includes cultural sectors, creative services and IT and software), we aim to understand whether past innovative activity within these businesses proves to be an effective signal to investors, and if so whether that signal is positive or negative. Our research questions, therefore, ask, effectively, whether companies in the creative industries that have previously innovated are more, less or equally likely to receive funding; and whether innovative companies are more likely to use internal funding rather than using external funding.

Our results suggest that prior innovative activities in creative sectors do not appear to provide a strong signal to providers of external capital, and where there is a signal it appears to be negative. For public funding and VC/equity investments there is no evidence that innovation (either product, organisation or “complex” combinations of the two, per Cincera and Santos 2021) makes a significant difference either way. We find that companies that engaged in innovation were more likely to be rejected by providers of debt finance, with a stronger effect observed for those companies engaged in complex innovations. We find instead that companies engaged in complex innovations appear more likely to rely on personal and informal capital to meet their needs.

On this basis we may draw some implications from this work. First, the embedded and intangible nature of innovation in creative industries (Jones et al., 2015), which relies heavily on symbolic products and services, means that innovation in these sectors is more common (Bird et al 2020) but less visible and attractive to investors than in other sectors, where patents provide a clear indication of technological knowledge. Paradoxically, in terms of equity and public finance, these innovative activities give few signals of quality to funders. Discerning between

innovative firms in the creative industries may therefore require a more nuanced, sector-specific (and time-intensive) approach. Compared to the literature on the role of patents in securing subsequent funding (Engel and Keilbach 2007; Haeussler et al 2014; Farre-Mensa et al 2017) it appears that VCs are not able to take the existence of past innovations in the businesses in our sample as indicators of future performance. This may be due to issues around appropriability of IP, even when patents themselves may prove to be smaller signals, around which complementary knowledge (e.g. knowledge adjacent to the patent from which the patent's scope is necessarily small so as to serve as a signal) proves to be the source of long-term value creation (Anton and Yao 2004).

The only evidence of a signal comes from businesses that apply for debt finance, and here innovative, particularly complex innovative, firms are less likely to receive funding. This may reflect issues around credit scoring, where high-tech businesses have previously been shown to face a 'debt penalty' in terms of interest rates due to higher risk of failure (Cowling et al 2018). While the traditional pecking order appears to be less a "fact of life" for entrepreneurial firms in general with new forms of finance and opportunity (Bellavitis et al., 2017), our data confirms the dominance of internal capital for innovative creative industries firms, for whom innovation is not interpreted as a signal to invest, but what the evidence suggests may instead signal the contrary. The ability to draw on personal capital (Evans and Jovanovich 1989) and social capital (Johansson and Lindbergh, 2013) to be able to provide funding is congruent with recent work about the importance of social status and personal wealth to participate in the creative industries (e.g. Brook et al, 2020).

The primary contribution of our paper, therefore, is to demonstrate that in the case of businesses in creative industries sectors, prior innovation activities appear not to provide quality signals to funders, as seen in other sectors (for instance Engel and Keilbach 2007; Francis et al 2012; Davis et al 2017). This is likely because innovative activities in these sectors are complex, likely to involve a mix of products and processes, and as such are not patentable, meaning that patents are relatively uncommon (Bird et al 2020). Without the tangible signal of quality that patents provide (Long 2002, Anton and Yao 2004), other innovation activities do not provide strong signals of quality. Moreover, we find evidence that prior innovation activity may indeed prove to be a negative signal. We find a significant negative effect for debt funding for innovators, which suggests that innovative creative sector businesses may be particularly subject to the bias in credit scoring algorithms that in any case tend not to capture innovative activities (Berger and Udell 2006). We also see negative coefficients for venture capital and public funding, but these are not significant in our models. On aggregate we conclude that innovative activities in creative sectors certainly do not provide a positive signal, and indeed these activities may be discriminated against in some financial markets. Consequently, a secondary contribution is that given this situation, and in absence of formal capital, these companies are more likely to rely on informal and personal funding, which is broadly consistent with the pecking order hypothesis approach. Moreover, it is also pertinent to growing literature around status, class and personal privilege for participation within the creative industries (following from Brook et al 2020),

as one implication is that innovative businesses without access to personal capital or capital through networks may struggle to get capital at all. This then potentially risks undermining the innovative potential of creative entrepreneurs without sufficient personal capital.

Our paper does have some meaningful drawbacks. Our measure of innovation is not as fine-grained as we would like, and it is difficult to assess the quality of any of the innovations that companies in the survey have produced, or the intensity of the company's investment in innovation and R&D activities. Using cross-sectional survey data means that it is difficult to clearly identify the sequence in which companies have applied for and received funding, so limiting what can be said regarding the pecking order and, therefore, the arrow of causality is more ambiguous than it might be in panel data. Further, the cross-sectional data means that we are able to speak about associations but not directly about causality. The survey instrument we used, while valuable in a number of ways, has required us to employ parsimonious model specifications. Also, the data collected in the UK in 2017/18 - may be reflective both of particular national characteristics as well as the pre-Covid environment.

A number of further caveats apply to our work and overcoming them could be considered in the future research agenda in the area. Vouchers schemes, for example, are also often employed by the public sector to support small businesses especially. Since we do not have this information in the data, we have not been able to investigate whether innovators tend to apply or receive more often this type of funding. Similarly, while we try to control for the broadest possible list of barriers that could affect the access to finance by creative firms, our empirical estimation is limited to that considered in the questionnaire. Other barriers, like the size of the market, the lack of market intelligence can also affect the access to finance of creative firms. Finally, our analysis considers the UK creative industries as a continuum. This choice is also dictated by empirical modelling reasons (such as survey data sample stratification issues and implications of sample size for the empirical estimation). Differences across sub-sectors could naturally be present, and whilst they are controlled for in the empirical analysis, they are not investigated in the present work. Yet, they could very well play a role, given the sub-sectoral heterogeneity within the creative industries and the differing nature of innovation between CI sub-sectors. Investigating the CIs sub-sectors and, possibly, the differences between the CIs and non-CIs would require alternative datasets and is left as a promising future extension of this paper.

With this said, our paper has substantial policy implications. Our finding that innovative companies appear to be "forced" into reliance upon internal and informal capital suggests that the screening processes, particularly for traditional debt-based finance, miss the potential of these innovative firms (in common with the broader issues identified elsewhere in the literature on financing innovative firms). This, therefore, means that entrepreneurs with higher levels of social capital will be more able to fund their businesses, and points to the need for new and innovative financial instruments to help creative industries businesses grow. Instruments like start-up or IP-backed loans, specialist equity and crowdfunding approaches, and other novel techniques could address the issues we identify.

There are also a number of other fruitful areas for future research. In particular, more detail

about how intangible assets and forms of IP are treated by investors would represent a valuable contribution. More detailed investigations of loan rejection rates for creative businesses, as well as the selection processes behind VC and other equity investments in the creative industries contexts would be welcome. Also, our research has only considered spatial elements broadly in the context of regional controls, but there would be considerable scope to see if the regional inequalities that are abundant in the creative industries (see Tether 2019) manifest in the ability of creative industries firms' ability to access finance. Similarly, while the analysis uncovers some heterogeneity in the access to finance due to personal characteristics, such as gender, age and experience, these are important areas that would each require separate deeper consideration, especially with respect to the issue of equality of access and inclusion.

In conclusion, our paper explores the extent to which prior innovative activities serve as an effective signal to funders of quality in creative industries firms. We find limited evidence of signalling, and find that the signals that do appear in the data are in fact negative. Developing means of helping innovative companies to signal their quality of their innovative activities more clearly is, therefore, suggested to be a valid policy goal.

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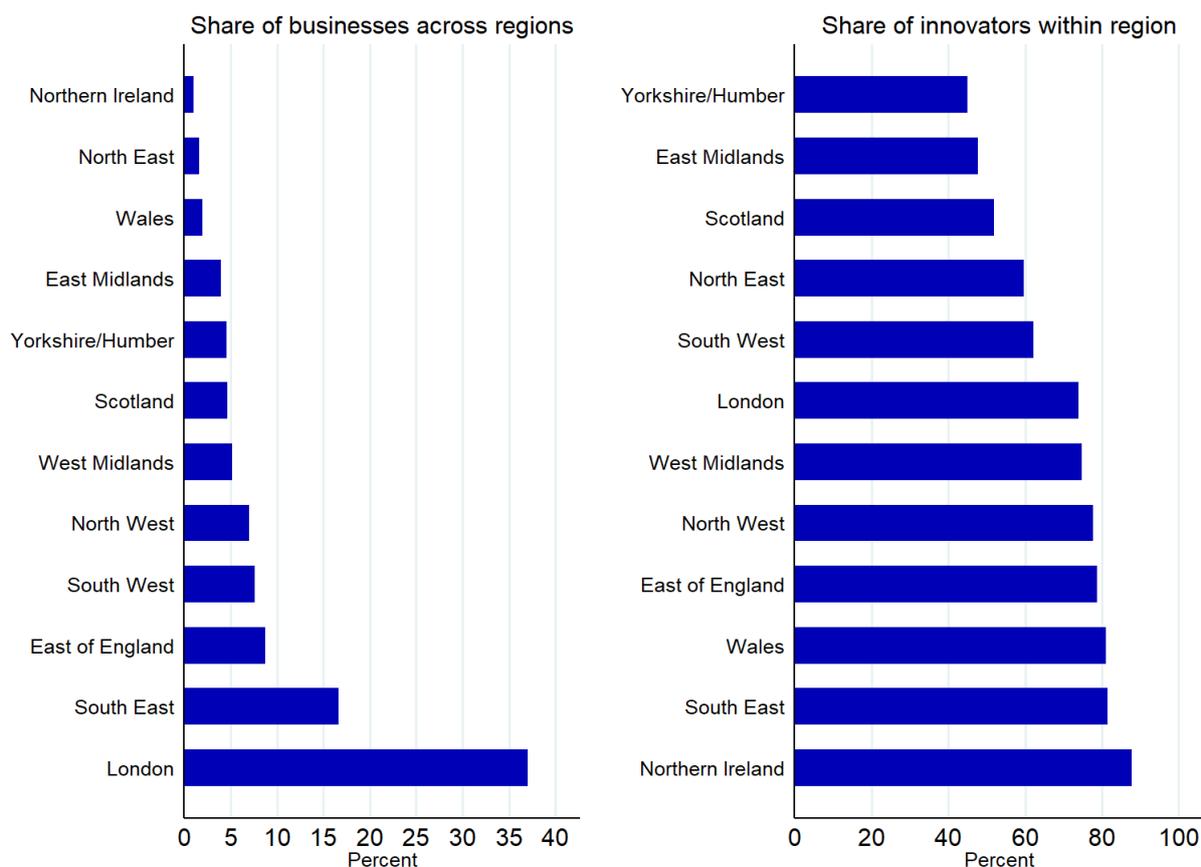
# A Data and descriptive statistics

Table A1: Variables description

Variable group	Description/Answering options
Product innovation	You have developed a new product or service in the past 3 years (Yes/No)
Business improvement	You have significantly improved an aspect of the business/organization in the past 3 years (Yes/No)
Employees	Classes (units): 1, 2-10, 11-50, $\geq 51$
Turnover	Classes (£): <50,000, 50,000-99,999, 100,000-249,999, 250,000-499,999, 500,000-999,999, 1-4,999 millions, $\geq 5$ millions
Turnover growth	Classes (%): <0, 0, 1-10, 11-19, $\geq 20$
Earnings	Loss/Break-even/Profit
Exporting	Currently exporting (Yes/No)
Business plan	You have a formal written business plan (Yes/No)
Mgmt. accounts	You produce regularly monthly or quarterly management accounts (Yes/No)
Firm age	Classes (years): <1, 1, 2-5, 6-9, 10-15, >15
Demand source	Businesses/Consumers/Both
Legal status	Sole proprietorship, Partnership, Limited liability company, Charity/CIC
External funding:	
Financial instrument (f) apply <sup>a</sup>	Yes/No
Financial instrument (f) obtain <sup>a</sup>	Yes/No
Finance enquiries	You have sought information to find about potential types of finance, sources and investors (Yes/No)
Advice on external funding	You have sought professional advice before seeking external finance (Yes/No)
Additional info on external funding	Would additional information and advice about preparing your organisation or business to attract external finance be useful to you at the moment? (Yes/No)
Own/Informal funding:	
Own funding (choice)	In the past 12 months the owner/directors injected personal funds to help the business/organization develop (Yes/No)
Own funding (constraint)	In the past 12 months the owner/directors injected personal funds to keep the business/organization going (Yes/No)
Own funding	Own funding (choice)=Yes or Own funding (constraint)=Yes
Informal funding	In the past 12 months we have received funds from friends or family (Yes/No)
Female owner	Female/Male
Owner age	Classes (age): <25, 25-34, 35-44, 45-54, 55-64, $\geq 65$
Managerial background:	
Run other bus. (past)	You have been involved in running another business/organisation in the past
Run other bus. (current)	You are currently involved in running another business/organization
Invest other bus.	You have invested in other business/organization
Funding sets based on multiple funding instruments:	
Bank/debt funding set (C)	Business Overdraft, Business Loan, Bridging Loan
Public funding set (P)	CI body's funding not to payback, CI body's funding to payback, Other Public body's funding not to payback, Other Public body's funding to pay-back

Notes: <sup>a</sup> This does refer to any of financial instruments reported in Table A4.

Figure A1: Creative businesses and innovators by region



Note: Geographical distribution of creative businesses across UK NUTS1 regions (left-panel). The right panel also reports the percentage of businesses reporting innovation within each region. Innovation is defined as product/service innovation introduced in the past three years. All figures are weighted.

Table A2: Sectoral breakdown of creative businesses

Subsector	% Businesses by subsector	% Innovators
Advertising and Marketing	9.0	47.7
Architecture	5.6	28.2
Crafts	1.0	74.6
Design and designer fashion	8.1	65.2
Film, TV, radio, video and photography	11.4	53.6
IT, software and computer services	44.7	93.3
Museums, galleries and libraries	2.6	56.8
Music, performing and visual arts	13.4	50.4
Publishing	4.1	88.5

Notes: Sectoral composition of creative businesses. The table also reports the percentage of businesses reporting innovation within each creative sector. Innovation is defined as product/service innovation introduced in the past three years. All figures are weighted.

Table A3: Current use of funding instruments by innovation status

Financial instrument		Non-innovators	Innovators
	Bank/debt		
Business Overdraft		13.98	22.94
Business Loan		10.92	2.93
Commercial Mortgage		0.99	0.15
Bridging Loan		0.00	1.50
Business credit card		19.46	18.58
	Secondary		
Leasing and equivalent		8.97	7.85
Invoice finance		1.25	2.73
Export/import finance		0.00	0.00
Trade Finance		0.00	0.01
3rd party equity investment		7.63	7.63
Crowd funding		7.13	3.75
Non-bank Sh. term finance (i.e. online)		0.00	0.99
	Public		
CI body's funding to pay back		4.20	11.47
CI body's funding not to pay back		11.10	7.04
Other Public body's funding to pay back		0.00	0.24
Other Public body's funding not to pay back		3.79	0.67
	Informal/personal funds		
		10.87	30.08
Own funding (choice)		28.23	33.57
Own funding (constraint)		11.58	24.85
Informal funding		2.69	5.20

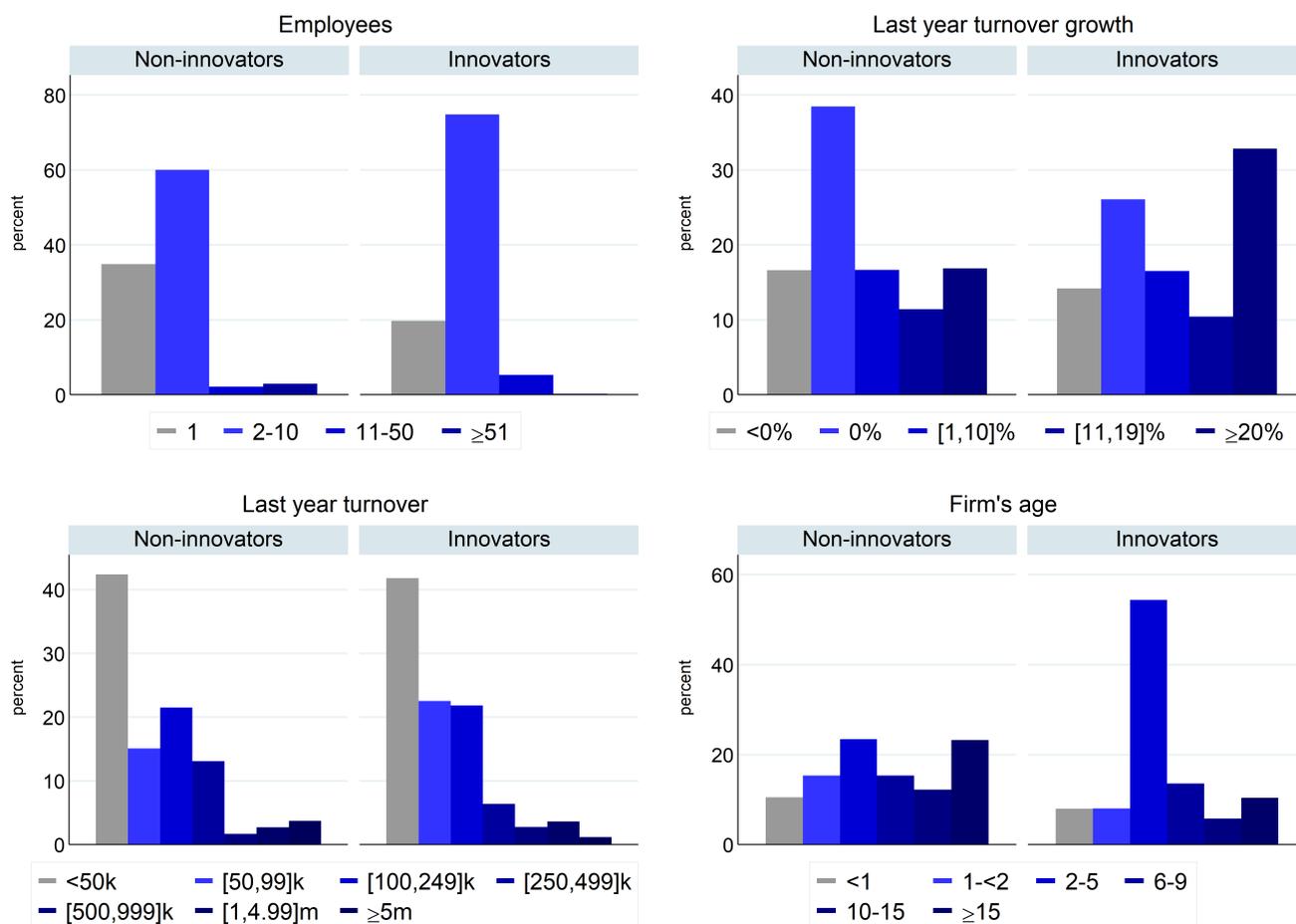
Notes: Current use of funding instruments by innovation status. Innovation is defined as product/service innovation introduced in the past three years. For further details on funding variables, see Table A1. All figures are weighted.

Table A4: Apply for funding/obtain funding

	Apply for funding			Obtain funding		
	Fraction	Count (wgt.)	Count (unwgt.)	Fraction	Count (wgt.)	Count (unwgt.)
Business credit card	0.32	539	528	0.98	173	215
Business Overdraft	0.27	481	478	0.78	129	133
CI body's funding not to pay back	0.26	462	455	0.41	119	139
CI body's funding to pay back	0.21	486	511	0.45	103	59
Business Loan	0.21	507	491	0.53	107	91
3rd party equity investment	0.19	525	538	0.44	98	61
Other Public body's funding not to pay back	0.15	473	475	0.14	73	73
Leasing and equivalent	0.11	519	509	0.92	60	90
Other Public body's funding to pay back	0.07	523	523	0.13	35	33
Crowd funding	0.06	517	509	0.67	33	28
Invoice finance	0.04	512	492	0.80	18	36
Commercial Mortgage	0.04	564	550	0.99	22	21
Trade Finance	0.03	527	514	0.59	14	18
Bridging Loan	0.03	529	532	0.72	16	10
Non-bank Sh. term finance (i.e. online)	0.02	554	548	0.45	11	11
Export/import finance	0.01	516	508	0.74	7	11

Notes: This table reports the share of creative businesses applying/obtaining funding from each financial source - columns (2) and (4), alongside the count of businesses for each funding related variable. All figures are weighted.

Figure A2: Summary of businesses characteristics by innovation status



Notes: Self-reported business characteristics by innovation status. Innovation is defined as product/service innovation introduced in the past three years. All figures are weighted.

Table A5: Further summary statistics by innovation status

	Non-innovators	Innovators
<u>Business characteristics:</u>		
Last year's profits*	53.08	50.30
Sell to: Consumers&Businesses*	36.98	43.71
Currently exporting	58.43	73.25
Business plan	29.37	37.46
Mgmt. accounts	33.84	41.79
<u>Owner characteristics:</u>		
Female owner	24.85	31.55
Owner's age ≥45 years*	61.40	42.36
<u>Owner characteristics - Managerial background:</u>		
Run other bus. (past)	58.80	52.30
Run other bus. (current)	23.21	27.74
Invest other bus.	14.70	27.77

Note: This table reports summary statistics for selected variables, conditional on innovation status. Innovators are distinguished with respect to product/services innovation carried out in the past three years.

\* Aggregated from multinomial variables. See Table A1 for more details.

Table A6: Correlation among covariates

	Turnover	Employees	Turnover growth	Earnings	Exporting	Business plan	Reporting	Firm age	Innovation	Business improv.	Owner age	Female owner	Run bus. (past)	Run other bus. (current)	Invested other bus.
Turnover	1														
Employees	0.89	1													
Turnover growth	0.32	0.28	1												
Earnings	0.37	0.22	0.52	1											
Exporting	0.30	0.23	0.19	0.23	1										
Business plan	0.45	0.49	0.13	-0.16	0.15	1									
Mgmt. accounts	0.67	0.66	0.24	0.14	0.61	0.61	1								
Firm age	0.49	0.38	0.15	0.56	0.02	0.02	0.30	1							
Innovate	0.13	0.16	0.16	-0.02	0.09	0.23	0.25	-0.04	1						
Business improv.	0.43	0.40	0.51	0.28	0.16	0.33	0.50	0.19	0.47	1					
Owner age	0.19	0.12	-0.07	0.14	-0.04	-0.04	0.14	0.40	-0.09	-0.13	1				
Female owner	0.21	0.13	0.03	0.04	0.24	0.07	0.07	-0.03	0.16	1					
Run other bus. (past)	0.38	0.38	0.11	0.08	0.07	0.30	0.33	0.20	0.09	0.13	0.33	1			
Run other bus. (current)	0.15	0.23	0.15	0.11	0.14	0.11	0.16	0.13	0.07	0.14	0.10	0.34	1		
Invested other bus.	0.19	0.23	0.14	0.16	0.28	0	0.11	0.20	0.04	0.13	0.21	0.62	0.67	1	

Note: Polychoric correlations among covariates. For further details on variables see Table A1.

Table A7: Components selection from business characteristics

Component	Eigenvectors							
	e1	e2	e3	e4	e5	e6	e7	e8
Turnover	0.49	-0.06	-0.12	-0.06	-0.38	0.12	0.14	-0.74
Employees	0.47	-0.18	-0.12	-0.04	-0.52	0.20	-0.02	0.65
Turnover growth	0.26	0.29	0.70	0.38	-0.03	0.15	-0.43	-0.04
Earnings	0.27	0.57	0.22	-0.16	0.10	-0.19	0.67	0.15
Exporting	0.19	0.25	-0.55	0.75	0.21	-0.01	0.03	0.04
Business plan	0.27	-0.54	0.20	0.10	0.56	0.41	0.32	0.03
Mgmt. accounts	0.42	-0.30	0.04	-0.04	0.21	-0.80	-0.20	0.03
Firm's age	0.32	0.34	-0.29	-0.50	0.42	0.27	-0.44	0.02
	Eigenvalues (frac. overall variance)							
$\lambda$	3.48	1.65	0.91	0.85	0.45	0.30	0.26	0.09
	(.44)	(.21)	(.11)	(.11)	(.06)	(.04)	(.03)	(.01)

Note: Results from Principal Components Analysis (PCA) among variables regarding business characteristics. The top panel reports - for each factor - the contribution of each variable to that component. The bottom panel report the eigenvalue corresponding to each eigenvector (component) and the related overall portion of variance explained by the component.

Table A8: Components selection from business' owner involvement

Component	Eigenvectors		
	e1	e2	e3
Invested other bus.	0.64	-0.04	-0.77
Run other bus. (past)	0.53	0.74	0.41
Run other bus. (current)	0.55	-0.67	0.50
	Eigenvalues		
	(frac. overall variance)		
$\lambda$	2.11	0.67	0.22
	(.70)	(.22)	(.07)

Note: Results from Principal Components Analysis (PCA) among variables regarding the owner's exposure toward other business enterprises. The top panel reports - for each factor - the contribution of each variable to that component. The bottom panel report the eigenvalue corresponding to each eigenvector (component) and the related overall portion of variance explained by the component.

Table A9: Components selection from sectors and nuts1 regions

Principal inertia (frac. overall variance)									
dim1	dim2	dim3	dim4	dim5	dim6	dim7	dim8	dim9	dim10
0.12	0.08	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00
(0.37)	(0.24)	(0.17)	(0.09)	(0.06)	(0.04)	(0.02)	(0.00)	(0.00)	(0.00)

Note: Results from Multiple Components Analysis (PCA) among variables regarding the owner's exposure toward other business enterprises. Each column reports Principal Inertia associated with each component and the associated portion of the overall variance explained by each component.

## B Are “Combined” Innovators Different?

Table B1: Differentiate innovation status (1)

	Own funding (choice)	Own funding (constraint)	Informal funding	Bank/debt funding		Public funding	
				Outcome	Apply	Outcome	Apply
Prod. innovation: Yes & Bus. improvement: Yes	0.384*** (0.141)	-0.304 (0.253)	0.376** (0.163)	-0.832*** (0.322)	-0.054 (0.219)	-0.404 (0.334)	0.352* (0.197)
Log-lik.	-240.54	-206.85	-109.50	-288.87		-220.36	
AIC	529.1	461.7	267.0	655.7		518.7	
BIC	630.6	563.2	368.5	820.6		683.6	
Wald Test				5.42		2.93	
Wald test (p-value)				0.02		0.09	

Notes: Estimation results for the likelihood of current funding from own, informal, bank/debt and public sources. Results in columns (1)-(3) are from probit estimation, while results in columns (4)-(5) and (6)-(7) are from bivariate with selection onto apply for funding. Innovation variable equals to one when both product/service innovation and organizational improvements are reported, and zero otherwise. For further details on dependent variables, see Table A1. Sector-region factors selected=3 (See Table A9 for further details). Other controls omitted for brevity. All figures weighted.

Table B2: Differentiate innovation status (2)

	Own funding (choice)	Own funding (constraint)	Informal funding	Bank/debt funding		Public funding	
				Outcome	Apply	Outcome	Apply
Innovation depth: (Ref. category: Prod. innovation: No & Bus. improvement: No)							
Prod. innovation: Yes <i>or</i> Bus.improve: Yes	0.162 (0.197)	0.346 (0.228)	0.182 (0.236)	0.471 (0.669)	0.321 (0.307)	-0.127 (0.590)	0.151 (0.242)
Prod. innovation: Yes & Bus.improve: Yes	0.495** (0.216)	-0.042 (0.251)	0.500** (0.198)	-0.488 (0.573)	0.189 (0.397)	-0.504 (0.532)	0.463** (0.225)
Log-lik.	-240.20	-205.64	-109.32	-287.56		-220.20	
AIC	530.4	461.3	268.6	653.1		518.4	
BIC	636.1	567.0	374.4	818.0		683.3	
Wald Test				4.77		2.64	
Wald test (p-value)				0.03		0.10	

Notes: Estimation results for the likelihood of current funding from own, informal, bank/debt and public sources. Results in columns (1)-(3) are from probit estimation, while results in columns (4)-(5) and (6)-(7) are from bivariate with selection onto apply for funding. Innovation depth refers to indicators variables accounting for whether firms do not report any innovation activity (Reference category), report either Product/service innovation or Business improvements, and they report both. For further details on dependent variables, see Table A1. Sector-region factors selected=3 (See Table A9 for further details). Other controls omitted for brevity. All figures weighted.