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TITLE:

BORROWER DISCOURAGEMENT AND SMES NEW PRODUCT DEVELOPMENT: EVIDENCE FROM THE UK

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Dedication

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Declaration

By submitting this thesis electronically, I, Bernard Amoako Baah, declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by the University of Salford will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

B. A. Baah Date: December 2022

Abstract

Purpose

This research aims to investigate the issues of borrower discouragement and new product development (NPD) among SMEs in the UK. Specifically, the study investigates the relationship between discouraged borrowers and ethnic minority SMEs, the relationship between discouraged borrowers and NPD, and the impact of growth obstacles on SMEs NPD. These purposes were organised into three empirical essays.

Methodology

In order to gather data for this study, secondary data from the longitudinal small business survey (LSBS) was extracted from the UK data archives, the largest telephone survey of SMEs in the UK. The raw data extracted was cleaned and coded quantitatively using excel, and the relevant variables were selected. The selected data were entered into STATA to generate descriptive statistics, correlation matrixes, and hypothesis testing. The models used for data analysis were mainly probit regression and logit regression models. We also used propensity score matching (PSM) and instrumental variable two-stage least squares (IV2SLS) to control for possible biases and endogeneity problems that may arise among the variables.

Findings

The following findings were established: First, ethnic minority SMEs have a significantly positive relationship with discouraged borrowers. Second, discouraged borrowers have a strong positive

impact on SMEs' NPD engagement. Third, crowdfunding positively moderates the relationship between borrower discouragement and NPD. Finally, growth obstacles negatively impact SMEs' engagement in NPD.

Implication

Management needs to identify other cost-effective sources of capital for the smooth operation of their activities. Additionally, SME owners and managers could take advantage of crowdfunding platforms to raise capital and provide an immediate market for their prospective products. Lastly, management must take the necessary steps to mitigate the growth obstacles so as to eliminate their impact on NPD.

Keywords: Discouraged Borrowers. Rejection. Unwillingness. Additional risk. Ethnic minority. New Product Development. Crowdfunding. Growth obstacles.

Chapter 1: Introduction

1.1. Background of the study

The importance of discouraged borrowers is acknowledged in theoretical and empirical research for three reasons (Han et al., 2009). Firstly, SMEs are more likely to report discouragement than rejection (Levenson & Willard, 2000). Secondly, the likelihood of being discouraged varies with demographic factors (Vos et al., 2007), particularly the ethnic background of the entrepreneur, with ethnic minority groups in both the United States (Cavalluzzo et al., 2002) and the United Kingdom is more likely to be discouraged (Han et al., 2009). Thirdly, the evaluation of discouraged borrowers is a test of the lending efficiency of financial institutions in terms of screening errors and application costs in financing small enterprises. According to Kon & Storey (2003), the unobservable quality of borrowers is one of the most influential factors of discouragement. Idealistically, lenders would prefer to encourage excellent borrowers and discourage bad borrowers, but information asymmetries prevent them from knowing the quality of the borrower. Accordingly, borrower quality is quantified in numerous methods in the empirical literature, including Dun and Bradstreet Scores (Cavalluzzo et al., 2002) and the variation of returns to equity (Booth & Booth, 2006).

Therefore, imperfect information is at the core of the concept of discouraged borrowers, and the collection of trustworthy information from small business borrowers who are informationally opaque is a challenge for lenders. Several empirical approaches address opacity, including the age of firms (Hyytinen & Pajarinen, 2008). Petersen & Rajan (2002) measure the information openness of a business using business credit cards and credit lines. It is suggested that users of business

credit cards and lines of credit are informationally transparent because their creditworthiness has been evaluated on the external credit market. The duration of the relationship between the firm and its bank managers is a second consideration. Here, it is suggested that longer connections indicate reduced opacity, resulting in increased access to finance (Petersen & Rajan, 2002) and decreased cost (Berger & Udell, 1998) of small business financing.

In Kon and Storey's model of discouraged borrowers, screening errors resulting from information asymmetries are another significant factor. Nonetheless, some lenders have easier access to private information to counteract imbalances than others. For instance, banks may collect information by monitoring transactions on current accounts held by borrowers, whereas non-bank lenders and venture capitalists may not have access to this information. Their position as the most important and complete provider of financial services to small businesses is directly correlated with their higher acceptance rates on loan applications from small firms compared to other sources of financing (Hughes, 1997; Song et al., 2018). SMEs applying for funding from their bank are likely to incur lesser application fees than when they use elsewhere. Simply put, SMEs are less likely to be discouraged from applying for bank financing if all other factors are equal.

In many western nations, racial minorities are significant and strong agents of social, political, and economic transformation (Miller et al., 2013). Thus, organisational researchers have become interested in researching the experiences of ethnic minorities in the labour force and the workplace. Recent scholarly research indicates that ethnic minorities continue to experience a high rate of inequality in workplace positions and authority (Elliott & Smith, 2004; Joshi & Knigh, 2015), continue to be subjected to stereotypes (Grzywacz et al., 2016), and remain underrepresented and socially isolated in the corporate higher echelons (McDonald & Westphal, 2013; Park & Westphal, 2013; Zhu et al., 2014). Such disparities may present underprivileged populations with significant

problems and fewer opportunities. As a result, ethnic minorities have historically and continue to be attracted to entrepreneurship since it is viewed as one of the most realistic routes to upward mobility (Bates & Robb, 2016; Clark & Drinkwater, 2000; Heilman & Chen, 2003). Despite the attractiveness of an entrepreneurial career and the implementation of state policies designed to assist ethnic minority entrepreneurial endeavours, ethnic minority entrepreneurs continue to encounter impediments that perpetuate inequality, just like their colleagues in more established firms (Neville et al., 2018). This disparity is especially apparent in situations involving access to finance and acquiring other vital resources (Mitchell & Pearce, 2011; Neville et al., 2018). Due to the prevalence of such inequalities among SMEs from the ethnic minorities, the study of this community might give a unique insights and noteworthy implications for academics, policymakers, and society as a whole. The broad and obvious implication is that ethnic minority entrepreneurs may not be able to acquire resources that permit the type of social and economic upward mobility they sought while pursuing entrepreneurship (DiTomaso, 2013). A significant but less evident aspect is whether or not ethnic minority SMEs have become discouraged from engaging in activities associated with entrepreneurial growth and development (Neville et al., 2018). Therefore, this study seeks to investigate the relationship between ethnic minority SMEs and discouraged borrowers.

In other ways, SMEs' engagement in innovative activities, specifically new product development (NPD), is addressed in this research. Evidence suggests that innovative SMEs have difficulty utilising bank finance to fund innovative ideas (Hall & Rosenberg, 2010; Lee et al., 2015). For instance, Freel (2007) found that innovative SMEs in the UK were less likely to secure finance from the bank to fund their innovation activities. Moreover, Schneider et al. (2010) demonstrate that innovative SMEs in Germany regard external finance limitations as a significant issue

impeding SMEs' innovation. Additionally, it is suggested that SMEs frequently have insufficient or irregular financial flows to adequately repay bank loans, but larger innovative companies can fund innovation with internal cash flows (Hall & Rosenberg, 2010). Recent data also suggests that innovative SMEs may be penalised in other ways, for as, by being charged higher interest rates for loans than their less innovative competitors (Rostamkalaei & Freel, 2016). There is evidence in continental Europe and the United States that SMEs that are engaged in NPD operations frequently encounter severe external finance limitations (Hall et al., 2016; Kerr & Nanda, 2015). It also appears that innovative SMEs are more susceptible to exogenous liquidity shocks. For instance, Brazil (Paunov, 2012) and the United Kingdom (Lee et al., 2015) provide evidence that innovative SMEs were more likely to be denied financing after the global financial crisis.

Similarly, when SMEs try to innovate, they encounter several challenges that serve as rational justification to restrain their willingness to invest in and actively pursue an innovation activity and, thus, their ability to develop a novel product or service (Oudgou, 2021). In this vein, it is believed that SMEs face difficulties in innovating because market or business environment failures are not easy to overcome and can have a significant impact on both their productivity and their ability to effectively translate their innovations into a dared benefits for their stakeholders (Oudgou, 2021).

According to de-Oliveira & Rodil-Marzábal (2019), there are two lines of research into how innovation barriers are perceived. The first line of research attempts to describe how various impediments affect the innovation's tendency and intensity of the SME. This line of research is frequently used to highlight the effects and causes of financial constraints. The second line attempts to identify and analyse the factors that impact the perception of each innovation obstacle. In this regard, the organisational, sectoral, and industrial features give crucial context for understanding the challenges associated with innovation creation and implementation.

Several studies have demonstrated that lack of funding restraints expenditures in plant or machinery (Bloom & Van Reenen, 2007) and research & development (R&D,) which affects the innovation capacity of the SME (Mancusi & Vezzulli, 2014). Moreover, according to García-Quevedo et al. (2018), internal and external financial limitations have a more significant impact on the conceptual stage of product development. In contrast, external financial constraints have a significant effect on the execution phase. Nonetheless, Pellegrino & Savona (2017) identified other factors that are at least as relevant as financial restrictions in explaining innovation failures among businesses.

The next session will discuss the aims and objectives of the study, the contributions of the study, and how the study is structured.

1.2. Aims and Objectives

There have been several studies on discouraged borrowers in the literature (Cole & Sokolyk, 2016; Ferrando & Mulie, 2022; Gama et al., 2017; Han et al., 2009; Lee & Brown, 2017; Levenson & Willard, 2000; Moro et al., 2017; Rostamkalaei, 2017; Rostamkalaei et al., 2020; Tang et al., 2017), and new product development (Cooper, 2019; Ford & Terris, 2017; Liu et al., 2020; Sharma & Sagar, 2018; Wan et al., 2022; Wang et al., 2020; Xiao et al., 2021; Yang & Zhang, 2018). However, most of these studies have avoided the migrant effect of discouragement, how borrower discouragement influences new product development and how obstacles affecting SMEs' growth impact on tr engagement in new product development.

This research is an empirical study aimed at examining borrower discouragement issues and new product development activities among SMEs in the UK. Specifically, the study seeks to investigate the objectives in three interrelated essays, which are:

1. To investigate the relationship between discouraged borrowers and ethnic minority SMEs,
2. To examine the relationship between discouraged borrowers and SMEs' new product development, and
3. To examine the relationship between obstacles to growth and SMEs' new product development.

These objectives were analysed in three distinctive essays. In essay 1, we examine the potential relationship between discouraged borrowers and ethnic minorities. In this study, we observe from the literature that ethnic minority entrepreneurs face challenges in accessing finance, perhaps due to discrimination or a high rate of missing payments, which may render them credit unworthy. However, researchers are yet to examine whether, in the midst of the challenges in accessing finance, ethnic minority entrepreneurs are discouraged from borrowing. This study seeks to fill this gap and is presented in Chapter 3:.

In essay 2, we aim to investigate further the impact of borrower discouragement on SMEs' engagement in new product development. Here we observe that innovative SMEs are less likely to obtain external funding to finance their projects due to a lack of adequate information regarding the future prospect of the project. The aim of this study is to explore whether, in the wake of discouragement, SMEs are able to invest in NPD. This study seeks to extend the research conducted by Brown et al. (2022) to include how crowdfunding moderates the relationship between discouraged borrowers and NPD. This will help to control for the financing options

available to discouraged borrowers and their participation in product innovation which is lacking in the literature. Finally, the investigation of the relationship between discouraged borrowers and NPD is presented in Chapter 4:.

Finally, in essay 3, we aim to explore how obstacles to growth affect NPD. Specifically, we identified the major obstacles that affect business growth and classified them into financial and non-financial obstacles. Finally, this essay reports the analysis of how each group of SMEs impacts engagement in NPD and presents details of the investigation in Chapter 5:.

Consequently, we draw evidence from the four nations in the UK, taking into consideration 3,296 SMEs to enhance the understanding of issues related to borrower discouragement, obstacles to growth and SMEs' engagement in new product development. Borrower discouragement that results from entrepreneurs belonging to the ethnic minority group is discussed to understand the role of ethnicity in borrower discouragement. Furthermore, the study explores the role crowdfunding plays in mitigating discouragement's effects on NPD. In this study, we compile the most recent data from the Longitudinal Small Business Survey (LSBS), which covers the sixth-round survey from 2015 to 2020, to close the recent data gap and capture SMEs in the UK to complement emerging study directions in the UK.

1.3. Contribution of the study

In investigating the relationship between discouraged borrowers and ethnic minorities, the relationship between discouraged borrower and NPD, and the relationship between obstacles to growth and NPD, this study makes empirical, theoretical, and methodological contribution to related research on discouraged borrowers, NPD and policy making.

1.3.1. Empirical contribution

The contributions of the study are presented in each of the three essays of this thesis. In essay 1, as presented in Chapter 3:, it is observed that, while existing literature has evaluated the incidence of discouraged borrowers, the link between ownership orientation of SMEs, particularly, ethnic minority ownership and borrower discouragement, has not been considered in the literature. Again, various definitions of discouraged borrowers have ignored risk aversion as a key for SMEs' discouragement. Therefore, our contributions to this essay are as follows. First, in addition to the existing definition of discouraged borrowers, where SMEs perceive that their application will be rejected, this study provides a new dimension of discouragement to capture SMEs' unwillingness to take on additional risk. For instance, the pecking order theory posits that firms will choose from financing sources that result in lower costs and decide not to apply for loans. This additional way of predicting the probability of borrower discouragement is an important contribution to be included in the literature. Second, this study examines the likelihood of ethnic minority ownership to be discouraged from applying for a loan and the dynamics of the discouragement from different forms of borrower discouragement. Subsequently, the result from this thesis predicts that ethnic minority SMEs are not only likely to be discouraged for fear of rejection but also see the loan as a risk they may not be willing to include in their operational cost. The study finds that firm age, size, ownership, and performance are significant determinants of the probability of SMEs to be discouraged borrowers. This is consistent with a recent study by Ferrando & Mulie (2022).

In essay 2, the study contributes to the existing literature in several ways. First, using a sample of 3296 SMEs operating in the UK between the years 2015 and 2020, we investigate the moderating effect that crowdfunding has on the link between discouraged borrowers and SMEs NPD. This is an extension of the study that was conducted by Brown et al (2022), who investigated the impact

of discouraged borrowers on innovation. They found that product innovation SMEs have a higher propensity to be discouraged from applying for external funding than their non-innovative counterparts. The purpose of this study is to further investigate this phenomenon. We observe that previous research does not adequately discuss the various financing options available to discouraged borrowers. We, therefore, extended our study to include the crowdfunding as an alternative source of financing (Sewaid et al., 2021) available to discouraged borrowers. Besides complementing the study that was conducted by Brown et al. (2022), we as well increase the body of literature on the topic. Our result confirms that SMEs are more likely to use crowdfunding platforms to finance their investment in NPD which helps to narrow the financing gap for innovative SMEs (Hervé & Schwienbacher, 2018).

Second, our study provides a significantly new understanding of how crowdfunding might moderate the incidence of borrower discouragement among SMEs and encourage further investment in the creation of the new product. In our findings, we discovered new evidence of discouraged borrowers, which helps to better understand why SMEs will turn to alternative non-traditional sources of financing their NPD projects. Our result shows that crowdfunding positively moderates the relationship between discouraged borrowers and NPD. This finding suggests that when SMEs use crowdfunding as their source of capital, they are more likely to increase their investment in NPD. To the best of our knowledge, this is the first time such a study is conducted.

Third, in building upon the study of Brown et al. (2022), we used the most recent dataset from the LSBS, which extends their survey to 2020 and resolve the problem of recent data gap. We also adopted a robust selection criterion for our sample where only SMEs that participated in at least three consecutive years of the six-year survey are considered. This selection criterion helps to observe the dynamic behaviour of the SMEs to achieve consistency in our panel distribution.

Fourth, the study contributes to the theoretical development of the pecking order theory by incorporating the moderating effect of financing sources on the developmental strategies of SMEs. Finally, we recommend to practitioners that, when analysing the effect of using crowdfunding platforms for discouraged borrowers, they should examine the impact of the platforms on the association between NPD and borrower discouragement. In particular, our findings indicate that the influence of crowdfunding improves the participation of discouraged SMEs in NPD.

Finally, the theoretical lens for this study is the pecking order theory which enhances the understanding of the interaction between the firm and the bank in terms of information access. A key proposition of pecking order theory is that the presence of information asymmetry compels firms to develop a hierarchical approach in selecting their financing sources (Serrasqueiro & Caetano, 2015). Based on this theory, the study is to determine the impact of non-traditional external sources of funding on the promotion of NPD. Consequently, this study will contribute to the theoretical development of incorporating borrower discouragement and how it affects new product development.

In essay 3, we investigate the impact of growth obstacles on SMEs' engagement in NPD. We contribute to the literature in several ways. First, in our analysis, financial obstacles are extended beyond just access to finance. We also take into account factors that directly affect the SMEs' finances, such as taxation, VAT, PAYE, national insurance, and business rate. This has been neglected in previous studies, and our contribution is that their inclusion will better explain how financial impediments affect the likelihood of SMEs to engage in NPD.

Finally, we examine the relative impact of financial and non-financial obstacles on SMEs' willingness to participate in NPD. Finally, we find that both financial and non-financial obstacles have a negative impact on SMEs' investment in NPD.

1.3.2. Theoretical contribution

As this thesis focuses on various dimensions, including borrowing decisions, ethnicity, product development and obstacles to growth, it does not fit a single theory. Therefore, the analysis of this study adopts various theories, including information asymmetry theory, pecking order theory, resource-based theory, and shared value theory. Although these theories have been tested on developed economies, very few have been tested on the UK economy. Thus, this study contributes to existing research by testing these theories on UK SMEs. In the first place, the relationship between discouraged borrowers and ethnic minorities is examined by applying the information asymmetry theory. It is found that discouraged borrowers follow the information asymmetry theory. Thus, the results emerging from this research contribute to knowledge with regards to the development and refinement of existing theory and that this study contributes to existing theory by extending the scope of information asymmetry theory. Managers might use this model even during a financing decision when they need external finance. This is because finance has a significant impact on SMEs' operational decisions, such as the introduction of new products (Palacios-Ibáñez et al., 2023). However, the financing decisions of discouraged borrowers may differ from the non-discouraged ones. Yıldırım & Çelk (2021) have explained the validity of the pecking order theory in explaining the financing decision of SMEs. Nevertheless, there is little evidence on how the pecking order theory will be applicable to discouraged borrower when they want to engage in product development. Thus, this thesis examines how crowdfunding moderates

the relationship between borrower discouragement and NPD. In doing so, we contribute to the existing literature by extending the area of pecking order theory. Moreover, policymakers may use this theory when dealing with issues of borrower discouragement and product development. Investors could also follow this pecking order theory in financing NPD among SMEs. Finally, the relationship between obstacles to growth and NPD was based on the resource-based theory and shared value theory. It is found that SMEs need adequate resources to improve productivity and growth, and it requires the contribution of all stakeholders to create value for the firm. The results contribute to the literature by providing new evidence on the study of NPD among SMEs.

1.3.3. Methodological contribution

The study expands the scope of borrower discouragement and NPD literature using several econometric techniques, including random effect probit regression, logistics regression estimates, and GEE population average logit regression. These estimates were conducted to test the robustness and consistency of the result estimations. Propensity score matching (PSM) and Instrumental variable Two-Staged Least Squares (IV2SLS) approaches have been applied. These methods were used to control for the problem of endogenous variables and potential biases during the analysis. Moreover, panel data methodologies were used to address individual firm heterogeneity. The application of advanced econometric methods confirms that the results are unbiased and consistent.

1.4. Structure of the thesis

This study is structured into six chapters. Chapter 1: deals with the general introduction of the research. In this chapter, we present the background of the study, its aims, and the objectives of

the study. We also present the contributions of the study in this chapter. Chapter 2: deals with the methodology of the study. Here we present the research strategy, research design, and choice of methods for the analysis. We also present the data structure and how the data is analysed in this study. In Chapter 3:, we present essay 1, which deals with investigating the potential association between discouraged borrowers and ethnic minority SMEs. Chapter 4: deals with essay 2, and we present the study on the role of crowdfunding on the relationship between borrower discouragement and NPD. In Chapter 5:, we present essay 3, where we discussed the impact of growth obstacles on SMEs' engagement in NPD. Finally, we present the conclusion and implications of the study in Chapter 6:.

1.5. Summary

This chapter has established the context of the study and set out the aims and objectives of the research. It has also outlined the purpose of the study and explained its potential contributions. The structure of the thesis has also been described. As is evident from the above discussion, the study concerns borrower discouragement and NPD investment among SMEs in the UK Economy. Its focus is on the relationship between discouraged borrowers and ethnic minorities, the relationship between discouraged borrowers and NPD, and the impact of growth obstacles on SMEs NPD in the UK.

Chapter 2: Methodology

2.1. Background

This chapter explains and justifies the methodology and methods that were used in the study. This will consider the justification of the scientific paradigm, epistemology, ontology, and the methods used. It also presents detailed information about the data used. Here, three questions are considered: First, what is the relationship between discouraged borrowers and ethnic minority-owned SMEs? Second, how does borrower discouragement influence SMES investment in new product development? Last, how do growth obstacles affect SMEs' engagement in new product development? In addressing these questions, a careful and strategic method needs to be considered and adopted.

There may not be a "correct" or "wrong" methodology for analysing a research study, but each approach has its own distinctive tradition, operates with its own techniques, has internally consistent underlying assumptions, and makes a specific set of decisions (O'Gorman & Macintosh, 2015). This suggests that the selected research paradigm or strategy should be supported throughout the methodological process and should be able to contribute significantly to achieve the objectives of the study.

The remaining sessions discuss the processes and procedures used in the study, how they were chosen, and how data was analysed. It also explains the data collection procedures in detail with more emphasis on the data source, collection technique and the variables adopted in this study.

2.2. Research Strategy and Design

Research has two main types, namely theoretical research, and empirical research. Theoretical research is a study that does not depend upon empirical evidence, an experiment or manipulation of variables. Theoretical research is based on exploring, developing, or testing theories. In the case of empirical studies, research is conducted by using empirical evidence. This suggests that new ideas are/or knowledge is developed by means of direct or indirect observation or experience and supported by concrete and verifiable evidence. In summary, the focus of the theoretical study is mainly on theories or concepts, but that of empirical studies is based on testing the theories using data. Though the approaches to theory development of the two forms of studies are different, they are interrelated. This implies that empirical studies are dependent on theoretical studies, and the findings from empirical research could be used to develop a new theory. The current study is based on empirical studies to address the research questions and follow the theoretical approach to achieve the objectives of the study.

Another important element to consider is the motives and beliefs influencing the interpretations and experiences gathered. Two types of beliefs are explained in this context, Ontology and Epistemology.

2.2.1. Ontology

Ontology focuses on nature of reality. The belief system reflects an individual's interpretation of what constitutes a fact. The researcher establishes the nature of the world and their place in it by choosing the ontological position of the research. Ontology is also explained as the study of being (Crotty, 1998; Kamal, 2019). According to Baker (2019), ontology is the philosophy of what

constitutes social reality, and more specifically, whether there are singular or multiple realities. In the works of Crotty (1998) and Silverman (2013), ontology describes the nature of reality, the elements it contains, and how existence can be explained. Specifically, in this study, ontology is determined as the study of being (Dudovskiy, 2018) that deals with the nature of reality. The idea of ontology is the interpretation of what establishes a fact by an individual (Dudovskiy, 2018).

From the viewpoint of social science, ontology is concerned with studying social entities or things and the commonalities between them (Ormston et al., 2014). Ontology assumption has two main types, namely objectivism and constructivism.

2.2.1.1. Objectivism

The objectivist are realists that believe in the concept of objectivism. They argue that social entities exist independently of individuals. Furthermore, in objectivism, facts and values are significantly different, allowing for objective and value-free inquiry (Beebe & Sackris, 2016). This assumption means that the researcher should always isolate himself or herself from the research findings or avoid having any direct or indirect impact on the research. As a result, objectivism helps to legitimately acquire knowledge about a concrete reality through observation and measurement, and any relation with intangibility or subjectivity is rejected as invalid (Morgan & Smircich, 1980).

In this research, the demographic data of SMEs are obtained from the objectivism point of view. SME owners and managers exist and are measurable. Additionally, an objectivism approach is applied to specifically identify discouraged borrowers, and owners from the ethnic minority group, define their financing decisions, explain their innovation practices, as well as explaining the major obstacles affecting their growth in the UK. These conditions would be presented to demonstrate the unique characteristics of the SMEs that are discouraged from borrowing, and how this

discouragement is linked to ethnicity and product innovation. The condition will also be used to determine the firm's view on growth obstacles and their interaction with other factors in the environment.

Therefore, the perspective of the ontology assumes realities and have concrete structures and processes that needs to be explored. Additionally, objectivists argue that individuals are born into a society or world and that their behavioural patterns can be explained through causal laws (Crotty, 1998).

2.2.1.2. Constructivism

Constructivism asserts that direct observation is not the only means of gaining knowledge about the external world. Constructivists believe that our perceptions and interpretations of the world around us are the most accurate means of explaining situations. In other words, our knowledge of the world is based on our 'understanding,' which is derived from our reflection on events and not merely our direct experience of them (Ormston et al., 2014). Further, they argue that knowledge is produced by investigating and comprehending (rather than discovering) the social world of the people being studied, focusing on their narratives, meanings, and interpretations.

The constructivist also asserts that social phenomena are the result of the perceptions of social actors and how these perceptions influence social behaviour. At its most extreme, the subjectivist ontological position (solipsism) holds that reality does not exist outside of oneself, but only in the mind, which is everything; as a result, reality consists entirely of imagination (Morgan & Smircich, 1980). In addition, they believe that knowledge is relative, and as a result, social actors have the autonomy and free will to shape their world in accordance with their experiences (Guba & Lincoln, 1994).

This view implies that individuals cannot separate themselves from their observations, perceptions, and interpretations. The observers are incapable of overcoming their inherent and acquired biases, which are the result of their educational background, socioeconomic standing, intellectual pursuits, religious beliefs, practical skills, and moral values, as well as everything else that defines them as individuals (Hunt, 2005; Steitenberger & McGregor, 2021). Regarding the role of individuals in discovering reality through investigation, a constructivist perspective would argue that researchers should be actively encouraged to reduce the distance between themselves and what is being investigated (Collis & Hussey, 2013).

The research philosophy is an additional important factor that can guide the structure and direction of the research process and design. Positivist and interpretive are the two types of research designs. Typically, the positivist approach is used to test a theory, whereas the interpretive approach is used to construct a theory. Positivist designs seek broad patterns based on an objective perspective of reality (Bhattacherjee, 2012). According to Mukherji & Albon (2018), in order to comprehend a phenomenon, it is necessary to observe events in a systematic manner and then determine the underlying theory that explains why the observed event occurred. This method also assists in defining the cause-and-effect relationships between variables. Interpretive designs, on the other hand, seek subjective interpretations of social phenomena from the subjects' perspectives (Bhattacherjee, 2012). In other words, interpretive designs are concerned with how individuals experience phenomena and determine their actual meanings. This is possible through subjective analysis.

For the following reasons, a positivist design was chosen for this study. Positivist designs enable coverage of a broad range of situations by representing larger populations and are straightforward to replicate in order to reach a general conclusion. The production of more acceptable

generalisations results from the absence of restrictions on the replication of a study. According to Remenyi et al. (1998), it is difficult to generalise when employing an interpretive methodology. Positivist results are typically expressed quantitatively, whereas interpretive results are typically expressed qualitatively (Kielmann et al., 2012). As the current study employs numerical data and quantitative methods to answer the research questions, the positivist methodology is more appropriate for this study. Limited in time and resources, the positivist paradigm is more economical than the interpretive approach. This study had a limited time frame, so a positivist approach is more appropriate. The positivist approach aims to make statistical comparisons (Kielmann et al., 2012), which contributes to the comprehensiveness of this study's analysis.

2.3. Choice of methods

The selection of research methodology is closely tied to the selection of research philosophy. Kielmann et al. (2012) noted that the positivist approach is typically quantitative, whereas the interpretive approach is qualitative. Quantitative methods deal with data to measure what people believe, whereas qualitative research focuses on why and how people make decisions. Consequently, qualitative research provides a deeper knowledge and comprehension of the researched phenomenon (Gramatikov et al., 2018). Quantitative research, on the other hand, reveals more significant facts about the data, such as trends, demographics, and group differences. Using an appropriate method, researchers collect, organise, and analyse data in quantitative research. To analyse a certain concept, qualitative research employs interview techniques or face-to-face or telephone interviews with the target group. This study investigates the relationship between borrower discouragement among SMEs and new product development. It also investigates the impact of growth obstacles on SME engagement in new product development. The

variables chosen for this analysis are based on previous research and are quantifiable and measurable. In addition, hypotheses are developed and evaluated using a quantitative methodology. In addition, the majority of previously published research on these topics was quantitative in nature. Examining the stated objectives, this study also employs a quantitative methodology.

2.4. Data structure

There are three different types of data: cross-sectional, time series, and panel (or time series cross-sectional data). Cross-sectional data describe multiple individuals simultaneously, such as the 2015 sales growth data for M&S, Primark, and T.K. Maxx. Time series data look at the same individual over a long period of time, like the sales growth of Primark from 2015 to 2020. Panel data are a combination of cross-sectional and time series data, using datasets with multiple individuals for multiple time periods, such as sales growth data from 2015 to 2020 for M&S, Primark, and T.K. Maxx. Due to their distinct advantages over cross-sectional and time series data, panel data were utilised.

The benefits of panel data are outlined as follows. First, panel data provide a great deal of flexibility for modelling differences in individual behaviour over cross-sectional data (Bell & Jones, 2015). In addition, Pindado & Requejo (2015) noted that panel data involve unobservable heterogeneity. R&D investment analysis must account for unobservable heterogeneity, as it is dependent on firm strategy, corporate culture, and the propensity to innovate (Busom et al., 2017; Ugur et al., 2020). In order to account for unobserved heterogeneity, panel data were utilised as opposed to cross-sectional or time series data. Second, panel data provide more informative data, more variability, less collinearity between variables, more degrees of freedom, and greater

efficiency (Baltagi et al., 2013), whereas time series research may have collinearity issues. Panel data are useful for identifying and quantifying effects that cannot be measured with cross-sectional or time series data. In addition, panel data facilitate the examination of more complex behaviour. For example, panel data are superior for evaluating technical efficiency (Koop & Steel, 2001). Third, according to Pindado & Requejo (2015), panel data are useful for studying the dynamics of changes in firm-level decision making. According to Baltagi et al. (2013), cross-sectional data conceal a multitude of changes. In addition, panel data mitigate the aggregation bias that can occur when time series estimates are used to characterise individual behaviour. Panel data allow a composite error term, such as it = I + dt + vit, to be decomposed into subcomponents (Pindado & Requejo, 2015). First, individual heterogeneity, denoted by I can be used to control for firm- or individual-specific effects. Second, panel data by definition include the time-series dimension, which regulates the macroeconomic effects on dependent variables. Finally, the analysis of panel data simplifies computations. For instance, panel unit root tests have a standard asymptotic distribution and are not afflicted by the problem of non-standard distributions that plagues time series analysis (Baltagi et al., 2013). However, the greatest challenge of panel data analysis is the collection of data. Due to the nature of panel data, researchers must collect data on multiple individuals over multiple time periods; however, non-responses, problems with coverage, frequency of interviews, firm listings, and bankruptcy make it impractical to work with panel data in all situations. Moreover, cross-sectional dependence is not always accounted for in panel data. This issue may arise if a researcher uses macro-panel data on countries or regions over an extended period of time (Baltagi et al., 2013). In addition, Cameron & Trivedi (2013) state that estimations of panel data are more complicated than estimations of cross-sectional data, necessitating much richer models and estimation methods.

2.5. Data Analysis

The analysis of the study is estimated using the STATA software. This research mainly uses the logit and probit regression for some reasons. Logistic (logit) or probit regression models provide a conditional probability of an observation belonging to a particular category. The logit and the probit model do not require assumptions as restrictive as discriminant analysis. Supporters of this approach argue that logit or probit regression fits the characteristics of the study prediction problems. The dependent variables in this study are binary variables (discouraged/non-discouraged or NPD investment/non-NPD investment). The logit or probit model yields a score between 0 and 1, which gives for instance, the probability of the firm being discouraged borrower or engaging in new product development or otherwise respectively.

However, as Pindado & Requejo (2015) point out, endogeneity is an issue in a lot of financial research. In general, they can occur when the error term is connected to one or more of the explanatory variables. Endogeneity issues can be caused by omitted variables, measurement errors, and causation, as identified by Wooldridge (2010). It is possible that explanatory variables may correlate with omitted variables. Some companies may invest more in NPD than others due to market conditions or internal policies, and this could lead to omitted variable bias. Any of the factors being measured, whether they are independent or causal, may be inaccurate. Causality concerns may arise from simultaneous determination of a dependent variable and at least one explanatory variable.

Therefore, we perform several endogeneity tests as follows: First, we perform the propensity score matching (PSM) to control for any possible biases that may exist between the independent variables and the control variables (Al Guindy, 2021). The PSM is explained in session 3.6.1.

Second, we further employ the two-stage least square (2SLS) to control not only for the possible endogeneity problems but also to solves the problem of heteroscedasticity, multicollinearity, and auto-correlation among the variables (Chanthawong et al., 2016).

2.5.1. Propensity Score Matching (PSM)

The most rigorous research strategy for examining therapy effectiveness while avoiding systematic bias is considered to be randomised trials. In actuality, subjects are assigned to the treatment or control group at random, allowing an equal distribution of measured and unmeasured confounders (variables that affect both the dependent variable and independent variable, resulting in a spurious association; referred to as covariates in regression context) between the two groups (Pocock & Elbourne, 2000).

Randomized trials may be difficult to carry out, however, and observation studies can provide significant proof. When doing observational studies, it is possible that the participants in the treatment and control groups may vary for potential confounders, and variations in results may be attributable to baseline circumstances rather than a true treatment effect. Confounding in observational studies may be reduced by matching each subject in the treatment group with a subject in the control group who has similar baseline confounders.

However, matching concurrently on a small number of confounders is a highly difficult procedure that often yields very few matches that are comparable. Propensity score (PS)-based matching is another approach (Rubin & Thomas, 1996). The PS is often computed using logistic regression and represents the likelihood that a person would get a therapy T conditional on a collection of confounding factors (X). By combining all confounders into a single number, the estimation of the PS aims to streamline the matching procedure. Comparing outcomes among groups of patients

with comparable estimated PS provides an unbiased measure of treatment impact, and matching patients with similar estimated PS approximates creating a balance for all the confounders (Austin, 2013; Stuart, 2010). PS matching can get around some of the drawbacks of traditional multivariable regression modelling (Rubin, 2007)

According to Benedetto et al. (2018), there are four main PS-based approaches: (i) matching: pairs 1 or more treatment cases with control cases that have PSs that are (almost) identical to each other, (ii) stratification (subclassification): splits the sample into strata based on rank-ordered PSs, then compares the groups within each stratum. (iii) Cases are weighted using the PS's inverse. Weights are used to guarantee that samples are representative of certain populations in a manner similar to survey sampling, and (iv) regression adjustment: This incorporates PSs as a covariate in a regression model used to calculate the treatment effect. The target audience and the research issue should both be taken into consideration while selecting a PS approach. The two most popular estimands are the "average treatment effect" (ATE), which is the influence on everyone (both treatment and control), and the "average effect of the treatment on the treated" (ATT), which is the effect for those in the treatment group. The ATT is preferred when a patient's features are more likely to influence the therapy received, but the ATE is more interesting if every treatment is possibly available to every subject. Covariate adjustment can only estimate the marginal effect; it cannot estimate the ATT or the ATE. Matching can only estimate the ATT, weighting can estimate either effect depending on how weights are defined, stratification can estimate either effect depending on how strata are weighted, and finally, covariate adjustment can only estimate the marginal effect. Comparing stratification and covariate adjustment to matching yields estimates with reduced bias when measuring treatment impact on binary outcomes (odds ratio). Particularly

when measuring the ATE is of relevance, inverse probability of treatment weighting (IPTW) should be utilised for evaluating risk differences (Austin, 2013).

To adjust for confounding by indication in observational research, propensity score (PS) approaches provide various advantages over more conventional regression methods (Benedetto et al., 2018). In the first place, one problem with multivariable (MV) regression is that there are restricted confounders than expected in the model. However, the number of confounders included in the PS model used to calculate the PS is not limited by the quantity of outcome occurrences. The investigator may include all potential confounders that would not have been able to include otherwise when covariates are collapsed into a single score, which may increase statistical efficiency. Consequently, when there are many confounders or few outcomes, the use of the PS may be justified. Secondly, with MV regression, the research is invalid because of confounding by indication while direct attention is given to the indications for the experimental therapy in matching on the PS. These zones of non-overlap, which are otherwise difficult to define in a multivariate situation with numerous variables impacting treatment choices, may be identified graphically by comparing the PSs in exposed vs unexposed participants. Moreover, MV regression has a problem with a modelling assumption but the linearity assumption between the PS and result is eliminated by matching by the PS. Lastly, the MV model development and the result analysis are integrated while by modelling factors and treatment assignment, PS matching calculates the treatment effect. Because the research design (PS model and matching) is distinct from the outcome analysis, PS matching mimics a randomised experiment. This guards against the researcher having real or potential bias.

In summary, to adjust for confounding by indication in observational research, propensity score (PS) approaches provide distinct benefits over more conventional regression methods. While

multivariable regression models account for confounding variables by modelling the link between covariates and result, PS approaches estimate the treatment impact by modelling the relationship between confounding variables and treatment assignment. Therefore, approaches based on the PS are not constrained by the number of events, and their usage may be justified whether the number of confounders is high, or the number of outcomes is small. The PS represents the chance that a patient will get a therapy given a set of baseline variables (confounders). The PS is often computed using logistic regression, and it is used to match variables with comparable distributions of confounders such that the difference in outcomes provides an unbiased assessment of the treatment impact (Benedetto et al., 2018).

2.6. Summary

This chapter has provided an explanation of the research methods that were applied to this study. Particular attention was paid to the research philosophy, the data collection technique, and the selection of methodology. The research has a positivist stance and employs a quantitative method in its methodology. Secondary data were acquired for the study from the Longitudinal Small Business Survey from 2015 to 2020. Detail explanation of the data collection procedure has been reported in this session. These data were used for the analysis. The most common methods for conducting the data analysis are probit and logit regression estimations. In addition, PSM and 2SLS with IV tests are utilised in order to control for any potential biases and endogeneity issues that may be present. The next chapter deals with the first essay with examines the relationship between discouraged borrowers and ethnic minority SMEs.

Chapter 3: Borrower Discouragement and Ethnic Minority Ownership

3.1. Introduction

Business finance appears to be a significant strategy for Small and Medium-sized Enterprises (SMEs) that requires immediate attention as it facilitate business growth and development. A consistent policy concern and recurring theme in the SME literature is the efficient supply of adequate finance to the SME sector (Gama et al., 2017; Cole and Dietrich, 2013). One school of thought holds that there is an insufficient supply of debt finance for the SME sector (Stiglitz & Weiss, 1981), whereas the opposing school of thought holds that there are excessive investment above socially efficient levels (De Meza & Webb, 1987). This suggests that efficient fund allocation should be aimed at ensuring adequate investment finance for 'good' borrowers while denying finance to 'bad' borrowers (Mac an Bhaird et al., 2016). As a result, good borrowers are likely to receive more finance at a lower cost while bad borrowers are likely to lead to fewer loan applications.

In addressing the financing issues with SMEs, information asymmetry, which refers to a situation where one party involved in a transaction has more information than the other party (Bergh et al., 2019; Chang et al., 2020), may be considered as it could results in adverse selection where good borrowers are denied credit while bad borrowers are granted (Gama et al., 2017; Rostamkalaei, 2017). This adverse selection creates a self-imposed credit rationing in which credit worthy SMEs do not apply for loan even though they have a need for it (Rostamkalaei, 2017). Thus, they develop a perception that their application may be refused. The literature describes these SMEs as

discouraged borrowers. However, since finance plays a major role in the success of the SMEs, and considering their immense contribution to the economy (Do, 2018; Gama et al., 2017; Olatunji & Houghton, 2017) it has become necessary to examine the factors that lead to their discouragement. Previous studies suggests that if the SMEs were not discouraged, they would have had their application approved. For instance, Cole & Sokolyk, (2016) find that over 30% of these discouraged borrowers would have been successful in obtaining credit if they applied. Moreover, Cowling et al. (2016) suggests that over 50% of discouraged borrowers would have succeeded if they were not discouraged.

Generally, literature explains the concept of borrowers discouragement as SMEs that has the need for finance but do not apply because they fear that their application will be rejected (Cowling et al., 2016; Freel et al., 2012; Han et al., 2009; Kon & Storey, 2003; Levenson & Willard, 2000; Mac an Bhaird et al., 2016; Mol-Gómez-Vázquez et al., 2020). In consistent with literature, we adopt the definition above. However, in addition to this definition, we seek to further investigate SMEs that are discouraged, because they are risk averse firms, to ascertain how their dynamics of discouragement differ from that of the literature. This will add to knowledge, a new group of discouraged borrowers for academic research and inform policy makers to consider them in policy formulation.

Borrower discouragement can be exacerbated by ownership characteristics including family business, gender, and those owned by the people from the ethnic minority. It could be observed that discouraged borrowers may be relatively high among SMEs belonging to the ethnic minority due to challenges they face in accessing finance such as discrimination (Carter et al., 2015). Another issue is that ethnic minority SMEs may become even more discouraged because they have

high rate of missing payment (Fraser, 2009) and thus become credit unworthy leading to a higher declining rate which put additional liquidity pressure on them.

Several studies have considered the contribution of ethnic minority SMEs on the economy and access to finance. Others also focused on challenges and opportunities of ethnic minorities businesses and several other issues. None on the previous studies have investigated the borrowing issues with regards to ethnic minorities. We fill this gap by investigating the potential association between discourage borrowers and ethnic minority.

In a variety of ways, we contribute to the literature. First, we identify a new definition of borrower discouragement to capture SMEs that are discouraged due to risk aversion. Based on this, we capture an additional way of predicting the probability of SMEs' discouragement to be included in the literature. Second, this study examines the probability of SMEs owned by the ethnic minority to be discouraged from applying for loan and the dynamics of different forms of discouragement. This study predicts that ethnic minorities are not only likely to be discouraged because of perception of being rejected but also, they assert that loan is a risk they are not willing to add to their operations. Finally, based on the firm-level analysis, the current study explicitly measures the impact of firm level characteristics (age, size), ownership orientation (family, female), and performance, and the probability of being discouraged as a result of self-rationing and risk aversion. Our results demonstrates that family, female, size, age, growth, industry, and profit help to explain the incidence of discouragement due to fear of rationing and risk averse among ethnic minority groups.

The organisation of this paper is as follows: Section 2 deals with literature review and hypothesis development of the research. Section 3, the data and methodology session, describes the data,

variables, and the method used in the study. The empirical results and discussions of the study is presented in session 4. Section 5 deals with the presentation of the endogeneity test and session 6 deals with robustness tests of the results. The final session presents the conclusion and the implications of the study and reported in session 7.

3.2. Theories and Hypothesis development

In this section, we discuss the information asymmetry and credit rationing theories. We then review the relevant studies concerning the issues of borrower discouragement and the extant literature on ethnic minority SMEs in relation to access to finance and borrower discouragement and constructed the hypothesis.

3.2.1. Information Asymmetry Theory

Akerlof (1970), first introduced the theory of information asymmetry. His main point was that, in many transactions, the vendor would choose the price of his products based on a number of market indicators. In this representation of the credit or the loan market, the buyer is privy to market averages for the loans (credit) he intends to purchase, while the seller has more detailed information about each individual loan product. The vendor gains an advantage and is able to offer below-average quality items, as suggested by (Akerlof, 1970). Given the shopper's lack of complete knowledge, the seller may respond by providing below-par products, which would ultimately cause the market to shrink (Waari & Mwangi, 2015). Under the premise of information asymmetry, one party to a transaction has important information while the other party(s) do not have. When one party to an agreement has the power to enforce or successfully punish for violations of particular sections of the agreement but the other party or parties do not, an

asymmetric information model may be useful. Asymmetric knowledge may lead to three separate consequences: adverse selection, moral hazard, and monitoring cost (Stiglitz & Weiss, 1981). It has been shown that informational discord raises transaction costs. For instance, attempts by a licensee to transfer technology from an inventor may occasionally result in higher costs for the licensee (Jensen & Thursby, 2001). This occurs because the creator may know important details about the innovation that are not included in the patent or contract. In cases of information asymmetry between a financial institution and an entrepreneur, both parties may resort to a number of strategies to close the gap. Leland & Pyle (1977) state that the entrepreneur has the option of using her or his own funds to start the firm. This is what is known as "signalling," or showing the financing institution that the entrepreneur is committed to the company for the long haul and that the firm is viable. The bank could choose for co-financing instead in other circumstances. However, Daniel and Willy's financial institutions have resorted to providing financial assurances, information booklets, and branding their lending facilities—all in an effort to lessen the knowledge gap. Both the supplier and the customer may benefit from relying on their own criteria when assessing the quality of a product, since this helps to narrow the knowledge gap between them (Waari & Mwangi, 2015). Stigler (1961) argues that consumers should consider a search for the product, experience, and credibility aspects before making a purchase decision. In addition, merchants might include indications centred on these characteristics to aid buyers' quest. Stigler elaborates on the three characteristics, noting that search qualities are those that can be used to evaluate a product before purchase, experience characteristics are those that can be used only after purchase, and credibility characteristics are hard to evaluate even after experiencing the product. Keeping this third quality in the minds of consumers takes more than just advertising and public relations activities. Stigler (1961) seems to be suggesting in this discussion that loyal clients are

simpler to deal with and should be prioritised above new ones. Perhaps this is why banks and other financial organisations value their regular clientele so highly. To further assist the assessment method by prospective businesses seeking financing, financial institutions are urged to establish credibility indicators that are recognisable by their clients (Waari & Mwangi, 2015).

Furthermore, financial institutions favour returning clients since doing business with them incurs lower transaction costs, as shown by the research of Reichheld & Sasser (1990). As a result of this quality, there is far less of an information gap between the business and the client. They maintain the implication that service providers should have in-house competencies and resources that vary with the nature of the services they provide. The sourcing of external funds by SMEs best reflects the three effects of the asymmetric information syndrome on the financial or, more specifically, the credit market. In order to achieve their goals, most SMEs must rely on finance from outside sources. Borrowed resources are subject to terms and conditions that all involved parties must fulfil before the transaction can go through. Each side of this financial deal must provide the other all the information they need to make an informed decision. It is irrelevant whether or not both parties share symmetric knowledge. Asymmetric information is a reality, whereas symmetric information remains in the realm of theory, as shown by many real-world instances in both domestic and international finance (Waari & Mwangi, 2015).

As discussed above, in trading contexts where one side possesses more knowledge than the other, information asymmetries occur (Sewaid et al., 2021). This asymmetry may result in market failures, when exchange transactions either do not occur or are inefficient (Akerlof, 1970). Financing new product development exacerbates the asymmetric information problem (Lerner & Hall, 2010). Signalling theory provides a potential remedy for information asymmetry (Spence, 1973). In the case of crowdfunding, potential investors generally have poor and partial knowledge

on the quality of a venture, the product or the credibility of the entrepreneur (Sewaid et al., 2021). To mitigate this issue, the entrepreneur sends signals to share information about the prospect of the start-up, so mitigating a portion of the negative consequences of information asymmetries (Sewaid et al., 2021). Several signals have been demonstrated to credibly reveal information to backers, thereby enhancing crowdfunding performance which includes media usage (such as a video and images), the entrepreneur's experience (previously successful crowdfunding campaigns), and a product prototype (Anglin et al., 2018). Given the limited information accessible to potential investors, they may value signals that they can use to infer information about the quality of the venture, such as rhetorical signals that have been found to be highly associated with campaign performance (Anglin et al., 2018).

3.2.2. Credit Rationing Theory

The majority of financial institutions are private organizations whose goal is to maximize profit (Keiding, 2013; Reichheld & Sasser, 1990; Waari & Mwangi, 2015). Contrary to this purpose, not all applicants for finance are approved. As a result, the pricing mechanism is unable to balance the loan market. Even if someone is willing to pay high-interest rates arbitrarily, credit may still be refused. According to De Meza & Webb (1987), the credit market is different from a traditional one, where supply and demand are equal, because borrowers who are willing to accept higher interest rates may have trouble making their repayments. An instance of credit rationing is when there is an excessive demand for commercial loans at the market rate for commercial loans (Mostafa & Boregowda, 2014; Stiglitz & Weiss, 1981). They also distinguish between two forms of credit rationing: One, pure credit rationing, which occurs when certain people get loans but others who have the same qualities do not. The same people are competing under the same credit

and non-credit parameters, and two, redlining, which is a situation where some people cannot get a certain amount of credit at any interest rate until the amount of credit available increases. According to Hodgman (1960), the borrower would be unable to repay the loan because of the higher interest rates. In other words, the borrowing costs would be greater than the return on investment. A borrower who requests credit when interest rates are higher may not get it because of the cost of the loan. This theory was eventually disproved when Stiglitz & Weiss (1981) developed a more convincing argument linking credit rationing to the information asymmetry among market participants. In accordance with Stiglitz & Weiss (1981) hypothesis, credit rationing starts when financial institutions recognize that their anticipated returns are lower than predicted. The following elements or causes cause the anticipated returns and interest rates to have a non-monotonic relationship. First, when interest rates are unable to distinguish between good and bad borrowers, an unfavourable selection bias occurs. Those are the borrowers who can assess their projects and stick to safer project parameters. When loan rates go above the anticipated returns, the borrowers with safer projects are meant to leave the market. The lending company views candidates who choose higher interest rates as being riskier. Second, an adverse incentive impact occurs. Stiglitz & Weiss (1981) contend that a rise in interest rates encourages borrowers to choose riskier projects, putting the financial anticipated profits of the institutions at risk or increasing the likelihood that their portfolio may include bad loans.

Sometimes credit restrictions are done on purpose to protect financial institutions from known hazards. Even if the borrowers who need finance are willing to pay higher interest rates, institutions may elect to limit credit in situations where they are unable to minimize hazards that may occur owing to the application of free market principles (Waari & Mwangi, 2015). Due to the inability of the pricing mechanism to achieve market equilibrium, it demonstrates a flawed market. The

lack of equilibrium in spite of willing borrowers is referred to as the flaw. In other words, demand exceeds supply at the current market interest rate, but lenders are unwilling to either lend additional money or increase the interest rate charged since they are already maximizing earnings. In a situation like this, SMEs that are not sure of the prospect of their loan application are more likely to be discouraged from applying for loan outrightly.

3.2.3. Discouraged Borrower

Although there has been a relatively wider literature on the credit access to SMEs, as at yet, literature on this group, discouraged borrowers, has been relatively skimpy. Meanwhile, evidence suggests that discouraged borrowers constitute a relatively small proportion of firms in the SME sector, but they constitute a proportion worthy of attention by academic researchers. Previous studies show that a large proportion of firms that are discouraged with regards to loan application are more than those that applied but were unable to secure (Freel et al., 2012). Discouraged borrowers may be classified as constituting approximately 8.1% of all SMEs in the UK in 2005 (Freel et al., 2012).

Determinants of Borrower discouragement should be a very important topic of interest in academic study. This is because the theory proposed by Kon & Storey (2003) on borrower discouragement is based on the existence of information asymmetry in terms of unobservable quality of the borrower (Brown et al., 2018; Han et al., 2009). Unlike in the state of perfect information, where every creditworthy borrower (also called good borrower) will have their application granted, it is not so in the case of imperfect information. Here, under imperfect information, the cost of capital may be higher than the return on capital which may be difficult to cover the borrowing cost (Brown et al., 2018). It is also explained that imperfect information exists where good borrowers refuse to

apply for credit for fear of being rejected even if they stand the chance of receiving the amount they would have applied for (Brown et al., 2018).

Borrower discouragement may arise from the perception of SMEs towards lending restriction from certain economic uncertainties related to sudden global or national event such as global credit crunch (Lee et al., 2015) and UK's Brexit (Brown et al., 2018). Again, other determinants that may trigger borrower discouragement include but not limited to debt finance (Lee & Brown, 2017), and time constraints in completing application documentations (Parker, 2002).

Literature has explained the concept of borrower discouragement in a variety of ways. Kon & Storey (2003) explained discouraged borrower as a good firm that needs finance but took the option not to apply for a loan from the bank because of the perception that the bank will reject its application. This is the definition that is widely accepted of which most authors derived their definitions from (Brown et al., 2018). It is argued that this definition limits discouraged borrowers to those SMEs that borrow from the bank (Brown et al., 2018). According to Brown et al. (2018), borrower discouragement definition of Kon and Storey fails to address the underlying causal factors that influence the discouragements. They argue that these causal factors are likely to be heterogeneous. The issues surrounding the decision of entrepreneurs to seek external funding is likely to be influenced by factors such as experience in borrowing, personal rating experience, personal wealth, degree of risk, personal credit ratings, personal contacts and social relations (Avery et al., 1998).

In view of this, existing literature has extended Kon & Storey (2003) description of discouraged borrowers to include firms that had need for finance but do not apply for some reasons (Rostamkalaei et al., 2020). For instance Xiang et al. (2015) explained discouraged borrowers to

include those SMEs that are discouraged from seeking debt financing as well as equity financing. Evidence suggests that there may be a variety of reasons why firms do not apply for loan beside the fear of being rejected (Rostamkalaei et al., 2020). Accordingly, the data of Small and Medium-Size Enterprise Finance Monitor in the UK for example shows that firm owners and managers gave reasons such as fear of rejection, informal turndown, high expected costs, hard expected conditions, avoiding hassle or lack of knowledge & time constraints and other reasons. This suggests that there may be several other reasons for the discouragement (Rostamkalaei, 2017). For instance, previous study suggests that discouraged borrowers are relatively engaged in riskier projects compared with their counterpart that apply for credit (Cole & Sokolyk, 2016; Cowling et al., 2016; Ferrando et al., 2015) which could be a major reason for being discouraged. This means that firm owners and managers who are operating in highly risk-scored businesses, have a higher tendency of being discouraged from applying for credit (Rostamkalaei et al., 2020).

This assumption agrees with the data from the survey of Longitudinal Small and Medium-Size Business Survey in UK which include unwillingness to take on additional risk as one of the main reasons for being discouraged. Aside fear of rejection being a reason for discouragement, SMEs might want to avoid additional risk of borrowing from the bank. Arguably, the characteristics of these SMEs are not likely to differ from those categories in the previous studies and so their analysis is expected to exhibit similar results with the existing literature.

Meanwhile, borrower discouragement dwells on the notion that, the decision as to whether to access external finance or not by entrepreneurs is unpredictable (McMullen & Shepherd, 2006). Therefore, it is necessary to understand borrower characteristics, behaviours, and cognitive factors that determine firms' decision making toward accessing funds (Brown et al., 2018). This suggests that some factors have a greater influence on some type of entrepreneurs than others and that,

discouragement may be considered from many different features and perspectives of individual entrepreneurs. The decision-making process of applying for credit is likely to be highly differentiated across SMEs (Neville et al., 2018).

In summary, research suggests that the concept of borrower discouragement takes its root from a host of complicated and interrelated determinants among SMEs (Freel et al., 2012). Brown et al. (2018) argues that, though borrowing is heterogeneous, there exist ambiguity in the definition of borrower discouragement in terms of the precise nature of the fundamental determinants of discouragement. The concentration of Kon & Storey (2003) definition stated three forms of application cost to firms: one, financial cost, including lack of or incomplete credit history, and huge additional required information cost; two, in-kind costs, which include more extra time required to complete the application process and liaising with the bank; and three, psychic costs, which has to do with the inconvenience of entrepreneurs to give full information about themselves to third party (Brown et al., 2018).

3.2.4. Ethnic Minority SMEs

There seem to be substantial number of businesses owned or managed by people from the Minority Ethnic Group. In the UK, the ethnic minority SMEs constitute about 14% of the total number of SMEs. Besides, like other SMEs, ethnic minority businesses contribute significantly to the socio-economic development of the country. For instance, in the UK, businesses owned by the ethnic minority provide between 6% to 7% of the total contributions of SMEs towards Gross Value Added (GVA) (Carter et al., 2015). Additionally, the impact of ethnic minority firms towards the revival of the declining sectors of the economy is quite substantial (Carter et al., 2015). However, Carter et al. (2015) enumerated challenges that these ethnic minority businesses might experience

in assessing external finance. Firstly, a key barrier to access finance by minority ethnic group entrepreneurs is discrimination. There has been a longstanding perception that ethnic minorities are likely to experience unequal treatment in their quest to access finance. Secondly, evident suggests that the refusal rate of banks for ethnic minority firm owners in their application is likely to be high due to the fact that they have higher likelihood of missing their repayment date (Fraser, 2009).

Moreover, SMEs owned by the ethnic minorities might be operating in an imperfect market and the financial institutions need to ensure that any form of information asymmetry existing between the bank and the firm is eliminated or highly reduced (Cowling et al., 2012). As a result, the banks create strict criteria to reduce risks which are mostly affected by the ethnic minority SMEs. Thus, they are more likely to be discouraged due to the difficulties they might experience in assessing finance (Berger & Udell, 1998). Therefore, based on the above discussion, we propose the following hypotheses:

> **H1**. *Ethnic minority SMEs have higher likelihood of being discouraged due to their own perception that their application would be rejected.*

3.3. Data and Methodology

3.3.1. Overview of survey method

Prior to conducting the 2020 survey, a thorough review of the questionnaire was conducted through discussions with relevant parties. As a result, several changes were made, including the addition and removal of questions from previous surveys. The necessity to strike a balance between the emergent needs of stakeholders, in particular in light of the coronavirus (COVID-19) pandemic,

and the desire to exploit the longitudinal power of the survey informed the modifications. After the discussion, a 'live' pilot of 50 interviews using the revised sixth-grade survey was conducted. To date, 11,002 'panel' interviews have been conducted, with 9,378 (85%) of those participants agreeing to a second interview. It was desired that as many of these panellists be interviewed again as possible. During the period of September 2020–April 2021, 4,764 individuals were questioned (a response rate of 51%; down from 53% in 2019 and 68% in 2018). 1,264 of these were non-employers, 14 were large employers with 250+ workers, and 3,486 were small and medium-sized businesses. Additionally, 4,830 businesses that were previously interviewed between 2015 and 2018 but not in 2019 may be re-contacted for an interview this year (they had given permission for re-interview and had not refused to take part between 2015 and 2018 and had not ceased trading). Of these, 424 were small and medium sized businesses and 3 were large with 250+ employees, for a response rate of 13% (down from 21% in 2019). The term "past panel" describes this set of people.

Top-up interviews

There were also 2,255 follow-up interviews (1,687 of which were SME employers). Therefore, out of a total sample size of 7,636, 5,597 were small and medium-sized enterprises (SMEs) in the 2020 survey: The supplementary samples followed the same sampling procedures as the original surveys conducted between 2015 and 2019:

- the sample was stratified by region within each of the four UK nations. Enterprise employment size targets were set, and within those targets, businesses employing between five and 249 people were significantly over-represented compared to their actual numbers in the business population.

- The IDBR (Inter Departmental Business Register) was used as a source for the sample because it contains information on legally operating businesses.
- Experian, a commercial database provider, was used to find information on unincorporated businesses with no employees.
- As the IDBR is a record of all UK enterprises that pay VAT or PAYE and contains around 2.65 million unique entries for enterprises, these contacts were filtered out if they had employees on the payroll or paid VAT. According to the BEIS Business Population Estimates (BPE) report, there are approximately 6 million businesses in the United Kingdom. Estimates of the number of unregistered businesses that do not pay VAT or PAYE are derived from the Labor Force Survey, which explains the discrepancy (LFS).
- The targets within the sample stratification matrix were based on the most up-to-date information at the time, which was the 2019 Business Population Estimates (BPE). This is why a separate database was kept as the source for supplemental businesses with no employees; it contains records for both registered and unregistered businesses. The results of the survey, however, were adjusted to account for the 2020 BPE2, which became available at the end of the field season. As well as more accurately reflecting the IDBR contacts used in the survey, the 2020 BPE also provides a more up-to-date picture of UK small businesses, so it was used for weighting.
- The 2019 BPE was used to inform the development of a 336-cell sample stratification matrix and the subsequent development of targets within each cell. In brief, these cells consisted of the following:
    - 14 '1-digit' SIC 2007 categories (ABDE, C,F,G,H,I,J,IL,M,N,P,Q,R,S),

- Multiplied by six size categories (unregistered zero employees, registered zero employees, 1-4 employees, 5-9 employees, 10-49 employees, 50-249 employees) = 84
- Multiplied by four nations (England, Scotland, Wales, Northern Ireland) = 336

Once the sample was drawn, it did not use quotas based on size, sector, or any other criteria except for country, where Northern Ireland was boosted above its actual proportion in the business population (based on experience from 2015-2019 surveys).

3.3.2. Data

We used the most recent and up-to-date Longitudinal Small Business Survey's (LSBS) panel dataset compiled by the Department for Business, Energy, and Industrial Strategy (BEIS). The LSBS is a large-scale telephone survey in which small business owners and managers in the United Kingdom are interviewed. To create our dataset, we used a variety of sample selection strategies. First, to qualify for the LSBS interview, the SME had to have fewer than 250 employees across all sites of the business. Firms that did not have a value for the number of employees and those that had increased employees beyond 249 during the survey period between 2015 and 2020 were omitted from the dataset. Second, to adjust for short panel bias, SME had to have at least three years of consecutive data between 2015 and 2020. We chose this time period to fill the most recent data gap. Our final sample is made up of an unbalanced panel of 3,296 SMEs from across UK based on the selection criteria adopted. The survivorship bias problem was controlled for using these unbalanced panel data.

3.3.3. Variables

Table 1 provides detail definitions of variables used in the model. Our response variable is whether the firm is a discouraged borrower or not. We employ a dummy variable for the response to the question: "*Have you decided not to apply for a loan because you expect a bank rejection, or you do not want to add on additional risk, or some other reasons*?". We coded the responses with the value 1 if the answer is "yes" and 0 if the answer is "no". The main explanatory variable is ethnic minority. We used the survey of the LSBS to identify firms that responded that their owners are from the minority ethnic group. The other variables included in the study are female, family, size, age, growth, export, status, industry, turnover, and profit.

[Table 1 about here]

3.3.3.1. Discouraged Borrowers

Previous research has shown that there are some differences in the definition of a discouraged borrower, based on the answers SMEs give as reasons for the discouragement. For example, some studies describe discouraged borrowers as small businesses rationing themselves for fear of being turned down (Cole & Sokolyk, 2016; Freel et al., 2012; Mac an Bhaird et al., 2016; Tang et al., 2017). Other definitions included the fact that, it was not the right time to borrower or the banks were not lending, application cost, bank screening errors and interest rate (Cowling et al., 2016; Gama et al., 2017; Rostamkalaei, 2017). In a study conducted by Chakravarty & Xiang (2013), they defined borrower discouragement to include reasons such as complex lending procedures, high interest rates, collateral required, and corruption in lending. In our study, we adopt the definition of Kon & Storey (2003). By this definition, a discouraged borrower is an SME who does not apply for a loan because they perceive their application will be rejected. We exclude SMEs

who reported that they had no need for external finance. Discouraged borrowers are measured as a binary with a value of 1 if the SME is discouraged and 0 otherwise. This group of SMEs is described in our sample as *discouraged borrower 1* representing 8.2% of the sample. See Figure 1 for the frequency distribution graph of discouraged borrower 1 in our sample. The study further considers another group of SMEs that are discouraged due to the fact that they are not willing to take on additional risk – *discouraged borrower 2*. As this reason seems to be a key factor for discouragement in the dataset, reporting 6.7% of the sample, the study seeks to identify how discouragement due to risk aversion differs from that of fear of rejection. The pictorial presentation of the distribution of *discouraged borrower 2* between 2015 to 2020 is presented in Figure 2.

3.3.3.2. Ethnic Minority

The main explanatory variable for the study is ethnic minority-owned SMEs. Ethnic minority refers to a demographic group that is much smaller than the population's main ethnically identified group (Isik et al., 2018). In the UK, number of businesses owned by the ethnic minority are significant in proportion to the total businesses. The current data shows that 14.5% of the SMEs in the sample are owned by the ethnic minority. We measure, ethnic minority as a dummy variable taking the value of 1 if the SMEs is owned by the ethnic minority and 0 otherwise. See Figure 3 for the frequency distribution graph of ethnic minority SMEs in our sample from 2015 to 2020.

3.3.3.3. Control variables

Based on the literature, the control variables used for the study include firm size, firm age, female, family, growth, export, status, industry, turnover, and profit.

Gender appears to be a great factor in estimating borrower discouragement. In terms of loan application, there seem to be high rate of female owned firms exhibiting discouragement than their

male counterpart (Freel et al., 2012). This suggests that female entrepreneurs may not approach banks for financing for various reasons. These may include self-ration, unwillingness to take on risk, lack of self-confidence, and the perceptions that they could control their own business (Freel et al., 2012). *Female* is defined as a dummy variable measured by 1 if more than 50% of the share of the firm is owned by female and 0 otherwise.

Family businesses seem to have several sources of finance for their operations other than bank loan. For instance, family-owned firms might seek finance from family savings and loans for their businesses, pool of personal resources through contributions or plough back benefits from the family business (Puiu et al., 2022). Besides, it is argued that family firms have higher level of indebtedness with limited capital making them susceptible to apply for loan from bank. In the study by Freel et al. (2012) they argued that family firms are likely to seek finance based on the fact that, they are financially impoverished. They suggested that family firms may be less discouraged due to the fact that, family members are mutually liable to the debts of the business and as such have high confidence to seek external finance. Finally, the longstanding relationship built with the bank are likely to increase their propensity to approach financial institutions for finance. Consequently, family businesses are conservative and pessimistic (Freel et al., 2012). As a result, it is expected that family-owned firms might exhibit lower likelihood of discouragement compared with non-family business (Cole & Sokolyk, 2016; Cowling et al., 2016). *Family* business is defined as dummy variable measure by 1 if the majority share of the firm is owned by members of the same family and 0, otherwise.

Age of small and medium-sized enterprises play a significant role in their confidence to approach banks for external finance. Entrepreneurs that operate older SMEs are less likely to be discouraged borrowers (Cowling et al., 2016; Mac an Bhaird et al., 2016; Rostamkalaei, 2017). Given this, Han

et al. (2009) suggest that entrepreneurs of younger firms are more likely to exhibit borrower discouragement irrespective of their geographical location (Chakravarty & Xiang, 2013; Mac an Bhaird et al., 2016). Additionally, a research in UK suggests that, generally, younger firms are more likely to be discouraged (Cowling et al., 2016). According to study by Freel et al. (2012), the propensity of the firm becoming discouraged reduces as the firm grows. They argue that, since the bank design their loan requirement to deal with impending risk and availability of appropriate collaterals, older firms are likely to meet the conditions in terms of experience and availability of information compared with younger firms. *Age* refers to the number of years since the firm was established. Age is given by LSBS as categorical variable (up to 5 years, 6-10 years, 11-20 years, more than 20 years). However, for the purpose of this study, age is measured by as a dummy variable which takes the value of 1 if the firm has been in operation for more than 20 years, and 0, otherwise.

The size of SMEs contributes immensely to the trust of financial institutions when it comes to approving external finance. Financial institutions will want to give loans to firms and expect that they will be able to pay both the principal and interest at the stipulated date and time. They will therefore want to give credit to firms they trust. However, research suggests that, there is lack of trust for smaller SMEs by the banks compared with the trust for larger firms (Lee & Brown, 2017). They trust that smaller firms lack the capacity to pay back and feels reluctant to grant their loan applications and so the firms are discouraged from approaching the banks. Furthermore, it is argued that, as a result of the existence of information asymmetry, bank tend to grant loans to firms that have a good relationship with them most especially since they are not able to distinguish between good and bad firm (Cowling et al., 2016). According to Tang et al. (2017), firm's trust in bank manager influences borrower discouragement and that, firms with a high level of trust in their

banks are less likely to be discouraged (Tang et al., 2017). Owners and Managers of SMEs exhibit different reactions toward borrowing which is influenced by the size of the firm they operate. Literature from previous studies show that entrepreneurs that operate larger firms are less likely to be discouraged borrowers (Cowling et al., 2016; Mac an Bhaird et al., 2016; Rostamkalaei, 2017). Given this, Han et al. (2009) suggest that entrepreneurs of smaller firms are more likely to exhibit borrower discouragement irrespective of their geographical location (Chakravarty & Xiang, 2013; Mac an Bhaird et al., 2016). Again, it is expected that the smallest firms with little or no information about their creditworthiness have greater tendencies of being discouraged (Berger & Udell, 1998). Thus, discouraged borrower are predominantly small businesses owned by more experienced entrepreneurs. According to Cowling et al. (2016), generally, discouraged borrowers are small businesses being inflicted by self-rationing. However, experience play significant role in borrower discouragement and as such Cowling et al. (2016) argues that discouraged borrowers are the most experienced entrepreneurs compared with their counterpart that applied and successfully secured credit facilities. *Size* is measured by number of employees (up to 249 employees) on the firm's payroll and in all cites of the business.

Sales turnover and profit play significant role in determining the decision of the firm to seek external finance. Interestingly, empirical evidence suggests that the decision of SMEs who make profit appear to experience lesser interest in using external finance and thus rely on their internal sources of finance. In general, firm performance is a key indicator of creditworthiness, however, Xiang et al. (2015) argues that firms that ascertain good profit and increased turnover are likely to be discouraged. Thus, since profitability measures the extent to which SMEs will seek external finance, firms with the capacity to obtain positive profit have higher likelihood of being discouraged from applying (Cowling et al. 2016). *Turnover* is a categorical variable measured as

1, if SME reported increase in turnover, 2, if SME's turnover stayed same, and 3, if SME recorded decrease in turnover compared with the previous 12 months. *Profit* is a dummy variable and takes the value of 1 if the firm generated profit or surplus in the last 12 months, and 0 otherwise.

Growth is defined as a dummy variable equals 1 if the firm aim to grow sales in the next 3 years, and 0, otherwise. *Export* is defined as a binary variable equal to 1 if the SME sold to oversees market in the previous year and 0 otherwise. *Status* refers to the legal status of the SME. *Status* is a categorical variable measured by 1 if the SME is a sole proprietorship business, 2, if the SME is a limited liability company, 3, if the SME is a partnership business, and 4 if the SME operates in other form of business. industry is measured by single owned SMEs and Production and Construction. *Industry* represents the sector in which the SME operates. *Industry* is a categorical variable which takes the value of 1, if the SME operates in the product & construction sector, 2, if the SME operates in the transport, retail, food service, or accommodation sector, 3, if the SME operates in business service, and 4 if the SME operates in other services.

3.3.4. Descriptive statistics

Table 2 reports the descriptive statistics for the variables used in the analysis showing the means and standard deviations. The table shows that on average, SMEs that are discouraged for fear of rejection represent 8.2% while risk averse SMEs represent 6.7% of the sample. The table also shows that 14.5% of the sample are owners from the *ethnic minority*. Moreover, while large majority of firms are owned by members of the same *family* (70.2%), 18% are owned by females. Firm *size* shows an average of 19 employees and 51% of the sample have been in operation for more than 20 years. Additionally, on the aspirations of the firm, 72.5% of SMEs aim to *grow* their business in the next three years while 12.8% aim to *export*. Again, *status* shows a mean value of

3.149 and a standard deviation of 1.027. The mean value of *industry* is 2.497 and the standard deviation is 1.028. *Turnover* shows a mean value of 2.008 and standard deviation of 0.886. Finally, the table reveals that 82% of SMEs in the sample recorded *profit* or surplus in the past 12 months. The data seems to reflect SMEs' characteristics suggested in previous studies. According to Cowling et al., (2016), 'typical' firms in UK are likely to be firms located in the urban centre, owned by a family and have decreasing rate of sales in the past years. They also disclosed that averaged firms are owned by white males and have experience in operating a business in the previous years.

[Table 2 about here]

3.3.5. Correlation

Table 3 shows the correlations between all variables used in the regression analysis to perform a preliminary check for multicollinearity. A correlation of 0.7 or higher in absolute value indicates a multicollinearity problem (D'Souza et al., 2017). As illustrated in Table 3, none of the correlation coefficients have an absolute value of 0.7 or higher, indicating that multicollinearity is not a problem (Gujarati et al., 2012).

[

Table 3 about here]

3.3.6. Method

The methodological approach used in the analysis consists of estimating longitudinal probit regression model. This model is suitable for the binary nature of the our dependant variables (Rostamkalaei et al., 2020). The underlying interest is the relationship existing between discouraged borrower and ethnic minority-owned SMEs in the UK. The borrower discouragement is determined considering the detailed account of information on SMEs as presented in LSBS panel data ranging from basic demographic orientation, business orientation and business models. The dependent variables are constructed through observation of the panel data to help trace the dynamics of borrower discouragement. The variables were selected based on existing literature (for example Brown et al., 2018; Gama et al., 2017; Rostamkalaei et al., 2020) and analysis of dataset used for the study (LSBS 2015-2020). Only SMEs with three or more consecutive observations between 2015 and 2020 are considered.

A probit regression model was employed to explore the phenomenon of borrower discouragement among the minority ethnic group. Using a six-year panel data, the study investigates how ethnic minority influences borrower discouragement. This was done using the model below:

$$DB_{it} = f(meg\text{-}led_{it}, + \ control\ factors_{it})$$

Where *DB* is a binary variable indicating whether the firm had a need for finance but did not apply for various reasons, *t* is the period (2015-2020), and *i* is the firm. As a dummy variable, *DB* takes the value of one if the firm *i* in period *t* is discouraged and zero, otherwise. *meg-led* represent ethnic minority, a dummy variable which takes the value of 1 if firm *i* in period *t* is owned by people from the ethnic minority, and 0, otherwise. *Control variables* include a set of independent variables explaining discouragement among SMEs and are defined in Table 1. The primary hypothesis is that being a member of the minority ethnic group, all other things being equal, they are likely to experience discouragement in terms of applying for finance.

3.4. Results and Discussion

In this section we discuss the determinants of discouraged borrowers with emphases of the relationship between ethnic minority and borrower discouragement. We estimate the model using probit regression. The dependent variables used in the models are discouraged borrowers. The binary nature of these variables make probit model appropriate for the estimation (Cowling et al., 2016). The sample of SMEs in the data that require finance were randomly sampled and does not represent the total population which might lead to selection bias. Heckman's selection model was employed to correct this selection bias (Heckman, 1979) by using the HECKPROB technique in STATA. The likelihood ratio test does not reject the assumption of the presence of selection bias making the approach relevant. Since probit regression model is sensitive to higher correlation among independent variables, correlation matrix was used to test for multi-collinearity. There is no bivariate correlation above 0.3.

Table 4 presents the empirical results of the probit regression estimate. First, we estimate the impact of ethnic minority SMEs on borrower discouragement resulting from fear of being rejected. This is reported in column 1 of

Table 4. The results show significantly positive coefficient estimate for ethnic minority. The coefficient for the regression is 0.592 suggesting that a unit increase in ethnic minority SME is likely to increase borrower discouragement for fear of rejection by 0.592. We argue that ethnic minority SMEs appear vulnerable to loan rejections which could discourage them from applying. Additionally, the result supports prior studies that ethnic minority SMEs could be exposed to issues such as risk factors, discrimination, opaqueness of information, smaller firm size, and collateralisation issues (Cowling et al., 2012; Berger & Udell, 1998). Moreover, these firms might be experiencing self-credit rationing due to the fact that they perceive their application to be refused if they apply. Meanwhile they could have received what they applied for if they did apply (Cole & Sokolyk, 2016).

Second, the study considers a significant borrower discouragement resulting from the SMEs not willing to take on additional risk. The regression estimate reported in

Table 4, column 2 shows a positive association between discouraged borrower 2 and ethnic minority SMEs. The result is statistically significant at 1% with a co-efficient estimate of 0.645 suggesting that a unit increase in ethnic minority SMEs is likely to increase risk-averse discouraged borrowers by 0.645.

Consequently, the results from the regression estimates are similar which suggests that ethnic minority SMEs are not only likely to be discouraged for fear of rejection but are even more likely to be discouraged because they are not willing to add loans to their risk portfolios. Our results are robust and to the best of our knowledge, this is the first time as such a study is conducted in the literature.

Besides, the regression estimates for the control variables reveals some interesting results. Though the directions of the coefficient estimates are similar, the significant levels defer in some of the variables. For instant, firm size shows a negative coefficient in both models, but it is only significant in model 2 at 10% and statistically not significant in model 1. Age is statistically significant at 10% in model 1 but not significant in model 2 and both coefficients are negative. Female exhibits a positive association, but while model 2 is statistically significant at 5% level, model 1 is not. With regards to family, the coefficients in both models are negative but only model 1 is significant at 5% level. The variable export shows a positive association in both models but significant at 10% level in model 2 and not significant in model 1. Finally, the result shows that the coefficient of turnover is negative but while it is significant in model 1, it is not significant in model 2.

Furthermore, the estimates of the control variables support the results as suggested in previous studies. For example, literature argues that female entrepreneurs appear to be highly discriminated against by the financial institutions (Bardasi et al., 2011; Bouzekraoui &

Ferhane, 2017) and are more likely to be discouraged due to disproportionate structural characteristics (Freel et al., 2012). This is confirmed in this study though model 1 is not significant. With regards to family ownership, prior studies suggest contrasting views on the relationship with borrower discouragement. While some studies suggest lower likelihood of discouragement (Chakravarty & Xiang, 2013; Cole & Sokolyk, 2016; Cowling et al., 2016; Freel et al., 2012), others suggest that family firms are more likely to be discouraged from borrowing (Brown et al., 2018; Han et al., 2009). Besides, the result of the current study shows a negative association between discouragement and family-owned SMEs. This confirms the earlier claim that family-owned firms are less likely to be discouraged from seeking credit. The finding could be due to the fact that family firms might rely on loan from family members and friends, and other informal financing sources including pool of family resources, family savings, family contributions or plough back benefit of the family business.

Firm Age and Size play significant role in the level of discouragement. Both age and size have negative association with borrower discouragement. This suggests that older and larger firms are likely to be able to have enough resources such as collaterals and access to information to meet the application requirements. These resources could serve as a motivation factor and thus may apply when they have a need for finance.

On the future intentions of the firms, growth and export are positively associated with borrower discouragement. Thus, while SMEs that aim to grow are more likely to be discouraged in both ways, those that aim to export are more likely to be discouraged if they are not willing to add on additional risk.

In estimating firm performance, the results shows that turnover is negatively associated with borrower discouragement. However, the coefficient estimate of turnover is statistically significant with only discouragement for fear of rejection. Additionally, profit shows a negative association with borrower discouragement and statistically significant. This suggests that firm with positive profit is less likely to be discouraged. Thus, we argue that profitable SMEs are likely to exhibit credit worthiness and might apply for finance if they require.

[

Table 4 about here]

3.5. Endogeneity Test: Propensity Score Matching (PSM)

The purpose of Propensity Score Matching (PSM) is to account for the fact that SMEs' self-rationing decisions are not random (Al Guindy, 2021) but may be influenced by a firm's financing choices or observable characteristics. For example, SMEs owned by minority ethnic groups may use non-traditional financing sources rather than borrow from a bank. Asymptotic biases caused by endogeneity or self-selection can be mitigated by matching (Roberts & Whited, 2013). As a result, matching can be used in the regression-based analysis as a robustness test. PSM may not completely solve endogeneity and self-selection problems. However, it can at least address endogeneity issues associated with functional form misspecification (Shipman et al., 2017).

The treatment and control groups are matched based on a propensity score measured from the SME's observable characteristics. According to Al Guindy (2021), the propensity score match is implemented as follows: First, we estimate the propensity scores using the probit model, which uses the control variables described in section 3.2 as independent variables. The model compares Ethnic minority SMEs to non-ethnic minority firms in this case. This method compares two similarly likely SMEs (with a comparable propensity) to apply for finance. However, one is owned by a person from an ethnic minority group, and the other is not from an ethnic minority group. As a result, the firm's level of discouragement can be isolated after accounting for the likelihood of various SMEs belonging to the ethnic minority. Finally, we matched Ethnic minority SMEs in their immediate surroundings with one, four, or eight non-ethnic minority SMEs.

The average treatment effect (ATE) of the population for ethnic minority SMEs are reported in Table 5. In our estimates, ATEs are statistically significant at 1%. After controlling for differences between SMEs, the treatment effect (i.e., ethnic minority) is positively associated with borrower discouragement. Thus, the outcome is consistent with our baseline results.

[Table 5 about here]

3.6. Robustness

Several robust tests were performed in this section to ensure the consistency of the regression estimates. Even after accounting for potential endogeneity issues, our empirical analysis thus far strongly supports our hypothesis that ethnic minority firms are more likely to discouraged borrower for fear of rejection and not willing to add on additional risk. However, we performed several robustness checks to rule out the possibility that other factors in the model are driving the positive relationship between ethnic minority and borrower discouragement. We used an alternative method (the GEE population average logit estimation) on the variables in our sample. The result is shown in

Table 6 with column 1 showing the result for discouraged borrower 1 and column 2 showing discouraged borrower 2. The findings of our robustness test confirm a positive relationship between ethnic minority SMEs and discouraged borrowers, which are statistically significant at 1%.

3.7. Summary

SMEs owned by the ethnic minorities play crucial role in the economic wellbeing of United Kingdom. However, they experience challenges in their quest for external finance. These challenges have the tendency to influence them to be discouraged from accessing finance from external sources. This paper investigates the impact of ethnic minority SMEs on discouraged borrowers.

Using large dataset of individual firms from 2015 – 2020 conducted by Longitudinal Small Business Survey (LSBS), the current study finds that "fear of rejection" and "unwillingness to take on additional risk" accounted for 8.2% and 6.7% of the sample, respectively. Here discouraged borrowers are defined as SMEs that require external finance but do not apply for loan for reasons such as fear of being rejected (Kon & Storey, 2003) or not willing to take on additional risk.

After controlling for SME characteristics and other factors determining why they are discouraged from borrowing when they need external finance, we find that ethnic minority SMEs are not only discouraged due to fear of rejection (Gama et al., 2017) but also they are unwilling to take on additional risk. The analysis indicates that the dynamics of borrower discouragement in the two models are similar in terms of the likelihood of their discouragement. Our results show that, ethnic minority is positively associated with discouraged borrowers. This suggest that SMEs owned by

people from the ethnic minority are more likely to be discouraged from borrowing. They may have other alternative sources of finance to resolve their financial obligation, and this could be further investigated in the future.

In relation to other variables in the model, the findings show in a dynamic association between discourage borrowers and other variables. Firm age, according to Rostamkalaei et al. (2020), seem to have inconclusive relation with borrower discouragement. While in some studies, the researchers find no significant relation between age and discouragement (Chakravarty & Xiang, 2013; Freel et al., 2012), other researchers reported either negative effects (Cole & Sokolyk, 2016; Cowling et al., 2016; Ferrando et al., 2015) or positive effects (Han et al., 2009). However, in consistent with literature, this study shows that, age is negatively associated with discouraged borrower for fear of rejection. Firm size appears to be a key factor in determining the probability of borrower discouragement and the result significantly suggests that, relatively, larger firms are less likely to be discouraged. This study is consistent with literature (Cole & Sokolyk, 2016; Freel et al., 2012; Han et al., 2009; Rostamkalaei et al., 2020). Additionally, our results indicate that family-owned and growth-oriented SMEs are less likely to be discouraged borrowers. Interestingly, SMEs that plan to export are more likely to be discouraged because they do not want to add on additional risk. Finally, profit exhibit a negative association with borrower discouragement.

Limitation of the study included the need to investigate further other sources of finance for Ethnic minority SMEs if they are discouraged to borrow from the traditional sources of finance. Evidence suggest that finance is the fuel for every business that aim to grow and meet its operational investment cost. Therefore, SMEs need to access finance both internally and externally to ensure

continuity of business. Moreover, expansion and the need for more improvement of business activities require expansion in the strength of extra finance.

The implication is that, while discouraged borrower exist, there is the likelihood of negative implications for future growth and development (Mac an Bhaird et al., 2016). Recent evidence suggests that there is a higher negative implication on SMEs in the long run. According to Ferrando & Mulie (2022), using the survey of the European Central Bank, to conduct research on access to finance, found that investment growth for average discouraged borrowers was 4.7% lower than their non-discouraged counterpart. However, Cowling, Liu, & Zhang, (2016) find that about 55% of discouraged borrowers would have received their requests if they applied. Cole & Sokolyk, (2016) also confirm that over 33% of discouraged borrowers would have obtained credit if they had applied (Cole & Sokolyk, 2016).

Another implication of the study is that borrower discouragement may lead to lower investment growth. In the UK economy it is reported that investment growth declined by £1.5 billion affecting job creation to decline, leading to a fall in economic growth, reducing profit margin for banks, and also lowering return on investment for firm owners (Cowling et al., 2016).

Consequently, recent research reveals that, borrower discouragement posits potential threat to the SME sector (Brown et al., 2018), and as such the effects on SMEs may be treacherously long-lasting (Mac an Bhaird et al., 2016) with the related hiccups which inhibits investment of firm owners and firm growth. Therefore, it is important for policymakers to consider borrower discouragement in their policy formulation with keen interest in the ethnic minority financing policies.

Appendix A

Table 1: Definition of variables

Variable	Definition	Original Source
Discouraged borrower 1	A dummy variable equals to 1 if SME is discouraged for fear of rejection otherwise 0	LSBS
Discouraged borrower 2	A dummy variable equal to 1 if SME is discouraged because it is not willing to add on additional risk	LSBS
Ethnic minority	Dummy variable equal to 1 if SME is owned by people from the ethnic minority group, and 0, otherwise. (LSBS data item 'MLED')	LSBS
Firm size	Total number of employees currently on payroll excluding owners and partners across all sites (0 to 249 employees) (LSBS data item'A2PSS1')	LSBS
Firm age	Dummy variable equal to 1 if SME has been operating for more than 20 years, and 0, otherwise (A6SUM, A6)	LSBS
female	Dummy variable equal to 1 if more than 50% of the SME is owned by women, and 0, otherwise. (LSBS data item 'WLED')	LSBS
family	Dummy variable equal to 1 if SME is majority owned by members of the same family, and 0 otherwise. (LSBS data item'A12')	LSBS
Export	Dummy variable equal to 1 if SME aims to sell to oversees in the next 3 years, otherwise 0	LSBS
Status	Categorical variable equal to 1 if SME is a sole proprietorship, 2, company, 3, partnership, and 4, others.	LSBS
Growth	Dummy variable equals 1 if SME aims to grow in the next 3 years and 0 otherwise	
turnover	Categorical variable equal 1 if SME increases turnover, 2 if turnover stay same, and 3 if SME decreases turnover compared to the previous year.	LSBS
profit	Dummy variable equal to 1 if SME generated profit or surplus in the previous year, and 0, otherwise (LSBS data item'P12')	LSBS

This table reports the detail definition of the variables used in the study. Source: Author's own elaboration based on the survey by LSBS

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Discouraged borrower 1	11310	0.082	0.274	0	1
Discouraged borrower 2	11310	0.067	0.250	0	1
Ethnic minority	11310	0.145	0.352	0	1
Female	11310	0.180	0.385	0	1
Family	11310	0.702	0.346	0	1
Size	11298	18.693	33.575	0	245
Age	11298	0.510	0.500	0	1
Growth	11310	0.725	0.447	0	1
Export	11206	0.128	0.334	0	1
Status	11271	3.149	1.027	1	4
Industry	11310	2.497	1.028	1	4
Turnover	11310	2.008	0.886	1	3
Profit	11310	0.821	0.383	0	1

This table reports descriptive statistics of the variables. The full sample consists of 11,310 observations of UK SMEs in 2015-2020 with required data in our regressions. Detail definition of the variables are provided in Table 1*. Source: Author's own elaboration based on the survey by LSBS*

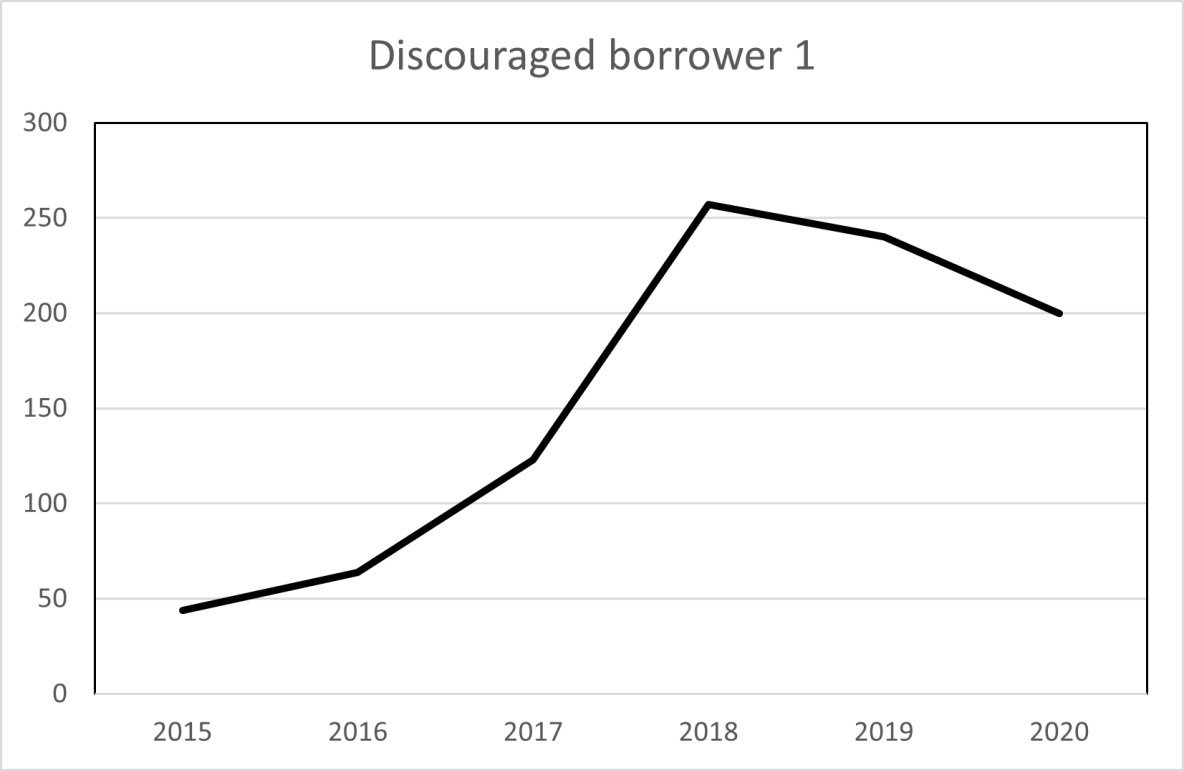

Figure 1: Frequency distribution graph for discouraged borrower 1

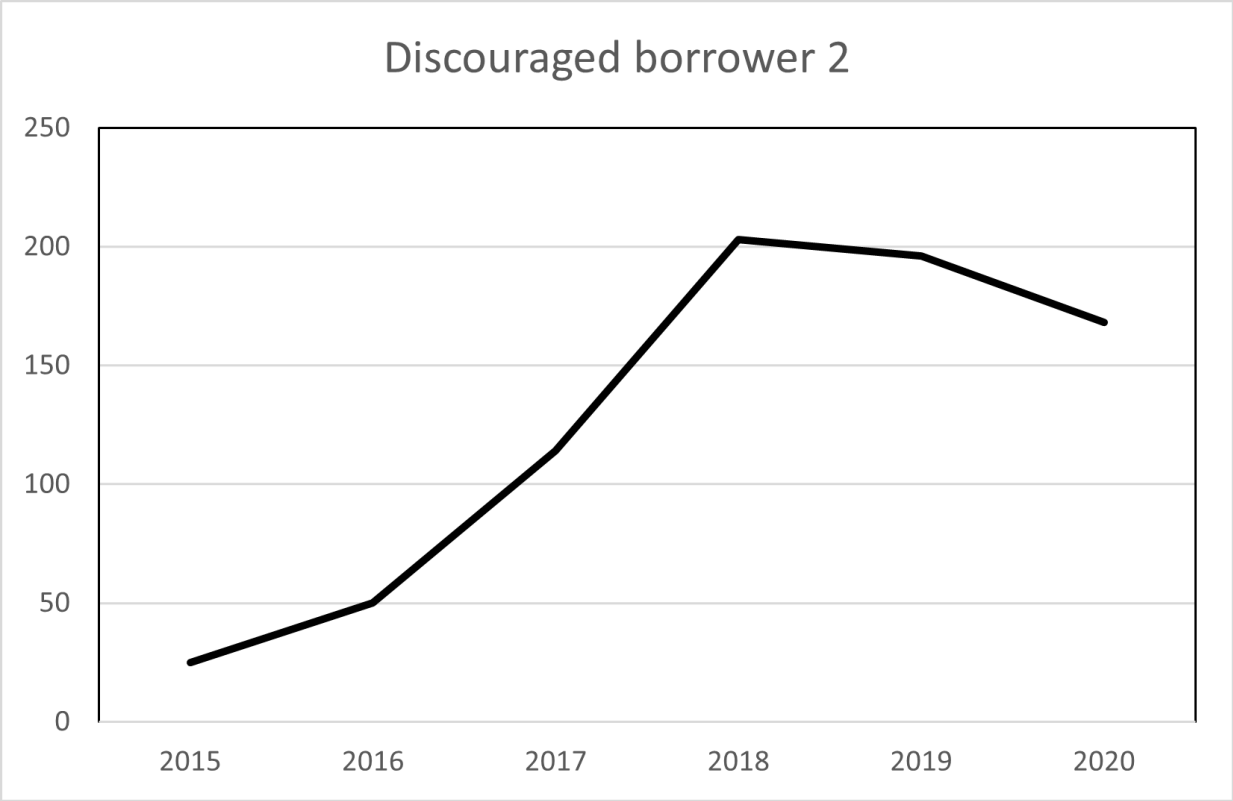

Figure 2: Frequency distribution graph for discouraged borrower 2

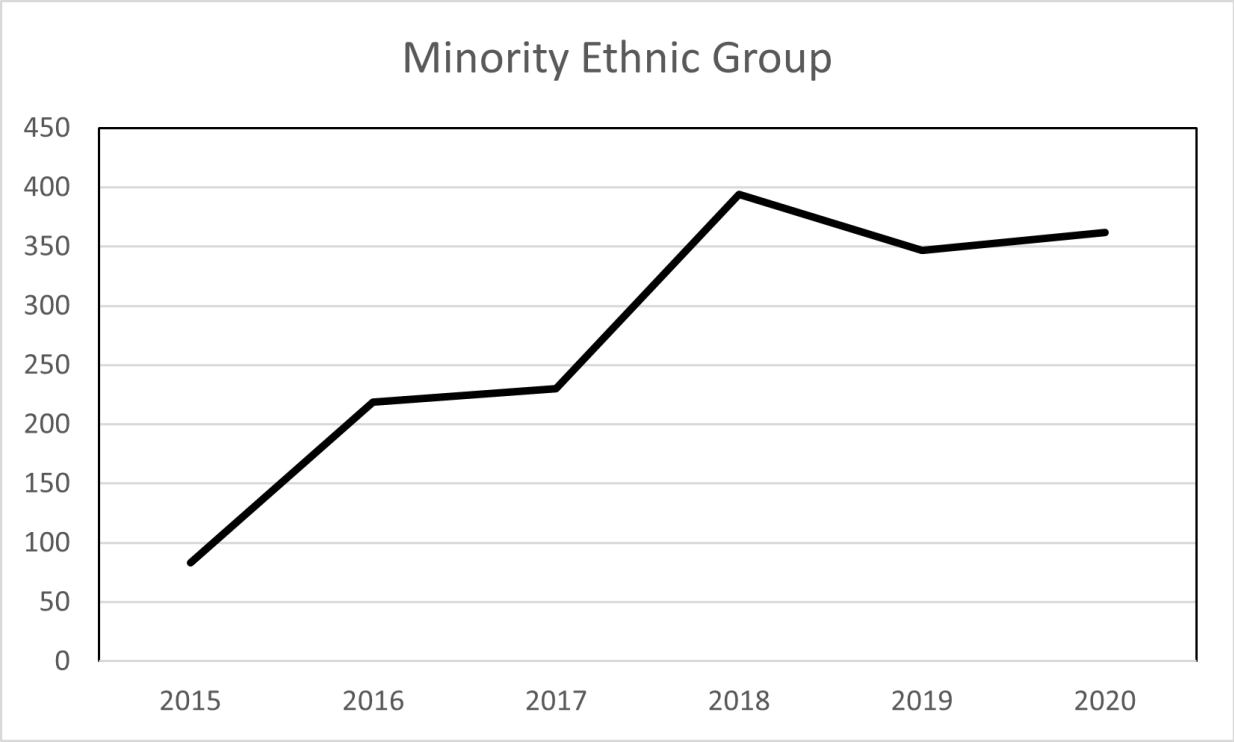

Figure 3: Frequency distribution graph for Ethnic minority SMEs

Table 3: Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Discouraged borrower 1	1.000								
(2) Discouraged borrowers 2	0.332	1.000							
(3) Ethnic minority	0.108	0.111	1.000						
(4) Size	0.004	-0.021	0.073	1.000					
(5) Age	-0.044	-0.034	0.069	0.166	1.000				
(6) Female	0.009	0.014	-0.087	-0.059	-0.079	1.000			
(7) Family	-0.052	-0.034	-0.347	-0.216	-0.084	0.180	1.000		
(8) Export	0.014	0.024	-0.004	0.038	0.025	-0.013	-0.005	1.000	
(9) Status	-0.039	-0.033	0.066	0.160	0.842	-0.078	-0.084	0.033	1.000
(10) Industry	0.023	-0.018	0.189	0.047	-0.094	0.077	-0.199	-0.061	-0.071
(11) Growth	0.095	0.044	0.012	0.168	-0.068	-0.018	-0.105	0.032	-0.095
(12) Turnover	-0.039	-0.014	0.023	-0.116	0.088	-0.002	0.036	-0.010	0.115
(12) Profit	-0.062	-0.070	-0.099	0.030	-0.021	0.001	0.092	0.033	-0.009

This table report the correlation estimate of the variables used in the study. Detail definition of the variables are presented in

Table 3 .***, **, * *denote significance at the p > 0.01, p > 0.05, and p>0.10 levels respectively.*

Table 4: Relationship between Discouraged Borrower and Ethnic minority SMEs

	Model 1	Model 2
Ethnic minority	0.592***	0.645***
	(0.060)	(0.065)
Size	-0.001*	-0.002**
	(0.001)	(0.001)
Age	-0.225**	-0.156
	(0.082)	(0.889)
Female	0.115	0.159*
	(0.059)	(0.063)
Family	-0.135*	-0.068
	(0.053)	(0.578)
Export	0.074	0.175**
	(0.064)	(0.067)
Status	0.019	-0.012
	(0.039)	(0.042)
Industry	-0.067**	-0.113***
	(0.023)	(0.024)
Growth	0.487***	0.270***
	(0.058)	(0.059)
Turnover	-0.069**	-0.036
	(0.025)	(0.027)
Profit	-0.315***	-0.355***
	(0.053)	(0.057)
Observation	11,195	11,195
Firm fixed effect	YES	YES
Year fixed effect	YES	YES
Wald Chi^2	255.73	205.00

*This table reports the results estimate of the probit regression model. Results for discouraged borrowers 1 & 2 are reported in columns 1 & 2 respectively. We report coefficient estimates with related standard errors (in parenthesis. Statistically significant levels are reported as ***, **, * for 1%, 5%, and 10% respectively.*

Table 5: Propensity Score Matching

Panel 1: One match per observation	Ethnic minority
ATE	0.085***
Z	(8.95)
N	11310
Panel 2: Four matches per observation	
ATE	0.085***
Z	(8.94)
N	11310
Panel 3: Eight matches per observation	
ATE	0.085***
Z	(8.94)
N	11310

*This table shows the effect of ethnic minority SMEs on the likelihood of being discouraged using a Propensity Score Match (PSM). The Propensity score match uses a probit regression to estimate firms' propensity be discouraged as a function of observable firm characteristics. The control variables are used with industry and year fixed effects. Lastly, the table shows the Average Treatment Effect (ATE) on borrower discouragement. Robust z-statistics are reported in parentheses. ***, ** and * Significant at the the p < 0.01, p < 0.05, and p<0.10 levels respectively.*

Table 6: Robustness tests - Logit

Discouraged borrower	(1)	(2)
Ethnic minority	0.910***	1.084***
	(0.001)	(0.101)
Size	-0.001	-0.004**
	(0.001)	(0.002)
Age	-0.347***	-0.268*
	(0.131)	(0.148)
Female	0.119	0.236**
	(0.096)	(0.105)
Family	-0.125*	-0.168
	(0.258)	(0.623)
Export	0.134	0.279**
	(0.106)	(0.115)
Status	0.031	-0.014
	(0.063)	(0.069)
Industry	-0.092**	-0.175***
	(0.038)	(0.043)
Growth	0.844***	0.412***
	(0.102)	(0.102)
Turnover	-0.112***	-0.063***
	(0.040)	(0.043)
Profit	-0.480	-0.557***
	(0.086)	(0.090)
Observation	11195	11195
Firm fixed effect	YES	YES
Year fixed effect	YES	YES
Wald Chi^2	256.090	241.091

*This table reports the results estimate of GEE population average logit regression model for ethnic minority SMEs between 2015 to 2020. Results for discouraged borrowers 1 & 2 are reported in columns 1 & 2 respectively. We report coefficient estimates with related robust standard errors (in parenthesis) scaled using root of Pearson x2-based dispersion. Statistically significant levels are reported as ***, **, * for 1%, 5%, and 10% respectively.*

Chapter 4: Borrower Discouragement and SMEs New Product Development: The Role of Crowdfunding

4.1. Introduction

A growing number of research has underscored the role of new product development (NPD) for the sustenance of its competitive advantage (Prasetyo & Dzaki, 2020) in the business environment (Liu et al., 2020). In this fast-growing and changing global market, small and medium enterprises (SMEs) that are engaged in NPD enhance both economic and technological growth needed to meet the changing demands of customers (Hallstedt et al., 2020; Wan et al., 2022). They are major agents for job creation and promote growth in productivity (Lee et al., 2015). However, NPD is seen to be risky (Mousavi et al., 2021), and thus goes through various challenges (Held et al., 2018; Marques et al., 2019; Phan & Archer, 2020). Consequently, research into the issues regarding SMEs' engagement in NPD has been a focal point of discussion in policy implementation and academic discourses in the recent period (Liu et al., 2020; Prasetyo & Dzaki, 2020; Wan et al., 2022;Yang et al., 2021).

A major driver for NPD among businesses is access to external finance (Kerr & Nanda, 2015). However, there seems to be a serious challenge confronting SMEs in accessing finance to pursue NPD projects (Cowling, Liu, & Zhang, 2016) due to major structural barriers such as the financial structure of the economy, knowledge about financing opportunities, and availability of small business support schemes (Osano & Languitone, 2015). Additionally, the existence of information asymmetry between financial institutions and the innovative SMEs makes it extremely difficult to obtain external finance (Giraudo et al., 2019; Lee et al., 2015). In fact, since these innovative SMEs

lack collaterals - e.g. asset intangibility (Osano & Languitone, 2015), they are less likely to obtain external finance (Neville et al., 2018) and thus are discouraged to apply (Cowling, Liu, & Zhang, 2016) because they fear that their application will be rejected which are referred to, in the literature, as discouraged borrowers (Kon & Storey, 2003). Consequently, this study seeks to investigate whether in the wake of discouragement, SMEs engage in new product development.

While discourage borrowers had a need for finance but refused to apply for fear of being rejected (Kon & Storey, 2003), innovative firms find it extremely difficult to access finance (Lee et al., 2015). In view of these difficulties, SMEs in recent times have identified crowdfunding platforms as an ultimate compliment to the traditional sources of finance from the bank (Joenssen et al., 2014). They use crowdfunding platforms to obtain funding to support the development of their new products (Forbes et al., 2020). One significant feature about crowdfunding is the fact that it provides non-financial benefits including creation of potential markets, provision of good customer relations and brand awareness with prospective customers, and engagement in broader conversion with large number of interested backers (Stanko & Henard, 2016; Zhang & Chen, 2019). Thus, crowdfunding provides the opportunity for the SMEs to sell their impending product before the actual production (Forbes et al., 2020). It is therefore necessary to investigate into the role of crowdfunding on discouraged innovative SMEs.

This study contributes to the existing literature in several ways. First, we examine the moderating role of crowdfunding in the relationship between discouraged borrower and SMEs NPD for a sample of 3,276 SMEs during 2015 – 2020 in the UK. This is an extension of the study by Brown et al., (2022) who investigate the impact of discouraged borrowers on innovation and find that product innovation has higher propensity to be discouraged from applying for external funding than their non-innovative counterparts. However, the financing options of discouraged borrowers

remain lacking in the literature. In addition to complementing the study by Brown et al., (2022) and the emerging body of literature, we extend the study to include crowdfunding as an alternative source of finance (Sewaid et al., 2021) for discouraged borrowers. We find that SMEs are likely to use crowdfunding platforms to finance the investment in NPD which help to reduce the financing gap for innovative SMEs (Hervé & Schwienbacher, 2018).

Second, our study provides a significant insight into how crowdfunding moderates the incidence of borrower discouragement among SMEs and their continues investment into new product development. In our findings, new evidence of discouraged borrower is identified to understand better why SMEs will resort to other non-traditional sources of finance for their NPD projects. Our result shows that crowdfunding positively moderates the association between discouraged borrower and NPD which suggests that when SME uses crowdfunding source to raise capital, they are more likely to increase their investment in NPD. To the best of our knowledge, this is the first time such a study is conducted.

Third, in building upon the study of Brown et al. (2022), we used the most recent dataset from the LSBS which extends their survey to 2020 and adopted a robust selection criteria for our sample where only SMEs that participated in at least three consecutive years of the six-year survey are considered. In our opinion, this strategy ensures that the dynamics of the SME is observed in a continuous manner to achieve a consistent panel distribution.

Fourth, the research adds to the theoretical development of pecking order theory by integrating the moderating effect of financing sources on SMEs' developmental strategies. For practitioners, this study suggests that, when analysing the effect of using crowdfunding platforms for discouraged borrowers, they should consider its influence on the relationship between NPD and borrower

discouragement. In particular, our finding shows that the effect of crowdfunding increases discouraged SMEs' engagement in NPD.

Finally, the theoretical lens for this study is pecking order theory that supports the understanding of the relationship between the firm and the bank with regards to access to information. A key proposition of pecking order theory is that the presence of information asymmetry compels firms to develop a hierarchical approach in selecting their financing sources (Serrasqueiro & Caetano, 2015). Based on this theory, the study intends to ascertain the effect of selecting from non-traditional external source of finance in promoting NPD. Therefore, this study will add to the theoretical development of integrating borrower discouragement and how it influences new product development.

The remaining part of the study is structured as follows: Section 2 reports on the theory and hypothesis development to test. Section 3 describes the dataset and present the empirical model. Section 4 presents the results of the empirical analysis. Section 5 reports on the conclusion of the study.

4.2. Theory and Hypothesis Development

This session discusses the pecking order theory and develops the hypothesis of the study.

4.2.1. Pecking order theory

One of the fundamental concerns in corporate finance study is financing hierarchy. The pecking order theory (Myers, 1984; Myers & Majluf, 1981) postulates that information asymmetry between managers and investors leads to a ranking of finance sources by preference. Therefore, SMEs

prefer internal financing over external financing (i.e., the first rung on the ladder), and if external financing is exhausted, they will prefer debt over stock finance (i.e., the second rung of the pecking order).

However, there is limited consensus among scholars on the pecking order's ability to characterise firms' financing behaviour, particularly its second rung. For instance, Shyam-Sunder & Myers (1999) and Frank & Goyal (2003) both utilise funding deficit regressions to evaluate the pecking order, but they reach contradictory outcomes. Leary & Roberts (2010) demonstrate through simulation tests that the second rung of the pecking order has weak predictive potential. Lemmon & Zender (2022) contend that this rung's explanatory value is limited until debt capacity is considered.

In accordance with Myers' (1984) pecking order theory, the financing of various investment projects is prioritised based on the cost of asymmetric information. The theory proposes a hierarchy for funding initiatives, with internal capital coming first, followed by external debt and/or equity. According to empirical data, new product development (NPD) or innovation financiers prefer internal finance since it is simpler and less expensive to acquire (Himmelberg & Petersen, 1994). Furthermore, due to agency issues, it is better to finance NPD investments internally (Hagedoorn, 1996) and the question of whether debt or equity is preferred for NPD financing emerges only when internal funding is exhausted. According to Hottenrott & Peters (2012), when internal funding is depleted, corporations use debt to finance NPD initiatives because issuing new equity can be expensive and frequently unwelcome. Similarly Brown et al. (2009) observed that when internal finance is depleted and debt is not an option, companies are forced to issue additional shares. Chen et al. (2010) and Agrawal (2020) contend that enterprises choose equity financing in order to avoid the expenses of debt requirements and maintain adequate

financial flexibility . Additionally, equity financing decreases the necessity to pay periodic interest (Wang & Thornhill, 2010).

Pecking Order theory proposed by Myers (1984) seeks to discuss the preliminary conflict between the insider and the outsider due to the presence of information asymmetry. The decision of managers and owners of a firm on the financing sources depends on the order of preference of the financing sources. Firms try to select from the cheapest available options to gain value for money (Sheikh & Wang, 2010). In explaining pecking order theory, Myers & Majluf, 1981 posit that firms will initially choose from internal sources such as reserves & retain earnings to finance their projects rather than arranging for new debt, or basically prefer debt finance to equity. This hierarchy is created by the presence of information asymmetry and so firms will consider the financing option that provides the lowest cost. In this case, it is argued that internal sources have the lowest information asymmetry costs followed by debt finance while equity finance has the highest cost of information asymmetry (Mostafa & Boregowda, 2014). Moreover, profitability seems to play a role in this hierarchy of finance. For instance, firms that are more profitable are less likely to use debt finance and more likely to use internal funding for their investment activities. Consequently, firms primarily rely on internal sources of finance for their new project or any investing activity, but if they are not adequate, it may or may not seek external financing. However, if they decide to use external finance, they will select from among alternative sources so as to reduce the cost of asymmetric information (Luigi & Sorin, 2009).

According to the pecking order theory, since firms experience financial constraints, owners/managers employ a hierarchical approach to select their preferences among the financing sources (Myers, 1984; Myers & Majluf, 1981). First, firms will prefer to select from internal sources rather than external ones known in the literature as the first rung of pecking order (Chay

et al., 2015; Serrasqueiro & Caetano, 2015) . Second, if external financing is selected, firms may use short-term external debt with little or at best, no risk before they finally consider equity financing (Chay et al., 2015; Serrasqueiro & Caetano, 2015). This is the second rung of the pecking order (Chay et al., 2015). However, there is inconclusive agreement among researchers with regards the extent to which the second rung can be used to describe the financial behaviour of the firm (see Frank & Goyal, 2003; Leary & Roberts, 2010; Lemmon & Zender, 2022; Shyam-Sunder & Myers, 1999).

In a study conducted by Chay et al. (2015), using dataset of non-financial and non-utility firms in the US for the period between 1981 to 2010, they find that firms use internal resources as their primary source of funding across all levels of investment activities. However, at the highest levels of investments, external funding becomes crucial given the limited internal funds available. This suggests that financing choice of new product development is likely to be linked to the level of investment it is faced with. For instance, if the SMEs decides to engage in large investment into the product development, the limited availability of internal finance could trigger the need for external funding.

Interestingly, the performance and the efficiency of the planned NPD is uncertain due to the fact that there is lack of sufficient information which tends to affect the lending relationship between the SMEs and the financial institutions (Agénor & Canuto, 2017). Clearly, some SMEs are so pessimistic about their chances of getting external funding or perhaps, are aware of some barriers to access credit and therefore are discouraged from applying (Brown et al., 2022; Kon & Storey, 2003). This confirms why innovative SMEs are discouraged from borrowing and thus select internal sources as the prime sources of finance from the hierarchy of finance suggested in the pecking order theory (Prędkiewicz et al., 2017).

Given the risk and uncertainly of new product development, innovators are more likely to encounter barriers in accessing finance (Brown et al., 2022; Mazzucato, 2013). In this regard, Freel et al. (2012) argue that innovative SMEs are more likely to be discouraged borrowers. Due to the lack of track record and adequate collateral to apply for the loan, there is a higher incidence of discouragement among innovative SMEs (Brown et al., 2022). Being charged for higher interest rates for loans could be another reason to be discouraged (Rostamkalaei & Freel, 2016). Moreover, application costs are one of the important factors that firms consider in their discouragement decisions (Ferrando & Mulie, 2022). Application costs could be in multiple forms such as financial (consultant or accountant fees), in kind, (such as time spend on application), and psychological (such as discomfort experience by the owner in case of credit denial (Ferrando & Mulie, 2022). As a result, Luigi & Sorin (2009) suggest that discouraged SMEs are more likely to rely on internal sources to finance their new projects, and if the funds are not enough, they may not seek external funding. Following Freel et al. (2012) and Brown et al. (2022), we posit the following hypothesis:

H1: SMEs have higher likelihood of being discouraged when they need external financing for NPD.

Pecking order theory allows SMEs to select from short-term external debt financing for their projects. According to Sewaid et al. (2021), since the presence of information asymmetry creates a major difficulties for NDP SMEs to attract external funding, they have discovered alternative sources of accumulating funds for new projects including corporate venture capital, accelerators, angle networks and crowdfunding (Sewaid et al., 2021). However, Sewaid et al. (2021) argues that crowdfunding platform is a major alternative source of finance where the decision to finance a project is dispersed among crowds. In this case, instead of NPD SMEs to apply for bank credit,

they try to attract the prospective investor with his/her idea and use that to solicit for funding through pre-orders (Boon et al., 2017; Forbes et al., 2020)

Crowdfunding platform is useful in reducing risks associated with creating new product because SMEs are likely to sell the prospective product before its official launch (Forbes et al., 2020). According to Stanko & Henard, (2016), the overall purpose of crowdfunding campaign is to raise money. However, the most important benefit to the NPD entrepreneur is the non-financial aspect of the crowdfunding platform (Stanko & Henard, 2016). First, crowdfunding provides a major avenue to create awareness and ready market for the new product. Second, it generates an avenue for Kickstarter backers to provide valuable feedback and ideas. Last, early adopters of the impending product are likely to influence potential consumers (Stanko & Henard, 2016). Overall, crowdfunding brings together large number of innovating entrepreneurs to raise funds, create awareness of the potential product and join large group of potential backers to brainstorm about the innovative idea.

Based on the pecking order theory, discouraged borrowers may prefer to use the crowdfunding platforms as a comparatively cheaper source of funding. This suggests that SMEs even become more discouraged when they identify crowdfunding sources and take advantage of the accompanied benefits to invest more in NPD. Based on the above argument, we propose the following hypothesis:

H2: Crowdfunding increases the incidence of borrower discouragement thereby increasing the likelihood of SMEs' engagement in NPD.

4.3. Data and Methodology

4.3.1. Data

The purpose of this study is to investigate the impact of discouraged borrowers on NPD and how crowdfunding moderates the incidence of borrower discouragement among SMEs. We used the current and most updated panel dataset of Longitudinal Small Business Survey (LSBS) compiled by the Department for Business, Energy, and Industrial Strategy (BEIS). LSBS is a large-scale telephone survey where small business owners and managers are interviewed in the United Kingdom. This longitudinal data covers six years from 2015 to 2020 to close the latest data gap. The target population for the survey was SMEs located in the United Kingdom. We chose the study location in the UK for the following reasons: first, vast majority of business in the UK are SMEs, accounting for over 99% of total businesses and 55% of non-governmental employment (Ford & Terris, 2017). Second, borrower discouragement has been an important area of research in recent times in the UK (Cowling et al., 2016; Naegels et al., 2022; Rostamkalaei et al., 2020) which calls for further scholarly work.

In this study, we adopt several selection-criterial to construct our dataset from the LSBS data. First, we describe SMEs as firms with fewer than 250 employees across all sites for all the six years survey following Brown et al. (2022). This allows for a longitudinal tracking element for SMEs that are re-surveyed in six consecutive years to provide the basis for our panel analysis. It also allows for a detailed analysis of how combinations of factors affect SME performance through the passage of time. We identified that some firms had become large scale businesses with 250+ employees between years 2015 and 2020 and were excluded from the sample. Second, we included only SMEs that participated in the survey for at least three consecutive years to control for short

panel bias. In fact, all firms that have less than three years data, and those that have gaps in the six-year surveys were excluded from the sample. This is done to also ensure that the SMEs in sample are observed continuously to achieve consistency in the panel distribution for the period between 2015 and 2020. Using this period helps to close the latest data gap (Alam et al., 2022). Our final sample, based on our selection criteria, compose of an unbalanced panel of 3,296 SMEs across UK. The unbalance panel data helps to control for the problem of survivorship bias (Alam et al., 2022).

4.3.2. Variables

Table 7 provides detail definitions of the dependent variable, the explanatory variables, and the control variables used in the model. The dependent variable is New Product Development (NPD). The main explanatory variable is discouraged borrower. The control variables included in the study are export, female, family, turnover, profit, growth, industry, size and age.

[Table 7 about here]

4.3.2.1. New Product Development

Previous studies measure product innovation (and for the purpose of this studies NPD) as creating a unique product or making a significant improvement in existing products (Barasa et al., 2017; Brown et al., 2022; Hashi & Stojčić, 2013; Lee et al., 2015; Lee & Brown, 2017; Medase, 2020; Van Uden et al., 2017). This measure complies with the Community Innovation Survey (CIS) and the Oslo Manual (Medase, 2020) where firms stated in affirmation response. The data pertaining to NPD is collected from the LSBS dataset which is available in the UK data archive's website. Consequently, owners or managers were asked to indicate whether in the last 3 years there have been an introduction of new or significantly improved products which were new to both the firm

and the target market. The approach is not aimed at the performance of the product, thus, whether successful or unsuccessful. The variable is measured as binary which take the value of 1 if the firm undertakes NPD activities, and 0, otherwise. The frequency distribution of NPD is reported in Table 8.

[Table 8 about here]

4.3.2.2. Discouraged Borrower

Prior studies outlined some differences in defining discouraged borrowers based on the conditions given by the firms as the reason for their discouragement. For instance, some studies describe discouraged borrowers as SMEs that self-ration resulting from fear of being rejected (Cole & Sokolyk, 2016; Freel et al., 2012; Mac an Bhaird et al., 2016; Tang et al., 2017). Other definitions included the fact that, it was not the right time to borrower or the banks were not lending, application cost, bank screening errors and interest rate (Cowling et al., 2016; Gama et al., 2017; Rostamkalaei, 2017). In the study conducted by Chakravarty & Xiang, (2013), they defined discouragement to include reasons such as complicated loan procedure, high rate of interest, collateral requirement, and corruption in the allocation of the loan. Our study adopts the definition by (Kon & Storey, 2003) who define discouraged borrowers as SMEs that do not apply for finance because they perceive their application will be rejected. In the analysis, SMEs that stated that they had *no need* for external finance and, hence, do not to apply, are excluded. This follows a similar measurement by Brown et al., (2021). Discouraged borrower is measured as binary taking the value of 1, if the firm is discouraged and 0, otherwise. See Table 9 for the frequency distribution of discouraged borrowers.

[Table 9 about here]

4.3.2.3. Crowdfunding

Crowdfunding may be described as the process in which an SME that wants to undertake a new project requires financing and ask a large group of individual to supply those funds for the investment (Forbes et al., 2020; Hervé & Schwienbacher, 2018). In the current study, the SME owners were asked whether they applied for finance from a crowdfunding platform. Crowdfunding is therefore measured as binary variable and coded as 1 if the SMEs agreed to have used the crowdfunding platforms for finance and 0 if otherwise.

4.3.2.4. Moderator Variable

As described earlier, we examine the influence of crowdfunding on the relationship between NPD and discouraged borrowers. Here crowdfunding is considered to be the emerging alternative source of finance for innovative SMEs, and we interacted with borrower discouragement variable to generate a moderator variable (*DB x CRO)*. The key problem arising from including the interactive variable is the effect of multicollinearity between the interaction terms and their constituents (Delgado-García et al., 2013). The issue of multicollinearity in this model is addressed by centring the moderator variable (Aiken et al., 1991; Delgado-García et al., 2013).

4.3.2.5. Control Variables

The analysis includes nine control variables to account for factors which may influence NPD following previous studies. Firm *size* is included in the model. To measure firm *size*, we use total number of employees representing workers currently on the firm's payroll excluding owners and partners across all sites of the firm. This is consistent with prior studies (Barasa et al., 2017; Gama et al., 2017; Medase, 2020; Mohammadi et al., 2017). *Size* may be measures in different ways but to control for endogeneity, total employment is used (Lee & Brown, 2017). Firm *age* is included in the model. This variable represents the life of the firm and is measured by the number of years

since the firm's formation (Wang et al., 2020) according to the data from LSBS. In the analysis, we measured firm *age* by subtracting the year the firm started operation from the year waves of the survey (Medase, 2020). *Age* is measured in the study as 1, if the firm is more than 20 years old and 0, if otherwise. Additionally, the study includes variables that measure firm ownership which are family and female firms. *Family* is a dummy variable, defined as 1, if majority share of the firm is owned by members of the same family and 0, otherwise (Brown et al., 2022). *Female*, a binary, is also defined as 1, if more than 50% share of the firm is owned by female and 0, otherwise (Gama et al., 2017; Rostamkalaei et al., 2020).

We also control for firm performance related variables. In this regard, turnover, profit, and growth are measured. In the first place, turnover is measured as a dummy variable which takes the value of 1, if the firm recorded increase in turnover in the last 12 months compared with the previous year, and 0, otherwise. Additionally, profit is measured as a dummy variable, taking the value of 1, if the firm recorded profit in the past year and 0, otherwise (Brown et al., 2022). Growth, a dummy, takes the value of 1, if the firm experienced growth in the past year, and 0 otherwise. We included industry to control for sector of the firm and it is measured as a categorical variable, taking the value of 1 for production and construction sector, 2, for transport, retail, and food service/accommodation, 3, for business services, and 4, for other services.

4.3.3. Descriptive Statistics

Table 10 reports the descriptive statistics of the sample for the study. Beginning from the survey covering the dependent variable, 23.4% of the sample are SMEs that are engaged in NPD and 8.2% had a need for external funding but are discouraged from applying. Averagely, 2.9% of SMEs applied for finance from crowdfunding platforms. Additionally, the data reveals that 12.8% of the

SMEs exported products to the foreign market during the last 3 years. The sample shows that majority of the SMEs, 70%, are owned by people from the same family while about 18% are owned by females. Moreover, industry indicates a mean value of 2.497. With respect to the firm performance in the recent years, 39.7% of the sample recorded increase in turnover. Meanwhile, majority of the firms, 82.1% in the sample recorded surplus or profit in the previous financial year. SMEs in the sample are predominantly old firm (20+ years old) representing 51%.

[Table 10 about here]

4.3.4. Correlation

Table **11** provides the correlation analysis for the variables that are used in the study. DB shows a positive correlation with NPD. The results indicates that DB has higher incidence of engaging in new product development. The correlation coefficients for between DB and NPD is statistically significant at the 1% level. All corrections coefficients are well below 0.5. It reveals that excessive correlation is not a significant factor in the regression estimates that follow. The correlation result indicates no multicollinearity between the independent variables (Gujarati et al., 2012).

[Table 11 about here]

4.3.5. Model

The current study provides new evidence on the relationship between discouragement and new product development (NPD). To measure NPD, we follow methodology employed by Lee & Brown (2017). The model searches for NPD as a measure of whether SME develops unique product or significantly improved goods or services. The estimation equation for this potential relationship is given as:

$$NPD_{it} = (1,0) \text{ if } NPD_{it} \leq 0; \text{ or } NPD_{it} > 0 \quad (1)$$

$$NPD_{it} = \alpha + \beta DB_{it} + CRO_{it} + X_{it}b_{it} + \mathcal{E}_{it,}\ \mathcal{E} \sim N\ (0,\ o^2) \quad (2)$$

where *i* and *t* represent firm and period respectively, and NDP denotes new product development of firm *i* in period *t*. *DB* is the variable that indicates whether the firm *i* is discouraged from applying for external credit in period *t*. CRO indicates whether firm *i* utilised crowdfunding platforms in period *t*. *X* is the vector of the characteristics of the firm *i* in period *t* used as control variables. β and *b* are the parameters that is going to be estimated. $\mathcal{E}_{it}$ denotes time varying firm specific error term.

In eq. 2, the dependent variable (NDP) takes the value of 1, if a given firm *i* in year *t* engages in NPD and 0, otherwise. The explanatory variables are discouraged borrower (DB) proxied by the dummy that takes the value of 1 when the firm *i* in year *t* is discouraged from borrowing and 0, otherwise and crowdfunding (CRO) which takes the value of 1, if the firm used crowdfunding platform, and 0 otherwise. The control variables (X) are *export, female, family, turnover, profit, growth, industry, size,* and *age* as defined and explained in Table 7. In considering the appropriate econometric method to use, it is seen that, in eq. (2), the dependent variable is a dummy (0/1) suggesting a discrete response model. In view of this, the model is estimated using the maximum likelihood technique (Saridakis et al., 2019). The appropriate approach adopted is the random effect probit regression because it deals with problems relating to linear probability model (Brown et al., 2022; Njikam, 2017). We estimated the eq. 2 by employing random-effect probit model with the assumption that the cumulative distribution function follows the standard normal distribution (Guariglia et al., 2019).

4.4. Results and Discussion

The main focus of the study is to analyse the effect of borrower discouragement on SME's engagement in new product development (NPD). The study also examines the impact of crowdfunding on the NPD and how it moderates the relationship between discouraged borrower and NPD. To test our result, we employ the random-effect probit regression using LSBS dataset from 2015 to 2020.

Table 12 presents the estimation model in three columns. In column 1, we only introduce discouraged borrower, crowdfunding, and the interaction term of these two variables (DB x CRO), industry fixed effect, and year fixed effect. In column 2, we regress discouraged borrower, the interaction term and included control variables with firm and year fixed effect. Lastly, we incorporate all the variables in the sample with the interaction term, firm, and year fixed effect in column 3. The coefficient of discouraged borrower is 1.614 and significant at 1% which means that discouraged borrower has a significantly positive association with NPD. This is consistent with our prediction mentioned above (hypothesis 1) because discouraged borrowers may find alternative sources to raise capital to finance their initiatives. Moreover, the coefficient of crowdfunding is 0.203 and significant at 5%. The positive association of crowdfunding with NPD indication that SMEs may resort to crowdfunding platforms to solicit for funding to embark on developing a new product. This is in line with prior studies as firms have now found a new and emerging source of financing their projects. Finally, we find that the coefficient of the interaction variable remains positive and significant with the magnitude being almost the same, which means that our results are robust. This positive coefficient suggests that crowdfunding positively moderates the relationship between borrower discouragement and NPD. As shown in *Figure 4*, as

borrower discouragement increases, the level of crowdfunding increases thereby increasing the SME's investment in NPD. Therefore, our hypothesis 2 is verified.

Furthermore, we argue, based on the pecking order theory, that if SMEs are discouraged, they may have other alternative sources of increasing capital at a lower cost or perhaps through innovative activities. Additionally, evidence suggests that incorporating new product development into the firm's corporate strategy is crucial to gain competitive advantage which helps to improve performance and customer satisfaction (Prasetyo & Dzaki, 2020). Moreover, discouraged borrowers may consider the benefits to be derived from investing in NPD which may drive their willingness to engage in product innovation. Again, pecking order theory posits that if SMEs need external finance, they are likely to select from the source that gives little or no risk. Among other sources, crowdfunding platforms, though not a new phenomenon, seem to be an emerging approach that innovative firms are using to raise capital for their projects (Hervé & Schwienbacher, 2018). We find that, with an increasing level of borrower discouragement, we see an even stronger use of crowdfunding if the SMEs engages in NPD. In support of the pecking order theory, the result suggest that, when SMEs are discouraged, they are more likely to consider crowdfunding platforms to raise capital for their NPD project.

For the control variables, the results show that *export* is positively related to NPD and significant at 10%. It could be argued that SMEs that are engaged in NPD have a higher likelihood of exporting to foreign countries. In addition to this, firm *size* is estimated, and the result is statistically significant. In consistent with prior studies small firms are negatively related to NPD while large firms are positive (Barasa et al., 2017). This confirms the argument that larger firms are more likely to produce new product or services or significantly improve their existing products than smaller firms (Medase, 2020). This is because larger firms have access to more resources and

capabilities and can provide economies of scale in innovative activities compared to smaller firms (Ayyagari et al., 2011). Firm *age* plays a significant role in the innovative performance of SMEs. Empirical studies provide mixed report on the significance of a firm's age in innovation performance (Medase, 2020). It helps to provide appropriate time for employees to be creative in what they do at the workplace (Medase, 2020). Firm *age* is used in this study as a control variable and previous studies suggest a positive relation between firm *age* and new product development (Barasa et al., 2017). In consistent with literature, we find the that older firms are less likely to introduce new product. This is because older firms are more conservative compared to younger ones (Rossi, 2016). There is a negative and significant association between family firms and NPD. This suggest family firms are less likely to engage in new product development. Turnover shows a positive association with NPD. However, in consistent with the expectation of the study, firms that experience increase in turnover suggests that if the firm's turnover increases, they might be able raise enough resources to engage new product development. Finally, growth has positive and significant association with NPD.

[Table 12 about here]

4.5. Endogeneity

4.5.1. Propensity Score Matching (PSM)

The objective of propensity score matching (PSM) is to account for the reality that companies' decisions to self-ration are not random (Al Guindy, 2021) but may be influenced by a firm's financing choices or observable features. For example, innovative SMEs may use non-traditional financing sources rather than borrow from the bank. Matching can attenuate asymptotic biases

caused by endogeneity or self-selection (Roberts & Whited, 2013). As such, matching may be used as a robustness test in regression-based analysis. While PSM may not entirely solve endogeneity and self-selection, it can at the very least address endogeneity problems connected to functional form misspecification (Shipman et al., 2017).

The treatment group is matched with the control group based on a propensity score calculated from the observable characteristics of the SME. The propensity score match is implemented in accordance with the existing research, such as Al Guindy (2021) as follows: First, we used the probit model to estimate the propensity scores, which used the control variables explained in section 4.3.2.5 as independent variables. Here, the model compares discouraged SMEs to non-discouraged firms as well as crowdfunding and non-crowdfunding users. In column 1, two businesses that are similarly likely (have a comparable propensity) to apply for finance are compared, but one firm is discouraged, and the other does apply. As a result, the influence of discouragement may be isolated after accounting for various SMEs' propensity to apply for finance. Similarly, column 2 compared crowdfunding users with non-crowdfunding users. Then, we pair discouraged SMEs with one, four, or eight non-discouraged SMEs in their immediate vicinity and did same with respect to crowdfunding.

Table 13 presents the average treatment effect (ATE) of the population for the discouraged borrowers. Control group includes non-discouraged SMEs. We observe that ATEs are positive in both probit and logit estimates and statistically significant at 1%. After accounting for SMEs variations, the treatment effects are all positively associated with SMEs' engagement in NPD. Specifically, on average, the likelihood of a discouraged borrower engaging in NPD is 51% and that of crowdfunding users is 11.6% compared with non-discouraged SMEs and non-crowdfunding users respectively. Consequently, the result is consistent with our baseline results.

[Table 13 about here]

4.5.2. Two-stage Least Square (2SLS)

The study faces the problem of endogenous variables. Some of the independent variables are endogenous and may create the problem of endogeneity. We adopt the 2SLS approach to address the challenge of endogeneity.

Table 14 represents the results of the 2SLS regression. In the first stage, we employ discouraged borrower and the interaction term (DB x CRO) as the dependent variables. All the control variables are used in the first-stage regression. In the second stage, we used the predicted values of discouraged borrowers and interaction term to run the baseline regression. We used robust standard errors clustered at firm and year level. The coefficient of discouraged borrower, crowdfunding and the interaction term are all positive and significant which is consistent with our previous results.

[

Table 14 about here]

4.6. Robustness Test

In this section various robust tests are conducted to verify the consistency of our baseline regression estimates. Our empirical analysis, thus far, strongly supports our hypothesis that discouraged borrowers are more likely to engage in new product development even after addressing the potential endogeneity issues. However, to eliminate the possibility that other factors in the model could drive the positive relation between discouragement and NPD, we perform several robustness checks. We re-estimate our model using GEE population-average logit regression and adopted semi-robust standard errors clustered at the firm and year levels. Five estimates are constructed and in all the estimates. Table 15 present the regression estimate of the GEE population-average logit regression. All estimates in the models confirm significantly positive coefficients of discouraged borrower, crowdfunding, and the interaction term of discouraged borrower and crowdfunding.

[Table 15 about here]

4.7. Conclusion and Implications

Using a panel of 3,296 SMEs operating in the UK over the period 2015–2020, this paper presents evidence on how borrower discouragement affects SMEs engagement in new product development (NPD). It also determines the association between crowdfunding and new product development and how crowdfunding moderates the effect of borrower discouragement on NPD. Utilising the random effect probit regression model, we find a positive association between discouraged borrower and NPD. Our result suggests that discouraged borrowers are not likely to abandon their

innovative ideas, instead, may seek funding from other sources including crowdfunding. Additionally, we argue that there is uncertainty about the viability of the new product, and banks are unlikely to invest in such uncertainties which SMEs to self-ration.

Additionally, in accordance with the pecking order theory, we explore an important alternative source of capital that is accessible to discouraged SMEs and how this source impact on their engagement in NPD. In this case, crowdfunding is seen as important alternate source of finance because SMEs do not only solicit for funding but also receive relevant feedback from diverse professionals. We find a positive association between crowdfunding and NPD suggesting that SMEs are likely to use crowdfunding platforms to solicit for funds and build a ready market for their impending products. Our results provide a new evidence of financing choice used by SMEs when they want to engage in NPD. Lastly, the study examines how crowdfunding moderates the incidence of borrower discouragement and find that crowdfunding positively moderates the effect of discouraged borrowers on their engagement in NPD. With a growing level of borrower discouragement, we anticipate an even greater usage of crowdfunding if the SMEs engage in NPD.

Our study also has implications for managers. Specifically, our results suggest that when SME managers require finance to enhance and/or embark on new projects, adopting crowdfunding platforms, may help them to achieve this aim. Additionally, the result shows that when analysing the consequences of using crowdfunding platforms, managers should focus on its positive influence on NPD. Further, SMEs owners and managers could strive to eliminate the incidence of information asymmetry to improve the trust issues between them and bank managers by reporting relevant information needed to access finance. Finally, the results support policymakers' efforts to alleviate the incidence of borrower discouragement and financing barriers among SMEs that strive to engage in NPD. For example, the British Business Bank created the Demand Development Unit

to promote and assist SMEs in seeking the best-suited credit for their requirements. Consequently, crowdfunding may need to be incorporated when formulating policies to support NPD SMEs, as this study suggests that policymakers may have to provide a conducive environment to promote widespread crowding platforms. Lastly, discouraged SMEs could be motivated to seek external credit when required since they are likely to have their application approved.

The findings point to future research directions. Crowdfunding is not in fact the only alternative source of capital to finance NPD project for discouraged borrowers. Therefore, future research analysing the financing options of discouraged borrowers could take into account the moderating effect of other financing sources on the relationship between borrower discouragement and NPD. Second, it would be interesting to consider investigating the mediating effect of other variables such as venture capital, equity financing, and peer-to-peer. Finally, we have focused on alternative source of financing discouraged borrowers. However, it would be interesting to replicate this research using financial technology as a moderating variable.

Appendix B

Table 7: Definition of Variables

Variable	Definition	Source
New product development (NPD)	"*During the last three years, did the firm introduce new or significantly improved goods or services"?*	LSBS
Discourage borrower	"*During the last 12 months, did the firm have a need for finance, but did not apply for various reasons*"?*	LSBS
Crowdfunding	Whether the firm applied for finance from a crowdfunding platform	LSBS
Export	Whether the firm export goods or services	LSBS
Family	Whether the firm is majority owned by members of the same family	LSBS
Female	Whether more than 50% of the business is owned by women	LSBS
Turnover	Whether turnover in the past 12 months increased compared with previous year	LSBS
Profit	Whether the firm generated profit or surplus in the previous year	LSBS
Growth	Whether the firm experienced growth in the past year – Categorical (1 – substantial growth to 9 – shrinkage, don't know how much)	LSBS
Sector	Whether the firm operates in the production or construction sector	LSBS
Firm size	Total number of employees currently on payroll excluding owners and partners across all sites (0 to 249 employees)	LSBS
Firm Age	Whether the firm is operated for more than 20 years since its establishment.	LSBS

This table reports the detail definition of the variables used in the study. Source: Author's own elaboration based on the survey by LSBS

Table 8: Frequency distribution of New Product Development

Variable	Year						
	2015	2016	2017	2018	2019	2020	Total
0	445	897	1067	2302	2112	1844	8667
1	136	270	312	715	652	558	2643
Total	581	1167	1379	3017	2764	2402	11310

This table reports the yearly distribution of the NPD in 2015-2020.

Table 9: Frequency distribution of Discouraged borrowers

Variable	Year						
	2015	2016	2017	2018	2019	2020	Total
0	537	1103	1256	2760	2524	2202	10382
1	44	64	123	257	240	200	928
Total	581	1167	1379	3017	2764	2402	11310

This table reports the yearly distribution of the discouraged borrowers in 2015-2020.

Table 10: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
npd	11310	0.234	0.423	0	1
Discourage borrower	11310	0.082	0.274	0	1
crowdfunding	11310	0.029	0.168	0	1
export	11206	0.128	0.334	0	1
female	11310	0.180	0.385	0	1
family	11310	0.699	0.459	0	1
turnover	11310	0.397	0.489	0	1
profit	11310	0.821	0.383	0	1
growth	11218	3.471	1.917	1	9
industry	11310	2.497	1.028	1	4
size	11298	18.693	33.575	0	245
age	11298	0.510	0.500	0	1

This table reports descriptive statistics of the variables. The full sample consists of 11,310 observations of UK SMEs in 2015-2020 with required data in our regressions. Detail definition of the variables are provided in Table 7. *Source: Author's own elaboration based on the survey by LSBS*

Table 11. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) npd	1.000											
(2) Discouraged borrowers	0.344	1.000										
(3) crowdfunding	0.045	0.045	1.000									
(4) export	0.036	0.014	-0.002	1.000								
(5) female	-0.023	0.009	-0.004	-0.013	1.000							
(6) family	-0.037	-0.052	0.003	-0.005	0.180	1.000						
(7) turnover	0.101	0.033	-0.002	0.010	-0.002	-0.045	1.000					
(8) profit	-0.002	-0.062	0.012	0.033	0.001	0.092	0.154	1.000				
(9) growth	-0.060	-0.029	0.005	0.006	-0.002	-0.018	-0.584	-0.050	1.000			
(10) sector	-0.070	0.000	0.006	-0.060	0.078	-0.198	0.009	-0.063	0.002	1.000		
(11) size	0.056	0.004	-0.007	0.038	-0.058	-0.216	0.130	0.030	-0.008	0.046	1.000	
(12) age	-0.032	-0.043	-0.009	0.025	-0.079	-0.084	-0.081	-0.020	0.119	-0.095	0.165	1.000

*This table report the correlation estimate of the variables used in the study. Detail definition of the variables are presented in Table 11.***, **, * denote significance at the p > 0.01, p > 0.05, and p>0.10 levels respectively.*

Table 12: Random-effect probit estimation of the relationship between NPD and discouraged borrowers

NPD	(1)	(2)	(3)
DB x CRO	**0.569****	**0.745*****	**0.539***
	(0.277)	**(0.268)**	**(0.283)**
Discouraged borrower	**1.616*****	**1.610*****	**1.614*****
	(0.055)	**(0.056)**	**(0.056)**
Crowdfunding	**0.189***		**0.203****
	(0.092)		**(0.093)**
export		0.103**	0.104**
		(0.045)	(0.045)
female		-0.071*	-0.070*
		(0.042)	(0.042)
family		-0.075**	-0.074**
		(0.036)	(0.036)
turnover		0.288***	0.287***
		(0.039)	(0.039)
profit		0.007	0.007
		(0.041)	(0.041)
growth		0.004***	0.004***
		(0.010)	(0.010)
sector		-0.128***	-0.128***
		(0.016)	(0.016)
size		0.002***	0.002***
		(0.001)	(0.001)
age		-0.100***	-0.100***
		(0.033)	(0.033)
Observations	11310	11182	11182
Ind. fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Wald chi^2	918.630***	1035.592***	1039.560***

*The table reports the results estimated from the random-effect probit regression analysis for new product development (NPD) between 2015 to 2020. NPD is measured by 1, if the SME introduced new or significantly improved product and 0 otherwise. We report coefficient estimates with related standard errors (in parenthesis). Statistically significant levels are reported as *** p < 0.01, ** p < 0.05, * p < 0.10 respectively.*

Source: Author's own elaboration based on the survey by LSBS

Table 13: Addressing endogeneity: Propensity Score Matching

	Discouraged Borrower	**Crowdfunding**
	(1)	**(2)**
Panel 1: One match per observation		
ATE	0.511***	0.101***
Z	(22.59)	(2.92)
N	11,182	11,182
Controls	YES	YES
Year fixed effect	YES	YES
Firm fixed effect	YES	YES
Panel 2: Four matches per observation		
ATE	0.517***	0.116***
Z	(27.01)	(4.14)
N	11,182	11,182
Controls	YES	YES
Year fixed effect	YES	YES
Firm fixed effect	YES	YES
Panel 3: Eight matches per observation		
ATE	0.511***	0.120***
Z	(27.72)	(4.43)
N	11,182	11,182
Controls	YES	YES
Year fixed effect	YES	YES
Firm fixed effect	YES	YES

*This table shows the effect of being discouraged and/or using crowdfunding platform and the likelihood of engaging in NPD using a Propensity Score Match (PSM). The Propensity score match uses a probit regression to estimate firms' propensity to be discouraged and/or using crowdfunding as a function of observable firm characteristics. The control variables used are size, age, export, female, family, turnover, profit, growth, industry, year and firm fixed effects. Lastly, the table shows the Average Treatment Effect (ATE) on new product development. Robust z-statistics are reported in parentheses. ***, ** and * Significant at the the p < 0.01, p < 0.05, and p<0.10 levels respectively.*

Table 14: Addressing endogeneity: 2SLS Random-Effect Instrumental Variable Regressions

Panel A: First stage		
Variable	*Discouraged borrower*	*DB x CRO*
	(1)	*(2)*
Export	*0.012*	*-0.002*
	(0.008)	*(0.002)*
Female	*0.011*	*-0.002*
	(0.007)	*(0.001)*
Family	*-0.035****	*-0.004***
	(0.007)	*(0.002)*
Turnover	*0.019****	*0.003***
	(0.007)	*(0.001)*
Industry	*-0.004*	*-0.001*
	(0.003)	*(0.001)*
Profit	*-0.047****	*-0.001**
	(0.008)	*(0.002)*
Growth	*-0.001*	*0.001*
	(0.002)	*(0.001))*
Constant	*0.149****	*0.008****
	(0.014)	*(0.003)*
Observation	*11,190*	
Wald chi	*92*	
Pr (Chi2)	*0.000*	

Panel 2: Second Stage

	NPD	*NPD*	*NPD*
	(1)	*(2)*	*(3)*
Discouraged borrower	*0.408***	*0.429**	*0.609**
	(0.219)	*(0.257)*	*(1.957)*
Crowdfunding	-	-	*1.368**
	-	-	*(15.964)*
DB x CRO	-	*1.032**	-
	-	*(10.390)*	-
Controls	*Y*	*Y*	*Y*
Year fixed	*Y*	*Y*	*Y*
Observation	*11,190*	*11,190*	*11,190*
Wald Chi^2	*208.66*	*203.67*	*187.05*
R-squared	*0.115*	*0.012*	*0.051*
Root MSE	*0.398*	*0.421*	*0.268*

*This table reports the estimated result from the two-stage least square (G2SLS) instrument variable regressions using xtivreg. Panel 1 report the first stage while panel 2 reports the second stage. Robust standard errors are reported in parentheses. *. **, *** denote the significant levels at 10%, 5%, and 1% respectively.*

Table 15. Robustness Tests: GEE population-average logit regression estimates of the relationship between discouraged borrower and NPD.

VARIABLES	Model 1	Model 2	Model 3	Model 4	Model 5
Discouraged borrower	2.783***		2.771***	2.727***	2.735***
	(0.098)		(0.098)	(0.099)	(0.099)
Crowdfunding		0.626***	0.466***		0.355**
		(0.134)	(0.148)		(0.161)
DB x CRO				1.368***	1.014*
				(0.514)	(0.539)
Controls	YES	YES	YES	YES	YES
Observations	11,182	11,182	11,182	11,182	11,182
Firm fixed effect	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES
Wald Chi2	939.36***	246.53***	945.39***	932.26***	936.54***
Chibar2	116.36***	90.50***	114.51***	116.06	114.78***

*This table reports the results of logit regression estimate using GEE population-average model of the impact of discouraged borrower on NPD. For brevity, we report only the estimates for our key independent variables, discouraged borrower and crowdfunding as well. The dependent variable (NPD) is a binary variable that equals 1 if SME engages in NPD and 0 otherwise. See Table 7 for definition of all the variables. Coefficient estimates are reported with semi-robust standard error in parenthesis below. Firm and year fixed effects are included. Statistically significant level is indicated as ***, **, * the p > 0.01, p > 0.05, and p>0.10 levels respectively.*

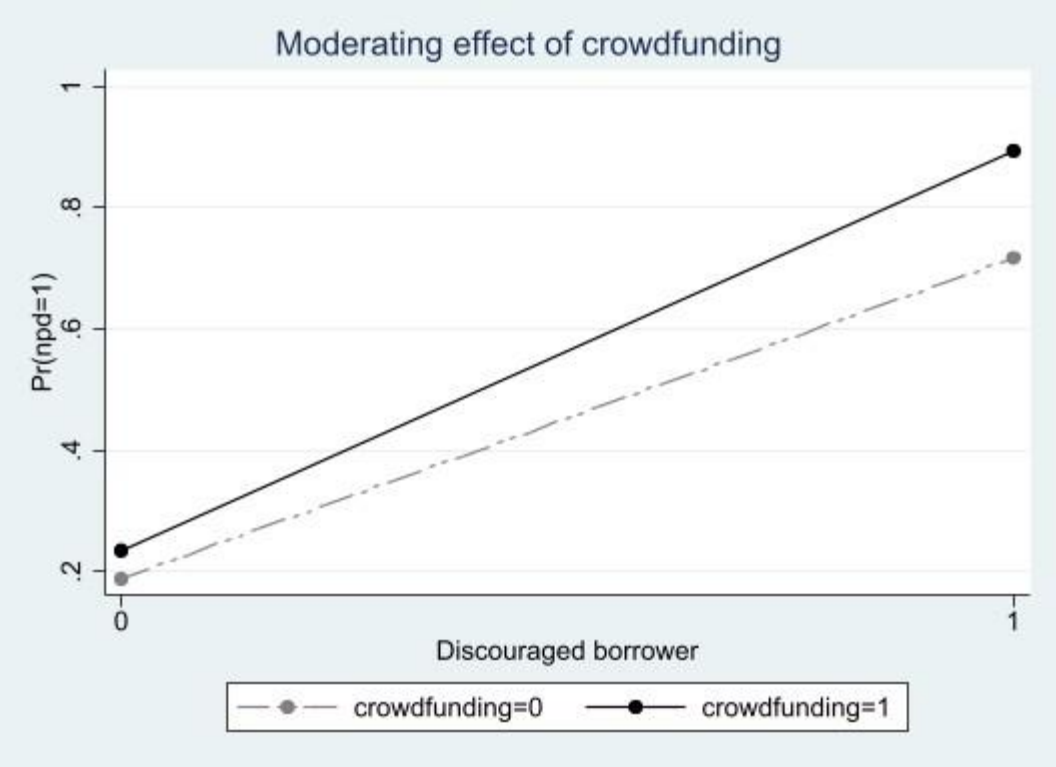

Figure 4: Moderating effect of crowdfunding on the relationship between discouraged borrower and NPD

Chapter 5: Obstacles to Growth and New Product Development of SMEs in the UK

5.1. Overview

Globally, Small and Medium-Sized Enterprises (SMEs) are viewed as an engine of economic growth and a source of equitable development (Riaz & Chaudhry, 2021; Shah et al., 2020). In 2021, the United Kingdom (UK) had 5.58 million private firms, with 99.9% being SMEs with fewer than 250 workers. Due to the significant contribution SMEs offer, Gamidullaeva et al. (2020) posits that SMEs are central to the UK's economy, and their contribution is increasing every year. Despite these significant contributions, SMEs encounter several obstacles that stifle their growth and development, reducing the weight of their potential contributions (Buli, 2017; Edwige, 2021). In dealing with the growth obstacles, prior studies have established that if SMEs are innovative, they are likely to overcome the growth obstacles in order to sustain their businesses. Thus, according to Ferreras-Méndez et al. (2021) innovation is a key catalyst for SMEs' growth and long-term development. Therefore, SMEs may consider investing in innovative activities, including creating a new product, which is one of the significant innovative activities (Ferreras-Méndez et al., 2021).

However, a school of thought argues that when SMEs decide to engage in New Product Development (NPD), they place themselves in a position where they may have to overcome numerous obstacles and challenges. These obstacles provide a valid justification for SMEs to limit their investment and participation in NPD (Oudgou, 2021). Consequently, the SME's ability to introduce a new product or method is reduced. This school of thought further explains that the

presence of innovation barriers is attributable to market or business environment failures as well as specific company characteristics. This is because it is asserted that innovation barriers are associated with particular firm characteristics. Specifically, this school of thought holds that specific firm characteristics correlate with the presence of innovation barriers in those SMEs. These obstacles can be challenging to overcome and have a negative effect not only on their productivity but also on their capacity to translate their innovative efforts into something useful for the firm. This is due to the fact that their productivity and capacity to do so are directly proportional to their degree of innovation (Oudgou, 2021).

In effect, SMEs face obstacles whether they seek to grow or engage in innovative activities, including new NPD. While previous studies focus on the obstacles to NPD (Amara et al., 2016; Strobel & Kratzer, 2017), the vast majority of empirical research examines and analyses the obstacles to the growth of SMEs. However, reviewing the literature, we establish that obstacles to growth are not differentiated from obstacles that affect NPD. We therefore use obstacle to growth and obstacles to innovation interchangeably. To the best of our knowledge, however, there is no study on how obstacles to growth influence new product development in a broader sense.

This paper attempts to fill this gap by examining how growth obstacles influence innovation in SMEs. The ultimate aim is to show how different obstacles affect NPD in the UK. To do so, we group the obstacles into financial and non-financial obstacles (M. R. Sarker et al., 2021) and examine how each impact on NPD. Finally, we examine the overall impact of growth obstacles on NPD.

This study contributes significantly to the literature in the following ways. First, we argue that it is necessary to distinguish between financial and non-financial obstacles in order to analyse the

relationship between NPD engagement and the obstacles faced by the SMEs. While financial obstacles refer to the difficulties in accessing finance, non-financial obstacles refer to factors that are related to the business environment (Oudgou, 2021). In our study financial obstacle is not limited to obtaining finance. We also consider items, such as taxation, VAT, PAYE, National Insurance, and business rate, which directly impact on finances of the firm. This is ignored in the literature and our contribution is that their inclusion will better explain how financial obstacles influence the propensity to engage in NPD. To the best of our knowledge, this is the first time such study is conducted. Second, we provide a comparative analysis of how financial obstacles and non-financial obstacles influence SME's engagement in NPD. The results show a differing relationship between the two forms of growth obstacles and NPD. In our estimates, financial obstacles have a strong positive and significant association with NPD, while non-financial obstacles are negatively associated with new product development. Finally, we provide new evidence of how obstacles to growth impact NPD for the first time in the UK. Overall, this study argues that growth obstacles positively affect NPD.

The theoretical lens for the study is the Resource Base Theory (RBT) and the Shared-Value Theory (SVT). Based on RBT and SVT, the study tries to ascertain how challenges to the resource availability affects the innovative ideas of SMEs and that the success of NPD engagement is a shared responsibility among all stakeholders. We contribute the theory by introducing growth obstacles to the theoretical development of growth obstacles and how they impact on NPD engagement.

The remainder of the study is structured as follows: The second section describes the theory and hypotheses to be tested. The third section describes the dataset and introduces the empirical model.

The empirical analysis results are presented in Section four. The study's conclusion is discussed in this section.

5.2. Theory and hypothesis development

This section discusses the resource-based theory and the theory of shared value which are used in this study, and there after develops the hypothesis.

5.2.1. Resource Based Theory

In product innovation research, the resource-based view (RBT)of the firm has been frequently utilised (Henard & McFadyen, 2012; Kleinschmidt et al., 2007; Olavarrieta & Ellinger, 1997; Serrano-García et al., 2022; Yuesti et al., 2018). From an RBT perspective, successful new product development (NPD) can be attributed to a capability consisting of a collection of firm-controlled resources (Verona, 1999). This capability will enable the firm to differentiate its products from those of its competitors (Barney, 2001) and ultimately achieve superior overall performance (Peteraf & Barney, 2003). Wernerfelt (1984) was the first to develop RBT. He studied the utility of analysing organisations from a resource viewpoint as opposed to a product perspective. RBT emphasises the diverse internal resources and skills that provide competitive advantage and define a company's performance (Barney, 2001). The fundamental unit of analysis for RBT is internal resources, which consist of the physical, human, organisational, financial, commercial, and technological assets utilised by firms to design, manufacture, and deliver products and services to customers (Barney, 2001).

In emerging markets, SMEs with a bigger competitive advantage will be more successful (Makhija, 2003). NPD is one of the main resources of an SME that are difficult to replicate and

replace in order to obtain a competitive advantage. Moreover, investment in product development assists businesses in gaining a competitive advantage by boosting technological expertise, upgrading product quality, enhancing products and processes, and enhancing customer satisfaction. In contrast, an SMEs innovative initiatives are contingent upon its resources and operations. These resources may need financial backing which SMEs mostly find it difficult to raise enough capital to support. This create a major obstacle know in the literature as financial obstacle (Chundakkadan & Sasidharan, 2020). This suggests that though internal resources have interesting association with innovation (Galende & Fuente, 2003), Ayalew & Xianzhi, (2020) have stated that access to finance obstacles have a negative influence on the SMEs' engagement with new product development. Moreover, apart from financial obstacles, several other factors could influence the overall performance of the SMEs and that RBT will help the firm to implement a significant strategy (Barney, 2001) to differentiate their product from their competitors (Peteraf & Barney, 2003). However, following RBT, it is possible to draw the wrong conclusions about the performance of the SMEs by investigating only the association between resources and their performance. It makes it more relevant to examine the obstacles that limits firm growth and how these obstacles affect the innovative activities of the firm.

5.2.2. Creating Shared value (CSV)

Business and society coexist and thrive alongside one another, with the former having a value creating role towards the latter (Goshal & Moran, 1996). This is the portrait of the economic and social development, or at least it used to be before the heightened public awareness of the dangers of human activities for the environment unveiled that businesses may also exert detrimental actions on society. Unresolved steady social problems and the urgency of global challenges such as climate

change, the consequences of which appear to be every day closer, have led to an increasingly large number of individuals paying greater attention to these issues. Clamorous cases of improper business conduct and natural catastrophes associated with poor risk management practices have certainly contributed to spread of the perception that business profits at the expense of society. Given the situation Porter & Kramer (2011) came up with the concept of Creating Shared Value, according to which companies can solve societal problems in profitable ways. Strategic decisions about how to allocate corporate resources are carrying higher level of complexity because nowadays companies are also assessed on how they met social expectations (Waddock & Graves, 1997). The idea behind CSV is to integrate social issues into the capitalistic economic mechanism in order to enlarge benefits for both business and society, thereby enabling the reconciliation of the two separated realms. Porter & Kramer (2011) identified three ways by which companies can create shared value, namely a) reconceiving products and markets, b) rethinking productivity in the value chain, and c) local cluster development. Since its inception, CSV reached the ears of many corporate leaders providing them with lens to see social problems as growth opportunities (Pfitzer et al., 2013). This suggests that SMEs may have to take those growth opportunities to develop new ideas to meet the societal needs. That notwithstanding, if the firm is faced with obstacles, it is likely to impede the capacity to develop new or significantly enhance the existing product to satisfy the demands of the people. Researched into CSV has demonstrated how initiatives might enlarge the total value created for business itself, society, and the environment (Bowe & van der Horst, 2015; Narayan et al., 2012; Schmitt & Renken, 2012; Spitzeck & Chapman, 2012). Therefore, CSV is considered a very useful concept, to guide firms to be innovative and create new products. The study uses CSV concept to investigate how growth obstacle impact on the firm capacity to innovate and engage in product innovation.

5.2.3. New Product Development and Growth Obstacles of SMEs

New product development (NPD) in SMEs covers all stages of introducing a new product or service to market (Tukundane et al., 2020).. The NPD process comprises two parabolic paths: one comprises idea development, product development, and detail engineering, while the other includes market planning and marketing assessment (Tukundane et al., 2020). In today's competitive business environment, the essential aspect that holds the key to the commercial viability is the readiness to initiate and create new products and services in a faster and more cost-effective circumstance, while facing numerous difficulties such as added complexity, globalization interactions, cost reduction, and lowered cycle times (Tukundane et al., 2020).

NPD is pivotal to the survival and growth of most SMEs whenever they are faced with obstacles (Mansor et al., 2016). Moreover, several studies cited a lack of business capital and persistent cash flow as financial obstacles which impede the growth of SMEs and new product development (Gill & Biger, 2012; Islam et al., 2021; M. R. Sarker et al., 2021). Furthermore, some of the grounds for SMEs' poor growth include limited access to finance, lack of database, low R&D expenditures, inadequate sales channels, and low level of financial inclusion (Moreno-Moya & Munuera-Aleman, 2016; Yoshino & Taghizadeh-Hesary, 2016). Additionally, as a result of asymmetric information and agency problems, SMEs and start-ups may have difficulty gaining access to credit which is a major obstacles for SMEs, especially when they want to innovate. This is because they are often under-collateralized, have a short credit history, and may not have the knowledge or resources to create sophisticated financial statements (OECD, 2017)

The theoretical lens for this study is based on two theories, the Resource-Based Theory (RBT) and the Principle of Shared-Value.

According to RBT, a company's performance largely depends on its resources. In particular, competitive advantage emanates from resources that are valuable, rare, unique, and irreplaceable (Barney, 2001). Resources are assets or inputs to production owned and controlled by an organization or having access to them (Peteraf & Barney, 2003). The resources also increase the firm's efficiency or effectiveness and, therefore, its capacity to gain a sustainable competitive advantage or mitigate risks (Barney, 2001; Davis & McCarthy-Byrne, 2022). Meanwhile, key resources of NPD SMEs are generally intangible and developed over time (e.g., culture, reputation, experience, working relationships, etc.), rendering them heterogeneous, comparatively immobile, and not easily tradable (Teece et al., 1997). The main idea behind RBT of the business is that an enterprise is viewed as a pool of resources rather than a single product, and that the resources can be put to several uses (Thongpravati, 2022; Wernerfelt, 1984).

The theory of shared value (SVT), on the other hand, is based on the strong relationship that exists between the enterprise, its employees, and its clients. SVT is built on the assumption that employees and customers are integral parts of an enterprise, and that innovation can only be realized with their active engagement (Porter & Kramer, 2011).

New product development and innovation have been outlined as initiatives that can be used to strengthen a firm's competitive advantage (Brown & Eisenhardt, 1995; Das & Liu, 2022; Daskalakis & Thanou, 2010; Hansen & Pries-Heje, 2022; Olson & Bakke, 2001), improve a business' organizational effectiveness, and enhance a business' ability to grow and expand into new areas (De Brentani, 2001; Han et al., 1998). Notwithstanding earlier corporate approaches that focused on cost reduction and quality improvement, today's firm's competitive advantage in the marketplace is based on its ability to produce and develop new products (OECD, 2017). According to economic research, innovation is integrally related to economic growth,

competitiveness, and job creation (Rametsteiner & Gerhard, 2006). It is consequently critical for SMEs to increase their innovation activities in order to compete in the global market (Stendahl, 2009). It is also important to understand the characteristics of SMEs that are successful in participating in new product development (Bull & Ferguson, 2006).

There are several compelling reasons why SMEs should pay attention to NPD. Because of their labour-intensive nature, SMEs have a stronger potential for employment creation than large corporations (Abor & Quartey, 2010). They are also important for a country's social stability and overall economic health (Khan et al., 2011). In a fast-globalizing world, SMEs have been recognized as a significant participant in the modern economy capable of delivering sustainable livelihoods and dynamism (Rauch, 2014). Growing interest in SMEs corresponds to a new paradigm shift in most countries' development strategies toward a more decentralized approach. SMEs are expected to grow and flourish, according to Han et al. (1998), in order to create jobs for the youth and contribute meaningfully to the rural economy.

The shared-value theory (SVT) establishes a link between a firm's ability to integrate consumers' ideas into the production process and its ability to innovate (Porter & Kramer, 2011). Consumer concerns are at the centre of business operations, and product innovation is facilitated by shared perspectives between businesses and consumers. Consumer suggestions become a useful source of information that may be utilized to launch a new product or make improvements to an existing one. The goal of putting customers at the centre of product design is to meet their wants and needs. As customers have become more diversified and environmentally sensitive enterprises that are attentive to consumer ideas are more likely to produce a diverse selection of products, including those made of environmentally friendly materials. A study reveals that 75% of buyers favour ecologically friendly items, which backs up this assertion (Sarker, 2016). We propose the notion

of "firm-consumer-technology-innovation," in which healthy interactions between "the companies" and "the consumer" led to product innovation, with innovation serving as an enabler for new product development (OECD, 2017).

Prior studies argue that organizations, particularly SMEs may rely on revenues generated by new products to sustain their growth and client base (Sarker et al., 2021). However, there may be some obstacles which previous studies cited financial and non-financial obstacles (Gill & Biger, 2012; Sarker et al., 2021).

The RBT suggests that internal resources especially those of intangible nature are determining factors of NPD and competitive advantage. Thus, the SME may employ organizational designs, human resources management and technology to achieve their competitive advantages. That notwithstanding, finance play key role in SME's decisions in engaging in NPD. Lack of access to finance due to the fact that investment in NPD is intangible, it discourages financial institution to finance such projects (Chundakkadan & Sasidharan, 2020; Wellalage & Locke, 2020). SMEs therefore strive to reduce cost resulted from lack of adequate information and resort to their internal resources to finance their NPD project (Oudgou, 2021). Empirical research has shown that access to finance is their most significant obstacles affecting SMEs that engage in NPD. Meanwhile, literature suggest conflicting effects of financial obstacle on NPD. Some studies have it that SMEs are more innovative when they are faced with financial obstacles (Hussen & Çokgezen, 2020; Song et al., 2015). However, recent empirical studies confirm that the presence of financial constraints considerably reduces the likelihood that a company would participate in innovation (Ayalew & Xianzhi, 2020; Chundakkadan & Sasidharan, 2020). We therefore propose the following hypothesis:

H1: SMEs have higher likelihood of decreasing their engagement in NPD when they encounter financial obstacles.

Aside financial obstacles, several non-financial form of obstacles relevant to SME's engagement in NPD exist (Pellegrino & Savona, 2017) and they create impediment in the implementation process of the NPD ideas (Amara et al., 2016). According to SVT, skill set of employees and active involvement, or relevant activities of stakeholders enhance the performance of NPD. While financial resources are essential, it has been demonstrated in recent years that there are other non-financial obstacles that significantly impede enterprises' engagement in NPD (Chundakkadan & Sasidharan, 2019; Coad et al., 2016). Subsequently, if SMEs face challenges such as recruiting staff with relevant expertise, availability or cost of premises, regulation, and other critical factors needed to promote NPD, it is likely to cause a negative impact on NPD. In other words, non-financial barriers are likely to undermine business confidence and may impede the innovation process (Oudgou, 2021). We therefore predict the following hypotheses:

H2: When SMEs face non-financial obstacle, they are likely to reduce their propensity to engage in NPD.

5.3. Data and Methodology

5.3.1. Small Medium-Size Enterprises (SMEs)

According to Touriki et al. (2022), there is no single or precise description that is universally recognized in defining Small and Medium-size Enterprises (SMEs). Research contends that it is the primary concern in determining what makes a small or medium firm (Delima, 2022a). This business category has been defined differently by different researchers since it is related with

concepts that have various facets. In this case, prior studies use a variety of ways to define SMEs. In terms of size, some studies employ capital assets, while others rely on worker skills and turnover (Ibrahim et al., 2017). Other studies define SME in terms of a firm's legal standing and mode of production (Louis and Macamo, 2011) and number of employees (Lutfi et al., 2022).

However, these metrics will not be applicable to all businesses (Louis and Macamo, 2011). For instance, Abor and Quartey (2010) demonstrate that the use of size to describe the status of an enterprise may not be the same everywhere. They explain that, in some areas all businesses may be considered as small, while in other segments there are conceivably no businesses which are small. The Bolton Committee (1971) developed a statistical and economic definition by applying several conceptions of the small business to different industries (see Hughes, 1997).

According to the economic definition, an enterprise is considered small if it fulfils three requirements: first, it has a small market share; second, it is managed by owners or part owners in a personalized manner, rather than through the medium of a formal and structured organizational hierarchy; and third, it is self-sufficient, in the sense that it is not part of a large venture (Abor & Quartey, 2010). The Working group proposed the following eligibility requirements for the statistical meaning: first, the size of the SME and its effect on the economy, work opportunities, export earnings, and so on; second, the effect to which the small enterprise sector's economic benefit has developed over time; and finally, applying the statistical definition in a cross-country comparison of the small firms' contribution to the economy (Abor & Quartey, 2010).

In summary, the definition of the SMEs is not conclusive in the literature. However, this current study adopts the definition of the Bolton Committee which describes SMEs as firms with less than 250 employees.

5.3.2. Business Growth

Business growth refers to the firm's expansion into larger and sometimes superior services, products, and operations. According to studies, business owners are frequently faced with the difficult decision of whether to grow or not to grow (Delima, 2022). Some businesses may expand inadvertently, which indicates that it was not in the company's goal to grow at that time, but customers may want greater volume, better products, and even lower costs.

Enterprises, on the other hand, may choose to expand freely, which implies they have plans in place to achieve their objectives. Growth to small business might be defined as the capacity to utilize the provided possibilities and be extremely adaptable in order to capitalize on them (Delima, 2022). Companies may overcome a number of obstacles before they can begin to develop, whether monetarily or in terms of physical resources. Growth is strongly associated with profitability rather than loss because with well-controlled growth, businesses expand, new resources are introduced, and the firm progresses from one stage to the next (Islam et al., 2021).

5.3.3. Data

This section of the study elaborates on the design and methods adopted in the study. This empirical study employs secondary data from the Longitudinal Small Business Survey (LSBS) for SMEs which is a thorough national representative survey of UK SMEs. The survey also aims to obtain information on the major obstacles SMEs face in achieving business objectives and growth. Such obstacles of the survey encompass access to finance, taxation, VAT, PAYE, National Insurance, and Business rates, staff recruitment & skills, regulation/red tape, cost of rent, competition, pension, late payment, Brexit, National living wage, and Covid-19. The surveys for the UK nations also contain information on business age, size, ownership, gender, performance, and ethnicity.

To this study, the focus is on UK's four constituent areas being, England, Northern Ireland, Scotland and Wales. These areas were chosen in order to draw a representative sample for the entire United Kingdom. Stratified sampling method was used to collect data on the business environment from business owners and top managers of SMEs. The stratified sampling technique allows for fair representation of each nation, sector, and region.

This data collection was conducted from 2015 to 2020 from selected SMEs. We start with observations in the LSBS dataset and proceed to delete firms that have increased employment to 250 or more. We keep firms only if they have employees less than 250. We limited our sample to SMEs that have at least three years of consecutive data between 2015 and 2020 to control for short panel bias and close most recent data gap. In the analysis of relationship between NPD and the obstacles to growth, we controlled for firm-level and ownership characteristics among SMEs. Dataset was cleaned, coded and imported to STATA for analysis and visualization. Our final sample is composed of unbalanced panel data of 3,276 SMEs which helps to control for the problem of survivorship bias. The relevant variables used for the analysis are defined in Table 16.

5.3.4. Variables

Table 16 presents detail definitions of the various variables used in our model. The study concentrated on New Product Development (NPD) and is used as the dependant variable. With regards to the independent variables, we used financial obstacles and non-financial obstacles. Other variables employed in the model are used as control variables which include family, ethnic minority, female, turnover, profit, size, and age.

[Table 16 about here]

5.3.4.1. New Product Development (NPD)

Previous research has defined product innovation (and for the purposes of this study, NPD) as the creation of a new product or the significant improvement of an existing product (Barasa et al., 2017; Brown et al., 2022; Hashi & Stojčić, 2013; Lee et al., 2015; Lee & Brown, 2017; Medase, 2020; Van Uden et al., 2017). This measure is consistent with the Community Innovation Survey (CIS) and the Oslo Manual (Medase, 2020), where firms responded affirmatively. The NPD data is derived from the LSBS dataset, which is available on the UK data archive's website. This firm-level NPD takes on a value based on the self-reported answers to the following LSBS questions: "Has your business introduced new or significantly improved goods or services in the last 3 years?". The dependent variable is measured by 1 if the SME is engaged in NPD and 0, otherwise (Ayalew & Xianzhi, 2020). Table 17 shows that SMEs that engage in NPD represent 30.3% of the sample.

5.3.4.2. Obstacles to growth

We examine two groups of constraints to firm growth, namely, financial obstacles and non-financial obstacles. These firm-level obstacles were grouped based on the self-reported answers to the question below. *Which of the following would you say are major obstacles to the success of your business in general*? The various answers mentioned as the major obstacles to growth include access to finance, taxation, staff recruitment & skills, regulation and red tape, availability or cost of suitable premises, competition in the market, workplace pension, late payment, UK exit from the EU, National Living wage, and recent coronavirus COVID 19 pandemics.

Financial and non-financial obstacles are self-explanatory variables (D'Souza et al., 2017). However, in addition to obtaining finance, we include taxation, VAT, PAYE, National Insurance, and business rate as part of financial obstacles. We believe that these factors have direct impact on

that finance of the SMEs. The obstacles to growth are measured as dummy variables which take the value of 1 if the SME mentions major obstacles to the success of the business, and 0, otherwise. As reported in Table 17, the financial obstacles represent 28.5% of the sample and non-financial obstacles represent 34.8% of the sample.

5.3.4.3. Control Variables

Following prior studies, several control variables are included in this study to account for factors that could influence NPD. The variables included in the model are ownership orientation (family, ethnic minority, and female), performance (turnover and profit) and firm characteristics (age and size).

In controlling for ownership, we estimated family, ethnic minority, and female. Family is a dummy variable that take the value 1 if members form the same family possess majority share of the SME and 0, otherwise (Brown et al., 2022). Female, a binary, measured by 1 if more than 50% share of the SME is owned by female and zero, otherwise (Gama et al., 2017; Rostamkalaei et al., 2020).

We account for characteristics associated to SME performance. Turnover, profit, and growth are all measured in this regard. In this regard, turnover, profit, and growth were measured. To begin with, turnover is measured by the natural log of turnover of the SME in the past 12 months across all sites. Profit is measured as a dummy variable, taking the value of 1, if the firm recorded profit or surplus in the past year and 0, otherwise (Brown et al., 2022). Growth is a dummy variable measured by 1, if the firm experienced growth in the past year, and 0, otherwise.

To control for firm characteristics, we include firm age and size (Wang et al., 2020). Following previous studies, we measured age by subtracting the year the SME started operation from the survey year's wave (Medase, 2020). Here, year dummy is used and coded as 1 if the SMEs is more

than 20 year and 0, otherwise. Firm size is measured by the total number of employees currently on the firm's payroll across all the locations of the firm excluding owners and partners (Barasa et al., 2017; Gama et al., 2017; Medase, 2020; Mohammadi et al., 2017). Although size may be measured in variety of ways, total employment is used to adjust for endogeneity (Lee & Brown, 2017).

5.3.5. **Summary Statistics**

Table 17 reports the summary statistics of our sample SMEs in the study. The statistics indicate that average 23.4% of SMEs are engaged in NPD with a standard deviation of 0.423. We also observe that 23.7% of the SMEs face financial obstacles while 87.6% experience non-financial obstacles. Family-owned businesses account for 69.9%, and SMEs with female ownership are 18%. Ethnic minority account for 14.5% of our sample. Additionally, the mean value for turnover is 2.0 with a standard deviation is 0.886. In accounting for profit, 82.1% of SMEs generated profit. Average size is 18.69 and 51% of SMEs are more than 20 years in operation. In order to limit the effect of outliers, we winsorised all our variables.

[Table 17 about here]

5.3.6. **Correlation Matrix**

Table 18 presents the correlations among all independent variables that are used in the regression analysis as a rudimentary check for multicollinearity. A correlation of 0.7 or higher in absolute value is usually regarded as an indication of a multicollinearity problem (D'Souza et al., 2017). As shown in the correlation matrix in Table 18, none of the correlation coefficients have an

absolute value of 0.7 or higher, indicating that multicollinearity is not an issue (Gujarati et al., 2012). This makes the dataset reliable for the purposes of the study.

[Table 18 about here]

5.3.7. Model

To test empirically the impact of obstacles to growth to SMEs' new product development, we employ to the following specifications:

$$NPD_{it} = (1,0) \text{ if } NPD_{it} \leq 0; \text{ or } NPD_{it} > 0 \quad (1)$$

$$NPD_{it} = \alpha + \beta DB_{it} + X_{it}b_{it} + \mathcal{E}_{it,}\ \mathcal{E} \sim N(0, \partial^2) \quad (2)$$

where *i* and *t* represent firm and period, respectively. The dependent variable is NDP which denotes new product development of firm *i* in period *t*. The main variables of interest are financial and non-financial obstacles indicating whether the firm *i* is faced with financial obstacles and non-financial obstacles respectively in period *t*. *X* is the vector of the characteristics of the firm *i* in period *t* used as control variables based on extant literature. β and *b* are the parameters that are going to be estimated. $\mathcal{E}_{it}$ denotes time varying firm specific error term.

In eq. 2, the dependent variable (NDP) takes the value of 1 if a given firm *i* in year *t* is involved in NPD and 0, otherwise. The independent variables, financial obstacles and non-financial obstacles are proxied by the dummy variables that take the value of 1 when the firm *i* in year *t* faces financial and non-financial obstacles respectively, and 0 otherwise. The control variables (X) are family, female, ethnic minority, turnover, profit, size, and age, as defined and explained in Table 1. In considering the appropriate econometric method to use, it is seen that, in eq. (2), the dependent

variable is binary (0/1) suggesting a discrete response model. In view of this, the model is estimated using the logit regression model (Ahmed et al., 2020).

5.4. Results and Discussions

Table 19 presents the empirical results of logistic regression estimates. In column 1, we only introduced financial obstacles and non-financial obstacles with year and industry dummies in the model. In column 2 we regress both financial and non-financial obstacles and included the control variables. We also included the year and industry dummies in this model. From the result, the coefficient estimate of financial obstacle is -0.140 and statistically significant at 1%. This negative relation indicates that SMEs the face financial obstacles are likely to reduce their engagement in new product development. The result confirms our predicted hypothesis (H1) and it is consistent with a study previous studies (Hussen & Çokgezen, 2020; Oudgou, 2021; Song et al., 2015).

In estimating the non-financial obstacles, the coefficient estimate is -0.180 and statistically significant indicating a negative relationship with NPD. This empirical result indicates that non-financial obstacles negatively impact on SME's engagement in NPD. This suggests that when SMEs face non-financial obstacles, the probability to engage in new product development decreases. Thus, the result confirms our second predicted hypothesis (H2). Our result is consistent with the findings in previous studies (Mendy & Rahman, 2019; Oudgou, 2021).

For the control variables, our result indicates that family, ethnic minority, female, turnover and age negatively impact on SMEs NPD while firm size positively impacts on SMEs engagement in NPD. Profit has no significant impact on NPD.

[Table 19 about here]

5.5. Endogeneity test: 2SLS Random-Effect Instrument Variable Regression

Some of the independent variables used in the study may be create endogeneity problem. To correct the endogeneity bias, we adopt 2SLS approach with instrumental variable that affects financing problems but does not directly impact on SMEs engagement in NPD. Following previous studies, we use overdraft as our instrumental variable (Oudgou, 2021). According to Grace (2021), to qualify as a valid instrumental variable, a variable must meet two conditions: its relevance and its exogeneity. The first condition assumes a correlation between the instrumental variable and the endogenous variable, whereas the second condition, exogeneity, refers to the absence of a direct relationship with the dependent variable. In this empirical investigation, an overdraft facility is regarded a valid instrumental variable since it is associated with SMEs' access to financing (the first condition) and replaces the extent to which financial institutions are not willing to grant credit to finance innovative activities. In addition, it is challenging to finance an innovative activity whose conclusion is unknown with an overdraft that is granted only to finance very short-term activities (second condition).

Table 20 presents the result of the two-stage least square (2SLS) with instrumental variable, overdraft using xtivreg command. The result shows a significant negative effect of financial and non-financial obstacles on SMEs' NPD and are consistent with our underlining results.

[

Table 20 about here]

5.6. Robustness test

The robustness of the result has been tested using xtprobit estimation. To control for heteroscedasticity and autocorrelation, we used the cluster-robust standard errors. The key result concerning obstacles to growth remains unchanged. In our robustness test, financial obstacle is negatively related to NPD investment and non-financial obstacles also affects NPD investment negatively. It can be observed that the results are robust and fully confirm hypothesis 1 and 2. All the other control variables remains the same sign.

Additionally, we perform logistic regression using the independent major obstacles that affect the success of the SMEs. These obstacles include taxation (comprising of tax, VAT, PAYE, NI, & Business rate), staff recruitment & skill, regulation & red tape, cost of rent, competition, pension, late payment, Brexit, national living wage, and covid-19. This is presented in Table 21. The result show that obstacles related to staff recruitment & skill, regulation & red tape, and cost of rent negatively impact on SMEs' engagement in NPD. Competition and late pay positively impact on SMEs' NPD.

[Table 21 about here]

5.7. Summary

New product development (NPD) forms a major part of business prospects and serves as a driver for employment creation, value development, and overall impact on economic growth. Given the significant contribution of NPD, policymakers are interested in implementing various programs and regulations to encourage firms to be more innovative, develop new products, and expand their businesses. However, in trying to introduce new product or add value to the existing ones to be more competitive and grow, they face series of obstacles. Some of these obstacles affect the future growth of the firm. Against this background, the study aims to provide an empirical perspective of how growth obstacles influence entrepreneurs approach to investing in NPD. To accomplish this aim, we used the dataset from Longitudinal Small Business Survey (LSBS) to draw from a sample of 3276 SMEs across the four nations in the UK.

In analysing the propensity of SMEs to engage in NPD investment, we employ xtlogit model with binary variables to estimate our results. We also use two-stage least squares to control for possible endogeneity that may arise among our variables.

The analysis of the study first targeted at the determinants of the NPD among SMEs in the UK. Arguments from the analysis suggests that the main factors that determine the propensity of the SME to invest in NPD are ownership orientation, firm age, firm size, ethnicity, and turnover. We also identified major obstacles that affect the growth of the businesses in the UK to include access to finance, taxation, staff recruitment & skills, regulation and red tape, availability or cost of suitable premises, competition in the market, workplace pension, late payment, UK exit from the EU, National Living wage, and recent coronavirus COVID 19 pandemics. These obstacles are used to construct the main explanatory variables, financial and non-financial obstacles for the study.

Our results shows that obstacles to growth negatively impact on SMEs' engagement in NPD. We argue when SMEs are faced with financial obstacles, it decreases the propensity of SMEs to engage in NPD. The result demonstrates the relevance of finance when the SME wants to invest in NPD. Therefore, SMEs may need to find appropriate strategies to mitigate the effect of financial obstacles to help the SMEs to meet their innovative needs.

Additionally, our result indicates that when SMEs experience non-financial obstacles, they are less likely to engage in NPD investment. This may be due to lack of qualified or skilled staff, labour regulations, lack of suitable premises, market competition or the wage bill. Finally, we find that family, ethnic minority, female, turnover, age negatively impact on NPD while size positively impact on SMEs' engagement in NPD.

The implication of the study is that management should pay attention to exploring other means of raising funds as access to traditional banking finance may be a challenge for the SMEs to engage in NPD. Moreover, attention needs to be placed on the non-financial obstacles affecting the SMEs growth by devising strategies to mitigate these obstacles and their impact on NPD. They should invest more in staff recruitment and training. Again, the result suggests that participation of ethnic minority in ownership is highly encouraged. Additionally, policymakers should consider growth obstacles in the policy formulation so as to reduce the obstacles and its impact on SMEs' NPD engagement. Finally, policy formulation should be aimed at increasing the overall potential propensity to engage in new product development.

Appendix C

Table 16: Definition of variables

Variable	Definition	Original Source
npd	Dummy variable equal to 1 if SMEs owner or manager answers yes to the question, "during the last three years, did the firm introduce new or significantly improved goods or services"? and 0, otherwise. (LSBS data item 'J1SUM, J1)	LSBS
Financial obstacle	Dummy variable equal to 1 if financial obstacle is the major obstacles to the success of the SME in general, and 0 otherwise. (LSBS data item 'G2')	LSBS
Non-financial obstacle	Dummy variable equal to 1 if non-financial obstacle is the major obstacle to the success of the SME in general, and 0 otherwise. (LSBS data item 'G2')	LSBS
family	Dummy variable equal to 1 if SME is majority owned by members of the same family, and 0 otherwise. (LSBS data item'A12')	LSBS
Ethnic minority	Dummy variable equal to 1 if SME is owned by people from the ethnic minority group, and 0, otherwise. (LSBS data item 'MLED')	LSBS
female	Dummy variable equal to 1 if more than 50% of the SME is owned by women, and 0, otherwise. (LSBS data item 'WLED')	LSBS
turnover	Logarithm of turnover of the SMEs in the past 12 months across all sites. (LSBS data item'P1')	LSBS
profit	Dummy variable equal to 1 if SME generated profit or surplus in the previous year, and 0, otherwise (LSBS data item'P12')	LSBS
Firm size	Total number of employees currently on payroll excluding owners and partners across all sites (0 to 249 employees) (LSBS data item'A2PSS1')	LSBS
Firm age	Dummy variable equal to 1 if SME has been operating for more than 20 years, and 0, otherwise (A6SUM, A6)	LSBS

This table reports the detail definition of the variables used in the study. Source: Author's own elaboration based on the survey by LSBS

Table 17: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NPD	11310	0.234	0.423	0	1
Non-financial	11310	0.876	0.329	0	1
Finance	11310	0.237	0.425	0	1
Family	11310	0.699	0.459	0	1
Ethnic minority	11310	0.145	0.352	0	1
Female	11310	0.180	0.385	0	1
Turnover	11310	2.008	0.886	1	3
Profit	11310	0.821	0.383	0	1
Size	11298	18.693	33.575	0	245
Age	11298	0.510	0.500	0	1

This table reports descriptive statistics of the variables. The full sample consists of 11,310 observations of UK SMEs in 2015-2020 with required data in our regressions. Detail definition of the variables are provided in Table 16. Source: Author's own elaboration based on the survey by LSBS

Table 18: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) NPD	1.000									
(2) Non-financial	0.037	1.000								
(3) Finance	-0.043	0.048	1.000							
(4) Family	-0.037	-0.016	0.006	1.000						
(5) Ethnic minority	-0.012	-0.000	-0.001	-0.349	1.000					
(6) Female	-0.022	-0.000	-0.005	0.181	-0.088	1.000				
(7) Turnover	-0.095	-0.007	0.012	0.034	0.023	-0.004	1.000			
(8) Profit	0.000	0.011	0.012	0.094	-0.100	0.002	-0.075	1.000		
(9) Size	0.055	0.002	-0.004	-0.222	0.081	-0.059	-0.114	0.026	1.000	
(10) Age	-0.033	0.005	0.019	-0.087	0.071	-0.080	0.089	-0.022	0.170	1.000

This table report the correlation estimate of the variables used in the study. Detail definition of the variables are presented in ***Error! Reference source not found.****.***, **, * denote significance at the p > 0.01, p > 0.05, and p>0.10 levels respectively.*

Table 19: Impact of obstacles to growth on new product development

NPD	(1)	(2)
Finance	-0.147***	-0.140***
	(0.034)	(0.035)
Non-financial	-0.178***	-0.180***
	(0.040)	(0.041)
Family		-0.105***
		(0.034)
Ethnic minority		-0.103**
		(0.044)
Female		-0.074*
		(0.039)
Turnover		-0.145***
		(0.016)
Profit		-0.024
		(0.038)
Size		0.002***
		(0.001)
Age		-0.04***
		(0.015)
Observation	11310	11310
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Wald chi2	40.018	181.365

*The table reports the results estimated from the logit regression analysis for obstacles to growth between 2015 to 2020. Obstacles is measured by 1, if the SME faces financial obstacles or non-financial obstacles and 0, otherwise. We report coefficient estimates with related standard errors (in parenthesis). Statistically significant levels are reported as *** p < 0.01, ** p < 0.05, * p < 0.10 respectively.* Source: Author's own elaboration based on the survey by LSBS

Table 20: Endogeneity test: 2SLS Instrumental variable regression

NPD: Second stage	(1)	(2)
Finance	*-0.041***	
	(0.012)	
Non-financial	-	*-0.055***
	-	*(0.012)*
Observation	11310	11310
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Wald chi2	20.380	22.330
R-squared	0.115	0.012
Root MSE	0.398	0.421

*This table reports the estimated result from the two-stage least square (2SLS) instrument variable regressions using xtivreg. Panel 1 report the first stage while panel 2 reports the second stage. Robust standard errors are reported in parentheses. *. **, *** denote the significant levels at 10%, 5%, and 1% respectively*

Table 21: Robustness test

NPD	Coef.
Tax	0.012
	(0.033)
Recruit	-0.051*
	(0.031)
Regulation	-0.110***
	(0.031)
Cost of premise	-0.209***
	(0.039)
Competition	0.286***
	(0.030)
Pension	0.057
	(0.040)
Late pay	0.194***
	(0.031)
Brexit	-0.035
	(0.033)
National Living Wage	0.035
	0.039
Controls	Yes
Observation	11310
Year dummy	Yes
Industry dummy	Yes
Wald chi2	182.333

*This table reports the results of random effect probit regression estimate as a robust test for our results on the impact of growth obstacles on NPD. The dependent variable is a binary variable that equals 1 if SME engages in NPD and 0 otherwise. See Table 16 for definition of all the variables. Coefficient estimates are reported with semi-robust standard error in parenthesis below. Industry and year fixed effects are included. Statistically significant level is indicated as ***, **, * the p > 0.01, p > 0.05, and p>0.10 levels respectively.*

Chapter 6: Conclusion

6.1. Background

The purpose of this research is to investigate borrower discouragement amongst SMEs in the United Kingdom. It also explored the participation of small and medium-sized enterprises (SMEs) in the development of innovative goods even though they are discouraged from borrowing and face growth obstacles. Specifically, the study investigated the link between discouraged borrower and ethnic minority SMEs, discouraged borrower and NPD, and NPD and growth obstacles.

The first empirical essay which investigated the link between discouraged borrowers and ethnic minority SMEs addresses some important issues ignored in testing borrower discouragement among SMEs. One issue has to do with the measurement of discouraged borrowers. Most studies only consider discouragement based on fear of rejection. This study considers SMEs that are discouraged when they are not willing to add on additional risk to determine how this type of discouragement defers from that of fear of rejection. Another issue in examining borrower discouragement is that of possible biases and endogeneity between variables. It could be the case that several factors influence firms' decision to be discouraged. In this case it is important to control these biases and endogeneity. Unfortunately, few studies controls for this. In this study, we controlled for any possible biases and endogeneity with use of PSM and 2SLS which make our results more consistent and robust.

The second empirical essay examines the relationship between discouraged borrower and new product development (NPD) and made several contributions. Firstly, this study is an extension of the study conducted by Brown et al. (2022) and we included crowdfunding for the first time in the

study of borrower discouragement using a the most current dataset from the Longitudinal Small Business Survey (LSBS). Secondly, we examined the moderating effect of crowdfunding on the relationship between discouraged borrowers and NPD after controlling for possible endogeneity issues. This also controlled for alternative sources of finance for discouraged borrowers.

Finally, the third empirical essay investigated the impact of growth obstacles on SMEs new product development. This study also makes some significant contribution to literature. Unlike, previous studies, this study created obstacles from major obstacles that affect the general success of firm instead of just obstacles to innovation. Additionally, while other researchers measured financial obstacles as access to finance, this study included VAT, PAYE, National Insurance and business rate to create the financial obstacle as these items of finance. To obtain consistent results, we use an instrumental variable two-stage least squares (IV2SLS) estimation technique which has the ability to control endogeneity as well as controlling for the problem of heteroscedasticity, multicollinearity, and auto-correlation among the variables (Chanthawong et al., 2016).

6.2. Summary of research methods

This research is empirical in nature and employs a positivist methodology. The sample data was analysed using quantitative techniques. The sample information was obtained from a secondary data from the Longitudinal Small Business Survey (LSBS). The datasets utilised include the most current data available and captures a six-year-round survey from 2015 to 2020. Regression estimates were used for all the analysis which mainly included random effect probit estimation, random effect logistic regression and population average logit regression. Additionally, we tested for endogeneity and biases using propensity score matching (PSM) and instrumental variable two-

staged least squares (IV2SLS). Finally, we tested the robustness of our models using alternative regression estimations.

6.3. Summary of findings

Chapter 3: examines the relationship between discouraged borrowers and ethnic minority SMEs. In order to examine this relationship, random-effect probit estimation was used. To test for multicollinearity, we employed the correlation matrix to estimate the correlations between our variables. In order to control for possible biases and endogeneity, we estimated average treated effect (ATE) of the PSM. Finally, we estimated GEE population average logistic regression to test for the robustness of our results. The sample for the analysis is a panel data of 3,296 SMEs in the UK over the period between 2015 to 2020. After several robust testing, we find that ethnic minority SMEs are not only discouraged from borrowing when they require external finance because of fear of rejection, but also because they are unwilling to take on extra risk. The study shows that the probability of borrower discouragement follows the same dynamics in both models. Our research supports the evidence that being of a minority ethnicity is linked to a higher rate of disappointed loan applicants. For examples Bates & Robb (2016) indicated that SMEs owned by members of ethnic minorities are more likely to face bias when applying for loans. In relation to the control variables, prior studies have demonstrated that discouraged borrowers have a dynamic relationship with other variables in our models. For instance, according to Rostamkalaei et al. (2020), the relationship between firm age and borrower discouragement is inconclusive. While in some studies, researchers find no significant relationship between age and discouragement (Chakravarty & Xiang, 2013; Freel et al., 2012), or positive (Han et al., 2009). However, recent studies show that age have a significantly negative effects on discouraged borrowers (Cole & Sokolyk, 2016;

Cowling et al., 2016; Ferrando et al., 2015). Our study is therefore consistent with the latter and demonstrates that age is adversely related with discouraged borrowers due to rejection anxiety, but this association is not significant when the SME is risk averse. In dealing with firm size, research has shown that, it is a major factor in influencing the likelihood of borrower discouragement, and our finding shows a significantly negative association between firm size discourage borrower. This finding is consistent with previous research (Cole & Sokolyk, 2016; Freel et al., 2012; Han et al., 2009; Rostamkalaei et al., 2020). Our findings also show that although female, export, growth, and family are positively connected to discouraged borrowers, family, industry, turnover, and profit are negatively related to discouraged borrowers.

Chapter 4: examined the relationship between discouraged borrowers and NPD. It also investigated how crowdfunding moderates the impacts of this relationship. In the analysis, we used a panel data of 3,296 SMEs in the UK over the period 2015–2020. The dataset is latest survey by the LSBS which helps to close the recent data gap. We used the random effect probit regression model to estimate our main results. We also employed PSM and IV2SLS to control for possible biases and endogeniety problems between the variables. We finally conducted a robustness test to establish the consistency of our estimates using population average logit regression. The results show a positive association between discouraged borrower and NPD. Our findings show that disappointed borrowers are unlikely to forsake their creative ideas; rather, they may turn to other financing sources, such as crowdfunding. In addition, we suggest that the feasibility of the new product is questionable, and banks are hesitant to invest in such uncertainty, leaving SMBs to self-finance. In addition, we examine, in line with the pecking order theory, a significant alternative source of capital that is available to discouraged SMEs and the effect of this source on their participation in NPD. Crowdfunding is seen as a crucial alternative source of financing in this instance since SMEs

not only request funds but also obtain pertinent input from a variety of specialists. We demonstrate a favourable correlation between crowdfunding and new product development, indicating that small and medium-sized enterprises are likely to utilise crowdfunding platforms to raise money and create a market for their forthcoming items. Our findings give additional evidence of the funding options used by SME innovators. The research concludes that crowdfunding favourably moderates the influence of discouraged borrowers on their involvement in NPD. With borrower disillusionment on the rise, we predict an increase in the use of crowdfunding by SMEs that participate in NPD.

Chapter 5: investigated the relationship between growth obstacles and NPD. To accomplish this aim, we used the dataset from LSBS made up of 3296 SMEs in the UK. In analysing the propensity of SMEs to engage in NPD investment, we employ xtlogit model with binary variables to estimate our results. We also use instrumental variable two-stage least squares (IV2SLS) to control for possible endogeneity that may arise among our variables. Consequently, as a robustness test, we first conducted an alternative estimation using probit regression on our model. We then estimated the major obstacles that affects SMEs' growth to confirm how individual obstacles affect NPD. Our findings suggests that ownership type, firm age, firm size, ethnicity, and turnover are the most important variables in determining whether or not an SME would engage in new product development (NPD). Access to finance, taxation, employee recruitment and skills, regulation, the availability or cost of suitable premises, market competition, workplace pension, late payment, the UK's exit from the European Union, the National Living Wage, and the recent coronavirus COVID 19 pandemics were also identified as major obstacles to the growth of SMEs in the UK. The study's primary explanatory variables, monetary and non-monetary barriers, are based on these challenges. Our findings demonstrate that the participation of SMEs in NPD is adversely affected by growth

constraints. We claim that when SMEs are confronted with financial barriers, their tendency to participate in NPD declines. This shows the importance of finance when an SME wishes to invest in NPD. In order to satisfy their creative demands, SMEs may need to develop solutions to lessen the impact of financial constraints. Additionally, our result shows that SMEs are less likely to invest in NPD when they face non-financial obstacles. That might be because of a shortage of trained workers, stringent government rules, an absence of appropriate facilities, intense market competition, or prohibitive pay costs. Finally, we find that SMEs' participation in NPD is adversely affected by staff recruitment and skills, regulations, and cost of rent while competition and late pay positively impact on SMEs' NPD.

6.4. Contribution of the study

We make several contributions to the existing body of literature in essay 1. First, we introduced a new evidence of borrower discouragement that accounts for the unique circumstances of SMEs that are reluctant to borrow because of the inherent risk involved. Second, the first essay analyses the dynamics of different types of discouragement and their impact on the likelihood that SMEs owned by members of ethnic minorities would seek for a loan. Based on the findings of this research, it is predicted that members of ethnic minorities would be discouraged from applying for loans because either perceive that de their application will be rejected, or they are not willing to increase their business risks or both. Finally, to the best of our knowledge, this is the first such a study is conducted and the result to significant for policy making and opens a research gap for further studies.

Essay 2 also presents a number of ways in which this research adds to the body of knowledge already out there. First, using data from a sample of 3,296 UK SMEs collected between 2015 and

2020, we analyse the impact of crowdfunding on the link between discouraged borrowers and new product development (NPD). In this follow-up to their previous research, Brown et al. (2022) explores the effect that discouraged borrowers have on innovation and discovered that product innovators are more likely to be discouraged from seeking external finance. But there is still a shortage of information in the literature on the financing choices of discouraged borrowers. Crowdfunding as an alternative source of financing Sewaid et al. (2021) for discouraged borrowers is a new area of research, and ours complements the work of Brown et al. (2022) and the growing body of literature on this topic. Crowdfunding platforms are used by small and medium-sized enterprises (SMEs) to invest in new product development (NPD), which helps to close the financial gap faced by innovative SMEs (Hervé & Schwienbacher, 2018). Second, our research sheds light on how crowdfunding mitigates borrower discouragement among SMEs and their ongoing investment in new product development. Our research provides new evidence of discouraged borrowers, helping us comprehend the reasons small and SMEs choose to use alternative financing methods for new product development initiatives. In other words, when SMEs turn to crowdfunding as a funding mechanism, they are more likely to increase their investment in new product development (NPD), as our findings show that crowdfunding positively moderates the association between discouraged borrowers and NPD. This is the first research of its kind as far as we are aware. Third, we utilised the most current dataset from the LSBS, which extends their survey to 2020, expanding upon the work of Brown et al. (2022), and we applied stringent selection criteria for our sample, including only SMEs that participated in at least three consecutive years of the six-year survey. This strategy, in our view, helps to monitor the SME's dynamics in order to maintain a consistent panel distribution. And last, this study contributes to the expansion of pecking order theory by including the moderating influence of financing sources on the growth

strategies of SMEs. The findings of this research show that practitioners should account for the impact of financing sources on the link between borrower discouragement and NPD and the use of crowdfunding platforms when analysing the impact of these platforms for discouraged borrowers. In particular, our result demonstrate that crowdfunding encourages hitherto discouraged SMEs to participate in NPD. Consequently, the pecking order theory serves as a theoretical lens for this research, helping to clarify the connection between the SME and the bank in terms of information sharing. According to the pecking order theory, SMEs have to take a hierarchical approach to choosing their finance sources due to the prevalence of information asymmetry (Serrasqueiro & Caetano, 2015). The purpose of this research is to test this notion by analysing how choosing a non-traditional external source of financing affects NPD. Therefore, the results of this research will contribute to the growing body of literature on the topic of how borrower discouragement affects the creation of new products.

Finally, in essay 3, the following are some of the many ways in which this study contributes to literature. First, the previous studies considered only obstacle that only affect innovation. However, this study considered the major obstacles that affect the general success of the SMEs to determine how they impact on NPD. Second, as previous studies considered only access to finance to be the financial obstacles, we created our financial obstacle variable from any obstacle that directly affect the finance of the firm. Here our financial obstacle included access to finance and the tax components such as VAT, PAYE, National Insurance, and the business rate. This is neglected in the literature, and our original contribution is to include it in order to clarify the impact of economic constraints on the tendency to participate in NPD. This is the first research of its kind as far as we are aware. Second, we examine the relative importance of financial and non-financial obstacles on SMEs new product development. We find that both financial and non-financial

obstacles have significantly negative relationships with NPD. This suggest that obstacles that affect the growth of the SMEs are more likely to have a negative impact SMEs engagement in NPD. Addition, the major growth obstacles that negatively impact on SMEs' participation in NPD are staff recruitment and skills, regulations, and cost of rent while competition and late pay have positive impact. Finally, the resource-based theory (RBT) and the shared-value theory (SVT) serve as the theoretical frameworks for this investigation (SVT). We contribute to the theory by introducing growth obstacles and how they impact NPD engagement.

6.5. Implication of the study

The implications of the study are as follows. First, there is strong evidence to imply that financing is the driving force behind any SME's efforts to expand while also covering its operating investment costs. Therefore, SMEs must have access to both internal and external sources of financing. Additionally, growth and the subsequent requirement for further enhancement of firm's operations need growth in the strength of additional financing. This means that as long as there are discouraged borrowers, future growth and development may be hampered (Mac an Bhaird et al., 2016). In the long term, new data shows that SMEs will likely suffer worse consequences. Using data from a European Central Bank study on business financing, Ferrando & Mulie (2022) found that investment growth was 4.7% lower for discouraged borrowers on average compared to their non-discouraged counterparts. (Cowling et al. (2016) indicate that around 55% of discouraged borrowers would have gotten their requests if they had applied. More than 33% of would-be borrowers who were discouraged by (Cole & Sokolyk, 2016)'s findings would have been approved for a loan if they had applied for one. Once again, if borrowers get discouraged it might slow investment expansion. Reportedly, a drop in investment growth of £1.5 billion in the UK economy

has affected job creation, led to a drop in economic growth, reduced profit margin for banks, and lowered return on investment for company owners Cowling et al. (2016). Borrower discouragement therefore poses a potential threat to the SME sector, according to recent studies (Brown et al., 2018). The effects on SMEs may be perilously long-lasting (Mac an Bhaird et al., 2016), with the associated effects of impeding the investment of business owners and the expansion of businesses. Therefore, policymakers should take borrower discouragement into account while formulating regulations, paying special attention to the financing policies for ethnic minorities.

Taken from the second essay, our results suggest that managers of SMEs may benefit from using crowdfunding platforms to raise capital for business expansion and development. Moreover, the results demonstrate the positive effect crowdfunding platforms have on NPD, a feature that should be prioritised by managers when evaluating the platform's prospective consequences. Further, the owners and managers of SMEs might take steps to eliminate information asymmetry by sharing relevant information needed to get finance, hence addressing trust issues with the management of financial institutions. Finally, the results lend validity to government efforts to increase borrower engagement and decrease financial barriers for SMEs that are eager to engage in NPD. Specifically, the British Business Bank developed the Demand Development Unit to promote and support SMEs in securing the best financing possible. It is probable that crowdfunding will need to be taken into account when enacting policies to help NPD SMEs, since this study suggests that governments may have to create favourable atmosphere to support widespread crowding platforms. Those SMEs who have been feeling discouraged about seeking external financing may be encouraged to apply for finance.

Finally, in essay 3, the study suggests that since SMEs may have difficulty gaining access to conventional banking funding for NPD, management should prioritise investigating other forms of generating funding. In addition, non-financial obstacles to SMEs' development should be given attention, and solutions should be developed to lessen the effect of these obstacles on NPD. They need to put more resources into hiring and training new employees. Once again, this finding is extremely supportive of minority ownership involvement. Furthermore, growth barriers should be taken into account by policymakers during policy formation in order to lessen the influence of these barriers on NPD participation by SMEs. As a final point, policymaking efforts should seek to boost owners and manager's underlying enthusiasm for developing innovative products.

6.6. Limitation of the study

The study has some limitations. First, did not consider other alternative financing options for SMEs owned by members of ethnic minorities who may be discouraged from using more conventional loan providers. There is strong evidence to imply that financing is the driving force behind any business's efforts to expand and cover its operational investment costs. Therefore, this study could have captured others such as both internal and external sources of funding.

Secondly this study sort to determine how borrower discouragement influences NPD. It also looked at how crowdfunding moderate the relation as a control for other sources of finance. However, it he overall performance of the firm as a result the SME being discouraged could have been considered.

6.7. Areas for future research

As with other research, this study has limitations. First, the study has related to discouragement among ethnic minorities in the UK. However, the issues of ethnic minorities hovers around the whole of Europe. Thus, it would be interesting to examine and compare the relationship between discouraged borrowers and ethnic minorities across Europe to establish the dynamics of this relationship.

Finally, discouraged borrowers may not always have to resort to crowdfunding as a last resort when looking for funds to support their NPD project. This suggests that the association between discouraged borrowers and NPD may be moderated by the presence of other sources of finance, which may be examined in future studies. Second, it would be worthwhile to explore the potential moderating role of other factors including venture capital, equity financing, and peer-to-peer lending. Finally, our study considered the alternative form of financing discouraged borrowers as a moderating variable. Nonetheless, future study could use financial technology to moderate effect of discouraged borrowers on SMEs NPD.

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